Identification Guide to the Australian Odonata

Department of
Environment, Climate Change and Water NSW

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Prepared by:
Gunther Theischinger, Waters and Catchments Science, Department of Environment, Climate Change and Water NSW and Ian Endersby, 56 Looker Road, Montmorency, Victoria 3094

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Department of Environment, Climate Change and Water NSW
59–61 Goulburn Street Sydney
PO Box A290 Sydney South 1232
Phone: (02) 9995 5000 (switchboard)
Phone: 131555 (information & publication requests)
Fax: (02) 9995 5999
Email: info@environment.nsw.gov.au
Website: www.environment.nsw.gov.au

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About this guide

Identification Guide to the Australian Odonata (dragonflies) includes 325 described species in 110 recognised genera. This publication provides keys to the identification of the adults of all Australian species and to the larvae as far as known and diagnosable. In order to facilitate identifications, and to increase confidence, particularly in the identification of some larvae, detailed distribution maps of all species are included. Finally, profiles are given for species of serious conservation concern.

How to use this guide

Run the key, couplet by couplet, until you end up with a species name. If you come to a family group name (mostly) go to the key of that family and continue until you get to a species name. For identifying some species it is essential to consult the distribution maps; in other cases it is beneficial to consult them in order to increase the confidence in the result.

The keys to the larvae are based on characters of late instars. Some characters may vary with growth of the larvae and with the geographical, ecological and possibly other situations of their habitat. Even final instar larvae of some species, and even a few genera, cannot be distinguished. Therefore in some cases the best result may be to identify a family, a genus or a complex of more than one species.

Particularly when larvae of closely related species are identified, or species similar to species whose larvae remain undescribed, all their distribution maps should be consulted. In order to facilitate this, the maps are arranged in alphabetical order of genus and species names.

Abbreviations

pers. comm.	personal communication
TSC Act	*Threatened Species Conservation Act 1995*

1 Introduction

The dragonfly now known as *Neurothemis stigmatizans* was the first species described from Australia. Fabricius (1775) named it from specimens in the Banks Collection that were gathered at the Endeavour River on Cape York Peninsula. Four more species were described in the 18th century, and 97 in the 19th century, mainly by European odonatists, particularly Burmeister, Rambur, Brauer, Kirby, Martin, Sjöstedt and most notably Selys.

Their work continued into the 20th century but was overshadowed by R.J. Tillyard, Australia's first resident odonatist who, between 1906 and 1926, named approximately 110 species. After Tillyard, only Lieftinck (between 1933 and 1952) and Fraser (between 1948 and 1960) made significant contributions. Their work was followed by J.A.L. Watson (between 1958 and 1993) and G. Theischinger (from 1974 and current) who, often in cooperation with each other and sometimes with A.F. O'Farrell and a few others, described more than 90 species. This has taken the number of Australian dragonfly species to the presently recognised total of 325.

However, there was no attempt to key the adults of all known Australian species until Fraser (1960). Watson et al. (1991) presented an updated and more elaborate version of Fraser's key, but this guide was out of print before 2000. The first reasonably comprehensive key to the larvae of Australian dragonflies came from Hawking & Theischinger (1999) even if only for the New South Wales fauna. Theischinger (1999, 2000b, 2001a, 2002) covered the known larvae of the Epiproctophora, now Epiprocta (Anisoptera), for all of Australia. The comprehensive field guide of Theischinger & Hawking (2006) included keys for both adults and larvae of the Australian dragonflies but only for identification to generic level.

Since about 2006 (when the Theischinger & Hawking field guide was published) there has been growing demand for specific identification of Australian dragonflies. This increase in demand is possibly due to the publication of the 2006 guide, the rise of digital photography (for which dragonfly adults have become attractive objects) and university studies on global warming and climate change in which dragonfly species and their changing distributions are used as indicators. Biodiversity projects, conservation issues and river health programs have also increased the demand for specific identifications of both adults and, particularly, larvae. These uses highlight the difficulty of distinguishing the larvae of several Australian odonate genera, the fact that the larvae of a considerable number of species cannot be identified at present, and that collecting of some adults may have to complement the collection of larvae in future.

This publication fulfils the need for updated, specific keys to the adults of all known Australian dragonfly species and to the species of larvae as far as known. The keys are made more useful by also presenting, for the first time, detailed distribution maps of all species accompanied by information on their wetland habitats. Finally, some information is presented on Australian species of particular conservation concern.

2 Systematics

Up until the early 1980s dragonfly phylogeny and systematics were rather strictly based on the assumed strength of morphological characters. From then onwards a few authors such as Carle (1982) began to determine character weights based on character polarity determined from outgroups similar to the phylogenetic systematic methods of Hennig (1966, 1969). Only since 2002 – when molecular studies have been used and often combined with morphological analyses and based on increasingly more reliable approaches – have study results become more accepted as having basically resolved the phylogeny of the order Odonata.

The following suggested changes to the system accepted and used by Theischinger & Hawking (2006), largely following Bechly (1996), are significant for the Australian odonata:

1) to combine (under Austropetaliidae) Austropetaliidae and Archipetaliidae (Carle 1996)
2) to combine (under Synlestidae) Synlestidae and Chorismagrionidae (Carle 2007 pers. comm., Bybee et al. 2008)
3) to combine (under Lestoideidae) Lestoideidae and Diphlebiidae (Carle et al. 2008, Bybee et al. 2008, van Tol 2008 pers. comm.)
4) to include *Nososticta* (from Protoneuridae) in the subfamily Disparoneurinae of Platycnemididae (Carle et al. 2008)
5) to include *Dendroaeschna* (from Telephlebiidae) in Brachytronidae (Peters & Theischinger 2007)
6) to return Hemicorduliidae into a restricted Corduliidae (Ware et al. 2007)
7) to return Urothemistidae (as one of possibly eight subfamilies) into a slightly extended Libellulidae (Ware et al. 2007)
8) to integrate (with varying rank and some combining) Synthemistidae, Gomphomacromiidae, Pseudocorduliidae, Cordulephyidae, Austrocorduliidae and Oxygastridae, together with a few non-Australian genera, into a newly established clade GSI, possibly the single and greatly-to-be-extended family Synthemistidae (Ware et al. 2007; Carle, May, and Ware pers. comm.).

In this publication we accept the suggestions 1), 4), 5), 6) and 7) and the taxa listed under 3) and 8) as monophyletic groups. However, for the present, and without guarantee of taxonomic stability, we retain the family-level separation of the latter groups – except for Oxygastridae whose combination with Austrocorduliidae we support. These are not only morphologically, ecologically and ethologically very distinct, giving them indicator and predictive value, but more importantly, they emerge as monophyletic units in the respective studies, not all their genera have yet been studied, and more in-depth analyses are still in progress.

The family group taxa are treated in the following order:

Suborder Zygoptera

- Lestidae
- Hemiphlebiidae
- Chorismagrionidae
- Synlestidae
- Megapodagrionidae
- Chlorocyphidae
- Calopterygidae
- Lestoideidae
- Diphlebiidae
- Isostictidae
- Platycnemididae: Disparoneurinae
- Coenagrionidae

Suborder Epiprocta, infraorder Anisoptera

- Austropetaliidae
- Aeshnidae
- Brachytronidae
- Telephlebiidae
- Lindeniidae
- Gomphidae
- Petaluridae
- Synthemistidae
- Gomphomacromiidae
- Pseudocorduliidae
- Cordulephyidae
- Austrocorduliidae
- Macromiidae
- Corduliidae
- Libellulidae

The slightly senior name Epiprocta is used for suborder Epiproctophora; all Australian Epiprocta belong in the infraorder Anisoptera.

3 Checklist of species

Order Odonata

Suborder Zygoptera

Family Lestidae

Austrolestes aleison Watson & Moulds, 1979
Austrolestes analis (Rambur, 1842)
Austrolestes annulosus (Selys, 1862)
Austrolestes aridus (Tillyard, 1908)
Austrolestes cingulatus (Burmeister, 1839)
Austrolestes insularis Tillyard, 1913
Austrolestes io (Selys, 1862)
Austrolestes leda (Selys, 1862)
Austrolestes minjerriba Watson, 1979
Austrolestes psyche (Hagen, 1862)
Indolestes alleni (Tillyard, 1913)
Indolestes obiri Watson, 1979
Indolestes tenuissimus (Tillyard, 1906)
Lestes concinnus Hagen, 1862

Family Hemiphlebiidae

Hemiphlebia mirabilis Selys, 1869

Family Chorismagrionidae

Chorismagrion risi Morton, 1914

Family Synlestidae

Episynlestes albicauda (Tillyard, 1913)
Episynlestes cristatus Watson & Moulds, 1977
Episynlestes intermedius Theischinger & Watson, 1985
Synlestes selysi Tillyard, 1917
Synlestes tropicus Tillyard, 1917
Synlestes weyersii Selys, 1869

Family Megapodagrionidae

Archiargiolestes parvulus (Watson, 1977)
Archiargiolestes pusillissimus Kennedy, 1925
Archiargiolestes pusillus (Tillyard, 1908)
Austroargiolestes alpinus (Tillyard, 1913)
Austroargiolestes amabilis (Förster, 1899)
Austroargiolestes aureus (Tillyard, 1906)
Austroargiolestes brookhousei Theischinger & O'Farrell, 1986
Austroargiolestes calcaris (Fraser, 1958)
Austroargiolestes christine Theischinger & O'Farrell, 1986
Austroargiolestes chrysoides (Tillyard, 1913)
Austroargiolestes elke Theischinger & O'Farrell, 1986
Austroargiolestes icteromelas (Selys, 1862)
Austroargiolestes isabellae Theischinger & O'Farrell, 1986
Griseargiolestes albescens (Tillyard, 1913)
Griseargiolestes bucki Theischinger, 1998
Griseargiolestes eboracus (Tillyard, 1913)
Griseargiolestes fontanus (Tillyard, 1913)

Griseargiolestes griseus (Hagen, 1862)
Griseargiolestes intermedius (Tillyard, 1913)
Griseargiolestes metallicus (Sjöstedt, 1917)
Miniargiolestes minimus (Tillyard, 1908)
Podopteryx selysi (Förster, 1899)

Family Chlorocyphidae

Rhinocypha tincta semitincta Selys, 1869

Family Calopterygidae

Neurobasis australis Selys, 1897

Family Lestoideidae

Lestoidea barbarae Watson, 1967
Lestoidea brevicauda Theischinger, 1996
Lestoidea conjuncta Tillyard, 1913
Lestoidea lewisiana Theischinger, 1996

Family Diphlebiidae

Diphlebia coerulescens Tillyard, 1913
Diphlebia euphoeoides Tillyard, 1907
Diphlebia hybridoides Tillyard, 1912
Diphlebia lestoides (Selys, 1853)
Diphlebia nymphoides Tillyard, 1912

Family Isostictidae

Austrosticta fieldi Tillyard, 1908
Austrosticta frater Theischinger, 1997
Austrosticta soror Sjöstedt, 1917
Eurysticta coolawanyah Watson, 1969
Eurysticta coomalie Watson, 1991
Eurysticta kununurra Watson, 1991
Eurysticta reevesi Theischinger, 2001
Labidiosticta vallisi (Fraser, 1955)
Lithosticta macra Watson, 1991
Neosticta canescens Tillyard, 1913
Neosticta fraseri Watson, 1991
Neosticta silvarum (Sjöstedt, 1917)
Oristicta filicicola Tillyard, 1913
Rhadinosticta banksi (Tillyard, 1913)
Rhadinosticta simplex (Martin, 1901)

Family Platycnemidae: Disparoneurinae

Nososticta baroalba Watson & Theischinger, 1984
Nososticta coelestina (Tillyard, 1906)
Nososticta fraterna (Lieftinck, 1933)
Nososticta kalumburu Watson & Theischinger, 1984
Nososticta koolpinyah Watson & Theischinger, 1984
Nososticta koongarra Watson & Theischinger, 1984
Nososticta liveringa Watson & Theischinger, 1984
Nososticta mouldsi Theischinger, 2000
Nososticta pilbara Watson, 1969
Nososticta solida (Hagen, 1860)
Nososticta solitaria (Tillyard, 1906)
Nososticta taracumbi Watson & Theischinger, 1984

Family Coenagrionidae

Aciagrion fragile (Tillyard, 1906)
Agriocnemis argentea Tillyard, 1906
Agriocnemis dobsoni Fraser, 1954
Agriocnemis femina (Brauer, 1868)
Agriocnemis kunjina Watson, 1969
Agriocnemis pygmaea (Rambur, 1842)
Agriocnemis rubricauda Tillyard, 1913
Agriocnemis thoracalis Sjöstedt, 1917 [status uncertain]
Archibasis mimetes (Tillyard, 1913)
Argiocnemis rubescens Selys, 1877
Austroagrion cyane (Selys, 1876)
Austroagrion exclamationis Campion, 1915
Austroagrion pindrina Watson, 1969
Austroagrion watsoni Lieftinck, 1982
Austrocnemis maccullochi (Tillyard, 1926)
Austrocnemis obscura Theischinger & Watson, 1991
Austrocnemis splendida (Martin, 1901)
Caliagrion billinghursti (Martin, 1901)
Ceriagrion aeruginosum (Brauer, 1869)
Coenagrion lyelli (Tillyard, 1913)
Ischnura aurora (Brauer, 1865)
Ischnura heterosticta (Burmeister, 1839)
Ischnura pruinescens (Tillyard, 1906)
Pseudagrion aureofrons Tillyard, 1906
Pseudagrion cingillum (Brauer, 1869)
Pseudagrion ignifer Tillyard, 1906
Pseudagrion jedda Watson & Theischinger, 1991
Pseudagrion lucifer Theischinger, 1997
Pseudagrion microcephalum (Rambur, 1842)
Teinobasis rufithorax (Selys, 1877)
Xanthagrion erythroneurum (Selys, 1876)

Suborder Epiprocta

Infraorder Anisoptera

Family Austropetaliidae

Archipetalia auriculata Tillyard, 1917
Austropetalia patricia (Tillyard, 1910)
Austropetalia tonyana Theischinger, 1995

Family Aeshnidae

Adversaeschna brevistyla (Rambur, 1842)
Agyrtacantha dirupta (Karsch, 1889)
Anaciaeschna jaspidea (Burmeister, 1839)
Anax georgius Selys, 1872
Anax gibbosulus Rambur, 1842
Anax guttatus (Burmeister, 1839)
Anax papuensis (Burmeister, 1839)
Austrogynacantha heterogena Tillyard, 1908
Gynacantha dobsoni Fraser, 1951
Gynacantha kirbyi Krüger, 1898

Gynacantha mocsaryi Förster, 1898
Gynacantha nourlangie Theischinger & Watson, 1991
Gynacantha rosenbergi Kaup, 1867

Family Brachytronidae

Dendroaeschna conspersa (Tillyard, 1907)

Family Telephlebiidae

Acanthaeschna victoria Martin, 1901
Antipodophlebia asthenes (Tillyard, 1916)
Austroaeschna (Austroaeschna) anacantha Tillyard, 1908
Austroaeschna(Austroaeschna) atrata Martin, 1901
Austroaeschna (Austroaeschna) christine Theischinger, 1993
Austroaeschna (Austroaeschna) cooloola Theischinger, 1991
Austroaeschna (Austroaeschna) flavomaculata Tillyard, 1916
Austroaeschna (Austroaeschna) hardyi Tillyard 1907
Austroaeschna (Austroaeschna) inermis Martin, 1901
Austroaeschna (Austroaeschna) ingrid, Theischinger, 2008
Austroaeschna (Austroaeschna) multipunctata (Martin, 1901)
Austroaeschna (Austroaeschna) obscura Theischinger, 1982
Austroaeschna (Austroaeschna) parvistigma (Selys, 1883)
Austroaeschna (Austroaeschna) pinheyi Theischinger, 2001
Austroaeschna (Austroaeschna) sigma Theischinger, 1982
Austroaeschna (Austroaeschna) speciosa Sjöstedt, 1917
Austroaeschna (Austroaeschna) subapicalis Theischinger, 1982
Austroaeschna (Austroaeschna) tasmanica Tillyard, 1916
Austroaeschna (Austroaeschna) unicornis (Martin, 1901)
Austroaeschna (Pulchaeschna) eungella Theischinger, 1993
Austroaeschna (Pulchaeschna) muelleri Theischinger, 1982
Austroaeschna (Pulchaeschna) pulchra Tillyard, 1909
Austrophlebia costalis (Tillyard, 1907)
Austrophlebia subcostalis Theischinger, 1996
Dromaeschna forcipata (Tillyard, 1907)
Dromaeschna weiskei (Förster, 1908)
Notoaeschna geminata Theischinger, 1982
Notoaeschna sagittata (Martin, 1901)
Spinaeschna tripunctata (Martin, 1901)
Spinaeschna watsoni Theischinger, 1982
Telephlebia brevicauda Tillyard, 1916
Telephlebia cyclops Tillyard, 1916
Telephlebia godeffroyi Selys, 1883
Telephlebia tillyardi Campion, 1916
Telephlebia tryoni Tillyard, 1917
Telephlebia undia Theischinger, 1985

Family Lindeniidae

Ictinogomphus australis (Selys, 1873)
Ictinogomphus dobsoni (Watson, 1969)
Ictinogomphus paulini Watson, 1991

Family Gomphidae

Antipodogomphus acolythus (Martin, 1901)
Antipodogomphus dentosus Watson, 1991
Antipodogomphus edentulus Watson, 1991

Antipodogomphus hodgkini Watson, 1969
Antipodogomphus neophytus Fraser, 1958
Antipodogomphus proselythus (Martin, 1901)
Armagomphus armiger (Tillyard, 1913)
Austroepigomphus (*Austroepigomphus*) *praeruptus* (Selys, 1857)
Austroepigomphus (*Xerogomphus*) *gordoni* (Watson, 1962)
Austroepigomphus (*Xerogomphus*) *turneri* (Martin, 1901)
Austrogomphus (*Austrogomphus*) *angelorum* Tillyard, 1913
Austrogomphus (*Austrogomphus*) *arbustorum* Tillyard, 1906
Austrogomphus (*Austrogomphus*) *australis* Dale, 1854
Austrogomphus (*Austrogomphus*) *collaris* Hagen, 1854
Austrogomphus (*Austrogomphus*) *cornutus* Watson, 1991
Austrogomphus (*Austrogomphus*) *doddi* Tillyard, 1909
Austrogomphus (*Austrogomphus*) *guerini* (Rambur, 1842)
Austrogomphus (*Austrogomphus*) *mjobergi* Sjöstedt, 1917
Austrogomphus (*Austrogomphus*) *mouldsorum* Theischinger, 1999
Austrogomphus (*Austrogomphus*) *ochraceus* (Selys, 1869)
Austrogomphus (*Austrogomphus*) *pusillus* Sjöstedt, 1917
Austrogomphus (*Pleiogomphus*) *amphiclitus* (Selys, 1873)
Austrogomphus (*Pleiogomphus*) *bifurcatus* Tillyard, 1909
Austrogomphus (*Pleiogomphus*) *divaricatus* Watson, 1991
Austrogomphus (*Pleiogomphus*) *prasinus* Tillyard, 1906
Hemigomphus atratus Watson, 1991
Hemigomphus comitatus (Tillyard, 1909)
Hemigomphus cooloola Watson, 1991
Hemigomphus gouldii (Selys, 1854)
Hemigomphus heteroclytus Selys, 1854
Hemigomphus magela Watson, 1991
Hemigomphus theischingeri Watson, 1991
Odontogomphus donnellyi Watson, 1991
Zephyrogomphus lateralis (Selys, 1873)
Zephyrogomphus longipositor (Watson, 1991)

Family Petaluridae

Petalura gigantea Leach, 1815
Petalura hesperia Watson, 1958
Petalura ingentissima Tillyard, 1908
Petalura litorea Theischinger, 1999
Petalura pulcherrima Tillyard, 1913

Family Synthemistidae

Archaeosynthemis leachii (Selys, 1871)
Archaeosynthemis occidentalis (Tillyard, 1910)
Archaeosynthemis orientalis (Tillyard, 1910)
Archaeosynthemis spiniger (Tillyard, 1913)
Austrosynthemis·cyanitincta (Tillyard, 1908)
Choristhemis flavoterminata (Martin, 1901)
Choristhemis olivei (Tillyard, 1909)
Eusynthemis aurolineata (Tillyard, 1913)
Eusynthemis barbarae (Moulds, 1985)
Eusynthemis brevistyla (Selys, 1871)
Eusynthemis deniseae Theischinger, 1977
Eusynthemis guttata (Selys, 1871)

Eusynthemis netta Theischinger, 1999
Eusynthemis nigra (Tillyard, 1906)
Eusynthemis rentziana Theischinger, 1998
Eusynthemis tenera Theischinger, 1995
Eusynthemis tillyardi Theischinger, 1995
Eusynthemis ursa Theischinger, 1999
Eusynthemis ursula Theischinger, 1998
Eusynthemis virgula (Selys, 1874)
Parasynthemis regina (Selys, 1874)
Synthemiopsis gomphomacromioides Tillyard, 1917
Synthemis eustalacta (Burmeister, 1839)
Synthemis tasmanica Tillyard, 1910
Tonyosynthemis claviculata (Tillyard, 1909)
Tonyosynthemis ofarrelli (Theischinger & Watson, 1986)

Family Gomphomacromiidae

Archaeophya adamsi Fraser, 1959
Archaeophya magnifica Theischinger & Watson, 1978

Family Pseudocorduliidae

Pseudocordulia circularis Tillyard, 1909
Pseudocordulia elliptica Tillyard, 1913

Family Cordulephyidae

Cordulephya bidens Sjöstedt, 1917
Cordulephya divergens Tillyard, 1917
Cordulephya montana Tillyard, 1911
Cordulephya pygmaea Selys, 1870

Family Austrocorduliidae

Apocordulia macrops Watson, 1980
Austrocordulia leonardi Theischinger, 1973
Austrocordulia refracta Tillyard, 1909
Austrocordulia territoria Theischinger & Watson, 1978
Austrophya mystica Tillyard, 1909
Hesperocordulia berthoudi Tillyard, 1911
Lathrocordulia garrisoni Theischinger & Watson, 1978
Lathrocordulia metallica Tillyard, 1911
Micromidia·atrifrons (McLachlan, 1883)
Micromidia convergens Theischinger & Watson, 1978
Micromidia rodericki Fraser, 1959

Family Macromiidae

Macromia tillyardi Martin, 1906
Macromia viridescens Tillyard, 1911

Family Corduliidae

Hemicordulia australiae (Rambur, 1842)
Hemicordulia continentalis Martin, 1901
Hemicordulia flava Theischinger & Watson, 1991
Hemicordulia intermedia (Selys, 1871)
Hemicordulia kalliste Theishinger & Watson, 1991
Hemicordulia koomina Watson, 1969
Hemicordulia novaehollandiae (Selys, 1871) [status uncertain]
Hemicordulia superba Tillyardi, 1911

Hemicordulia tau (Selys, 1871)
Metaphya tillyardi Ris, 1913
Pentathemis membranulata Karsch, 1890
Procordulia affinis (Selys, 1871)
Procordulia jacksoniensis (Rambur, 1842)

Family Libellulidae

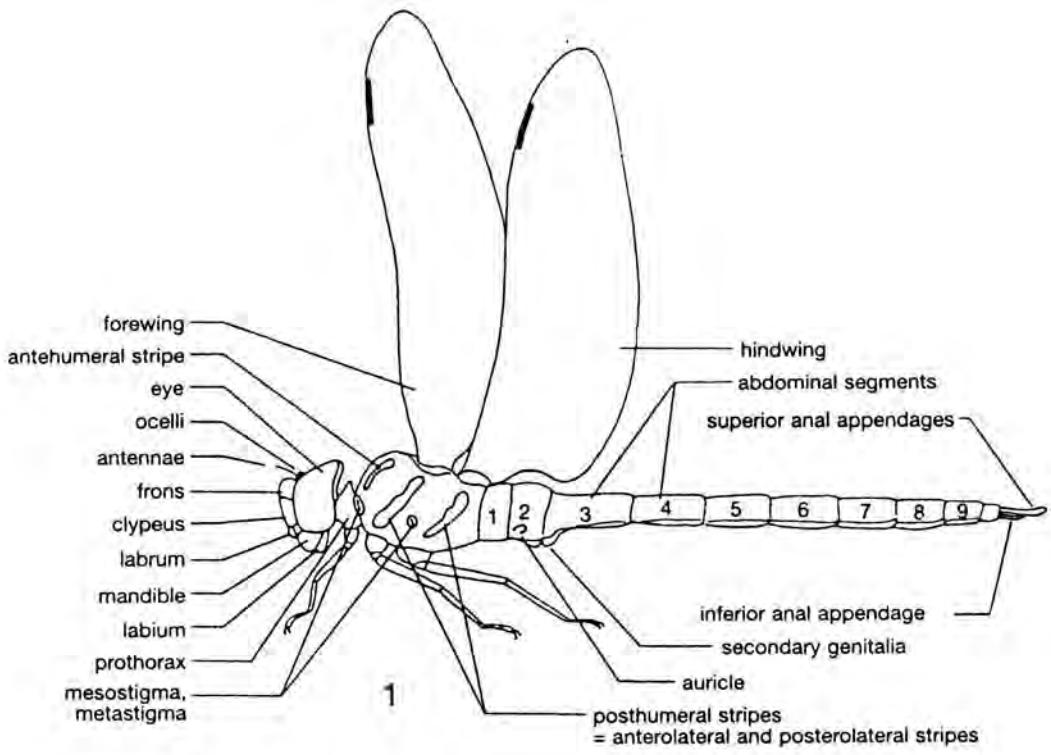
Aethriamanta circumsignata Selys, 1897
Aethriamanta nymphaea Lieftinck, 1949
Agrionoptera insignis allogenes Tillyard, 1908
Agrionoptera longitudinalis biserialis Selys, 1879
Austrothemis nigrescens (Martin, 1901)
Brachydiplax denticauda (Brauer, 1867)
Brachydiplax duivenbodei (Brauer, 1866)
Camacinia othello Tillyard, 1908
Crocothemis nigrifrons (Kirby, 1894)
Diplacodes bipunctata (Brauer, 1865)
Diplacodes haematodes (Burmeister, 1839)
Diplacodes melanopsis (Martin, 1901)
Diplacodes nebulosa (Fabricius, 1793)
Diplacodes trivialis (Rambur, 1842)
Huonia melvillensis Brown & Theischinger, 1998
Hydrobasileus brevistylus (Brauer, 1865)
Lathrecista asiatica festa (Selys, 1879)
Macrodiplax cora (Kaup, 1867)
Nannodiplax rubra Brauer, 1868
Nannophlebia eludens Tillyard, 1908
Nannophlebia injibandi Watson, 1969
Nannophlebia mudginberri Watson & Theischinger, 1991
Nannophlebia risi Tillyard, 1913
Nannophya australis Brauer, 1865
Nannophya dalei (Tillyard, 1908)
Nannophya occidentalis (Tillyard, 1908)
Nannophya paulsoni Theischinger 2003
Neurothemis oligoneura Brauer, 1867
Neurothemis stigmatizans (Fabricius, 1775)
Notolibellula bicolor Theischinger & Watson 1977
Orthetrum balteatum Lieftinck, 1933
Orthetrum boumiera Watson & Arthington, 1978
Orthetrum caledonicum (Brauer, 1865)
Orthetrum migratum Lieftinck, 1951
Orthetrum sabina (Drury, 1770)
Orthetrum serapia Watson, 1984
Orthetrum villosovittatum (Brauer, 1865)
Pantala flavescens (Fabricius, 1798)
Potamarcha congener (Rambur, 1842)
Raphismia bispina (Hagen, 1867)
Rhodothemis lieftincki Fraser, 1954
Rhyothemis braganza Karsch, 1890
Rhyothemis graphiptera (Rambur, 1842)
Rhyothemis phyllis (Sulzer, 1776)
Rhyothemis princeps Kirby, 1894

Rhyothemis resplendens Selys, 1878
Tetrathemis irregularis cladophila Tillyard, 1908
Tholymis tillarga (Fabricius, 1798)
Tramea eurybia Selys, 1878
Tramea loewii Kaup, 1866
Tramea propinqua Lieftinck, 1942
Tramea stenoloba (Watson, 1962)
Urothemis aliena Selys, 1878
Zyxomma elgneri Ris, 1913
Zyxomma multinervorum Carpenter, 1897
Zyxomma petiolatum Rambur, 1842

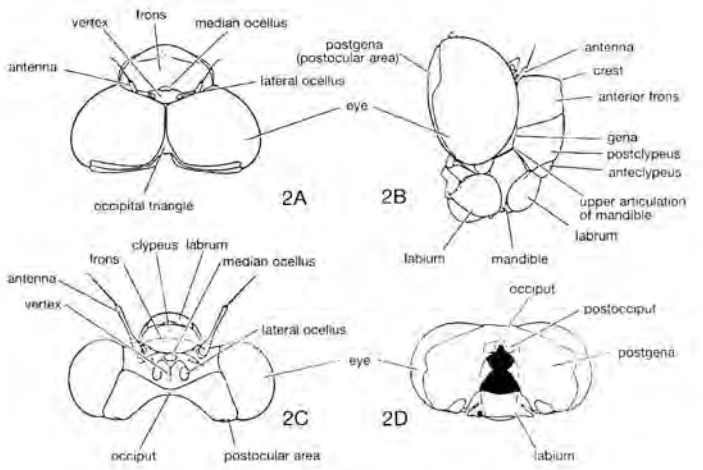
4 Illustrated glossary of terms and abbreviations

Term	Figure	Term	Figure
1A (anal vein)	4, 5	hind leg	8
abdominal segments	1, 6A, 6G, 6H	humeral stripe	3C
Ac (anal crossing)	4, 5	hypertriangle	4, 5
anal appendages	6A, 6G, 6H	inferior anal appendage	1, 6B-E
anal field	4	inner wing pad	8
anal loop	5	intercalated vein	4
anal margin	4, 5	intersegmental suture of thorax	3B
anal pyramid	9	IR2, IR3	4, 5
anal triangle	4	labial palp	7B
anal vein (1A)	4	labium	2B, 2D
antealar ridge	3A, 3B, 3C	labrum	1, 2B, 2C
antealar sinus	3C	lateral caudal gill	8
anteclypeus	2B	lateral ocellus	2A, 2C
antehumeral stripe	1, 3C	lateral setae	7A, 7B
antenna	1, 2A-C	lateral (abdominal) spine	7E
antenodal crossvein	5	ligula	77A, 7B
anterior frons	2B	MA (media anterior)	4
anterolateral stripes	1	mandible	1, 2B
arculus	4, 5	mandibular articulation	2B
articulation of mandible	2B	median caudal gill	8
auricle	1, 3A, 3B	median cleft	7A
Ax1, Ax2	4	median lobe of pronotum	3C
bridge crossvein	5	median ocellus	2A, 2C
C (costa)	4, 5	median space of wing	4, 5
cercus	7E	membranule	5
clypeus	1, 2B, 2C	mesanepisternum	3A, 3B
collar	3C	mesepimeron	3B
costal space	5	mesofemur	9
coxa	3B, 3C, 3D, 9	mesokatepisternum	3B, 3C
crest (of frons)	2B	mesopleural suture	3A, 3B
cu-a (cubito-anal crossvein)	4, 5	mesothoracic spiracle (mesostigma)	3A, 3B
cubital space	5	metafemur	9
CuP (posterior cubitus)	4, 5	metakatepisternum	3B
dentigerous plate	6G	metanepisternum	3B
dentition or tooth	7F	metapleural suture	3B
discoidal cell	4	metascutuma	3A
discoidal field	4	metastigm	1
distal margin of labial palp	7F	metathoracic spiracle (metastigma)	1, 3B, 3C
distal palpal setae	7F	metepimeron	3B
end hook	7B, 7C	mid-dorsal abdominal spine	9
epiproct	7E	mid leg	8
eye	1, 2A-D	movable hook	7A-D, 7F
femur	3D, 9	nodus	4, 5
flagellum	8	oblique vein	5
foreleg	8	occipital triangle	2A
forewing	1	occiput	2C, 2D
frons	1, 2A-C	ocellus	1
gena	2B	outer distal branch	7D
genital fossa	3B	outer wing pad	8
genital hamule	6F	ovipositor	6G
genital lobe	6F	palpal setae	7B-D, 7F
gill filament	8	palpal teeth (= palpal dentations)	7C, 7F
hamule	6F	paraproct	7E
head	8, 9	pedicel	8

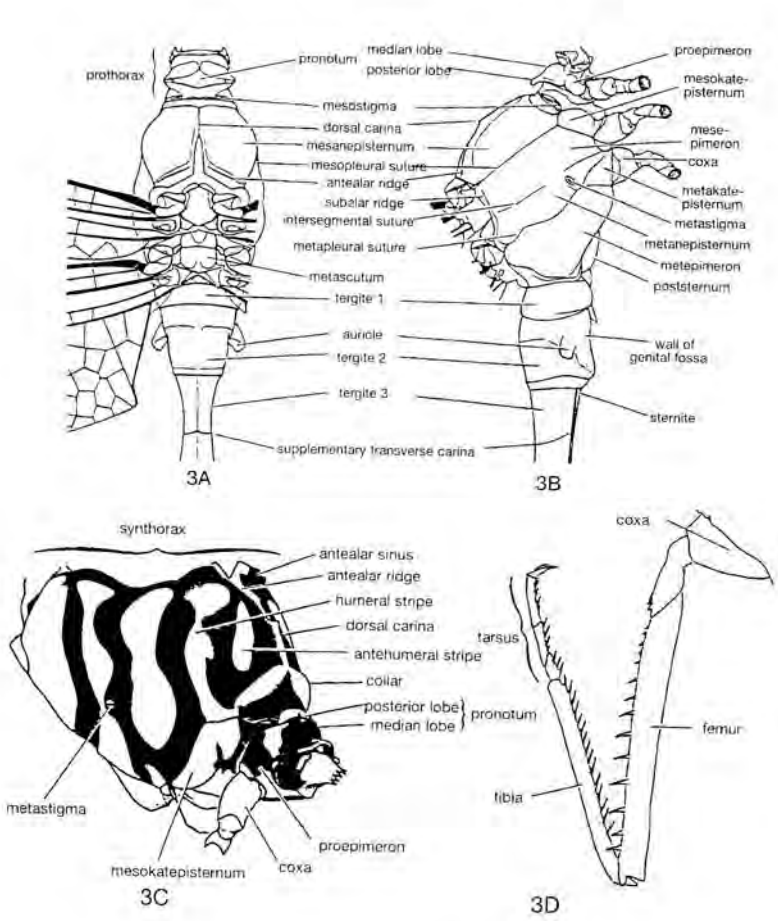
Term	Figure	Term	Figure
postclypeus	2B	secondary genitalia	1
posterior lobe of pronotum	3C	sectors of arculus	4
posterolateral stripes	1	segments 1–10 (of abdomen)	1
postgena	2B, 2D	setae of movable hook	7D
posthumeral stripes	1	sternite	6G
postmentum	7A	sternum 11	6D
postnodal crossvein	4	style	6G
postocciput	2D	subalar ridge	3B
postocular area	2B, 2C	subcostal space	5
postocular lobe	8	Subnodal space	5
poststernum	3B	subnodus	4
premental setae	7B	subtriangle	4, 5
prementum	7A	superior anal appendage	1, 6B-E
proepimeron	3B, 3C	supplementary transverse carina	3A, 3B
profemur	9	supra-anal plate	6G
pronotum	3A, 3C, 8	synthorax	3C
prothoracic process	9	tarsal claw	9
prothorax	1, 3A	tarsus	3D, 9
pterostigma	4	tergum	3A, 3B
quadrilateral cell	4	tibia	3D, 9
R+M (radius + media)	4, 5	triangle	4, 5
R2, R3, R4	4, 5	trochanter	9
Rs (anterior sector of arculus)	4	valve (of ovipositor)	6G
Rspl (radial splanate)	5	ventral carina	6H
Sc (subcosta)	4	vertex	2A, 2C
scape	8	vulvar scale	6H



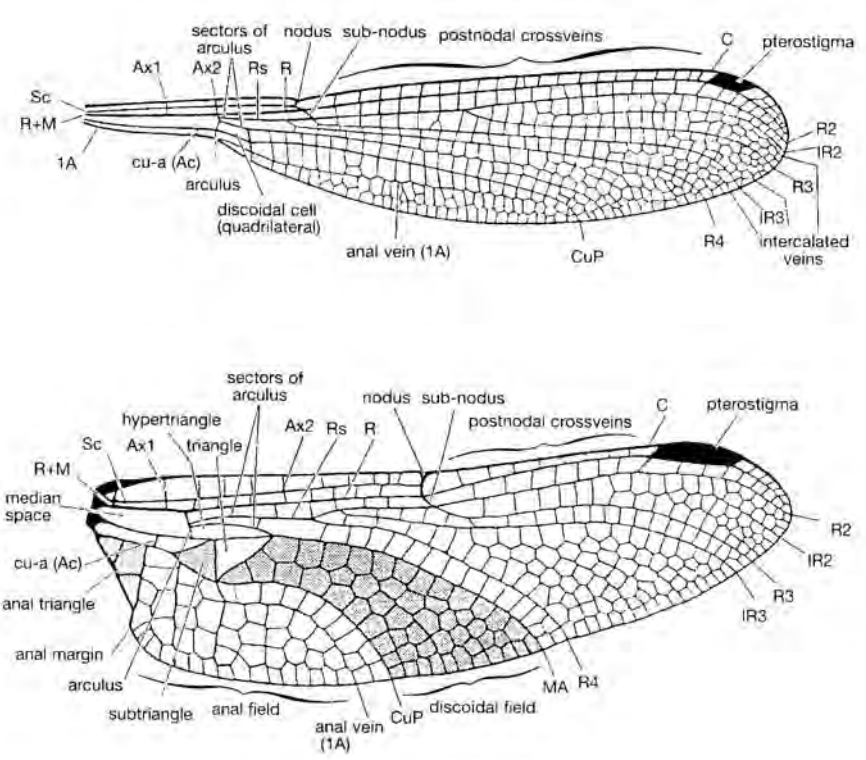
1 The adult dragonfly: Aeshnidae sp., male, lateral view. (Modified from Bellmann 1993.)



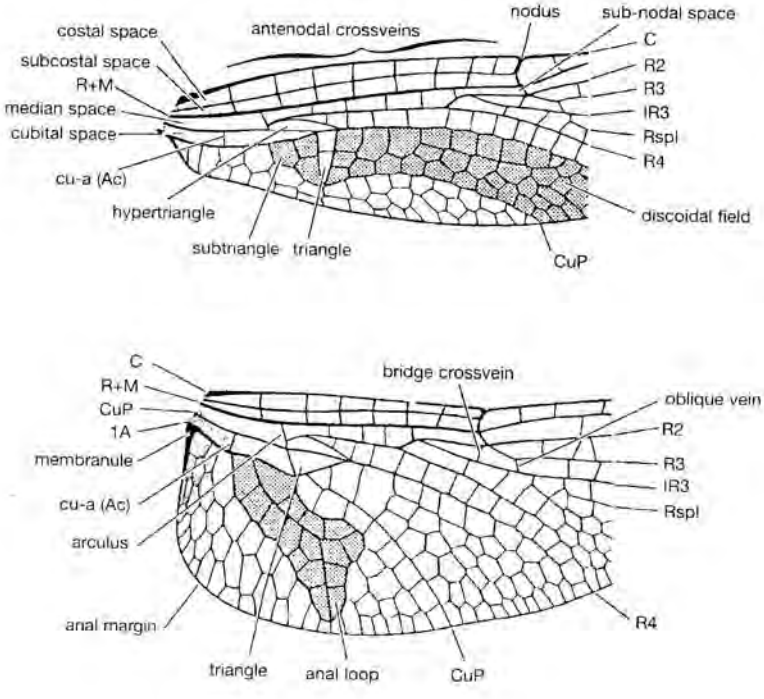
2 The dragonfly head: 2A, *Austroaeschna parvistigma*, male, dorsal view of head;
2B, *Austroaeschna parvistigma*, male, lateral view of head;
2C, *Synlestes weyersii*, male, dorsal view of head;
2D, *Austrogomphus amphiclitus*, female, rear of head.



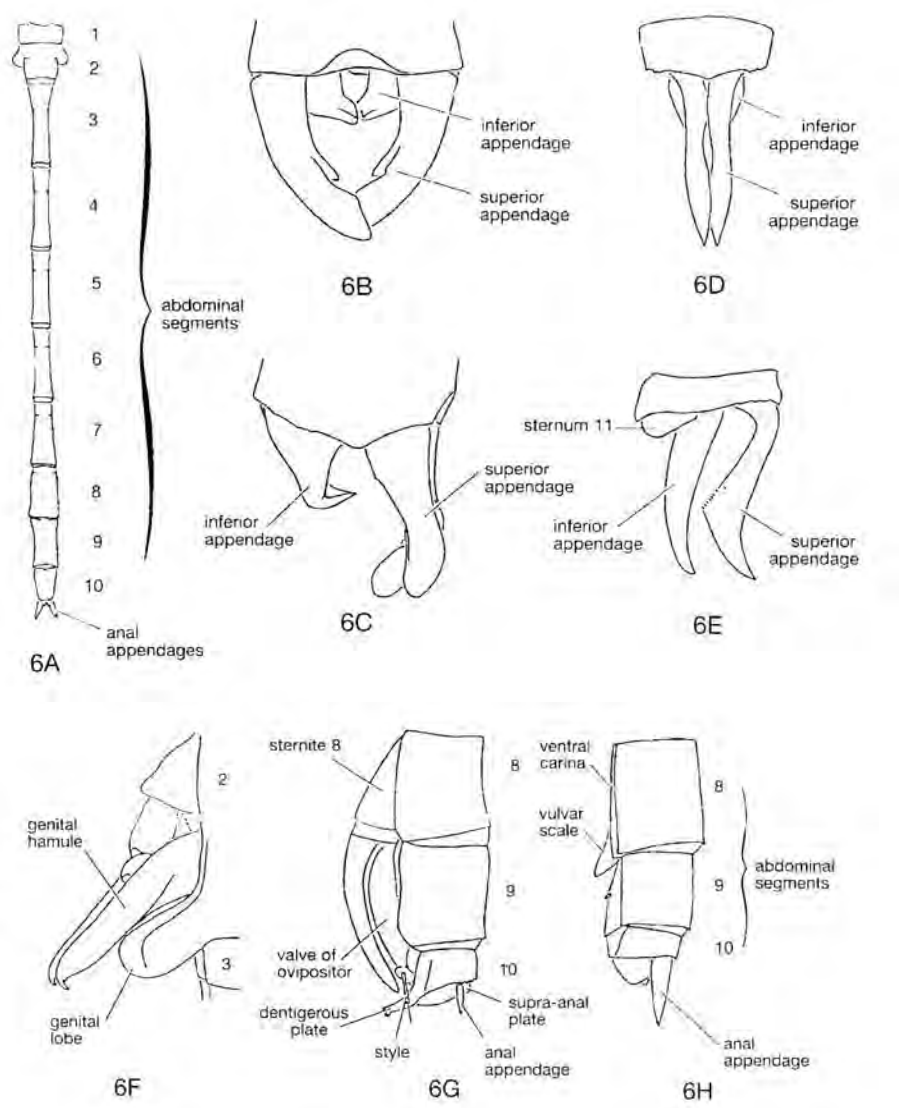
3 The dragonfly thorax: 3A, *Austroaeschna parvistigma*, male, dorsal view of thorax and anterior abdomen;
3B, *Austroaeschna parvistigma*, male, lateral view of thorax and anterior abdomen.
3C, *Austroepigomphus gordoni*, male, anterolateral view of synthorax.
3D, *Austrogomphus amphiclitus*, female, mesothoracic leg.



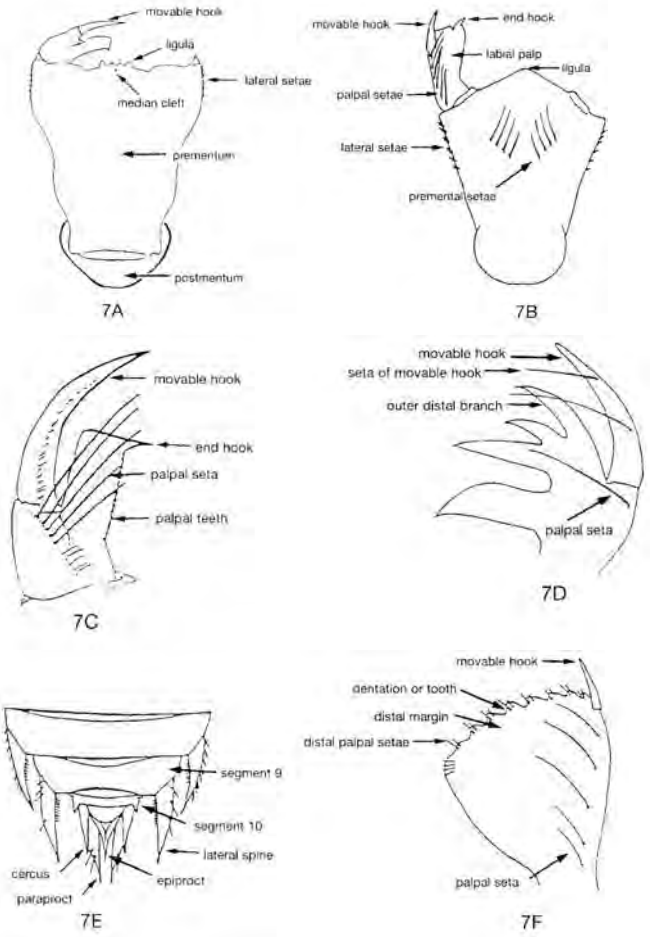
4 The dragonfly wing: *Austroargiolestes icteromelas*, male, hindwing (top);
Austrogomphus australis, male, hindwing (bottom)



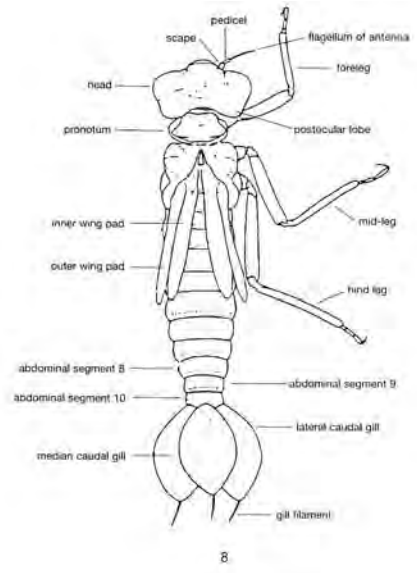
5 The dragonfly wing: *Diplacodes bipunctata*, male, base of forewing (top);
base of hindwing (bottom).



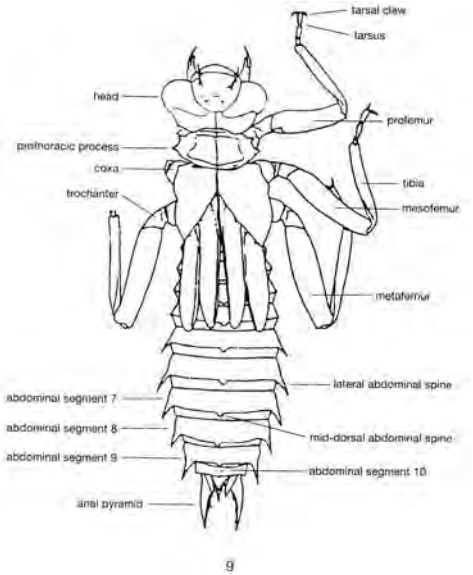
6 The dragonfly abdomen: 6A, *Antipodogomphus hodgkini*, male dorsal view of abdomen;
6B, *Eurysticta coolawanyah*, male, dorsal view of anal appendages;
6C, *Eurysticta coolawanyah*, male, lateral view of anal appendages;
6D, *Nannophlebia injibandi*, male, dorsal view of anal appendages;
6E, *Nannophlebia injibandi*, male, lateral view of anal appendages;
6F, *Tramea stenoloba*, male, lateral view of secondary genitalia;
6G, *Austroaeschna pulchra*, female, lateral view of end of abdomen;
6H, *Diplacodes bipunctata*, female, lateral view of end of abdomen.



7 Structures of dragonfly larvae: 7A, *Austroaeschna subapicalis*, labium, ventral view;
7B, *Ischnura heterosticta*, labium, dorsal view;
7C, *Gynacantha dobsoni*, left labial palp, dorsal view;
7D, *Austrolestes annulosus*, right labial palp, dorsal view;
7E, *Tramea loewii*, posterior abdominal segments, dorsal view.
7F, *Nannophlebia risi*, right labial palp, dorsal view



8 The damselfly larva: *Griseargiolestes griseus*, final instar, dorsal view.

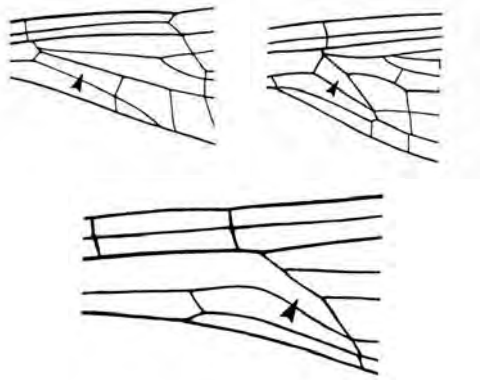
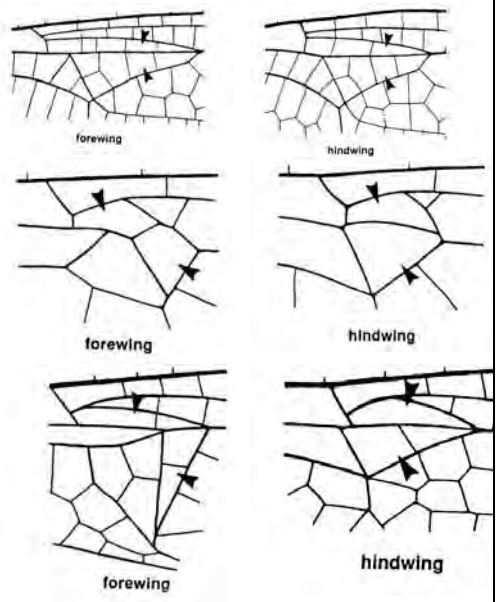
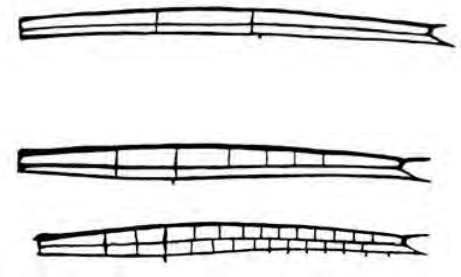


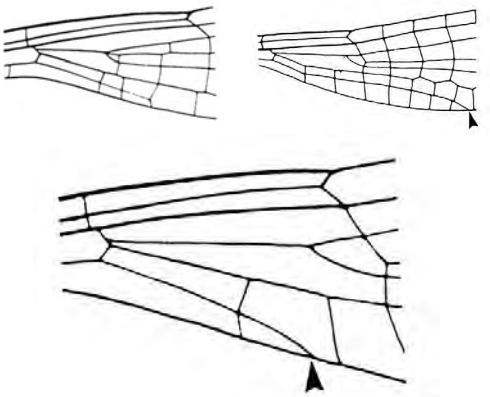
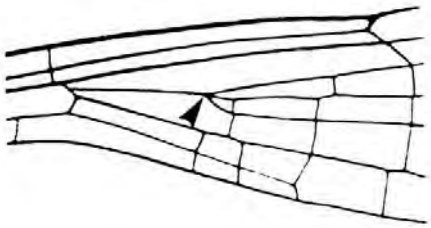
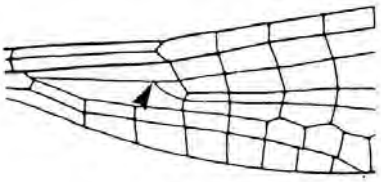
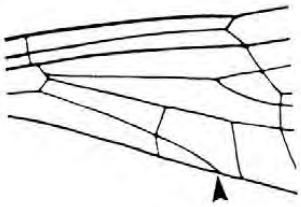
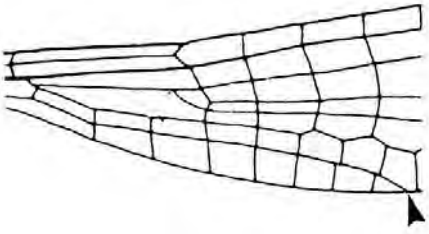
9 The dragonfly larva: *Notoaeschna geminata*, final instar, dorsal view

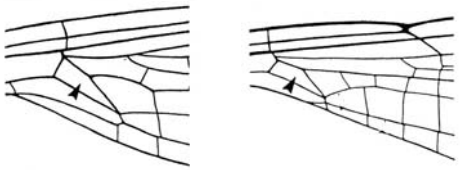
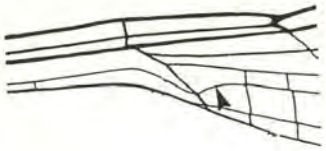
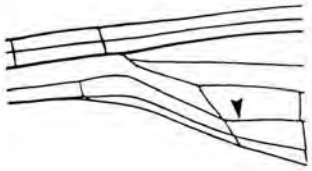
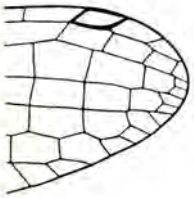
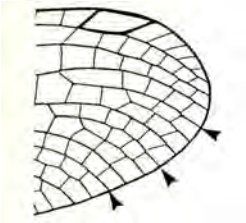
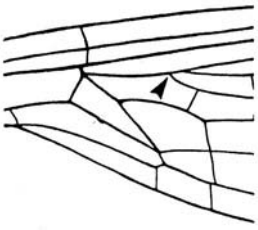
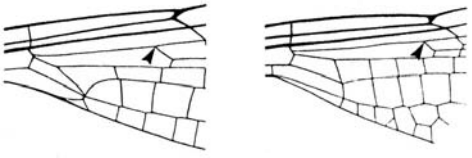
5 Keys to the adults

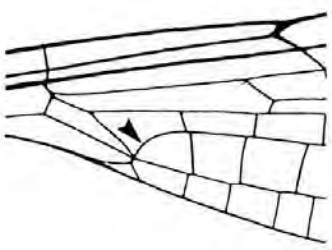
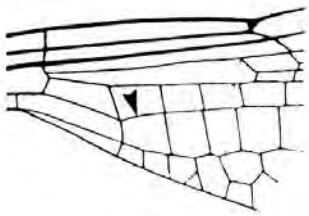
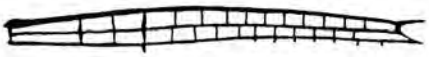
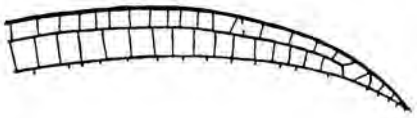
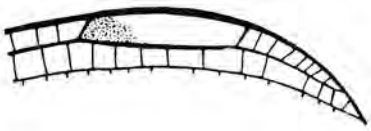
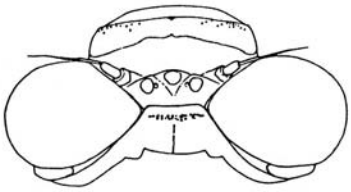
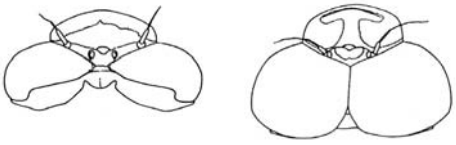
Key to suborders and families

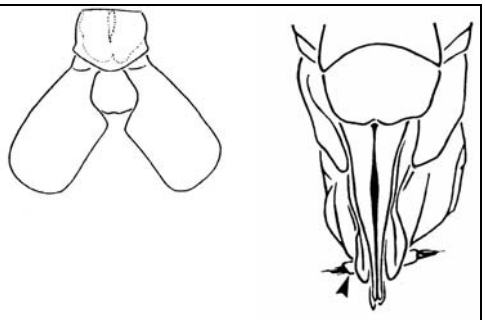
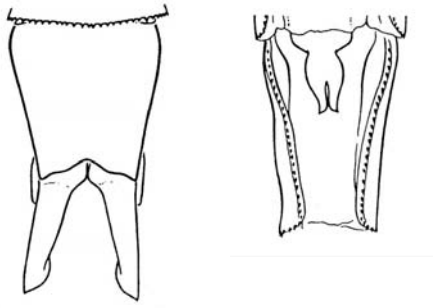
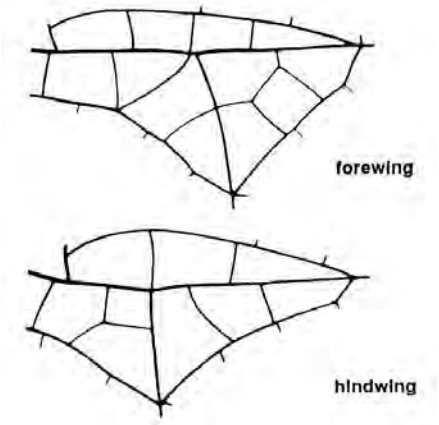
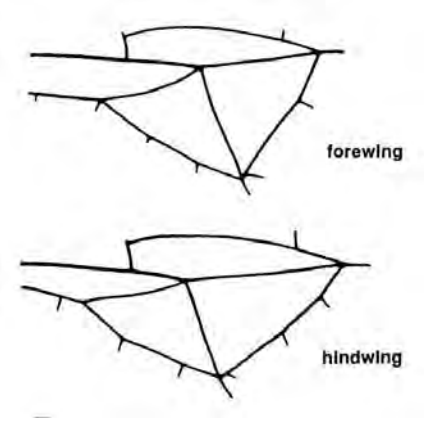
(Genera and species which are the sole representatives of a family in Australia may also key out here.)

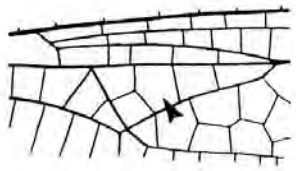
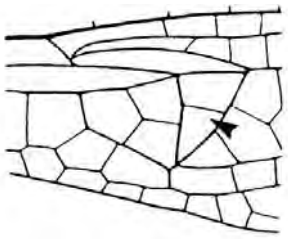
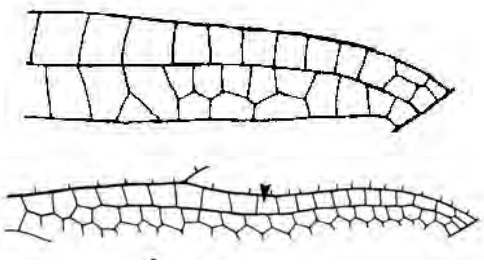
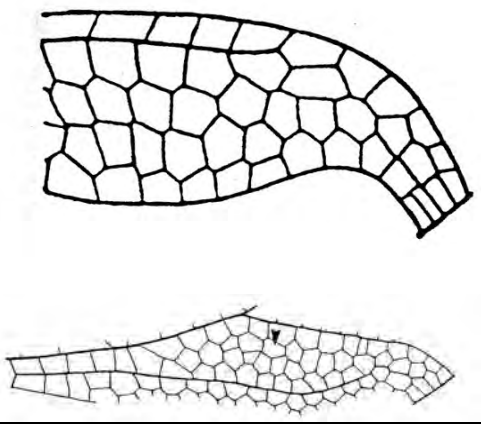
1a	Discoidal cell a simple quadrilateral, sometimes traversed by crossveins occasionally open at base Suborder **Zygoptera** (damselflies) **2**	
b	Discoidal cell divided into hypertriangle and triangle, often differing in shape in fore and hind wing, and often traversed by crossveins Suborder **Epiprocta** (dragonflies) **13**	
2a	Normally two antenodal crossveins, both extending across costal and subcostal spaces **3**	
b	Several antenodal crossveins, the extra veins not necessarily extending across both costal and subcostal spaces **11**	

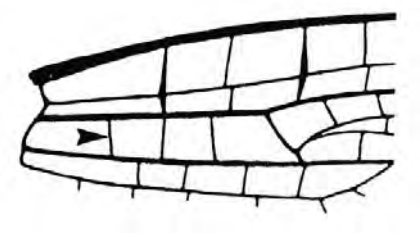
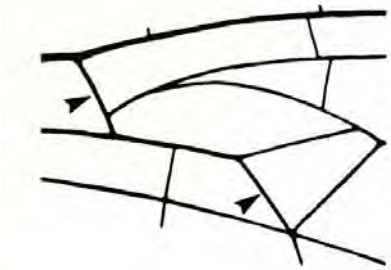
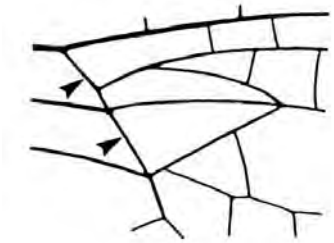
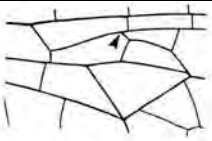
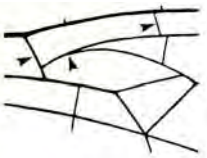
3a	Anal vein vestigial or absent, so that there are no longitudinal veins beyond the discoidal cell **4**	
b	Anal vein long, straight or zigzagged, extending well beyond level of subnodus **6**	
4a	Anterior sector of arculus forking about a third to half of the way from arculus to level of subnodus **Lestoideidae: *Lestoidea***	
b	Anterior sector of arculus forking well beyond half-way from arculus to level of subnodus, sometimes beyond subnodus **5**	
5a	Black damselflies marked with cream, green, blue or orange; CuP two cells or less long, commonly one cell **Platycnemididae: Disparoneurinae: *Nososticta***	
b	Pale brown to dark greenish grey, rarely black damselflies, thorax and abdomen sometimes pruinescent; CuP of variable length, one to several cells long **Isostictidae**	

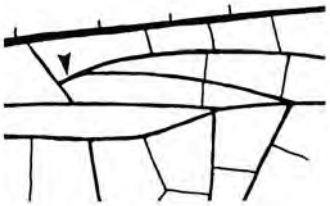
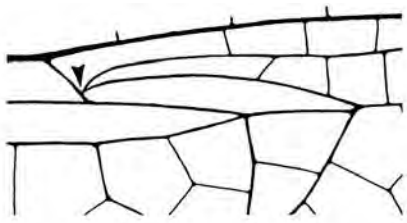
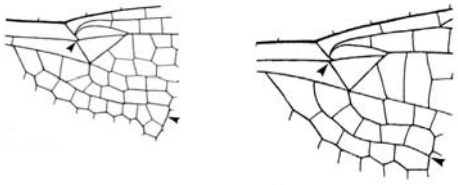
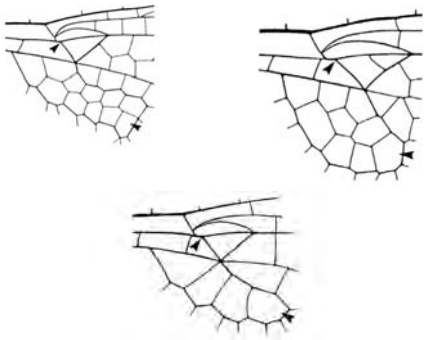
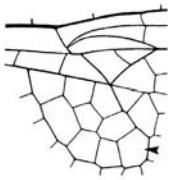
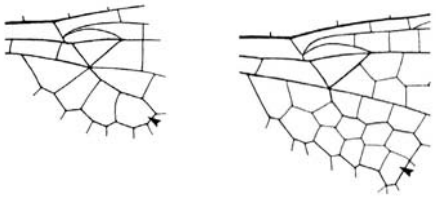
6a	Arculus of forewing incomplete so that discoidal cell is open at base **7**	
b	Arculus of forewing complete, discoidal cell closed at base **8**	
7a	CuP strongly arched forward in first cell after it leaves posterior distal corner of discoidal cell **Chorismagrionidae: *Chorismagrion risi***	
b	CuP almost straight in first cell beyond discoidal cell **Hemiphlebiidae: *Hemiphlebia mirabilis***	
8a	No supplementary longitudinal veins between branches of Rs (R2, IR2, R3, IR3 and R4) in distal portion of wings **Coenagrionidae**	
b	At least one supplementary, intercalated vein several cells long between branches of Rs in distal portion of wings **9**	
9a	Anterior sector of arculus (Rs) forking less than half-way from arculus to level of subnodus **Lestidae**	
b	Anterior sector of arculus (Rs) forking well beyond half-way from arculus to level of subnodus **10**	

10a	CuP strongly arched forward in first cell after it leaves posterior corner of discoidal cell **Synlestidae**	
b	CuP almost straight in first cell beyond discoidal cell **Megapodagrionidae**	
11a	Only the two basal antenodal crossveins extending across both costal and subcostal spaces, the additional crossveins confined to the costal space **Diphlebiidae: *Diphlebia***	
b	Numerous antenodal crossveins in both the costal and subcostal spaces **12**	
12a	Abdomen much longer than wings; pterostigma absent **Calopterygidae: *Neurobasis australis***	
b	Abdomen shorter than wings; pterostigma present **Chlorocyphidae: *Rhinocypha tincta semitincta***	
13a	Eyes widely separated on top of the head **14**	
b	Eyes close together on top of the head or, most commonly, narrowly or broadly fused in midline **16**	

14a	Male with broad leaf-like superior anal appendages; female with a complex ovipositor bearing pair of styli near tip which extends to or beyond end of abdominal segment 10 **Petaluridae: *Petalura***	
b	Male superior appendages relatively slender, more or less rounded in section; ovipositor reduced to scale-like structure rarely extending beyond end of abdominal segment 9, and lacking styli **15**	
15a	Large dragonflies (hind wing longer than 33 mm); triangle of forewing and hind wing traversed by crossveins **Lindeniidae**: ***Ictinogomphus***	
b	Smaller dragonflies (hind wing shorter than 33 mm); triangle of forewing and, usually of hind wing, free **Gomphidae**	

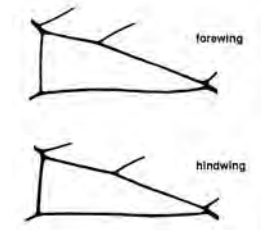
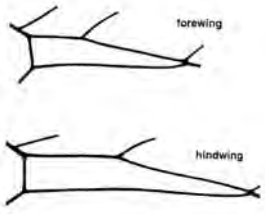
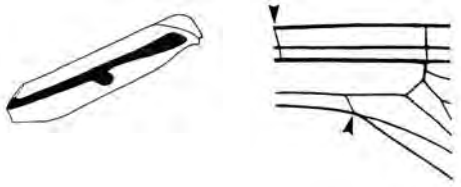
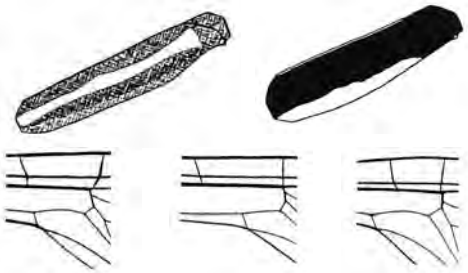
16a	Triangle of forewing elongate along wing axis **17**	
b	Triangle of forewing not elongate along wing axis, often elongate across it **19**	
17a	Anterior portion of both wings marked with series of well-defined, reddish brown spots **Austropetaliidae**	
b	Anterior portion of wings colourless except for pterostigma, or, marked with brown stripe, sometimes subdivided into bands and broad, rounded nodal spots **18**	
18a	MA unbroken distally and running parallel to, or diverging from, R4; a single row of cells, with or without groups of double cells, between IR3 and Rspl **Brachytronidae** and **Telephlebiidae**	
b	MA degenerate distally and converging upon R4; up to three to six rows of cells between IR3 and Rspl **Aeshnidae**	

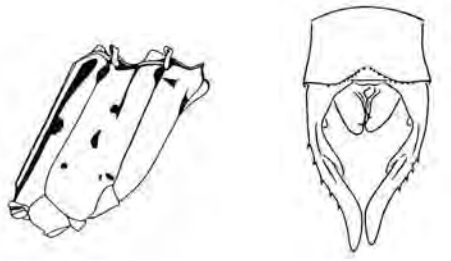
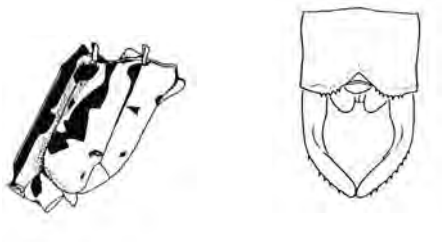
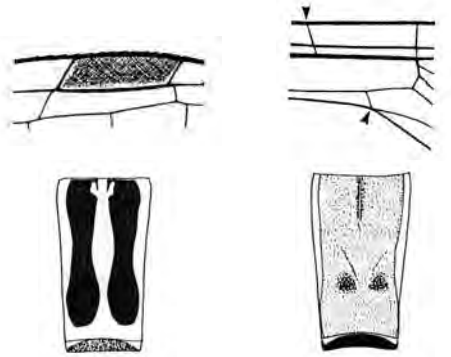
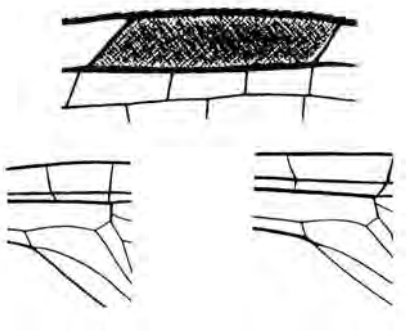
19a	Crossveins present in median space **Synthemistidae**	
b	No crossveins in median space **20**	
20a	Basal side of hind wing triangle far beyond arculus, separated from it by a distance equal to or greater than the length of the arculus **21**	
b	Basal side of hind wing triangle nearer to arculus, up to approximately half the length of arculus beyond it, often in line with it **23**	
21a	Large species, hind wing longer than 35 mm **Macromiidae: *Macromia***	
b	Small species, hind wing shorter than 35 mm **22**	
22a	Sectors of arculus separating close to first crossvein beyond arculus; male lacking auricles, hindwing rounded at base **Libellulidae** (part)	 
b	Sectors of arculus separating closer to arculus than to first crossvein beyond it; male with auricles and angulated base of hindwing **23**	 

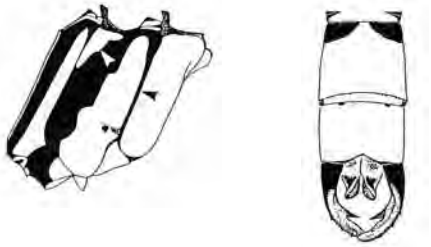
23a	Thorax and abdomen dark metallic with distinctive pale markings **Cordulephyidae: *Cordulephya***	
b	Thorax and abdomen all dark metallic **Pseudocorduliidae: *Pseudocordulia***	
24a	Sectors of arculus fused at their origins and forming a short stalk (except in the forewing of some *Rhyothemis*); wing colouration variable, often with dark general, nodal or distal pigmentation **Libellulidae** (part)	
b	Sectors of arculus diverging from their origins (at least in forewing); wings hyaline or partly suffused yellow or pale orange with or without yellow to reddish brown marks at their bases **25**	
25a	Basal side of hindwing triangle at or slightly basal to arculus; anal loop generally stocking-shaped, expanded with extra cells at tip **Corduliidae**	
b	Basal side of hindwing triangle beyond arculus; anal loop compact to sausage-shaped, generally not expanded, and without extra cells at tip **26**	
26a	Anal loop compact **Gomphomacromiidae: *Archaeophya***	
b	Anal loop distinctly but variously elongate **Austrocorduliidae**	

Lestidae

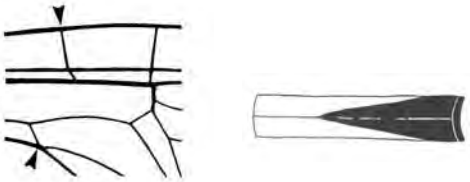
Key to genera and species of **Lestidae**

1a	Quadrilateral cells of forewing and hind wing similar in size and shape, that of hind wing less than 1.10 times length of forewing quadrilateral ***Lestes concinnus***	
b	Quadrilateral cell of hind wing more than 1.15 times, usually 1.3–1.5 times longer than that of forewing **2**	
2a	Front of synthorax marked with vertical, metallic green stripe on each side, expanded laterally near centre to form brownish green or green spot; Ac approximately midway between Ax1 and Ax2 in forewing, often nearer to Ax2 ***Indolestes*** **3**	
b	Front of synthorax unicolorous or striped, the stripe not expanded near centre; Ac generally near Ax1, basal or distal, occasionally almost midway between Ax1 and Ax2 ***Austrolestes*** **5**	
3a	Hind wing of male shorter than 20 mm long, of female shorter than 21 mm ***Indolestes alleni***	
b	Hind wing of male 20 mm long or more, of female 21 mm or more **4**	

4a	Abdominal terga 3-6 marked with pale basal ring, blue in mature male, ill-defined in mature female, and with or without ill-defined pale subapical band; metapleural suture marked brown only at upper end; superior appendages of male sinuate, reflexed and broadly contiguous at tips ***Indolestes tenuissimus***	
b	Abdominal terga 3-6 with pale basal ring and well-defined subapical band; metapleural suture with dark spot at upper end and narrow dark stripe over much, or all, of its lower course; superior appendages of male convergent at tips, forcipate ***Indolestes obiri***	
5a	Pterostigma overlying crossveins of adjoining row only near each end; Ac far beyond level of Ax1, generally about midway between Ax1 and Ax2; abdominal tergum 2 marked with dark longitudinal stripe on each side of pale midline, or with ill-defined marks on pale background ***Austrolestes insularis***	
b	Central part of pterostigma overlying one or more crossveins of adjoining row; Ac closer to level of Ax1 than of Ax2, sometimes basal to Ax1; abdominal tergum 2 with well-defined light and dark pattern, sometimes like that of dark *A. insularis*, or substantially dark **6**	

6a	Pale humeral stripe broad, its upper end crossing mesopleural suture on to mesepimeron and subalar ridge almost to segmental junction **7**	
b	Pale humeral stripe narrow, with at most a small upper patch extending across mesopleural suture, not meeting subalar ridge **8**	
7a	Metapleural suture narrowly lined black from subalar ridge to metastigma; abdominal segment 9 of male predominantly pale above ***Austrolestes aridus***	
b	Upper quarter to third of upper metapleural suture marked black; abdominal segment 9 of male predominantly dark above ***Austrolestes analis***	
8a	Humeral stripe extending across mesopleural suture **9**	
b	Humeral stripe not extending across mesopleural suture **11**	

9a	Abdominal segment 10 of male black; dorsal dark band on abdominal tergum 2 of female relatively narrow, the pale lateral areas clearly visible from above ***Austrolestes minjerriba***	
b	Abdominal segment 10 of male pale above; dorsal dark mark on abdominal tergum 2 of female broad, divided by narrow, pale mid-dorsal line, pale lateral areas scarcely visible from above **10**	
10a	Median lobe of pronotum with pale lateral margin; abdominal tergum 2 of male dark above, with pale, narrow mid-dorsal line over distal third ***Austrolestes io***	 
b	Median lobe of pronotum dark laterally; abdominal tergum 2 of male dark above with broad, pale mid-dorsal stripe ***Austrolestes leda***	 
11a	Abdominal tergum 2 dark distally, with basal pale semicircular, triangular or pointed half-oval spot; superior appendages of male sinuate, reflexed and broadly contiguous at tips ***Austrolestes cingulatus***	 
b	Abdominal tergum 2 without pale basal spot; superior appendages of male forcipate, converging at tips **12**	
12a	Abdominal tergum 2 with pale mid-dorsal stripe over entire length, broad in male, narrow in female ***Austrolestes leda***	 
b	Abdominal tergum 2 without pale mid-dorsal stripe **13**	

13a	Ac proximal to Ax1 in forewing; abdominal terga 3-7 of male substantially pale, with forward pointing, dark arrow-shaped mark on posterior half ***Austrolestes annulosus***	
b	Ac distal to Ax1 in forewing; abdominal terga 3-7 of male substantially dark, with pale basal rings **14**	
14a	Pale ring at base of abdominal tergum 7 occupying approximately 20% of posterior half ***Austrolestes minjerriba***	
b	Pale ring at base of abdominal tergum 7 occupying approximately 10% of length of segment, or less **15**	
15a	From south-eastern Australia; abdominal tergum 2 of male with dorsal dark mark, slightly constricted at centre ***Austrolestes psyche***	
b	From south-western Australia; dorsal mark on abdominal tergum 2 of male strongly constricted at centre, forming narrow stem ***Austrolestes aleison***	

Hemiphlebiidae

Key to genus and species of **Hemiphlebiidae**

This family contains only the single genus and species ***Hemiphlebia mirabilis***.

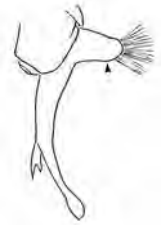
Chorismagrionidae

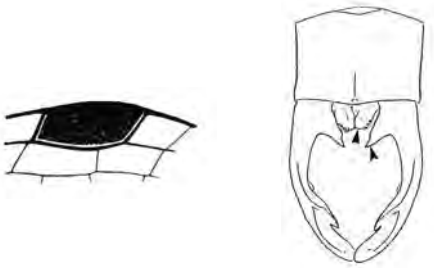
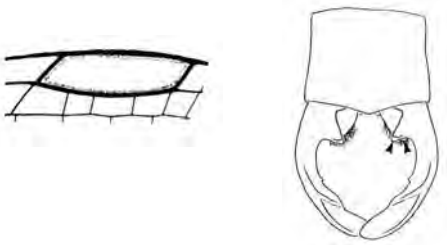
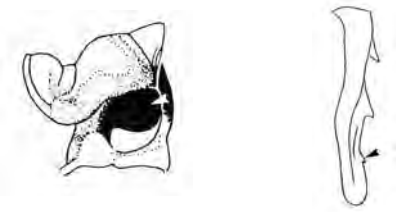
Key to genus and species of **Chorismagrionidae**

This family contains only the single genus and species ***Chorismagrion risi.***

Synlestidae

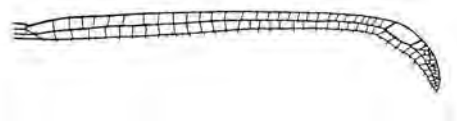
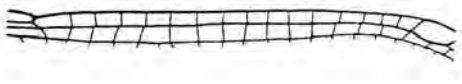
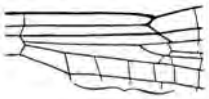
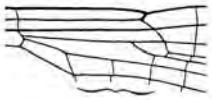
Key to genera and species of **Synlestidae**

1a	Anal appendages in both sexes and at least segment 10 of female substantially white ***Episynlestes*** **2**	
b	Anal appendages in both sexes and at least segment 10 of female substantially dark ***Synlestes*** **7**	
2a	Male **3**	
b	Female **5**	
3a	Superior anal appendages lacking conspicuous dorsal armature ***Episynlestes albicauda***	
b	Superior anal appendages with very conspicuous dorsal lobe **4**	
4a	Inner branch of superior anal appendages with step-like notch on outer side ***Episynlestes intermedius***	
b	Inner branch of superior anal appendages bifid ***Episynlestes cristatus***	
5a	Smaller species, hind wing generally shorter than 30 mm; pterostigma 1.5–1.9 mm; north from Paluma area ***Episynlestes cristatus***	
b	Larger species, hind wing generally longer than 30 mm; pterostigma 1.8–2.2 mm; south from Eungella area **6**	

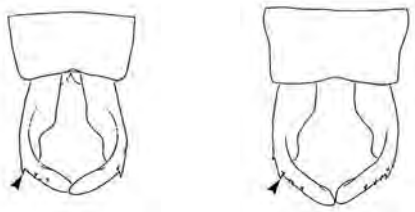
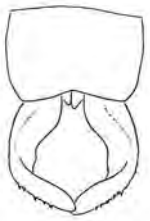
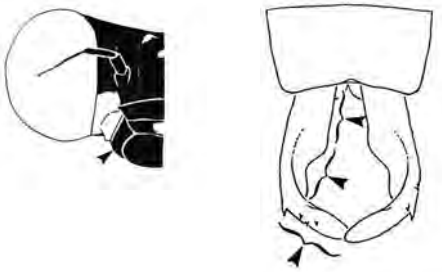
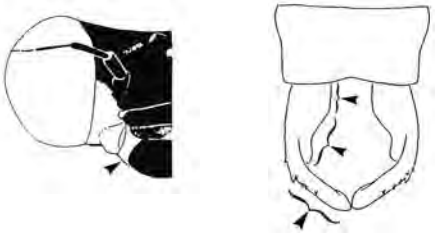
6a	From north-eastern New South Wales and south-eastern Queensland, north to the Rockhampton area ***Episynlestes albicauda***	
b	From the Eungella area ***Episynlestes intermedius***	
7a	Pterostigma dark brown to black, less than 2.0 mm long, generally overlying two cells, sometimes three; pronotum pale ochraceus, without black or metallic markings; male inferior anal appendages not reaching inner, basal prong of superior appendages **8**	
b	Pterostigma yellowish to brown, longer than 2.0 mm, generally overlying three to five cells; pronotum black or metallic, with yellow anterior and posterior margins; male inferior anal appendages extending slightly beyond inner, basal prong of superiors ***Synlestes weyersi***	
8a	Proepimeron pale ochraceus with distinct, brownish black or metallic patch on upper surface; male superior anal appendages with inner subapical tooth ***Synlestes selysi***	
b	Proepimeron pale ochraceus without dark marks; male superior appendages without inner, subapical tooth ***Synlestes tropicus***	

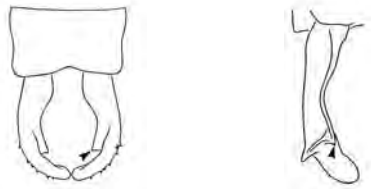
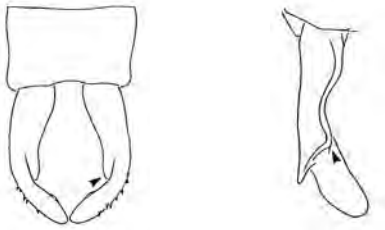
Megapodagrionidae

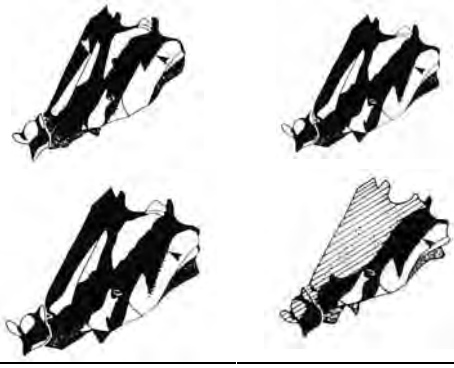
Key to genera and species of **Megapodagrionidae**

1a	Large, with abdomen longer than 42 mm; hind wings longer than 40 mm; more than 27 postnodals ***Podopteryx selysi***	
b	Smaller, with abdomen shorter than 42 mm, hind wings shorter than 35 mm; fewer than 27 postnodals **2**	
2a	Generally three or more cells, rarely two in discoidal field between discoidal cell and level of subnodus; male superior anal appendages with ventral spur ***Austroargiolestes*** **3**	 
b	Generally two, sometimes three, cells in discoidal field between discoidal cell and level of subnodus; male superior anal appendage without ventral spur **22**	 
3a	Anterior frons and postclypeus largely pale, yellowish or reddish orange **4**	
b	Anterior frons, clypeus and labrum dark greenish brown to black **5**	
4a	Abdominal tergum 2 black with conspicuous white to orange dorsal mark, shaped like a thick-stemmed wineglass ***Austroargiolestes amabilis***	
b	Abdominal tergum 2 black without any conspicuous bright dorsal mark ***Austroargiolestes aureus***	
5a	Male **6**	
b	Female **14**	

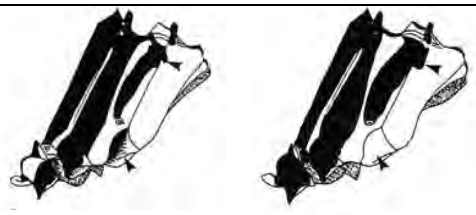
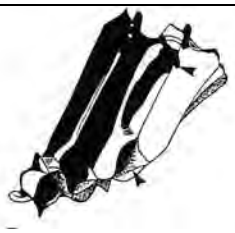
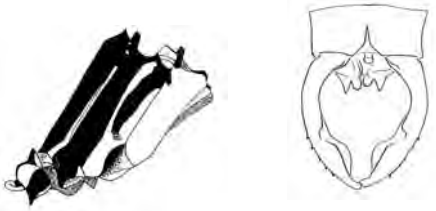
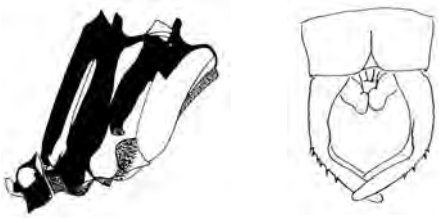
6a	Front of synthorax almost completely pale, yellow to orange, not pruinescent ***Austroargiolestes chrysoides***	
b	Median part to much of front of synthorax dark brown to black with pale to yellowish brown humeral stripe on each side, sometimes pruinescent **7**	  
7a	Humeral stripe constricted near upper end, then broadened at tip **8**	
b	Humeral stripe not widened at upper end **9**	
8a	Basal angle of superior anal appendages almost uniformly rounded; tips of appendages not overlapping if inner edges of basal portion are set parallel ***Austroargiolestes alpinus***	
b	Basal angle of superior anal appendages slightly angulated; tips of appendages overlapping if inner edges of basal portion are set parallel ***Austroargiolestes brookhousei***	

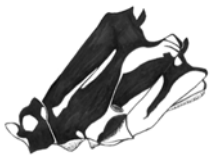
9a	Superior anal appendages with tip of ventral spur visible from above **10**	
b	Superior anal appendages with ventral spur not visible from above **12**	
10a	Distal end of inner marginal ridge of superior appendages ending in sharp point above ventral spur some ***Austroargiolestes calcaris***	
b	Distal end of inner marginal ridge of superior appendages rounded, or continuing into inner ridge of ventral spur **11**	
11a	Outer face of mandible very dark brown to black; superior anal appendages with basal portion about as long as median or distal portion ***Austroargiolestes elke***	
b	Outer face of mandible largely yellowish white to yellow; superior anal appendages with basal portion markedly shorter than median or distal portion ***Austroargiolestes isabellae***	

12a	Distal end of inner marginal ridge of superior appendages ending in sharp point above ventral spur some ***Austroargiolestes calcaris***	
b	Distal end of inner marginal ridge of superior appendages rounded, or continuing into inner ridge of ventral spur **13**	
13a	Inferior anal appendages, viewed from below, broad, blunt, rounded apically ***Austroargiolestes christine***	
b	Inferior anal appendages, viewed from below, almost triangular with sharply pointed tips ***Austroargiolestes icteromelas***	
14a	Front of synthorax almost completely pale yellow to white ***Austroargiolestes chrysoides*** (possibly teneral specimens)	
b	Median part to much of front of synthorax dark brown to black, with pale to red-brown humeral stripe on each side, sometimes pruinescent **15**	 

15a	Pale stripe in front of mesopleural suture constricted near upper end, then broadened at tip, not obscured by pruinescence **16**	
b	Pale stripe in front of mesopleural suture not widened at tip, its inner margin commonly converging on mesopleural suture, sometimes obscured by pruinescence **17**	
16a	Posterior lobe of pronotum with corners almost uniformly rounded; tergum 10 with or without pale anteromedian spot ***Austroargiolestes alpinus***	
b	Posterior lobe of pronotum with corners slightly angulated; tergum 10 without pale anteromedian spot ***Austroargiolestes brookhousei***	
17a	Outer face of mandible very dark brown to black ***Austroargiolestes elke***	
b	Outer face of mandible largely pale **18**	
18a	Uppermost point of mesanepisternal part of humeral stripe not at mesopleural suture, so that upper end of stripe appears peaked or truncate; not pruinescent ***Austroargiolestes chrysoides***	
b	Uppermost point of mesanepisternal part of humeral stripe at mesopleural suture, the upper part of stripe thus appearing acutely tapered; sometimes obscured by pruinescence **19**	

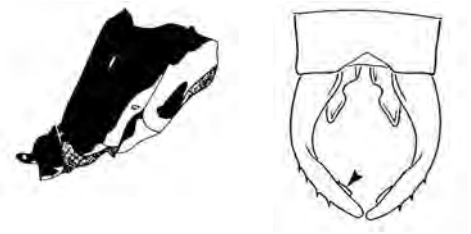
19a	Black patch on metepimeron extending half-way down segment of metapleural suture above metastigma, its lower end usually truncate or bluntly angled ***Austroargiolestes isabellae***	
b	Black patch on metepimeron extending well beyond half-way down upper segment of metapleural suture, or separated from it by long gently tapering white stripe **20**	  
20a	Ratio between length of hind wing and length of metafemur approximately 5.0 (range 4.5 to 5.5); front of synthorax never strongly pruinescent ***Austroargiolestes icteromelas***	
b	Ratio between length of hind wing and length of metafemur approximately 4.3 (range 4.0-4.6); mature adults with front of synthorax strongly pruinescent **21**	
21a	Pterostigma of mature adults brown to black; south-eastern New South Wales (south of Hunter River), Victoria ***Austroargiolestes calcaris***	
b	Pterostigma of mature adults black; north-eastern New South Wales (north of Hunter River) ***Austroargiolestes christine***	
22a	Pale humeral stripe well developed, conspicuous; from eastern Australia ***Griseargiolestes*** **23**	
b	Pale humeral stripe vestigial or absent; from south-western Australia **29**	 

23a	Labium dark brown to black ***Griseargiolestes fontanus***	
b	Labium pale **24**	
24a	Black marking on metepimeron reduced to a small patch, occupying less than one third of length and width of epimeron **25**	
b	Black marking on metepimeron much more extensive, occupying approximately half of width and at least one third of length of epimeron **27**	
25a	Anterior part of metakatepisternum dark brown; non-pruinescent species **26**	
b	Metakatepisternum entirely pale yellow; body partly pruinescent in mature individuals ***Griseargiolestes albescens***	
26a	Black marking on metepimeron reduced to tiny patch; male superior anal appendages widely arched, inferiors bifid ***Griseargiolestes metallicus***	
b	Black marking on metepimeron covering approximately one third of its length and width; male superior anal appendages bent, inferiors simple ***Griseargiolestes bucki***	

27a	Mesepimeral portion of humeral stripe substantial, much wider than the adjacent part of episternal portion; pale lateral marks on median and posterior lobes of pronotum fused ***Griseargiolestes griseus***	
b	Mesepimeral portion of humeral stripe narrow, scarcely wider than the adjacent part of episternal portion; pale marks on sides of median and posterior lobes of pronotum widely separated **28**	 
28a	Yellow patch along the intersegmental suture triangular and the dorsal two-thirds of the adjacent black bar almost parallel-sided; pterostigma generally markedly paler with the posterior side approximately twice as long as the distal or proximal side; pruinescence restricted to the front of the thorax ***Griseargiolestes eboracus***	 
b	Yellow patch along the intersegmental suture anterodorsally rather evenly curved and the dorsal third of the adjacent black bar distinctly conical; pterostigma generally markedly darker with the posterior side approximately 1.5 times as long as the distal or proximal side; pruinescence occurs over almost the whole insect ***Griseargiolestes intermedius***	 

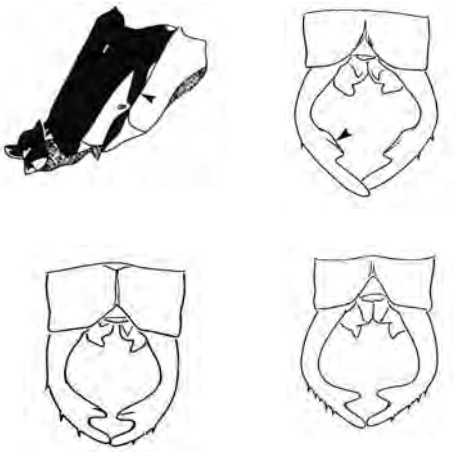
29a Line of junction between anterior dark metallic region of synthorax and pale region behind it almost straight, passing diagonally from mesocoxa to base of hind wing; male superior anal appendages with low, ventral subterminal flange

Miniargiolestes minimus



b Line of junction between dark and pale areas of synthorax irregular, with black stripe extending down in front of metapleural suture; male superior anal appendages with mesal tooth

ArchiargioIestes **30**

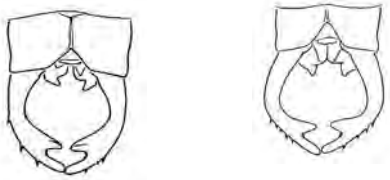


30a Tooth on superior appendages with broad crown, often forming two low, rounded peaks

Archiargiolestes pusillus

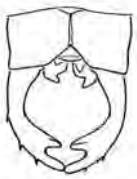
b Tooth on superior appendages with single peak

31



31a Anterior margin of tooth on superior appendages approximately 45º to axis of abdomen; a minor swelling present on anterobasal face of tooth

Archiargiolestes pusillissimus



b Anterior margin of tooth almost transverse to axis of abdomen

Archiargiolestes parvulus

Chlorocyphidae

Key to genus and species of **Chlorocyphidae**

The only species of this family recorded from Australia is ***Rhinocypha tincta semitincta.***

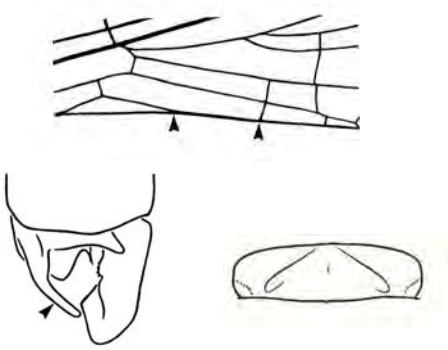
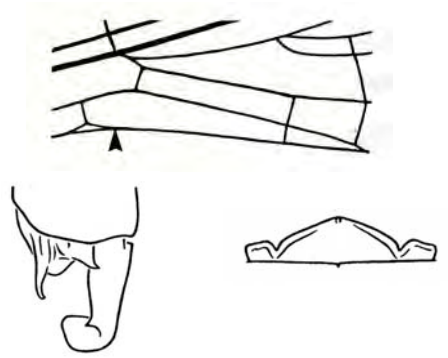
Calopterygidae

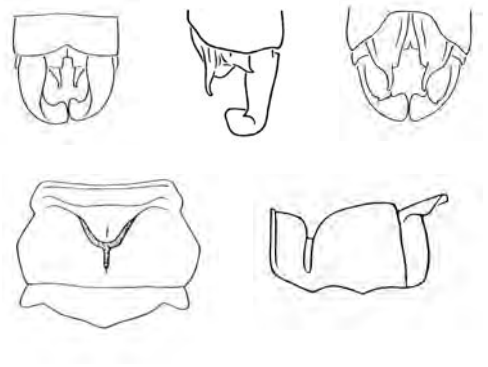
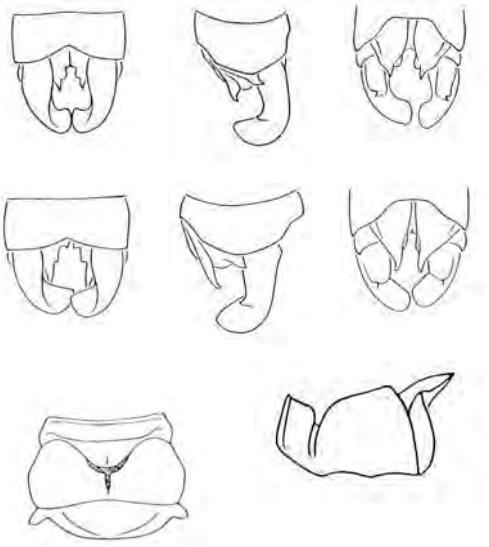
Key to genus and species of **Calopterygidae**

The only species of this family recorded from Australia is ***Neurobasis australis.***

Lestoideidae

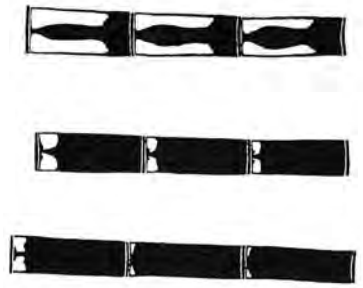
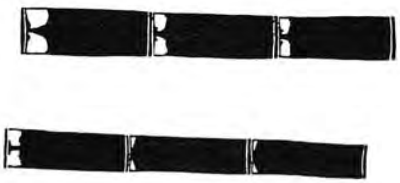
Key to genus and species of **Lestoideidae**

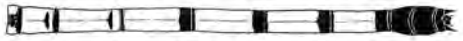
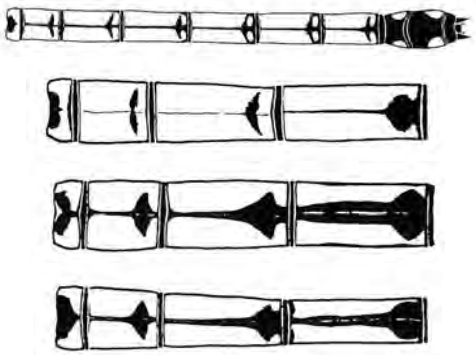
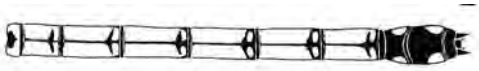
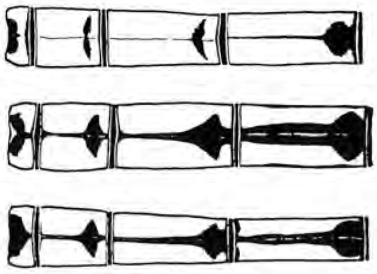
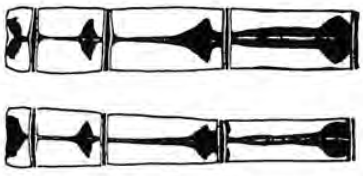
1a	Anal vein free of wing margin from Ac approximately one third or more of distance to crossvein at end of quadrilateral cell; inferior appendage of male almost as long as superior appendage; posterior lobe of female pronotum forming broad flange, not abruptly angulated, about half way to outer comer ***Lestoidea barbarae***	
b	Anal vein vestigial, free of wing margin for less than one third distance from Ac to crossvein at end of quadrilateral cell; inferior appendage of male much shorter than superior appendage; posterior lobe of female pronotum abruptly angled about half way to outer corner **2**	

2a	Male superior anal appendages perpendicularly bent ventrad, basal portion slim and with small ventral tooth, apex distinctly truncate; inferior appendages with end-lobe well defined, rather long and slim; female pronotum with medial portion of posterior lobe, narrow, subtriangular to widely rounded, the lateral margins narrow and not markedly upturned ***Lestoidea conjuncta***	
b	Male superior anal appendages almost perpendicularly bent ventrad **or** their basal and apical portion including a moderately wide angle; basal portion stout and with substantial ventral tooth, apex not distinctly truncate; inferior appendages with end-lobe not well defined and shorter; female pronotum with medial portion of posterior lobe wide and widely rounded, the lateral margins broad and markedly upturned **3**	
3a	Male superior anal appendages almost perpendicularly bent ventrad; inferior appendages with end-lobe short, claw-shaped ***Lestoidea brevicauda***	
b	Basal and apical portion of male superior anal appendages including a moderately wide angle; inferior appendages with end-lobe not well defined, longer and not claw-shaped ***Lestoidea lewisiana***	

Diphlebiidae

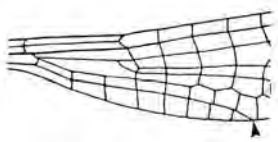
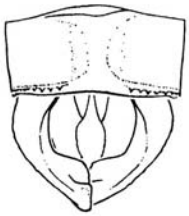
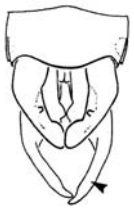
Key to genus and species of **Diphlebiidae**

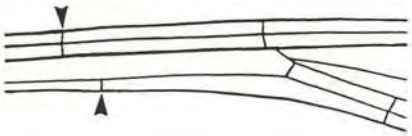
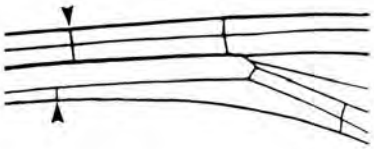
1a	Male **2**	
b	Female **6**	
2a	Terga 4-6 black above, at least in midline **3**	
b	Terga 4-6 largely blue or grey above, without broad, mid-dorsal black stripe **5**	
3a	Terga 4-6 with blue patch on each side, more than half length of tergum ***Diphlebia nymphoides***	
b	Terga 4-6 with or without blue basal spot on each side, no more than quarter length of tergum **4**	
4a	Basal spots on terga 4-6 usually very distinct; south of Paluma-Eungella gap ***Diphlebia coerulescens***	
b	Basal spots on terga 4-6 usually very small and indistinct, or absent; north of Paluma-Eungella gap ***Diphlebia euphoeoides***	
5a	Segment 10 and superior anal appendages black; apical half of wings with brownish black bar c. 10 mm wide, pale brown in tenerals, tip clear ***Diphlebia hybridoides***	
b	Segment 10 and superior anal appendages largely blue above; wings with or without white cross bar and darkened tip ***Diphlebia lestoides***	

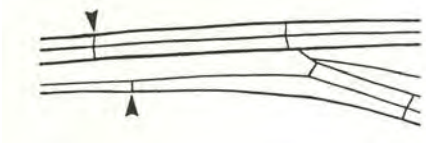
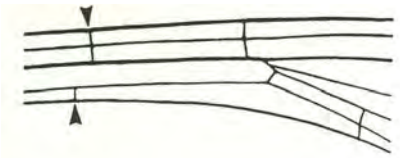
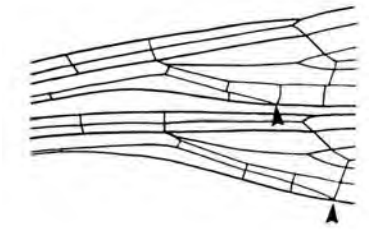
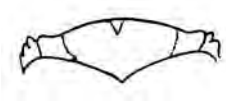
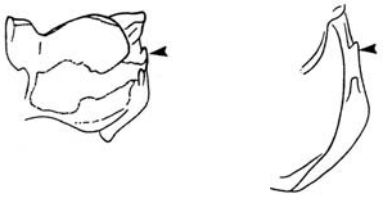
6a	Abdominal terga 4-7 without black mid-dorsal line, or with line of darkening confined to dorsal ridge; segments 8-10 entirely black ***Diphlebia hybridoides***	
b	Abdominal terga 4-7 with or without black mid-dorsal line; segments 8, 9 black with pale markings **7**	
7a	Dark mid-dorsal line, if present, of almost uniform width on terga 2-7, except for transverse black bar on supplementary transverse carina, sometimes extending to end of segment ***Diphlebia lestoides***	
b	Dark mid-dorsal line on terga 2 and 3 considerably narrower than on terga 4-7, or missing, distal black dorsal patch on segments 4-6 more or less onion-shaped, rounded at sides **8**	
8a	Mid-dorsal stripe on tergum 3 a very narrow line, or lacking; north of' Paluma-Eungella gap ***Diphlebia euphoeoides***	
b	Mid-dorsal stripe on tergum 3 narrow in front, broadening progressively towards swollen spot at end of segment; south of Paluma-Eungella gap **9**	
9a	Pale lateral stripe on terga 4-7 narrow, sharply downcurved in front, forming L-shape ***Diphlebia nymphoides***	
b	Pale lateral stripe on terga 4-7 broad, slightly widened basally ***Diphlebia coerulescens***	

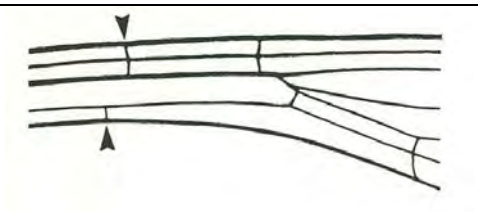
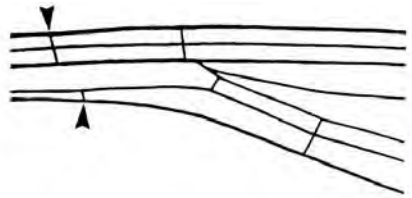
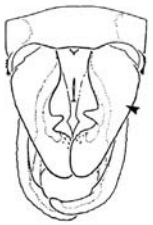
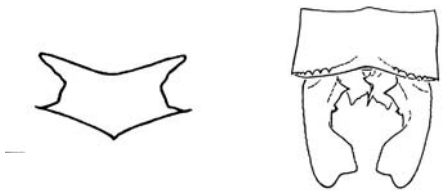
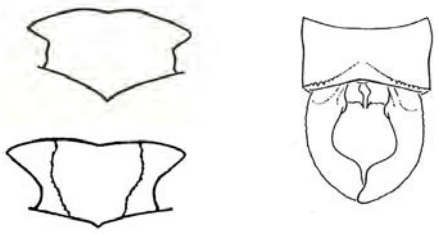
Isostictidae

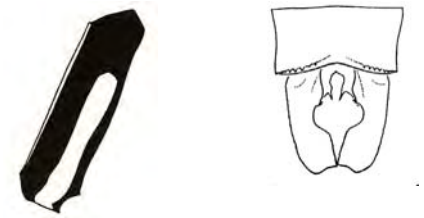
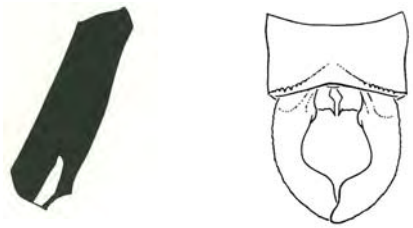
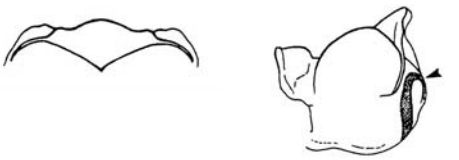
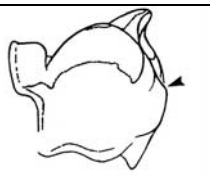
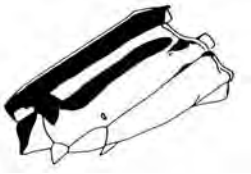
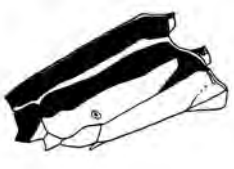
Key to genera and species of **Isostictidae**

1a	CuP one or two cells long, occasionally none **2**	
b	CuP three or more cells long **14**	
2a	Male **3**	
b	Female **10**	
3a	Superior anal appendages shorter than inferiors ***Rhadinosticta*** **4**	
b	Superior anal appendages longer than inferiors **5**	
4a	Distal part of male inferior appendage far more slender than superior appendage; lateral horns on posterior lobe of pronotum short, their length (without hairs) less than a quarter the basal width of posterior lobe ***Rhadinosticta simplex***	 
b	Distal part of male inferior appendage almost as substantial as superior appendage; prothoracic horns elongate, length more than a quarter the basal width of posterior lobe ***Rhadinosticta banksi***	 

5a	Ac in hind wing at or distal to level of Ax1 ***Oristicta filicicola***	
b	Ac in hind wing proximal to level of Ax1 **6**	
6a	Hind wing longer than 20 mm ***Labidiosticta vallisi***	
b	Hind wing shorter than 20 mm ***Eurysticta*** **7**	
7a	Front of synthorax either entirely pale (in many females), or with dark band on either side of dorsal carina, plus shorter, narrow, upright stripe half-way from dorsal carina to mesopleural suture ***Eurysticta coolawanyah***	
b	Front of synthorax bearing some bronze-green markings, sometimes substantially bronze; no upright stripe half-way from dorsal carina to mesopleural suture **8**	
8a	Bronze-green coloration completely restricted to median half of front of synthorax ***Eurysticta reevesi***	
b	Bronze-green coloration extending somehow into outer (lateral) portions of front of synthorax **9**	
9a	Bronze-green band on either side of dorsal carina occupying half the front of synthorax, or less, the outer edges parallel except for short broadening or diagonal, downward-directed lobe near centre ***Eurysticta kununurra***	
b	Bronze-green coloration occupying more than half width of front of synthorax, sometimes entire width, its outer edges wavy or scalloped, or set with a row of pale spots in front of mesopleural suture ***Eurysticta coomalie***	

10a	Ac in hind wing at or distal to level of Ax1 ***Oristicta filicicola***	
b	Ac in hind wing proximal to level of Ax1 **11**	
11a	CuP one cell long in forewing, two cells long in hind wing ***Eurysticta*** **7**	
b	CuP one cell long in forewing and hind wing **12**	
12a	Labrum black with pale front margin ***Labidiosticta vallisi***	
b	Labrum creamy white, with or without darker markings occupying up to basal half ***Rhadinosticta*** **13**	
13a	Female lacking prothoracic horns; hind margin of proepimeron with two short, blunt, upwardly-directed spines ***Rhadinosticta simplex***	 
b	Female with or without prothoracic horns; hind corner of proepimeron bearing low swelling ***Rhadinosticta banksi***	

14a	Ac in hind wing proximal to Ax1 ***Lithosticta macra***	
b	Ac in hind wing distal to, or aligned with, Ax1 **15**	
15a	Superior anal appendages of male much longer than inferiors; anal appendages of female black ***Neosticta*** **16**	
b	Superior anal appendages of male shorter than inferiors; anal appendages of female pale ***Austrosticta*** **21**	
16a	Male **17**	
b	Female **19**	
17a	Upper margin of posterior lobe of pronotum lowest in midline, appearing shallowly V-shaped in frontal view; superior appendages cleaver-shaped ***Neosticta fraseri***	
b	Upper margin of posterior lobe of pronotum slightly bowed upwards on each side of midline, then downturned towards lateral horns; superior appendages cleaver-shaped, or forcipate **18**	

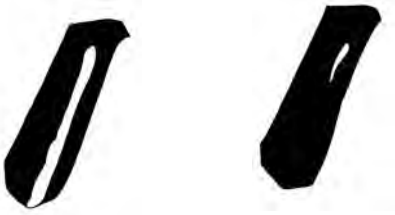
18a	Broad, pale antehumeral band over outer, lower half to two-thirds of front of synthorax; superior appendages cleaver-shaped ***Neosticta canescens***	
b	Front of synthorax entirely dark, or with pale, antehumeral stripe over outer, lower quarter to third; superior appendages forcipate with rounded, inner swelling near tip ***Neosticta silvarum***	
19a	Posterior lobe of pronotum low, its height in midline less than half its width; hind border of proepimeron excavate, cowl-shaped, with dark rim ***Neosticta fraseri***	
b	Posterior lobe of pronotum strongly produced and swollen in midline, its height more than half its width **20**	
20a	Hind margin of proepimeron inflated, black ***Neosticta canescens***	
b	Hind margin of proepimeron not inflated, bordered by ridges ***Neosticta silvarum***	
21a	Synthorax with large black frontal patch and black lateral stripe continuous, or almost so, across base of mesopleural suture ***Austrosticta frater***	
b	Synthorax with large black frontal patch and black lateral stripe not continuous across base of mesopleural suture **22**	

22a	Pale lateral areas of male abdominal terga 7-9 visible from above; superior anal appendages of male forcipate, with mesal tooth well beyond midlength ***Austrosticta fieldi***	
b	Pale lateral areas of male abdominal terga 7-9 scarcely or not visible from above; superior anal appendages of male forcipate, with mesal tooth slightly beyond midlength ***Austrosticta soror***	

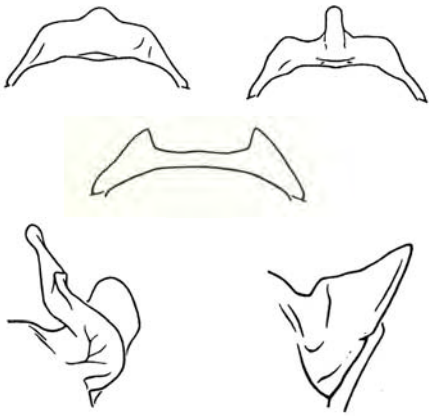
Platycnemididae: Disparoneurinae

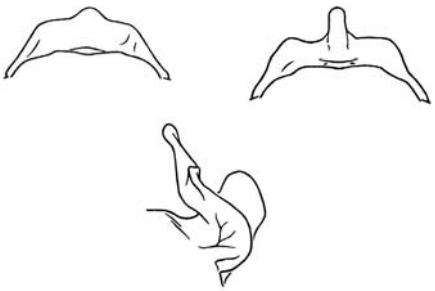
Key to genus and species of **Platycnemididae: Disparoneurinae**

1a	Male **2**	
b	Female **13**	
2a	Central portion of the wings with brown to black markings **3**	
b	Wing membrane hyaline or yellow **4**	
3a	Wings with well-defined brownish-black transverse band between levels of about 3rd-4th and 7th-9th postnodal veins ***Nososticta kalumburu***	
b	Wings with broader, more diffuse brown patch, from about level of nodus almost to pterostigma ***Nososticta baroalba***	
4a	Antehumeral stripes bright orange **5**	
b	Antehumeral stripes ochraceus, with whitish, pale green or blue **6**	
5a	Antehumeral stripes broad, occupying much of mesanepisternum ***Nososticta pilbara***	
b	Antehumeral stripes narrower, occupying outer half to two-thirds of mesanepisternum ***Nososticta solida***	

6a	Abdominal terga 5 and 8 with substantial basal green to yellowish marks, that on segment 8 occupying approximately half the tergum ***Nososticta solitaria***	
b	Abdominal tergum 5 with at most narrow basal spot or spots occupying 10% or less the length of the tergum, tergum 8 pale only along lateral margin **7**	
7a	Broad oval greenish to whitish spot beside each lateral ocellus [antehumeral stripes pale green] ***Nososticta liveringa***	
b	Small ferruginous spot, or no pale mark, beside each lateral ocellus **8**	
8a	Postclypeus black, genae substantially to entirely black; antehumeral stripes ochreous to greenish blue, narrow, parallel-sided or slightly widened above, sometimes short, truncate ***Nososticta fraterna***	 
b	Postclypeus blue, or blue and black; genae substantially blue; antehumeral stripes each occupying almost half the width of mesanepisternum, or more, narrowing above **9**	 

9a	Antehumeral stripes bright blue, occupying most of mesanepisterna, their inner margins straight, separated in midline by much less than half the maximum width of stripe ***Nososticta koongarra***	
b	Antehumeral stripes greenish blue or blue, inner margins straight or concave, separated in midline by half or more of the maximum width of stripe **10**	
10a	Superior anal appendages largely black, slender in profile, with single apex; abdominal terga 3-5 with lateral, whitish basal spots, broadly separated in dorsal midline [antehumeral stripes bright blue] **11**	
b	Superior anal appendages blue, broad in profile, their apices shallowly bifid; abdominal terga 3-5 with dorsal yellowish or greenish-blue basal spots, entirely or narrowly subdivided in midline, sometimes very small or absent **12**	  
11a	Posterodorsal portion of metepimeron black ***Nososticta mouldsi***	
b	All of metepimeron pale ***Nososticta taracumbi***	

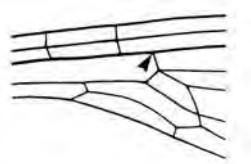
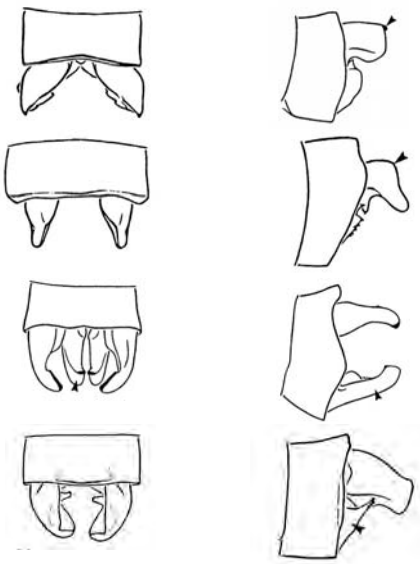
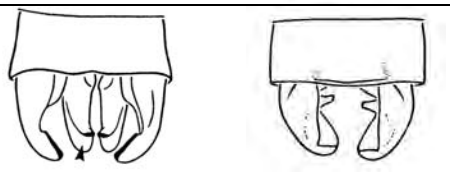
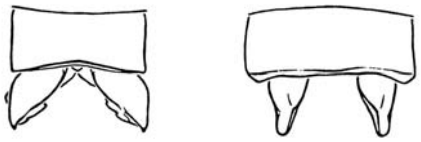
12a	Pale basal spots on abdominal terga 4-7 often lacking, when present much reduced, divided by narrow black mid-dorsal line ***Nososticta koolpinyah***	
b	Pale basal spots on terga 3-7 extending across mid-dorsal line ***Nososticta coelestina***	
13a	Posterior lobe of pronotum reflexed, scoop-shaped, strongly concave above, uniformly rounded to subtriangular with rounded apex **14**	
b	Posterior lobe of pronotum not scoop-shaped; apex, if defined, protuberant from lateral contour of lobe **18**	
14a	Abdominal tergum 1 pale to dull orange **15**	
b	Abdominal tergum 1 dark brown or black above **16**	

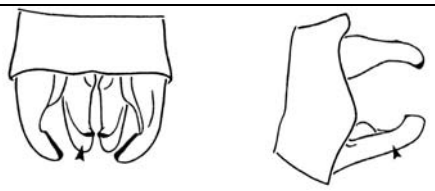
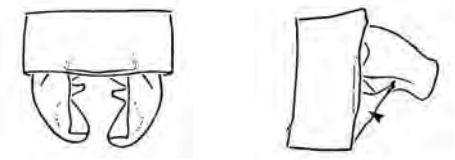
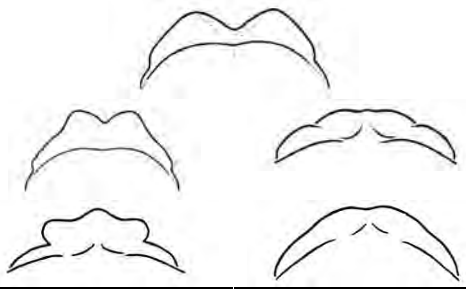
15a	Posterior lobe of pronotum shallowly concave, its edges almost straight in profile ***Nososticta pilbara***	
b	Posterior lobe deeply concave, its edges strongly bowed in profile ***Nososticta solida***	
16a	Posterior lobe of pronotum deeply concave, edges strongly bowed in profile, apex broad and rounded, appearing semicircular to truncate from above ***Nososticta solitaria***	
b	Posterior lobe shallowly concave, subtriangular, almost equilateral from above, edges almost straight in profile **17**	
17a	Antehumeral stripes narrow, separated from lower end of dorsal carina by at least twice their width at that level, commonly three times or more ***Nososticta fraterna***	
b	Antehumeral stripes broader, separated from lower end of dorsal carina by up to twice their width at that level ***Nososticta liveringa***	
18a	Posterior lobe of pronotum with well-defined apex, bearing blunt to finger-like or subtriangular projection **19**	
b	Posterior lobe of pronotum without well-defined apex **22**	

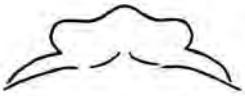
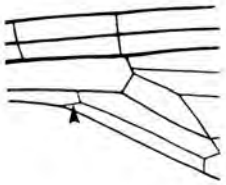
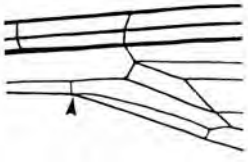
19a	Projection of apex of posterior lobe of pronotum subtriangular ***Nososticta mouldsi***	
b	Projection of apex of posterior lobe of pronotum blunt to finger-like **20**	
20a	Gena pale at anterior (upper) mandibular articulation ***Nososticta taracumbi***	
b	Black band extending across gena from anterior mandibular articulation to, or almost to, eye, sometimes contiguous with black lower margin of gena **21**	
21a	Antehumeral stripes narrow, separated from lower end of dorsal carina by approximately three times their width at that level ***Nososticta baroalba***	
b	Antehumeral stripes broad, separated from lower end of dorsal carina by approximately their own width at that level ***Nososticta koongarra***	
22a	Posterior lobe of pronotum a large, upright flap, almost flat, the upper margin variably emarginate in midline ***Nososticta kalumburu***	
b	Posterior lobe of pronotum low, comprising two small, widely separated peaks **23**	 
23a	Hind part of posterior lobe of pronotum broad and shelf-like, its lateral tooth partly behind upright triangular flap of anterior part ***Nososticta coelestina***	 
b	Hind part of posterior lobe of pronotum narrower, scarcely shelf-like, its lateral tooth lying behind upright triangular flap of anterior part ***Nososticta koolpinyah***	 

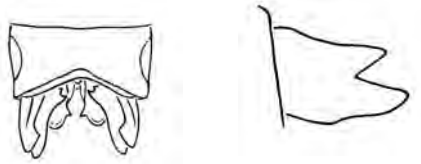
Coenagrionidae

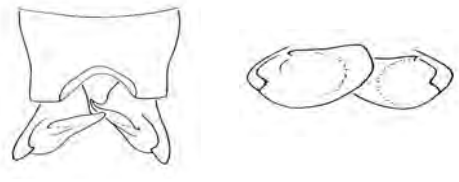
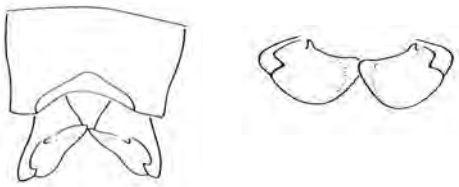
Key to genera and species of **Coenagrionidae**
Agriocnemis thoracalis cannot beinterpreted and is omitted from the key. *Pseudagrion ingrid* is regarded as junior synonym of *Archibasis mimetes*.

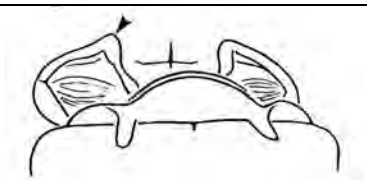
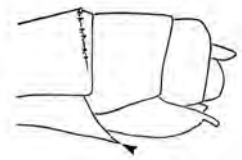
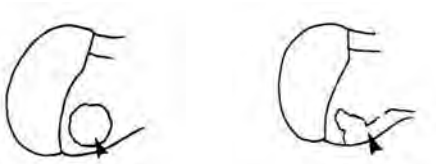
1a	Arculus in hind wing situated beyond distal antenodal crossvein by at least the length of subcostal part of antenodal; very small damselflies, hind wing shorter than 14 mm ***Agriocnemis*** **2**	
b	Damselflies without this combination of characters **14**	
2a	Male **3**	
b	Female **8**	
3a	Inferior anal appendages much longer than superiors ***Agriocnemis femina***	
b	Inferior anal appendages almost the same length as, or shorter than, superiors **4**	
4a	Tips of superior appendages converging **5**	
b	Tips of superior appendages not converging **6**	

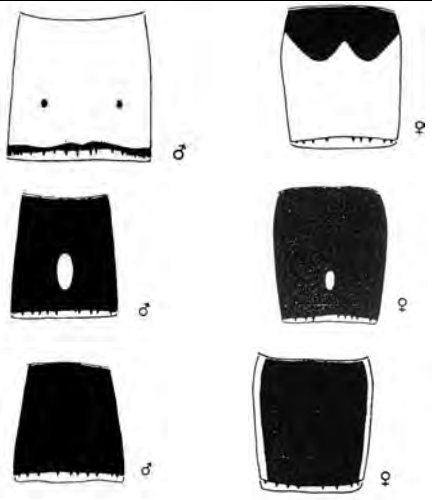
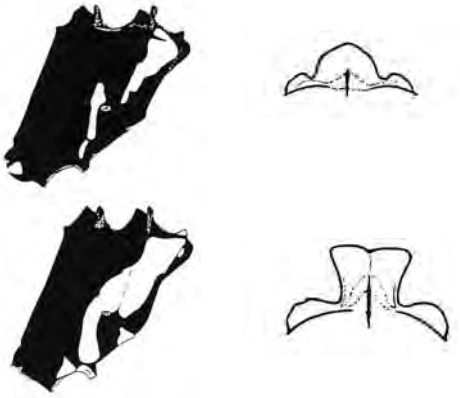
5a	Inferior appendages almost as long as superiors; abdominal terga 7-8 substantially dark brown-black ***Agriocnemis dobsoni***	
b	Inferior appendages much shorter than superiors; abdominal terga 7-8 substantially orange-red ***Agriocnemis rubricauda***	
6a	Black line present along upper half or more of metapleural suture ***Agriocnemis kunjina***	
b	Small black spot at upper end of metapleural suture **7**	
7a	Upper surface of superior appendage ending in short, stout tooth; mature males covered in white pruinescence ***Agriocnemis argentea***	
b	Upper surface of superior appendage uniformly curved; mature males not heavily pruinose ***Agriocnemis pygmaea***	
8a	Posterior lobe of pronotum reduced to low rim ***Agriocnemis pygmaea***	
b	Posterior lobe of pronotum well developed **9**	
9a	Central part of posterior lobe of pronotum a broad, posterior flap, depressed in midline with, in front of it, a narrower, upright lobe ***Agriocnemis dobsoni***	
b	Central part of posterior lobe of pronotum, if differentiated from rest, a single, upright flap, or depressed **10**	

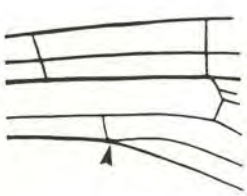
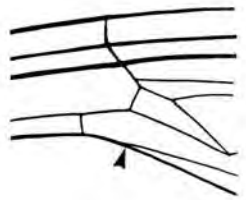
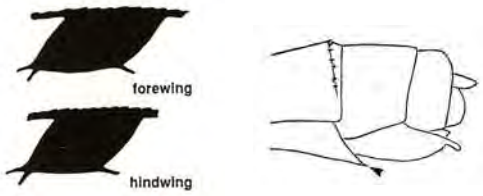
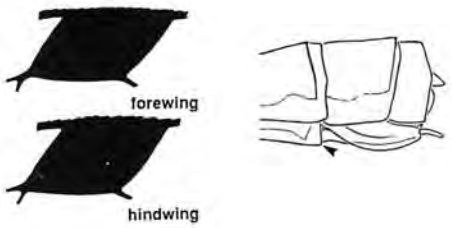
10a	Posterior lobe of pronotum upright, shallowly to deeply depressed in midline **11**	
b	Central part of superior lobe of pronotum, if differentiated, a simple or trilobed flap, usually highest in midline **12**	
11a	Black line present along upper half or more of metapleural suture ***Agriocnemis kunjina***	
b	Small dark spot at upper end of metapleural suture ***Agriocnemis femina***	
12a	Margins of central and lateral portions of posterior lobe of pronotum discontinuous, central portion ending behind lateral portion; from north-western Australia ***Agriocnemis argentea***	
b	Margins of central and lateral portions of posterior lobe of pronotum continuous; from eastern and northern Australia **13**	
13a	Central portion of posterior lobe of pronotum an upright, trilobed flap ***Agriocnemis rubricauda***	
b	Central portion of posterior lobe scarcely differentiated from lateral portions ***Agriocnemis argentea***	
14a	Anal vein leaving wing margin well basal to the level of Ac in both wings, so there is a basal segment of anal vein about the same length as Ac **15**	
b	Anal vein leaving wing margin nearer to or beyond level of Ac; basal segment of hind wing anal vein, if present, not more than half length of Ac **35**	

15a	Hind wing longer than 22 mm **16**	
b	Hind wing shorter than 22 mm **28**	
16a	Abdominal segments 2-4 black and blue or blue-grey above ***Caliagrion billinghursti*** (part)	
b	Abdominal segments 2-4 bronze-black above ***Pseudagrion*** (part) **17**	
17a	Male **18**	
b	Female **23**	
18a	Synthorax blue and black **19**	
b	Synthorax with extensive brown to yellow areas, sometimes pruinescent **20**	
19a	Superior anal appendages with deep, V-shaped notch at tip, the lower branch longer than the upper ***Pseudagrion microcephalum***	
b	Superior appendages with shallow, wide emargination at tips, the upper branch longer than the lower ***Pseudagrion cingillum***	
20a	Face dull brown; abdominal segments 8-9 pale bluish grey, pruinescent ***Pseudagrion jedda***	
b	Face yellow or orange-yellow; end of abdomen either blackish brown, often pruinescent, or bright blue on much of segments 8-9 **21**	
21a	Front of synthorax black or brown **22**	
b	Front of synthorax yellow ***Pseudagrion aureofrons***	

22a	Face of mature individuals orange to red; caudal face of male superior anal appendages more than twice as long as wide ***Pseudagrion ignifer***	
b	Face of mature individuals pale to bright yellow; caudal face of male superior anal appendages markedly less than twice as long as wide ***Pseudagrion lucifer***	
23a	Abdominal segments 3-5 brownish black above except for narrow, pale band at extreme base; lateral margin of dark upper surface almost straight **24**	
b	Dark pigmentation on abdominal segments 3-5 less extensive, tapered to rounded in front, narrowing to back, abruptly expanded distally, so that lateral pale areas are clearly visible from above, and lateral margin is sinuate **26**	
24a	12-15 postnodal crossveins **25**	
b	16-19 postnodal crossveins ***Pseudagrion jedda***	
25a	From New South Wales and from Queensland, except Cape York Peninsula ***Pseudagrion ignifer***	
b	From Kimberley region in Western Australia, from Northern Territory and from Cape York Peninasula ***Pseudagrion lucifer***	
26a	Length of forwardly-directed, finger-like process on each side of posterior lobe of pronotum less than height of anterior lobe at point of attachment ***Pseudagrion cingillum***	
b	Finger-like processes much longer than height of anterior lobe at point of attachment **27**	

27a	Transverse ridge above mesothoracic spiracle meeting ridge flanking its inner margin at a sharp angle, equal to or less than a right angle ***Pseudagrion aureofrons***	
b	Transverse ridge curving progressively into inner ridge ***Pseudagrion microcephalum***	
28a	Central part of posterior lobe of pronotum low, rounded, not produced into prominent tongue **29**	
b	Central part of posterior lobe of pronotum produced into prominent tongue **32**	
29a	Abdominal segment 3-5 of male extensively blue above, with black tips; female lacking ventral spine on apex of abdominal segment 8 ***Coenagrion lyelIi*** (part)	 
b	Abdominal segment 3-5 of male either dark brown to black or orange-red above; female with ventral spine on apex of abdominal segment 8 ***lschnura*** **30**	
30a	No pale markings on rear of head, behind eyes, although postocular area is usually pruinose in males ***Ischnura pruinescens***	
b	Postocular spots present **31**	
31a	Hind wing less than 14 mm long; male abdomen substantially red, marked blue and black distally ***Ischnura aurora***	
b	Hind wing more than 14 mm long; male substantially blue and black, the abdomen not red ***Ischnura heterosticta***	

32a	Reddish to black damselflies, hind wing longer than 14 mm ***Argiocnemis rubescens***	
b	Small bronze damselflies, hind wing shorter than 14 mm ***Austrocnemis*** **33**	
33a	Abdominal segment 9 substantially or entirely blue above ***Austrocnemis splendida***	
b	Abdominal segment 9 bronze-black above, with or without small blue spot **34**	
34a	Male metanepisternum black, often covered by pruinescence; posterior lobe of female pronotum an upright, rounded flap ***Austrocnemis maccullochi***	
b	Pale blue stripe extending diagonally across lower metanepisternum of male, on to metepimeron; posterior lobe of female pronotum a concave, inverted subtriangular flap ***Austrocnemis obscura***	
35a	Orange-red to yellowish green damselflies without dark thoracic markings **36**	
b	Damselflies with dark brown or black markings on pale background (reddish, yellow, green, blue, pale brown), or substantially dark, the dark areas in either case often with metallic sheen **37**	

36a	Anal vein leaving wing margin at or very close to level of Ac ***Ceriagrion aeruginosum***	
b	Anal vein leaving wing margin beyond Ac by at least the length of Ac ***Teinobasis rufithorax***	
37a	Pterostigma of forewing markedly larger than that of hind wing; female with ventral spine on apex of abdominal segment 8 ***Aciagrion fragile***	
b	Pterostigma of forewing similar in size to that of hind wing; female lacking ventral spine on abdominal segment 8 **38**	
38a	Pterostigma very small, almost as long as wide ***Archibasis mimetes***	
b	Pterostigma markedly longer than wide **39**	
39a	Male **40**	
b	Female **48**	
40a	Extensive dull orange to red markings on head, thorax and anterior abdomen ***Xanthagrion erythroneurum***	
b	No such markings on thorax or abdomen **41**	

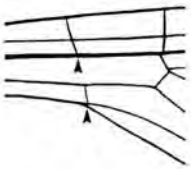
41a Synthorax with extensive brown or yellow areas, sometimes pruinescent
Pseudagrion (part) **18**

b Synthorax blue and black
42

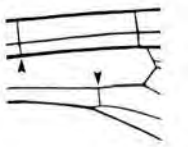
42a Antealar sinus partially to substantially blue
43

b Antealar sinus black
44

43a Ac of hind wing aligned, or almost aligned, with basal antenodal crossvein
CaIiagrion billinghursti (part)



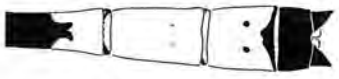
b Ac of hind wing beyond alignment of basal antenodal crossvein
Pseudagrion (part) **18**



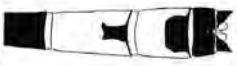
44a Abdominal segment 4 and 5 more than half blue above
Coenagrion lyelli (part)

b Abdominal segment 4 and 5 more than half black above
Austroagrion **45**

45a Abdominal segment 8 entirely blue; posterior part of segment 7 usually blue; segment 9 blue, occasionally with small, distal mid-dorsal black mark
Austroagrion cyane

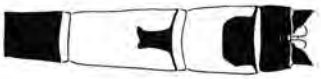
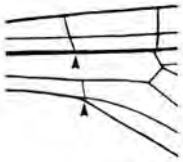
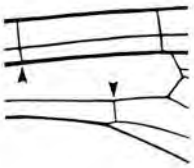
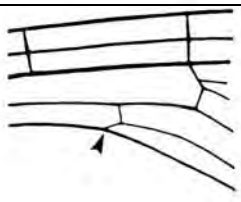
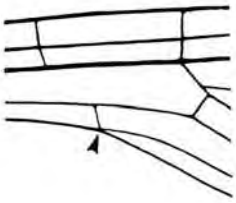


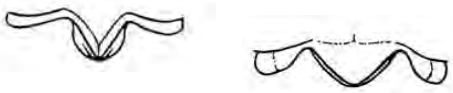
b Abdominal segment 7 black; segment 8 blue, usually with small to large distal, mid-dorsal black mark; segment 9 blue with generally large, distal, mid-dorsal black mark
46



46a Superior and inferior anal appendages almost equal in length
Austroagrion exclamationis

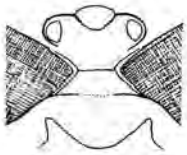
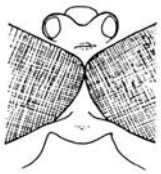
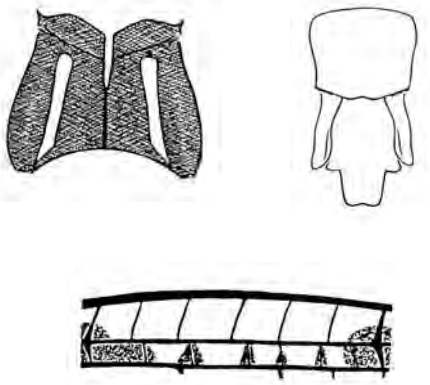
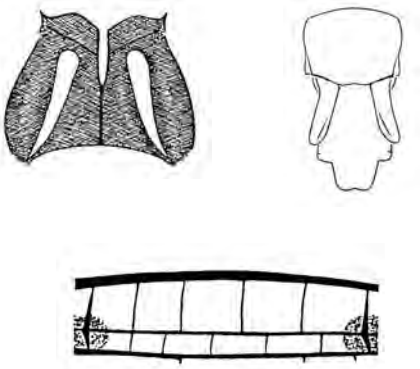
b Superior appendages much longer than inferiors
47

47a	Black marks on abdominal segments 8 and 9 extending full length of segment ***Austroagrion pindrina***	
b	Black marks on abdominal segments 8 and 9 occupying approximately half length of segment or less ***Austroagrion watsoni***	
48a	Posterior lobe of pronotum with forwardly directed, finger-like process on each side **49**	
b	Posterior lobe of pronotum without forwardly directed, finger-like process on each side **50**	
49a	Ac of hind wing aligned with basal antenodal crossvein ***Caliagrion billinghursti*** (part)	
b	Ac of hind wing beyond alignment with basal antenodal crossvein ***Pseudagrion*** (part) **23**	
50a	Posterior half of upper surface of abdominal tergum 1, excluding membrane, blue; anal vein leaving wing margin basal to Ac, forming short stalk ***Coenagrion lyelli*** (part)	
b	Upper surface of abdominal segment 1 brown to black, with or without orange-brown dorsal and lateral marks; anal vein leaving wing margin at Ac **51**	

51a	Synthoracic terga, between wing bases, pale orange; abdominal tergum 1 with triangular bronze dorsal mark partly divided by anterior, orange mid-dorsal line ***Xanthagrion erythroneurum***	
b	Synthoracic terga partially dark brown to black; abdominal tergum 1 with triangular to parallel-sided dark brown to black dorsal mark lacking pale mid-dorsal line ***Austroagrion*** **52**	
52a	Central part of posterior lobe of pronotum elongate, broadened at tip ***Austroagrion pindrina***	
b	Central part of posterior lobe of pronotum rounded triangular **53**	
53a	Central part of posterior lobe of pronotum with acutely V-shaped ridge on upper surface ***Austroagrion exclamationis***	
b	Central part of posterior lobe of pronotum with slightly raised margin and rounded apex **54**	
54a	Postclypeus black, with or without pale margin ***Austroagrion cyane***	
b	Postclypeus black with two pale spots, sometimes minute but sometimes fused in midline ***Austroagrion watsoni***	

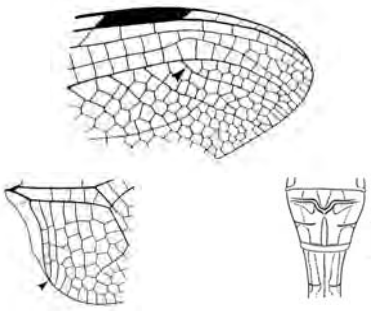
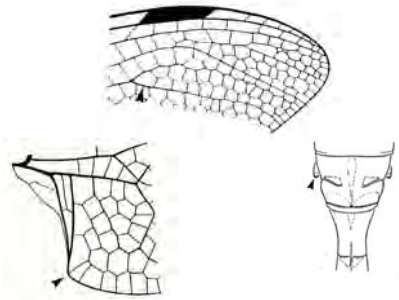
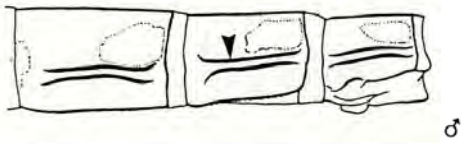
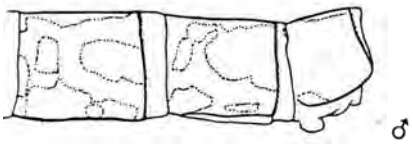
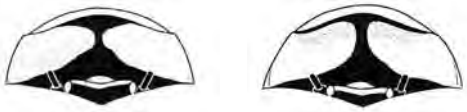
Austropetaliidae

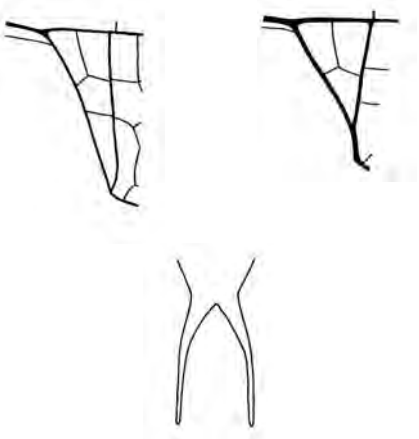
Key to genera and species of **Austropetaliidae**

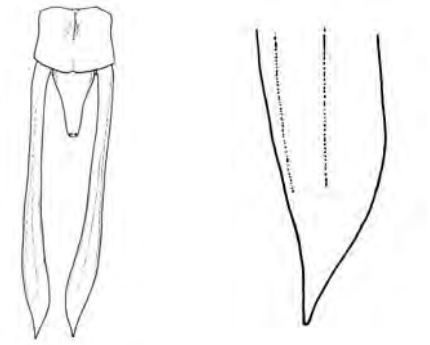
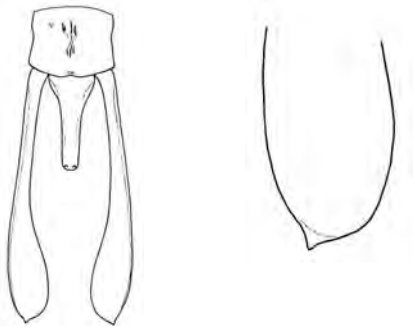
1a	Eyes separated in midline by a distance comparable to width of median ocellus; known only from Tasmania ***Archipetalia auriculata***	
b	Eyes meeting or almost meeting in midline; known only from mainland Australia ***Austropetalia*** **2**	
2a	Frons has pale line along crest or at least along its lateral portions; yellow stripes on front of synthorax narrow, parallel-sided for most of their length and separated by more than three times their maximum width; wing membrane of female strongly pigmented along several subcostal crossveins between the primaries; superior anal appendages of male slender, c. one-quarter as wide as long, convergent with slight bend at about midlength and with apex angulate. Only north of 35ºS ***Austropetalia patricia***	
b	Frons without pale line along crest; yellow stripes on front of synthorax moderately wide and separated by less than three times their maximum width near antealar ridge, thence slightly and rather evenly tapered to a point; wing membrane of female not pigmented along subcostal crossveins between the primaries; superior anal appendages of male rather stout, c. one-third as wide as long, straight and with apex rounded. Only south of 35ºS ***Austropetalia tonyana***	

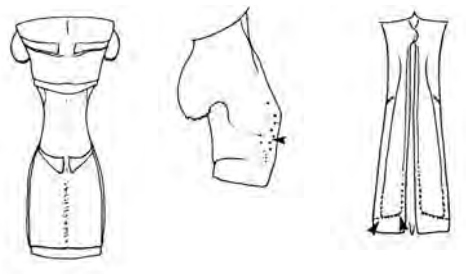
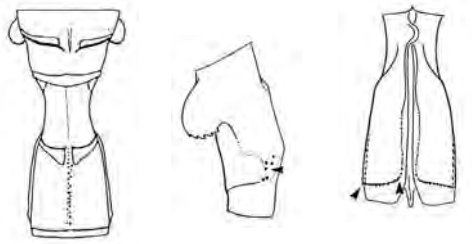
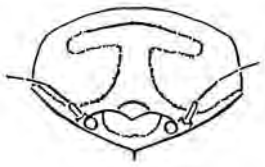
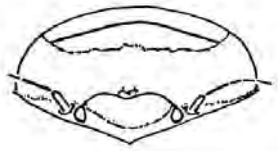
Aeshnidae

Key to genera and species of **Aeshnidae**

1a	Last prominent fork of IR3 at or near level of distal end of pterostigma in both wings; margin of hind wing rounded in both sexes, male lacking anal triangle and auricles ***Anax*** **2**	
b	Prominent fork of IR3 near or proximal to level of basal end of pterostigma in both wings; anal margin of hind wing rounded in female, angulated in male, forming anal triangle; male with auricles **5**	
2a	Sides of abdominal terga 7-9 in male, 4-9 or 5-9 in female, with strong supplementary longitudinal ridge **3**	
b	Sides of abdominal terga evenly rounded in male, strongly ridged on terga 7-8 or 7-9 in female ***Anax papuensis***	
3a	Top of frons dark brown to black only in subtriangular area in front of eyes and ocelli, midline and frontal crest pale or only slightly darkened ***Anax guttatus***	
b	Top of frons with T-shaped mark consisting of dark brown to black bar along frontal crest and dark brown mid-dorsal line, joining subtriangular black patch in front of eyes and ocelli **4**	
4a	Tergum 9 of both sexes with pair of large, posterodorsal spots ***Anax gibbosulus***	
b	Tergum 9 of male with pair of small, pale posterodorsal spots, or entirely dark Female unknown ***Anax georgius***	

5a	Space between CuP and 1A of hind wing slightly and continuously tapering from proximal to distal end, proximal portion usually one, occasionally two cells wide **6**	
b	Space between CuP and 1A of hind wing two to three cells wide proximally, narrowing to half or less in width over central third **12**	
6a	Anal triangle of male narrow, two-celled; dentigerous plate of female three-pronged ***Agyrtacantha dirupta***	
b	Anal triangle of male broad or narrow, with three or more cells; dentigerous plate of female two-pronged **7**	
7a	Front of synthorax with long, slanting pale stripe on each side; abdominal segments 4-7 with prominent basal, central and apical pale, yellowish spots ***Austrogynacantha heterogena***	
b	Front of synthorax dull brown or green, pale or dark, with or without an ill-defined pale patch in lower, outer corner; abdominal segments 4-7 with, at most, small pale spots, often almost unpatterned ***Gynacantha*** **8**	

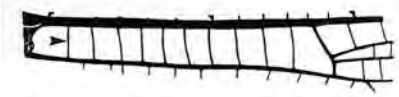
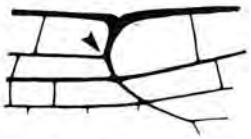
8a	Top of frons with faint darkening in midline ***Gynacantha nourlangie***	
b	Top of frons with variably dark mid-dorsal line, commonly forming T-shaped mark with dark transverse mark on crest **9**	
9a	Segment 3 strongly constricted, width of 'waist' c. 1.1 mm or less in male, 1.5 mm in female **10**	
b	Segment 3 less strongly constricted, width of 'waist' c. 1.3 mm or more in male, 1.8 mm or more in female **11**	
10a	Superior anal appendages of male slender, produced into a long, slender point, inferior appendage viewed from above about the same length as, or somewhat shorter than, segment 10; female frons relatively narrow, less than 4 mm wide, base of hind wing brown to dark brown as far as basal antenodal crossvein, sometimes to arculus ***Gynacantha kirbyi***	
b	Superior anal appendages of male broadened in distal half, more or less rounded at tip, inferior appendage longer than segment 10; female frons more than 4 mm wide, pigmented patch at base of hind wing, if present, pale brown, generally not extending beyond membranule ***Gynacantha mocsaryi***	

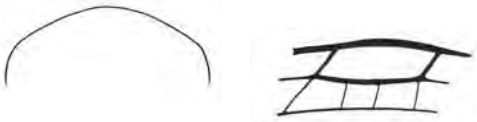
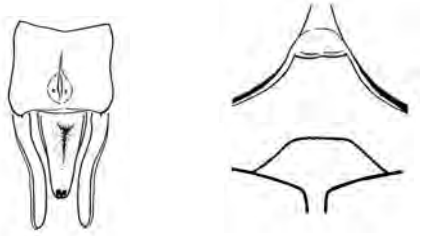
11a	Width of male 'waist' on abdominal segment 3 1.3-1.8 mm, 8-30 (commonly 15-25) black denticles around margin of genital fossa; ventral region of tergum 3 of female relatively narrow, hind margin from last tooth on lateral ridge to alignment of inner ridge less than 1.1 mm ***Gynacantha dobsoni***	
b	Width of male 'waist' on abdominal segment 3 1.8-2.3 mm, 2-10 (commonly 3-7) black denticles along margin of genital fossa; ventral region of tergum 3 of female relatively broad, hind margin more than 1.3 mm ***Gynacantha rosenbergi***	
12a	Top of frons with conspicuous black T-mark ***Adversaeschna brevistyla***	
b	Top of frons with black, transverse bar along the crest ***Anaciaeshna jaspidea***	

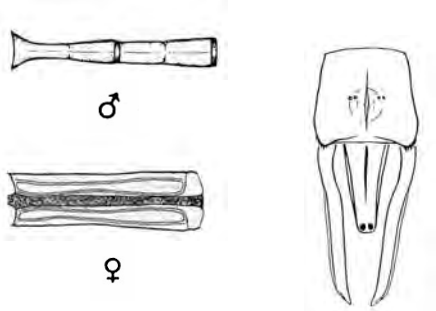
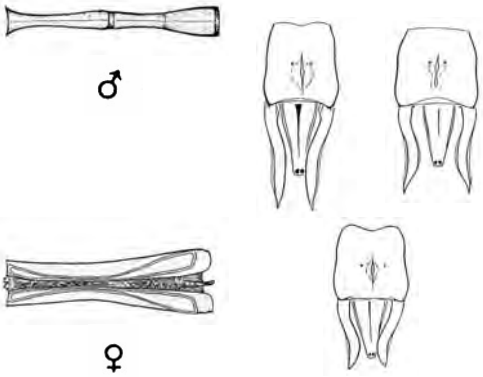
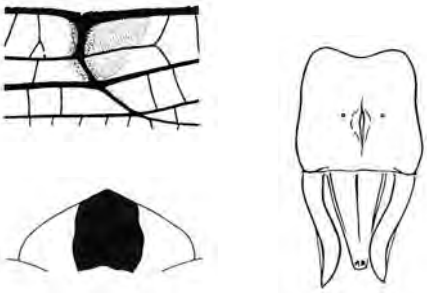
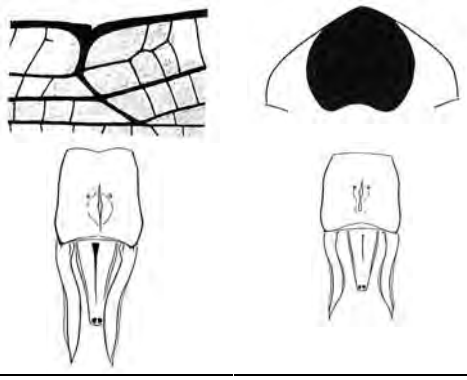
Telephlebiidae and Brachytronidae

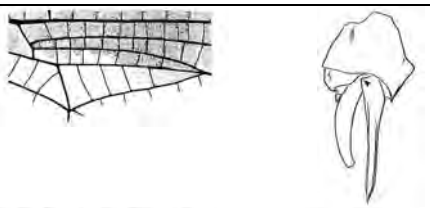
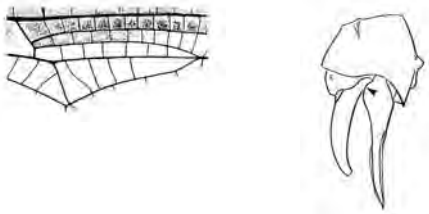
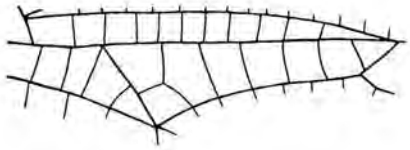
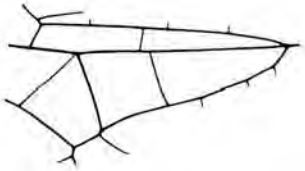
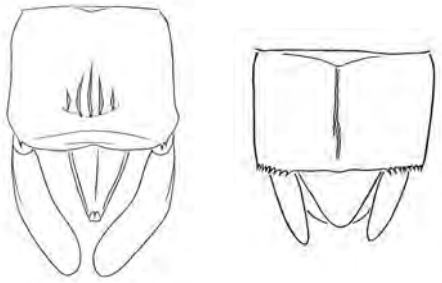
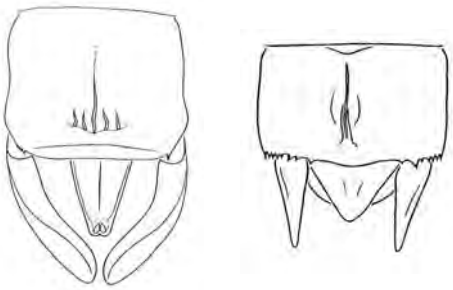
Key to genera, subgenera and species of **Telephlebiidae** and **Brachytronidae**

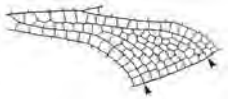
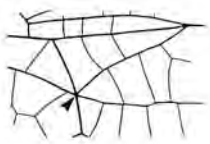
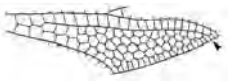
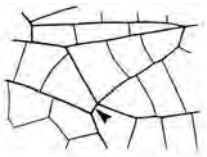
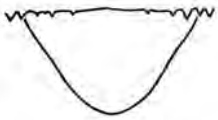
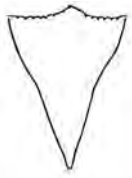
Only ***Dendroaeschna conspersa*** is considered to belong in Brachytronidae; all other species make up the Telephlebiidae.

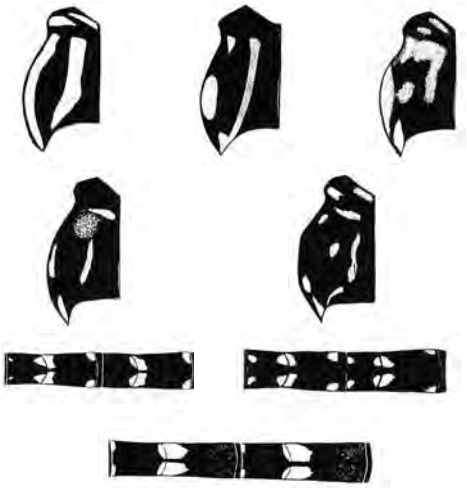
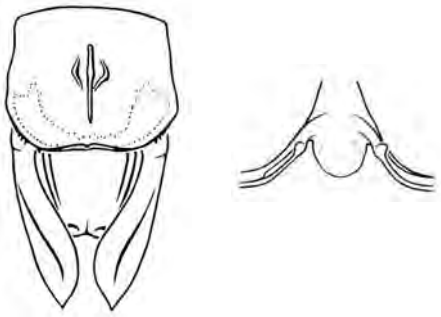
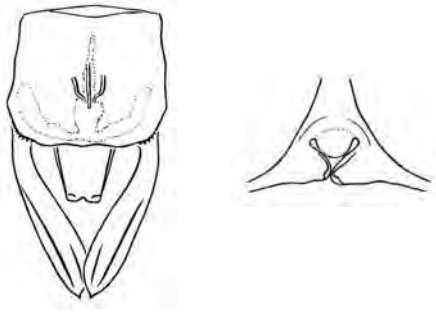
1a	Crossveins present in median space **2**	
b	No crossveins in median space **9**	
2a	Subcosta ending at nodus ***Dendroaeschna conspersa***	
b	Subcosta prolonged into first to third cell distal to nodus **3**	

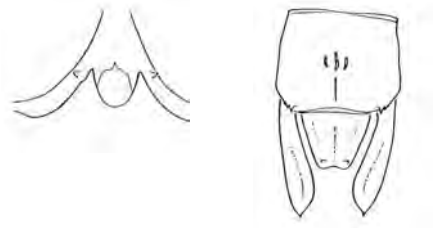
3a	Top of frons pointed in front; pterostigma overlying at least five cells ***Telephlebia*** **4**	
b	Top of frons rounded in front; pterostigma overlying no more than three cells ***Antipodophlebia asthenes***	
4a	Top of frons with wide, subtriangular dark mark, almost extending to outer edge **5**	
b	Top of frons with narrow dark mark, rounded or almost straight at sides, its base extending to level of antennal bases **6**	
5a	Male with tips of superior anal appendages rounded, or pointed on inner side, not convergent; female with comparatively narrow occiput ***Telephlebia brevicauda***	
b	Male with tips of superior anal appendages pointed or convergent; female with comparatively wide occiput ***Telephlebia godeffroyi***	

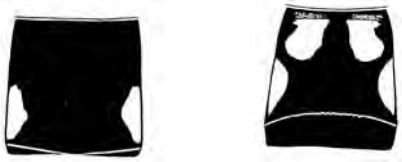
6a	Waist on abdominal segment 3 of male markedly narrower than that on segment 4, abdominal segment 4 of female almost parallel-sided; tips of superior anal appendages of male pointed and convergent ***Telephlebia cyclops***	
b	Waist on abdominal segment 3 of male little narrower than that on segment 4, abdominal segment 4 of female markedly constricted; tips of superior anal appendages of male pointed but not convergent **7**	
7a	Wings with basal and nodal markings widely separated, nodal mark extending behind radius only as a narrow band along subnodus; top of frons with narrow pentagonal dark mark in male, irregularly-shaped mark in female; superior anal appendages only slightly longer than inferior appendage, or larger than greatest width of tergum 10 ***Telephlebia undia***	
b	Wings with basal and nodal markings connected or separated, nodal mark extensive behind radius; top of frons with almost circular dark mark; superior anal appendages of male considerably longer than inferior appendage, and larger than greatest width of tergum 10 **8**	

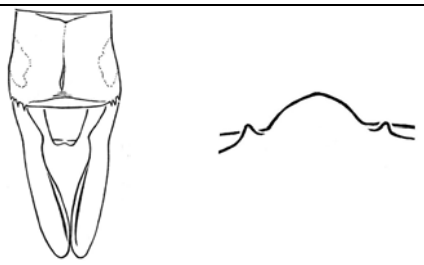
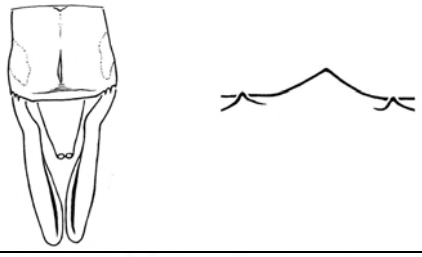
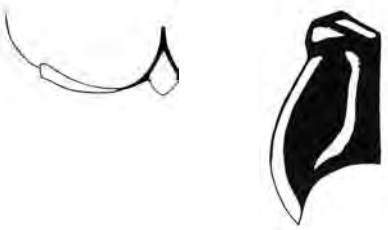
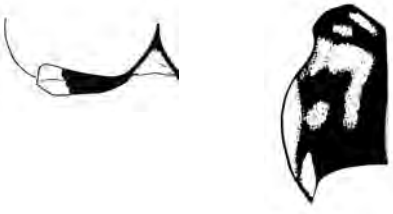
8a	Dark wing markings covering hypertriangle in both wings; lower basal corner of male superior anal appendages strongly angled ***Telephlebia tillyardi***	
b	Dark wing markings not covering hypertriangles in either wing; lower basal margin of male superior anal appendages rounded ***Telephlebia tryoni***	
9a	Wings with dark band just behind anterior margin; six to twelve cells in triangles and hypertriangles ***AustrophIebia*** **10**	
b	Wings hyaline; two to four, occasionally five, cells in triangles and hypertriangles **11**	
10a	Dark fasciae of wings extensive and vivid reddish brown, very similar in both sexes; male superior anal appendages convergent, markedly narrower in basal one-third than more distally, their outer margins slightly angulated near midlength, inferior appendage rather shallow, with apex very narrow; female with dentigerous plate of ovipositor moderately wide and bearing 8-12 teeth; anal appendages of female not particularly pointed ***Austrophlebia costalis***	
b	Fasciae of wings dark but not vivid olive brown, in female less strongly defined than in male; male superior anal appendages of approximately the same width from base to apex, their outer margins widely and evenly curved without any angulation; inferior appendage deeper and apically wider than in *A. costalis*; female dentigerous plate rather narrow and with apex truncate and bearing c. 6 teeth; anal appendages sharply pointed ***Austrophlebia subcostalis***	

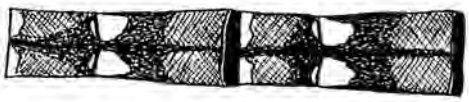
11a	Both wings with two supplementary radial veins (Rspl1 and Rspl2); posterior angle of hind wing triangle meeting 1A ***Acanthaeschna victoria***	 
b	Both wings with a single supplementary radial vein (Rspl); posterior angle of hind wing triangle and 1A joined by a short crossvein **12**	 
12a	Male with three or fewer, or without, distinct longitudinal dorsal ridges on segment 10; anal appendages of female shorter than to slightly longer than segment 10; supra-anal plate rounded to subtriangular ***Austroaeschna*** and ***Dromaeschna*** **13**	 
b	Male with five distinct longitudinal dorsal ridges on segment 10; anal appendages of female at least twice as long as segment 10 (sometimes broken, thus appearing short), supra-anal plate ending in long prominent spine **35**	 
13a	Abdominal segments 9 and 10 and anal appendages bright ochreous or rusty red-brown. [Synthorax dark brown with jade green markings, all but last abdominal segments dark brown and ochreous] ***Dromaeschna weiskei***	
b	Abdominal segments 9 and 10 and anal appendages largely dark brown or black **14**	

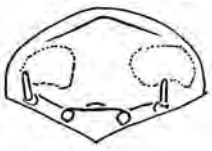
14a	Synthorax in front of mesopleural suture with a single yellow or yellowish green stripe over virtually its entire length on each side and, commonly, a small spot of the same colour beside it, near its upper end; abdominal terga 3-8 (male) or 3-7 (female) with one pair of pale spots, widely separated at base of segment ***Austroaeschna (Pulchaeschna)*** **15**	
b	Front of synthorax with one or two pale stripes over virtually the entire length on each side, or pale patches with or without a long pale stripe; abdominal terga 3-8 either lacking basal pale marks, or with both basal and central or distal marks ***Austroaeschna (Austroaeschna)*** **and** ***Dromaeschna*** **17**	
15a	Male inferior appendage scoop-shaped, broad, when seen from above extending almost to inner base of superior appendage; hind corners of occipital triangle of female unarmed or with small, upright or diverging tooth on each side **16**	
b	Male inferior appendage only slightly hollowed above, narrow, when seen from above occupying approximately central half of space between bases of superior appendages; hind corners of occipital triangle of female armed with pair of large, upright triangular flaps converging in midline ***Austroaeschna muelleri***	

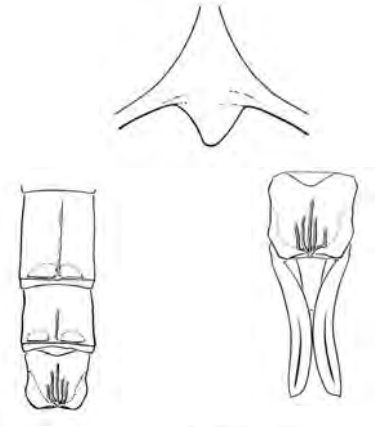
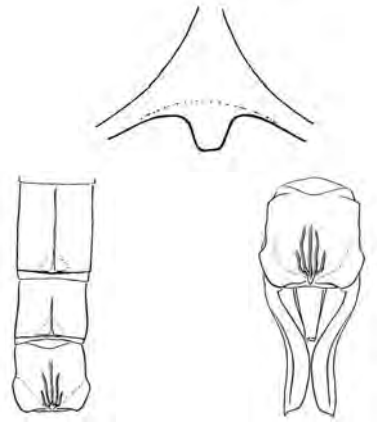
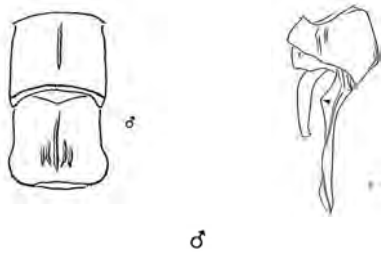
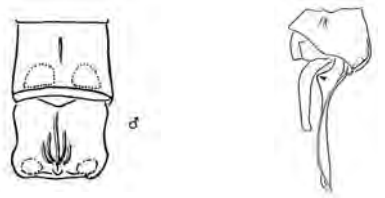
16a	Occiput large and predominantly pale; male superior anal appendages with tip asymmetrical; postoccipital lobes of female thin, finger-like, exceptionally missing ***Austroaeschna pulchra***	
b	Occiput smaller and predominantly dark; male superior anal appendages with tip almost symmetrical; postoccipital lobes of female wide, subtriangular ***Austroaeschna eungella***	
17a	Side of synthorax with three long, brown stripes of approximately equal width, one on mesopleural suture, one on line of intersegmental suture and one on metapleural suture, the intervening stripes green ***Dromaeschna forcipata***	
b	Side of synthorax with either unequal, pale stripes or pale patches on a dark background **18**	
18a	Top of frons black with pair of pale spots isolated from pale patch at side of anterior frons by broad to tenuous black band **19**	
b	Top of frons dark brown to black in centre and along anterior and posterior margins, otherwise pale, broadly continuous with pale lateral patch at side of anterior frons **28**	
19a	Anterior frons black or dark brown, pale at sides **20**	
b	Only upper part of anterior frons black **27**	
20a	Distal quarter to third of meso- and metafemur dark brown to black, darker than rest of femur **21**	
b	Meso- and metafemur reddish brown, with or without black tip **23**	

21a	A narrow pale green line, sometimes inconspicuous, over the whole length of front of synthorax, flanked by row of three pale spots in front of mesopleural suture ***Austroaeschna tasmanica***	
b	No uninterrupted line over whole length of front of synthorax **22**	
22a	Vertex dark with pale top ***Austroaeschna hardyi***	
b	Vertex entirely black ***Austroaeschna flavomaculata***	
23a	At least one broadly curved antehumeral stripe, covering whole length of front of synthorax **24**	
b	Antehumeral stripes reduced to short, narrow, slightly curved lines and small patches **25**	
24a	Tergum 9 of male and tergum 8 of female with pale dorsolateral patch each side ***Austroaeschna sigma***	
b	Tergum 9 of male and tergum 8 of female lacking pale dorsolateral patches ***Austroaeschna christine***	
25a	Anterodorsal spots on abdominal terga 3 and 4 generally much reduced or absent, and on 5-7, lacking ***Austroaeschna obscura***	
b	Anterodorsal spots on abdominal terga 3 and 4 generally well developed, and on 5-7, usually detectable **26**	

26a	Male inferior anal appendage short and thick, slightly emarginate and not particularly tapered; female occiput in caudal aspect rounded; from south-eastern New South Wales and Victoria, except for the Grampians ***Austroaeschna multipunctata***	
b	Male inferior anal appendage long and slender, distinctly bilobed and tapered; female occiput in caudal aspect obtusely pointed; from the Grampians ***Austroaeschna ingrid***	
27a	Three small pale marks on mesepimeron; mesokatepisternum dark brown to black; legs black with small yellow marks near bases of tibiae ***Austroaeschna anacantha***	
b	A curved, pale band on upper mesepimeron; mesokatepisternum brown with distinct yellow patch; a subapical yellow mark on meso- and metafemur ***Austroaeschna parvistigma***	
28a	Postgenae pale immediately behind eye-margin; one or two distinct, long, antehumeral stripes on each side **29**	
b	Postgenae immediately behind eye-margin black, with bright yellow or brown mark near lateral notch; front of synthorax with pale. often ill-defined patches on dull blackish brown background **34**	

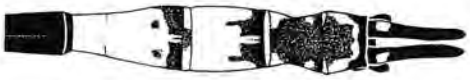
29a	Mesokatepisternum brown; profemur brown to dark brown, darkening distally ***Austroaeschna inermis***	
b	Mesokatepisternum brown with yellow patch; profemur brown to black above and at sides, pale below **30**	
30a	Lateral stripe on synthorax constricted and slightly curved at about its middle; abdominal segments 3-7 brown, darkened around pale spots on supplementary transverse carina [A warmly coloured dragonfly, with very long abdomen] ***Austroaeschna unicornis*** (part)	 
b	Lateral stripe on synthorax not constricted, more or less parallel sided; dark regions of abdominal segments 3-7 of male largely black, paler distally **31**	 
31a	Pale spots on abdominal tergum 8 extensive, about half as long as the tergum; male inferior appendage short, truncate **32**	
b	Pale spots on abdominal tergum 8 small, less than a third the length of the tergum; male inferior appendage long, subtriangular ***Austroaeschna cooloola***	
32a	From eastern Queensland north of 20°S ***Austroaeschna speciosa***	
b	From Queensland south of 20°S **33**	

33a	Lower pale mesepimeral mark a substantial patch ***Austroaeschna unicornis*** (part)	
b	Lower pale mesepimeral patch a fine line ***Austroaeschna pinheyi***	
34a	Hind margin of occipital triangle slightly concave to almost straight, that of female flanked by large, subtriangular flap ***Austroaeschna atrata***	
b	Hind margin of occipital triangle markedly convex, that of female flanked by rounded tooth of variable length ***Austroaeschna subapicalis***	
35a	Top of frons dark brown to black, with pale band running just in front of antenna and eye margin on each side; pale abdominal pattern largely consisting of elongate triangular spots along thin, dark midline ***Notoaeschna*** **36**	 
b	Top of frons dark brown to black, with a pale oval spot on each side; pale abdominal pattern largely consisting of almond-shaped spots, widely separated along midline ***Spinaeschna*** **37**	 

36a	Rear of occiput bearing pale, upwardly-directed, thumb-like projection; male with segment 10 markedly narrower than preceding segments, and superior anal appendages appearing long, slender ***Notoaeschna sagittata***	
b	Occipital projection small, dark, inconspicuous; male with segment 10 as wide as preceding segment, and superior anal appendages short, stout ***Notoaeschna geminata***	
37a	Abdominal segments 9,10 entirely dark brown or blackish brown above; superior anal appendages of male slightly angulated near base ***Spinaeschna watsoni***	
b	Abdominal segments 9, 10 of male and segment 9 of female with a pair of pale, posterodorsal patches; superior anal appendages with ventral tooth near base ***Spinaeschna tripunctata***	

Lindeniidae

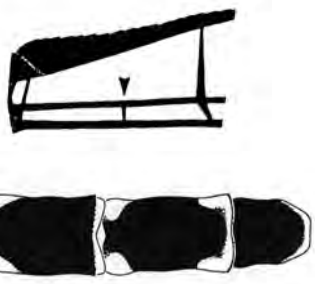
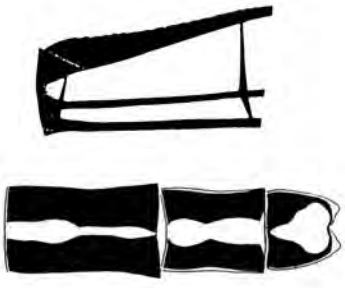
Key to genus and species of **Lindeniidae**

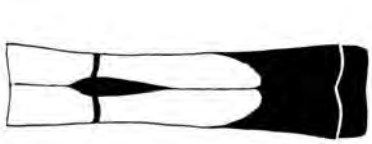
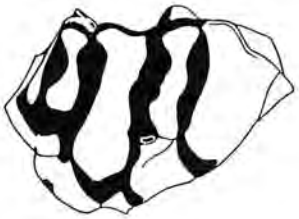
1a	Yellow humeral stripe reduced to spot below end of antealar ridge, with or without spot at lower end; yellow stripe on metanepisternum similarly reduced ***Ictinogomphus paulini***	
b	Yellow humeral stripe extending from just below antealar ridge to katepisternum, sometimes interrupted at upper third; yellow stripe on metanepisternum extending to level of metastigma **2**	
2a	Abdominal terga 7-8 approximately half yellow and half black above; terga 9-10 substantially black above ***Ictinogomphus australis***	
b	Abdominal terga 7-8 yellowish in front, reddish brown to reddish black behind; much of terga 9-10 reddish brown above ***Ictinogomphus dobsoni***	

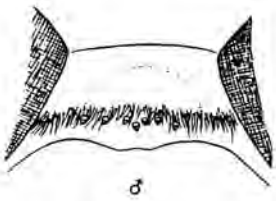
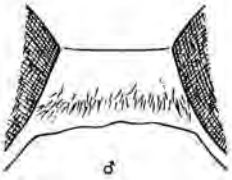
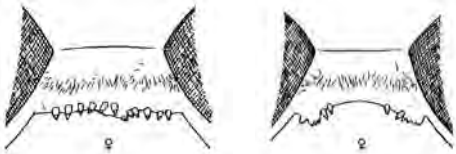
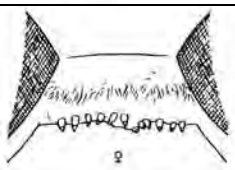
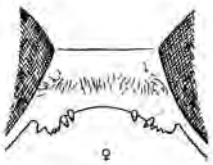
Gomphidae

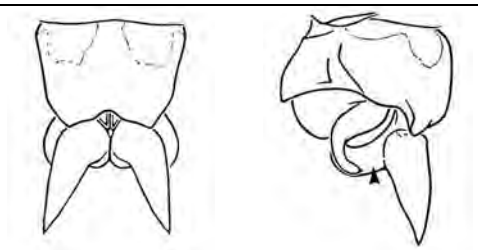
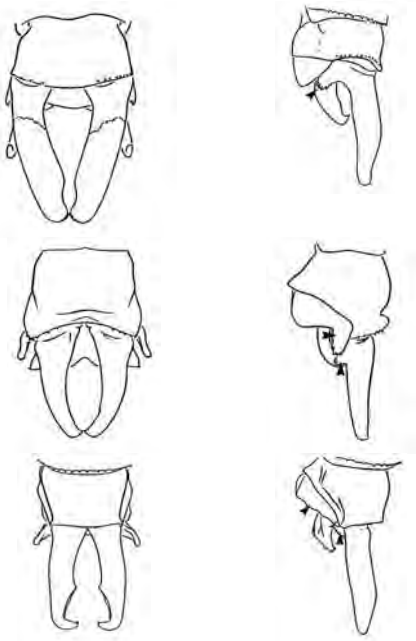
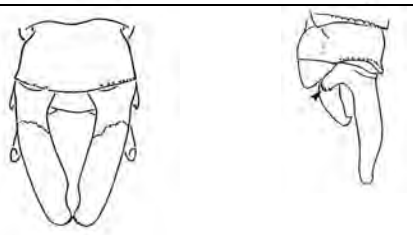
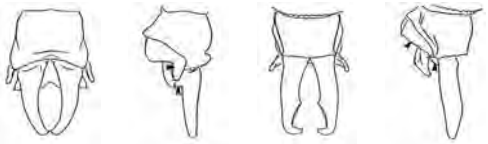
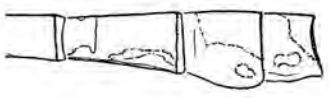
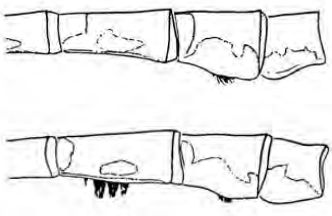
Key to genera, subgenera and species of **Gomphidae**

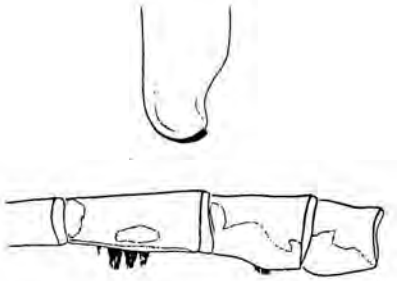
Austroepigomphus melaleucae is considered to be a junior synonym of *Austroepigomphus praeruptus.*

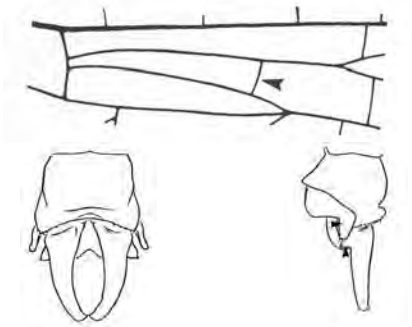
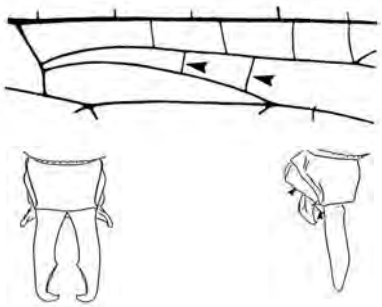
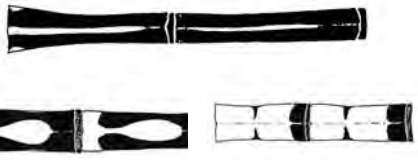
1a	Incomplete (subcostal) antenodal crossvein proximal to Ax1 usually present in forewings, sometimes lacking in hind wings; end of abdomen elongate, mid-dorsal length of abdominal tergum 9 more than 2.4 mm in male, 2.3 mm in female ***Antipodogomphus*** **2**	
b	Generally no incomplete antenodal crossvein proximal to Ax1 in any wing; end of abdomen not elongate, mid-dorsal length of abdominal tergum 9 less than 2.3 mm in male, 2.1 mm in female **9**	

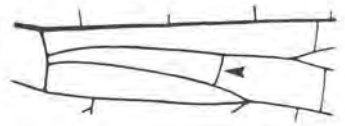
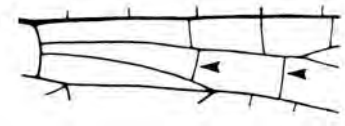
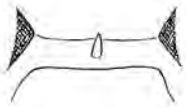
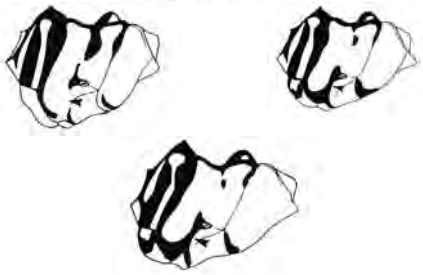
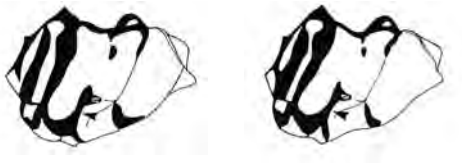
2a	Abdominal terga 9-10 reddish yellow; abdominal terga 4-5 with short, black mid-dorsal line, faint in very pale individuals, often fused with transverse black ring on supplementary transverse carina **3**	
b	Abdominal terga 9-10 mainly black above; terga 3-5 with yellow mid-dorsal line, sometimes fused to anterior yellow ring **4**	
3a	Black stripe along line of intersegmental suture of synthorax broken above metastigma ***Antipodogomphus neophytus***	
b	Black stripe along line of intersegmental suture continuous above metastigma ***Antipodogomphus hodgkini***	
4a	Humeral stripe reduced to two small, yellow patches: an upper, rounded spot below the antealar ridge and a central, short linear spot; abdominal tergum 9 black ***Antipodogomphus acolythus***	
b	Humeral stripe divided into three spots, almost equally spaced, the lowermost usually fused with outer end of collar; abdominal tergum 9 with basal and apical yellow spots on each side **5**	
5a	Male **6**	
b	Female **7**	

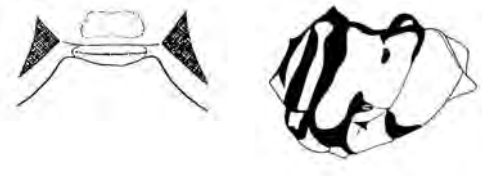
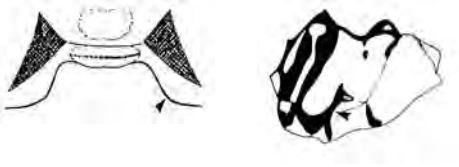
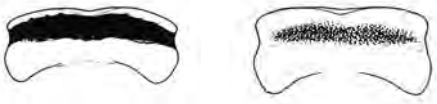
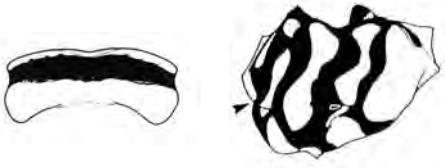
6a	Rear of occiput armed with irregular row of horizontal spines ***Antipodogomphus proselythus***	
b	Rear of occiput unarmed ***Antipodogomphus dentosus***	
7a	Rear of occiput unarmed ***Antipodogomphus edentulus***	
b	Rear of occiput armed **8**	
8a	Occipital armature consisting of a row of horizontal spines ***Antipodogomphus proselythus***	
b	Each end of occipital margin armed with fused mass of four to five horizontal spines, with one to three free-standing spines immediately adjacent, centre of occipital margin free of spines ***Antipodogomphus dentosus***	
9a	Male **10**	
b	Female **19**	

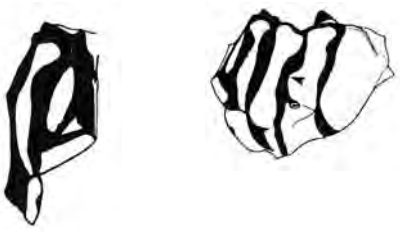
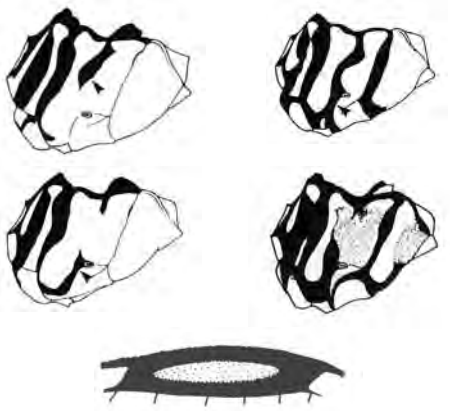
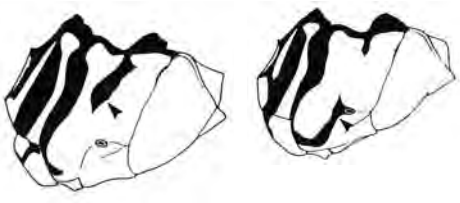
10a	Superior anal appendages parallel or divergent, not converging at tips, each bearing a long, curved ventrobasal branch **27**	
b	Superior anal appendages converging at tips, bearing basal, ventral to lateral spine or toothed spur **11**	
11a	Upper projection of bipartite sternum 11 concealed by basal, toothed spine of superior anal appendage; from eastern and northern Australia ***Hemigomphus*** **12**	
b	Upper projection of bipartite sternum 11 lying outside base of superior anal appendage, its upper end turned to rear and toothed or sculptured **18**	
12a	Abdominal sternites 7 and 8 lacking strong, central tufts of setae ***Hemigomphus magela***	
b	Abdominal sternites 7 and/or 8 each with pair of strong, central setal tufts protruding below ventral carina **13**	

13a	Tip of superior appendage smoothly curved inwards; setal tufts on sternite 7 and 8 **14**	
b	Tip of superior appendage abruptly folded inward; setal tufts present or absent on sternite 7 **16**	
14a	Abdominal terga 4-7 with basal pair of small, lateral yellow spots, broadly separated in midline ***Hemigomphus atratus***	
b	Abdominal terga 4-7 with basal yellow ring, or basal pair of large yellow spots, narrowly separated in midline **15**	
15a	Superior appendages widely separated at base, maximum separation more than 1.05 mm; inner margin of superior appendage convex beyond basal divergence, curving smoothly into distal convergence ***Hemigomphus heteroclytus***	
b	Superior appendages closer at base; maximum separation less than 1.05 mm; inner margin of superior appendage almost straight from basal divergence to abrupt outward bend about 0.7 times inner length from base ***Hemigomphus gouldii***	
16a	Setal tufts lacking from sternite 7 ***Hemigomphus comitatus***	
b	Setal tufts present on sternite 7 **17**	

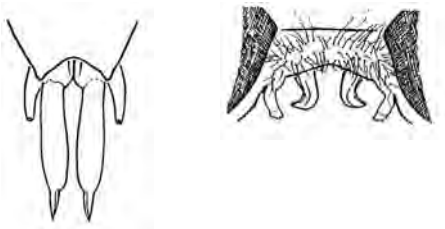
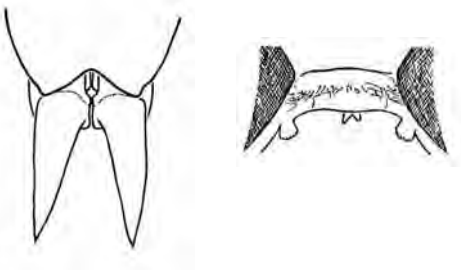
17a	Humeral stripe yellowish green, usually continuous, sometimes broken in upper half, forming upper spot and lower stripe ***Hemigomphus theischingeri***	
b	Yellow humeral stripe reduced to small upper and lower spots ***Hemigomphus cooloola***	
18a	One crossvein between sectors of arculus proximal to fork of Rs in hind wing; superior appendages with lateroventral spine near base; from south-western Australia ***Armagomphus armiger***	
b	Two or three crossveins between sectors of arculus proximal to fork of Rs in hind wing; superior appendages with slender ventral spine at extreme base ***Odontogomphus donnelIyi***	
19a	Anterior part of abdominal segments 3 and 4, in front of supplementary transverse carina, with broad, mid-dorsal black patch or band **20**	
b	Anterior of abdominal segments 3 and 4 with mid-dorsal yellow band, sometimes narrow; or entirely yellow **27**	
20a	Ovipositor about as long as sternum 9 ***Odontogomphus donnellyi***	
b	Ovipositor less than half length of sternum 9 **21**	

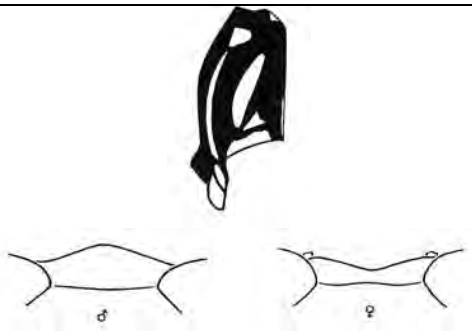
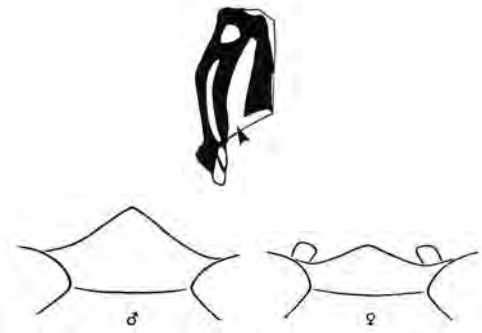
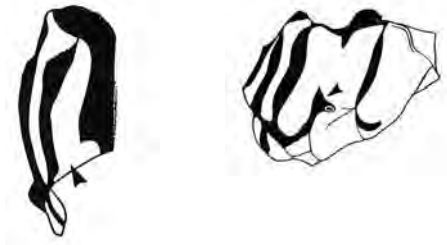
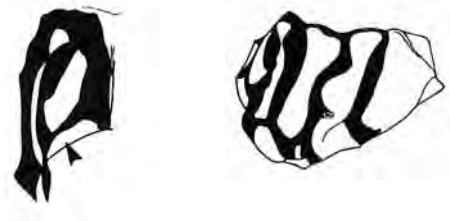
21a	One crossvein between sectors of arculus proximal to fork of Rs in hind wing; from south-western Australia ***Armagomphus armiger***	
b	Two or three (occasionally one) crossveins between sectors of` arculus proximal to fork of Rs in hind wing; from eastern and northern Australia ***Hemigomphus*** **22**	
22a	Occiput armed with central, more or less upright spine **23**	
b	Occiput unarmed **24**	
23a	Occiput spine stout, irregular conical, slanting rearwards ***Hemigomphus comitatus***	
b	Occiput spine slender, upright or slanting slightly to front ***Hemigomphus theischingeri***	
24a	Yellow humeral stripe reduced to small upper and lower spots ***Hemigomphus cooloola***	
b	Central part of yellow humeral stripe present, joined or not to upper humeral spot **25**	
25a	Black band along line of intersegmental suture of synthorax broken below metastigma, extensive to continuous above it ***Hemigomphus magela***	
b	Black band along line of intersegmental suture continuous below metastigma, lacking or almost so above it **26**	

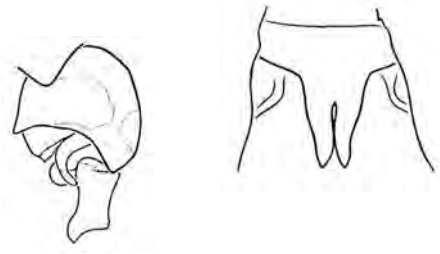
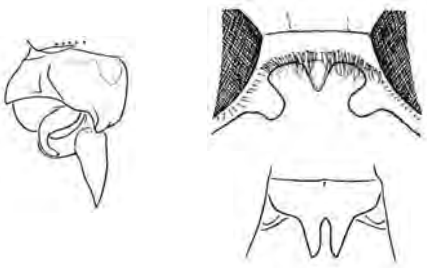
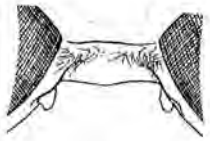
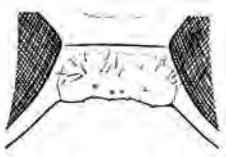
26a	Postgena not swollen on either side of occiput; antehumeral stripe commonly fused below with outer corner of collar ***Hemigomphus heteroclytus***	
b	Postgena strongly swollen on either side of occiput, except in specimens from southern Victoria; antehumeral stripe commonly isolated from collar ***Hemigomphus gouldii***	
27a	Abdominal terga 9-10 yellow or pale reddish brown, tergum 8 similar or with dark reddish brown to black distal half **28**	
b	Abdominal terga 9-10 usually marked with black or chocolate brown; if yellow or reddish, then tergum 8 substantially black **32**	
28a	Hind wing longer than 21.5 mm **29**	
b	Hind wing shorter than 21.5 mm ***Austrogomphus*** (***Austrogomphus***) (part) **31**	
29a	Postclypeus largely black ***Austrogomphus mouldsorum***	
b	Postclypeus yellow ***Austroepigomphus*** (***Xerogomphus***) **30**	
30a	Anterior frons extensively black; humeral stripe generally not meeting collar; distal third of abdominal tergum 7 dark reddish brown to black, rarely paler ***Austroepigomphus turneri***	
b	Anterior frons reddish yellow, or with reddish brown to reddish grey transverse bar; humeral stripe meeting collar; abdominal tergum 7 yellow to yellowish red ***Austroepigomphus gordoni***	

31a	Antehumeral stripe broadly fused with collar, forming inverted figure '7'; dark band along line of intersegmental suture of synthorax reduced to narrow line in front of and below metastigma ***Austrogomphus pusillus***	
b	Antehumeral stripe usually isolated from collar; dark band along line of intersegmental suture of synthorax complete ***Austrogomphus mjobergi***	
32a	Metanepisternum black, with small yellow dorsal spot; pterostigma black, swollen, its length less than 3.3 times its maximum width ***Austroepigomphus*** (***Austroepigomphus***) ***praeruptus***	
b	Metanepisternum substantially pale; pterostigma yellow, brown or black, its length more than 3.3 times its maximum width **33**	
33a	Brown and cream-coloured, with lilac colouration on side of synthorax; or brown and greenish yellow; lower half of metepimeron posteriorly margined with brown ***Zephyrogomphus*** **34**	
b	Black and yellow or greenish-yellow, lacking lilac colouration; metepimeron posteriorly not margined with brown **35**	

34a	Brown and cream coloured with lilac colouration on side of synthorax; from south-western Australia ***Zephyrogomphus lateralis***	
b	Dark brown, marked with brownish and greenish yellow ***Zephyrogomphus longipositor***	
35a	Antehumeral stripe with inner margin almost parallel to dorsal carina, its lower end fused with collar. Black mark on lower mesepimeron not extending to metastigma; metapleural suture not lined with black ***Austrogomphus*** (***Pleiogomphus***) **36**	 
b	Antehumeral stripe aslant, isolated or its lower end fused with collar. Black mark on lower mesepimeron extending to level of, or engulfing, metastigma; if not, metapleural suture lined with black ***Austrogomphus*** (***Austrogomphus***) (part) **39**	 
36a	Anal appendages black, those of males forked at tip **37**	
b	Anal appendages yellow, those of male forked or simple at tip **38**	
37a	Abdominal terga 8-9 extensively marked with yellow, generally including a basal yellow ring on tergum 9 ***Austrogomphus divaricatus***	
b	Abdominal tergum 8 black above, with small, anterior yellow spot on each side; tergum 9 entirely black ***Austrogomphus bifurcatus***	

38a	Superior appendages of male unevenly forked into long, pointed outer branch and short, rounded upper branch; female occiput unarmed, postocciput with two small, black spines ***Austrogomphus prasinus***	
b	Superior appendages of male not forked; female with large, blunt yellow tooth on rear of occiput, just below occipital margin, and two large, black teeth with out-turned tips on postocciput ***Austrogomphus amphiclitus***	
39a	Abdominal segment 10 black above **40**	
b	Abdominal segment 10 yellow, or black and yellow above **42**	
40a	Upper surface and sides of male superior appendages narrowing abruptly near apex, producing a very sharp, discrete tip; rear of female occiput with upturned, variably flattened tooth on each side, behind inner margin of eye, and pair of thick hooks, with out-turned lips, near the midline ***Austrogomphus angelorum***	
b	Male superior appendage tapering evenly to sharp tip; rear of female occiput with flattened tooth on each side, behind inner margin of eye, its hind border irregularly serrated **41**	

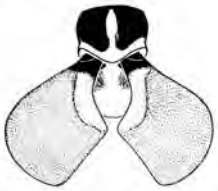
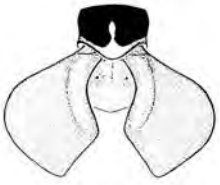
41a	Antehumeral stripe separated from or just meeting outer corner of collar; occiput of male black, with yellow spot on slightly swollen margin; occipital margin of female slightly lower in centre than at sides, not swollen ***Austrogomphus doddi***	
b	Antehumeral stripe broadly fused with collar; male occiput yellow, with darker edges, greatly swollen, forming blunt triangular horn; occipital margin of female swollen in centre ***Austrogomphus cornutus***	
42a	Antehumeral stripe broadly fused with collar, forming inverted figure '7'; black stripe along line of intersegmental suture of synthorax extending to just above metastigma, with or without small spot below subalar ridge **43**	
b	Antehumeral stripe usually isolated from collar; if fused, a black stripe present along all or most of line of intersegmental suture, interrupted for, at most, a third of length, above metastigma **44**	
43a	Hind wing more than 22 mm long ***Austrogomphus guerini***	
b	Hind wing less than 22 mm long ***Austrogomphus pusillus***	
44a	Abdominal tergum 8 with basal, mid-dorsal yellow stripe, sometimes short, and lacking basal yellow ring **45**	
b	Abdominal tergum 8 without mid-dorsal yellow fleck, and generally with basal yellow ring, sometimes substantially yellow **47**	

45a	Superior appendage of male swollen on upper surface just before tip; female occiput unarmed, vulvar scale narrow, elongate [The pterostigma is slightly swollen and usually 'windowed', with a heavy, blackish outer margin and a paler centre, commonly pale brown] ***Austrogomphus ochraceus***	
b	Superior appendage evenly tapered; rear of female occiput bearing three large, black teeth, two lateral and one central, vulvar scale more or less triangular **46**	
46a	Abdominal tergum 9 yellow in female, usually substantially or entirely yellow in male; from eastern Australia ***Austrogomphus australis***	
b	Abdominal tergum 9 black and yellow in female, extensively black with variably narrow, yellow basal ring in male; from south-western Australia ***Austrogomphus collaris***	
47a	Male hindwing c. 19.0 mm or more long; rear of female occiput with a small, rounded tooth on each side, behind inner-margin of eye ***Austrogomphus arbustorum***	
b	Male hind wing less than c. 18.5 mm long; rear of female occiput without discrete teeth, but set with many small tubercles ***Austrogomphus mjobergi***	

Petaluridae

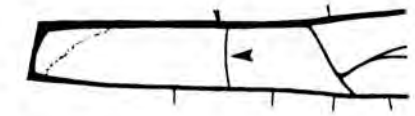
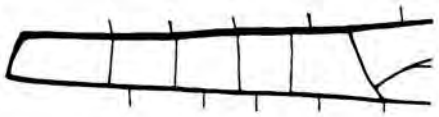
Key to genus and species of **Petaluridae**

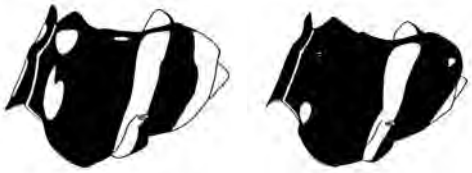
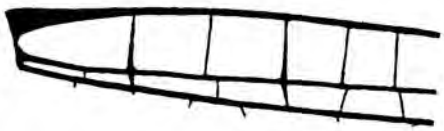
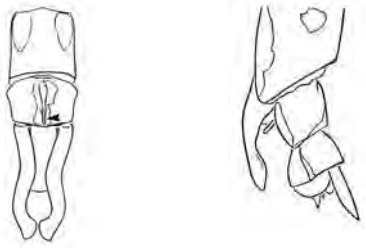
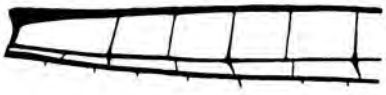
The specific status of *Petalura pulcherrima* is still uncertain.

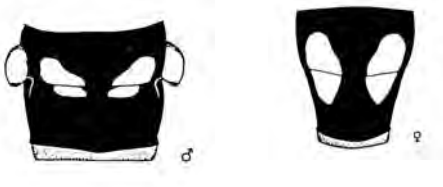
1a	Synthorax lacking stripes ***Petalura hesperia***	
b	Pale stripes present on front and sides of thorax **2**	
2a	Abdomen with ill-defined, pale dorsal and lateral longitudinal stripes, and no pale basal or apical rings **3**	
b	Abdominal terga 3-7 with sharply-defined, pale basal and apical rings **4**	 
3a	Plump; approximately upper half of anterior frons yellow; male superior anal appendages slightly elongate and with base distinctly black; inferior appendix predominantly yellow ***Petalura gigantea***	 
b	Very slender; only upper rim of anterior frons yellow; male superior anal appendages square and rather uniformly dark; inferior appendix predominantly dark brown ***Petalura litorea***	 
4a	Anterior frons largely black; postclypeus generally black ***Petalura ingentissima***	
b	Anterior frons largely yellow; postclypeus black with yellow spot each side ***Petalura pulcherrima***	

Synthemistidae

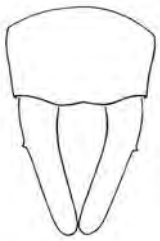
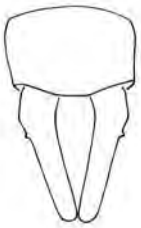
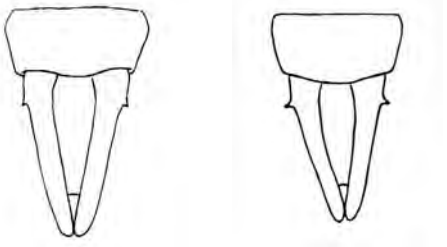
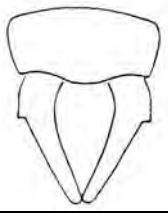
Key to genera and species of **Synthemistidae**

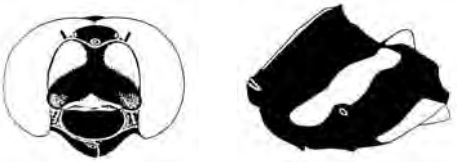
1a	Wings with dark brown spots at nodus ***Synthemiopsis gomphomacromioides***	
b	Dark markings, if present, confined to basal parts of wings **2**	
2a	Generally one crossvein in median space, sometimes two in one or two wings **3**	
b	Generally two to five crossveins in median space of all wings **9**	
3a	Labrum with black margin, often also with black stripe in midline ***Tonyosynthemis*** **4**	
b	Labrum pale to brown, without black margin or midline **5**	
4a	Black stripe on metapleural suture unbroken ***Tonyosynthemis claviculata***	
b	Black stripe on metapleural suture interrupted over central third ***Tonyosynthemis ofarrelli***	
5a	Front of synthorax dark without distinct markings, or black with one or two small pale spots on each side ***Archaeosynthemis*** **6**	
b	Front of synthorax dark with one dominant large pale mark on each side ***Austrosynthemis cyanitincta***	

6a	Pale intersegmental stripe on side of synthorax broken near centre **7**	
b	Pale intersegmental stripe on side of synthorax unbroken **8**	
7a	From south-eastern Australia ***Archaeosynthemis orientalis***	
b	From south-western Australia ***Archaeosynthemis occidentalis***	
8a	Front of synthorax with an upper and lower pale spot on each side, the lower spot sometimes very small and inconspicuous ***Archaeosynthemis leachii***	
b	Front of synthorax with small, pale spot low down on each side, and no upper spot ***Archaeosynthemis spiniger***	
9a	No accessory thick antenodal in forewing, only the two primaries present; male tergum 10 with posteriorly directed pale mid-dorsal cone; ovipositor reaching beyond segment 9 ***Synthemis*** **10**	 
b	An accessory thick antenodal in forewing in addition to the two primaries; this and the two previous alternating with thin antenodals; male tergum 10 without pale dorsal cone; ovipositor, if developed, not reaching beyond segment 9 **11**	

10a	Large pale spot on supplementary transverse carina on each side of abdominal tergum 2, smaller in male than in female ***Synthemis eustalacta***	
b	At most, small pale line on supplementary transverse carina on each side of male abdominal tergum 2, larger oval mark in female ***Synthemis tasmanica***	
11a	Anterior frons metallic black ***Parasynthemis regina***	
b	Anterior frons pale, or pale with black stripe, often quite broad, in midline **12**	
12a	Frons narrow; membranule of both wings vestigial; female ovipositor well developed ***Choristhemis*** **13**	
b	Frons broad; membranule of both wings well developed; female ovipositor reduced to vulvar lamina or poorly developed ***Eusynthemis*** **14**	
13a	Front of synthorax with large yellow patch each side, sides of synthorax with complex yellow markings; abdominal segments 9 and 10 black ***Choristhemis olivei***	
b	Front of thorax lacking large yellow patch, sides of synthorax with simple yellow markings; abdominal segments 9 and 10 mainly yellow on top. ***Choristhemis flavoterminata***	
14a	Labrum pale, with more or less extensive dark brown or black markings **15**	
b	Labrum black **16**	

15a	Labrum with dark stripe in midline ***Eusynthemis virgula***	
b	Labrum without dark stripe in midline ***Eusynthemis deniseae*** (part***)***	
16a	Intermediary piece at base of each wing white or pale yellow **17**	
b	Intermediary piece brown or black **22**	
17a	A large subtriangular yellow patch each side in basal half of front of synthorax ***Eusynthemis netta***	
b	Front of synthorax dark except for pale dorsal carina **18**	
18a	Metascutum yellow **19**	
b	Metascutum dark brown to black **20**	

19a	Base of male superior anal appendages laterally evenly curved ***Eusynthemis ursa***	
b	Base of male superior anal appendages laterally distinctly angulated ***Eusynthemis ursula***	
20a	Top of frons black, anterior and lateral margins pale ***Eusynthemis nigra***	
b	Top of frons black at base, continued into black midline between pair of conspicuous yellowish white anterior patches **21**	
21a	Postclypeus with large, yellowish patch on each side ***Eusynthemis deniseae*** (part)	
b	Lateral part of postclypeus black ***Eusynthemis brevistyla***	
22a	Superior appendages of male longer than width of abdominal segment 10; tropical species **23**	
b	Superior appendages of male not longer than width of abdominal segment 10; non-tropical species **24**	

23a	Lateral lobes of labium dark brown to black; anterior frons with distinct median mark ***Eusynthemis barbarae***	
b	Lateral lobes of labium pale yellow; anterior frons lacks distinct median mark ***Eusynthemis tenera***	
24a	Metascutum yellow ***Eusynthemis rentziana***	
b	Metascutum dark brown to black **25**	
25a	Front of synthorax with pale stripe, broad or narrow, near outer margin, or rarely missing; anterior lateral stripe of synthorax wide, posterior stripe distinctly curved ***Eusynthemis aurolineata***	
b	Front of synthorax dark except for pale dorsal carina; anterior lateral stripe of synthorax moderately wide and posterior stripe straight, or, anterior lateral stripe of synthorax narrow and posterior stripe distinctly curved **26**	
26a	Labium brown to black; anterior lateral stripe of synthorax moderately wide and posterior stripe straight ***Eusynthemis guttata***	
b	Labium yellow; anterior lateral stripe of synthorax narrow and posterior stripe distinctly curved ***Eusynthemis tillyardi***	

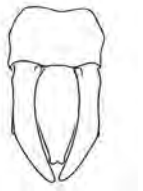
Gomphomacromiidae

Key to genus and species of **Gomphomacromiidae**

1a	Median lobe of pronotum with small lateral tooth ***Archaeophya adamsi***	
b	Median lobe of pronotum without lateral tooth ***Archaeophya magnifica***	

Pseudocorduliidae

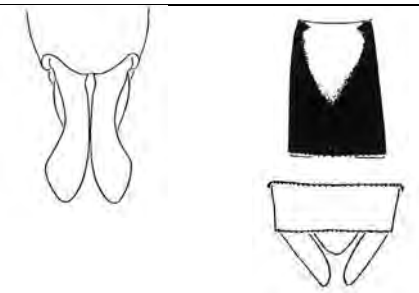
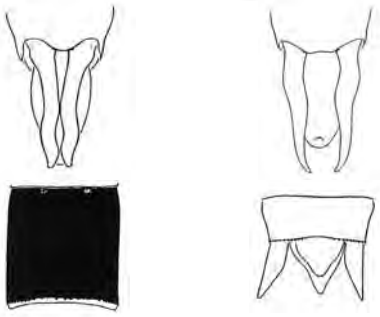
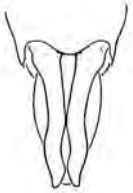
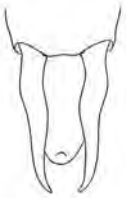
Key to genus and species of **Pseudocorduliidae**

1a	Postgena usually dark brown or black immediately behind eye margin; male superior appendages slightly convergent beyond lateral tooth; female valves short, broadly triangular ***Pseudocordulia elliptica***	 
b	Postgena usually brown immediately behind eye margin; male superior appendages converging abruptly beyond lateral tooth; female valves with elongate, finger-like apices ***Pseudocordulia circularis***	 

Cordulephyidae

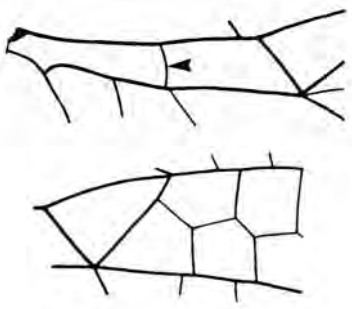
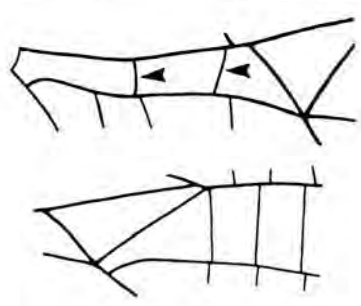
Key to genus and species of **Cordulephyidae**

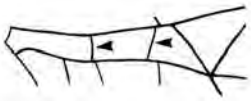
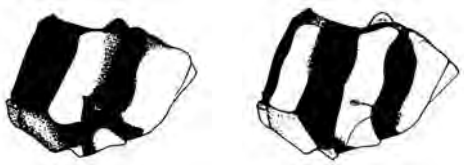
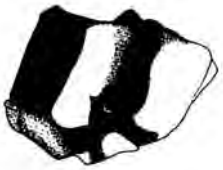
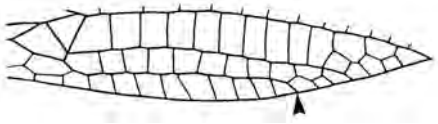
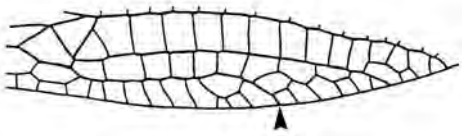
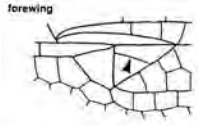
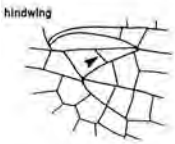
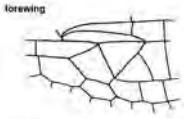
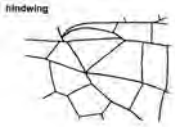
1a	Hind corner of metepimeron, and poststernum, bright yellow, very much paler than anterior part of metepimeron ***Cordulephya pygmaea***	
b	Hind corner of metepimeron, and poststernum, dull brownish-yellow to greyish brown, only slightly paler than anterior part of metepimeron **2**	

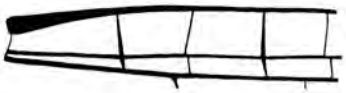
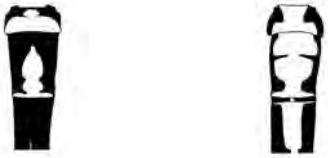
2a	Tips of male superior appendages swollen, divergent; female with triangular basal yellow patch reaching to centre of tergum 8, and broad, relatively blunt anal appendages ***Cordulephya divergens***	
b	Male superior appendages parallel or convergent at tips; yellow mark on tergum 8 of female restricted to extreme base, anal appendages relatively slender, pointed **3**	
3a	Small species, male hind wing less than 22 mm long, female hind wing less than 24 mm long; male superior appendages close together, almost parallel ***Cordulephya bidens***	
b	Large species, male hind wing more than 22 mm long, female hind wing more than 24 mm long; male superior appendages widely separated at base, convergent ***Cordulephya montana***	

Austrocorduliidae

Key to genera and species of **Austrocorduliidae**

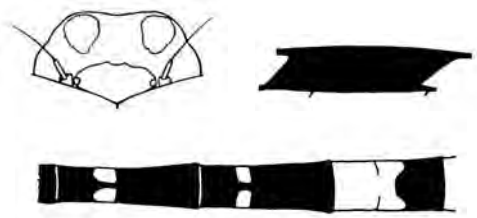
1a	Only one cu-a in hind wing; costal side of hind wing triangle up to 1.7 times the length of proximal side and discoidal side of hind wing beginning with two rows of cells ***Hesperocordulia berthoudi***	
b	Two, occasionally more, cu-a in hind wing, **or**, costal side of hind wing triangle approximately twice as long as proximal side and discoidal field of hind wing beginning with one row of cells **2**	

2a	One cu-a in hind wing ***Austrocordulia*** **3**	
b	Two, occasionally more, cu-a in hind wing **5**	
3a	Side of synthorax unicolorous, brown ***Austrocordulia refracta***	
b	Side of synthorax black with yellow stripes **4**	
4a	Synthorax with two yellow lateral stripes ***Austrocordulia leonardi***	
b	Synthorax with three yellow lateral stripes ***Austrocordulia territoria***	
5a	1A of forewing almost straight between end of cell behind subtriangle and wing margin; anal loop beginning with single cell ***Austrophya mystica***	
b	1A of forewing bowed forwards between end of cell behind subtriangle and wing margin; anal loop beginning with row of two cells **6**	
6a	Triangles of forewing and hind wing crossed ***Apocordulia macrops***	 
b	Triangles of forewing and hind wing free **7**	 

7a	First 3-4 antenodals thickened in forewing; abdomen bronze or black, without yellow markings ***LathrocorduIia*** **8**	
b	First and third antenodals thickened in forewing; abdomen black with yellow markings on at least the first two terga ***Micromidia*** **9**	 
8a	Distal half of male superior appendages broader than basal half, inner margin of apical part straight ***Lathrocordulia garrisoni***	
b	Male superior appendages broadest near basal third, tapering to convergent tips ***Lathrocordulia metallica***	
9a	Small species, hind wing shorter than 24 mm ***Micromidia rodericki***	
b	Larger species, hind wing longer than 26 mm **10**	
10a	Length:width of pterostigma c. 3:1, distal end strongly aslant, almost parallel to next postnodal crossvein ***Micromidia convergens***	
b	Length:width of pterostigma < 2.5:1, distal end squarer, less strongly aslant than next postnodal crossvein ***Micromidia atrifrons***	

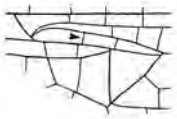
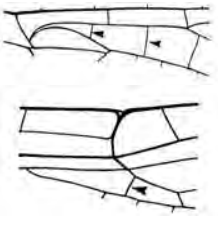
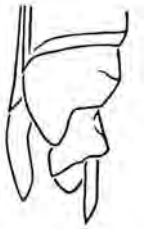
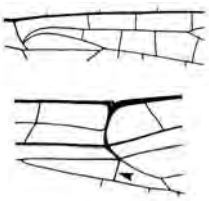
Macromiidae

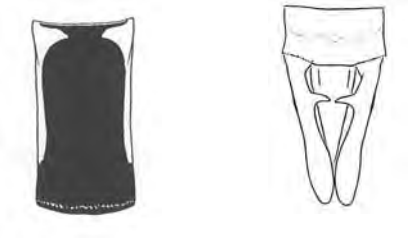
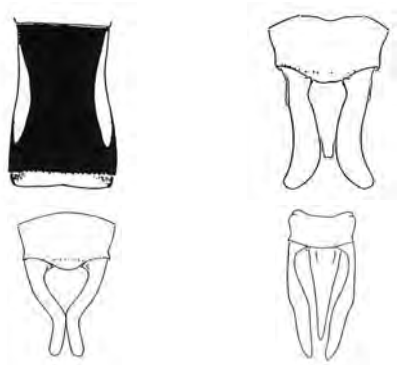
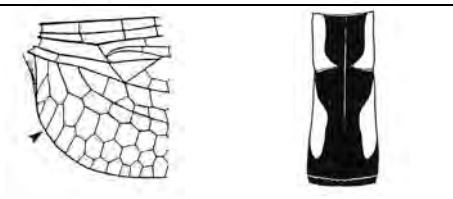
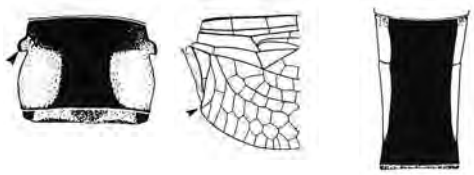
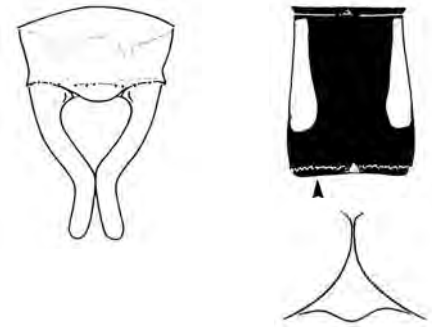
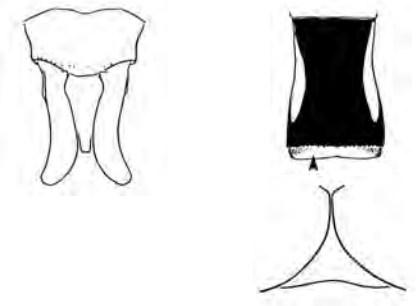
Key to genus and species of **Macromiidae**

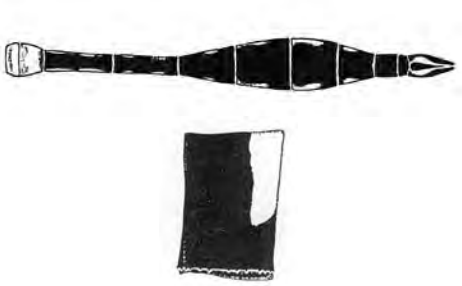
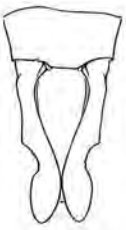
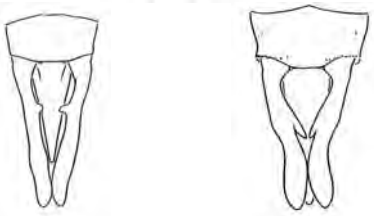
1a	Top of frons black with two yellow spots; abdominal terga 2-6 black, marked with yellow; pterostigma long ***Macromia tillyardi***	
b	Top of frons deep metallic green, blue or violet, without yellow markings; abdominal segments 1-6 dark metallic green, without yellow markings; pterostigma short ***Macromia viridescens***	

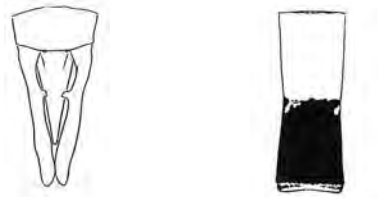
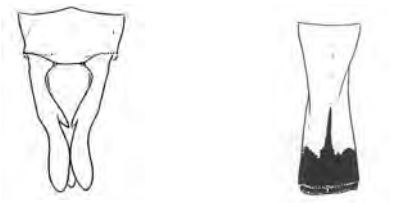
Corduliidae

Key to genera and species of **Corduliidae**
The status of *Hemicordulia novaehollandiae* is obscure; the species is omitted from the key.

1a	Hypertriangles of both wings crossed ***Pentathemis membranulata***	
b	Hypertriangles generally free **2**	
2a	Two crossveins between sectors of arculus basal to fork of Rs in hind wing; bridge crossvein between subnodus and oblique vein; ovipositor long, spoon-like, extending to or beyond end of abdomen ***Metaphya tillyardi***	 
b	Three crossveins between sectors of arculus basal to fork of Rs in hind wing; bridge crossvein at subnodus; ovipositor short, less than half length of tergum 9 ***Hemicordulia*** and ***ProcorduIia*** **3**	 
3a	Top of frons brown or black with metallic blue-green reflections **4**	
b	Top of frons yellow with dark T-mark, or black with pair of yellow spots **8**	 

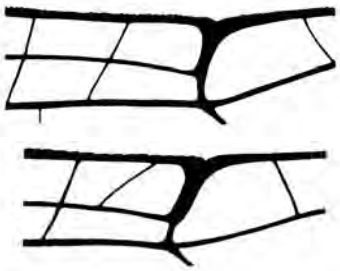
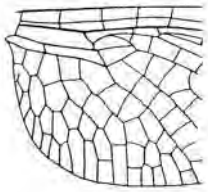
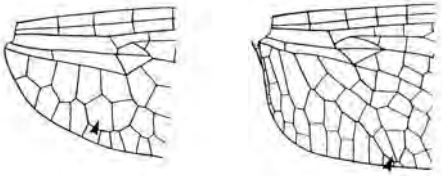
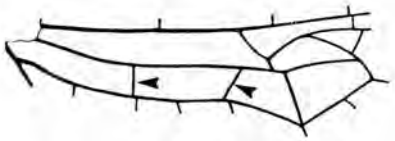
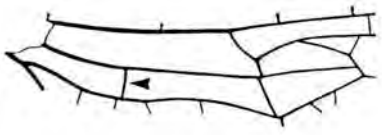
4a	Black mid-dorsal band strongly constricted at supplementary transverse carina, near anterior end of abdominal segments 6 and 7; male superior appendage with prominent, medioventral spine ***Hemicordulia australiae***	
b	Black mid-dorsal band not strongly; constricted at supplementary transverse carina on abdominal segments 6 and 7; male superior appendage without spine **5**	
5a	Male lacking auricles, anal border of hind wing rounded; mid-dorsal black stripe on female abdomen strongly constricted at supplementary transverse carina on segment 4 **7**	
b	Male with auricles, anal border of male hind wing angulated; mid-dorsal black stripe on female abdomen not constricted at supplementary transverse carina on segment 4 ***Procordulia*** **6**	
6a	Superior appendages of male strongly convergent, with parallel or slightly divergent tips; intersegmental membranes between abdominal terga 3-4 to 7-8 dark brown or black; female occiput swollen behind ***Procordulia affinis***	
b	Superior appendages of male slightly convergent, with strongly divergent tips; intersegmental membranes between abdominal terga 3-4 to 7-8 orange-brown; female occiput not swollen behind ***Procordulia jacksoniensis***	

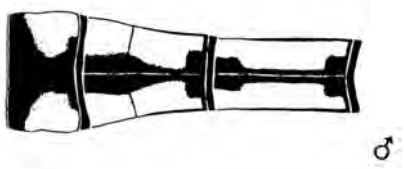
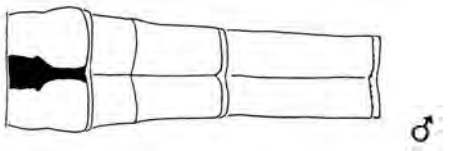
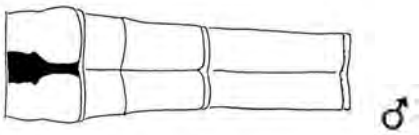
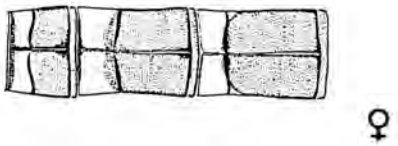
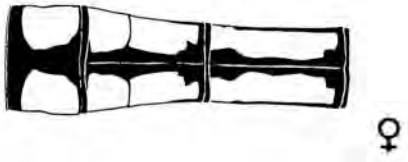
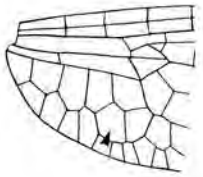
7a	Male abdomen strongly club-shaped, abdominal tergum 7 approximately 1.9 mm or more wide from midline to lateral margin; female anal appendages 1.9 mm or more long ***Hemicordulia continentalis***	
b	Male abdomen slightly club-shaped, abdominal tergum 7 1.8 mm or less wide from midline to lateral margin; female anal appendages 1.7 mm or less long ***Hemicordulia kalliste***	
8a	Abdominal tergum 7 extensively black above, yellowish at sides ***Hemicordulia tau***	
b	Basal half or more of abdominal tergum 7 yellow, with or without narrow, mid-dorsal black line **9**	
9a	Top of frons black with pale yellow spot on each side of midline ***Hemicordulia superba***	
b	Top of frons with dark T-mark **10**	
10a	Male superior appendage lacking medioventral spine; female anal appendages approximately 3 mm long ***Hemicordulia flava***	
b	Male superior appendage with strong medioventral spine; female anal appendages approximately 2 mm long **11**	

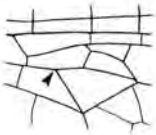
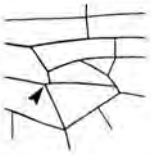
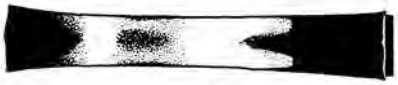
11a	Superior appendages markedly longer than inferior appendage, reflexed at tip; black distal band on abdominal tergum 7 of female occupying approximately 40-50% of mid-dorsal length of segment ***Hemicordulia intermedia***	
b	Superior appendages similar in length to inferior appendage, not reflexed at tip; black distal band on abdominal tergum 7 of female occupying approximately 20% or less of mid-dorsal length of segment ***Hemicordulia koomina***	

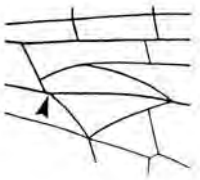
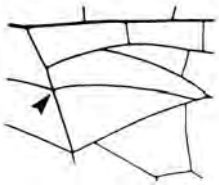
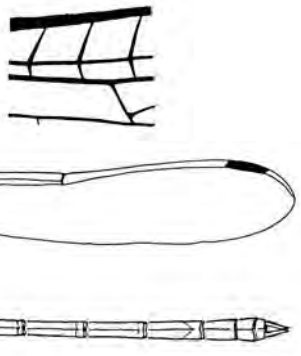
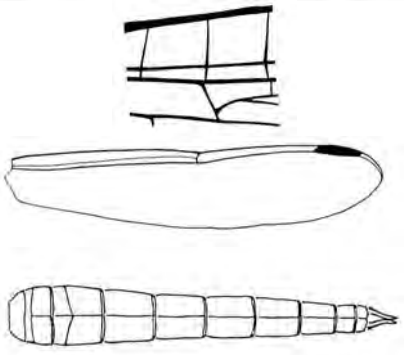
Libellulidae

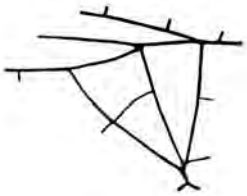
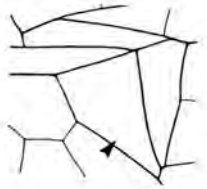
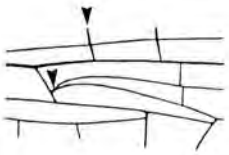
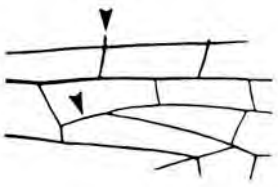
Key to genera and species of **Libellulidae**

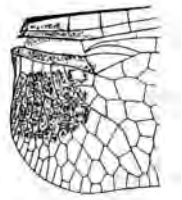
1a	Distal antenodal of forewing complete, both costal and subcostal sections present **2**	
b	Distal antenodal of forewing incomplete, only the costal section present **35**	
2a	Hind wing lacking anal loop ***Nannophya*** **3**	
b	Anal loop present **9**	
3a	Two to three crossveins in cubital space of hind wing (including Ac) ***Nannophya australis***	
b	Only one crossvein (Ac) in cubital space of hind wing **4**	
4a	Male **5**	
b	Female **7**	

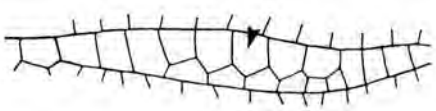
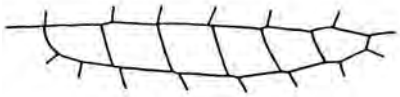
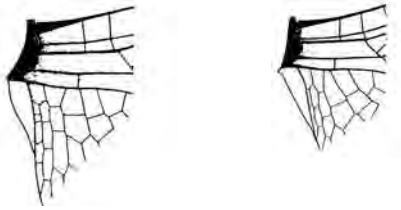
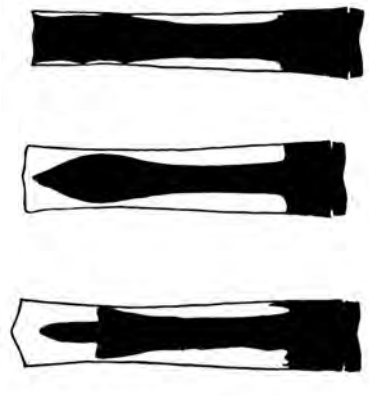
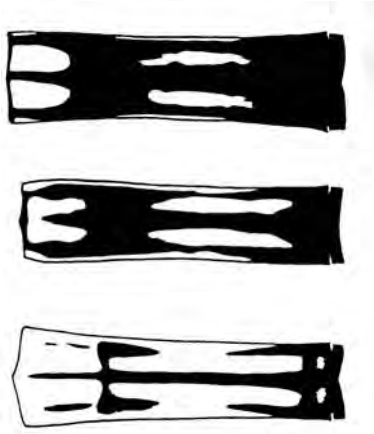
5a	Mid-dorsal dark line present on abdominal terga 2-3, sometimes more extensive ***Nannophya dalei***	
b	Abdominal tergum 3 lacking mid-dorsal dark stripe **6**	
6a	Abdominal terga entirely red ***Nannophya paulsoni***	
b	Abdominal terga 1 and 2 marked dark brown to black above ***Nannophya occidentalis***	
7a	Abdominal terga 2-4 pale in front of supplementary transverse carina, reddish brown behind ***Nannophya paulsoni***	
b	Abdomen with irregular, dark mid-dorsal band **8**	
8a	Black stripe on metapleural suture much narrower at level of metastigma than in upper half ***Nannophya dalei***	
b	Black stripe on metapleural suture broad behind metastigma ***Nannophya occidentalis***	
9a	Anal loop rounded, poorly developed, of three to five cells **10**	
b	Anal loop well developed, generally stocking-shaped, usually closed at tip **14**	

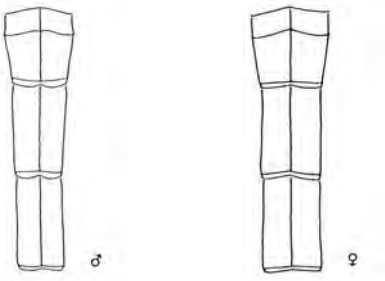
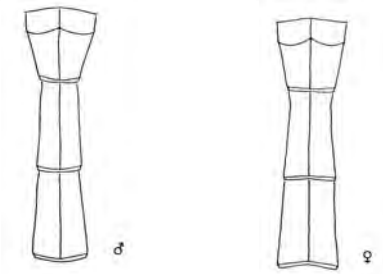
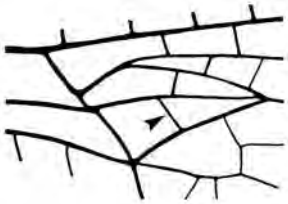
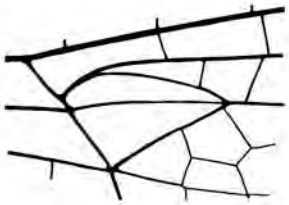
10a	Basal side of hind wing triangle well beyond arculus ***Tetrathemis irregularis cladophiIa***	
b	Basal side of hind wing triangle close to or at arculus ***Nannophlebia*** **11**	
11a	Abdominal tergum 4 with small, central yellow spot ***Nannophlebia eludens***	
b	Abdominal tergum 4 with two yellow spots, one central and one in basal half, sometimes fused **12**	 
12a	Top of vertex black; abdominal tergum 6 and, usually, 7 with single, central yellow spot ***Nannophlebia mudginberri***	
b	Top of vertex yellow; abdominal terga 6 and 7 with basal and central yellow spots, sometimes fused or partly so **13**	 
13a	Genae completely black ***Nannophlebia risi***	
b	Genae black with bright white spot ***Nannophlebia injibandi***	
14a	Small (hind wing c. 25 mm); synthorax and abdomen black with well-defined pale yellowish green markings ***Huonia melvillensis*** (part)	 
b	Not as above **15**	

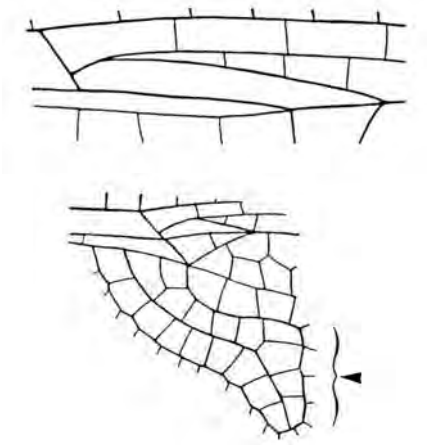
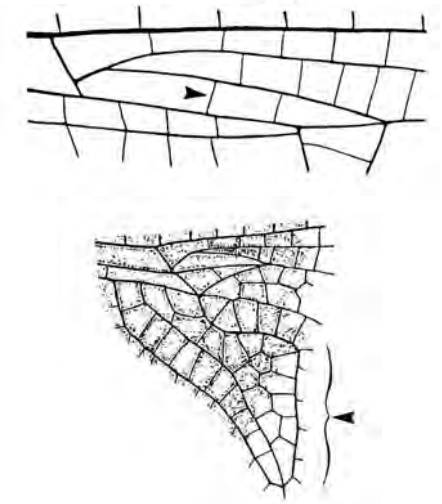
15a	Base of hind wing triangle just beyond to well beyond arculus; top of frons brilliant metallic blue or green, particularly in male **16**	
b	Base of hind wing triangle at or proximal to arculus; top of frons, if metallic, dully so **20**	
16a	Fewer than nine antenodals in forewing ***Brachydiplax*** **17**	
b	More than nine antenodals in forewing **18**	
17a	Labrum substantially pale; generally six antenodal crossveins in forewing, five in hind wing ***Brachydiplax denticauda***	
b	Labrum dark brown to black; seven antenodal crossveins in forewing, six in hind wing ***Brachydiplax duivenbodei***	
18a	Arculus almost equidistant from second and third antenodal crossvein; nodus closer to base of wing than to apex, the ratio between the distances approximately 4:5; male abdomen slender, almost parallel-sided ***Agrionoptera*** **19**	
b	Arculus in line or almost in line with second antenodal crossvein, or close to it; nodus almost equidistant from base and apex of wing; male abdomen broad, tapering from segment 3-10 ***Notolibellula bicolor***	

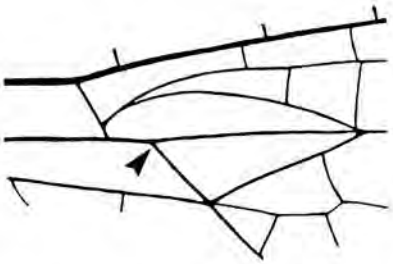
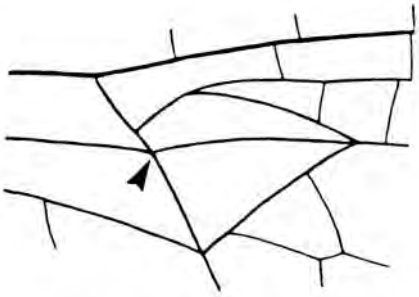
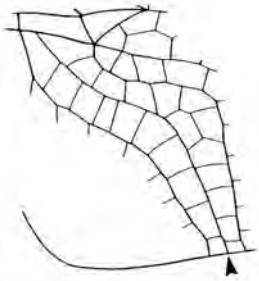
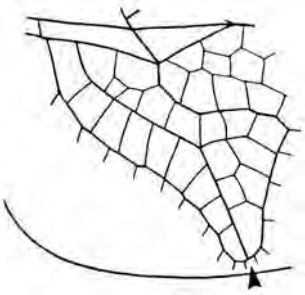
19a	Abdomen substantially brownish black; forewing triangle with crossvein ***Agrionoptera longitudinalis biserialis***	
b	Abdomen orange to red and black; forewing triangle lacking crossveins ***Agrionoptera insignis allogenes***	
20a	Large dragonflies, hind wing 45 mm or longer, wing membrane extensively marked with reddish- or blackish-brown ***Camacinia othello*** (part)	
b	Smaller dragonflies, hind wing up to 40 mm long; wings patterned or hyaline **21**	
21a	Subtriangle of forewing single-celled **22**	
b	Subtriangle of forewing with three or more cells **24**	
22a	Sectors of arculus, particularly in forewing, fused for only a short distance, separating well before level of second antenodal crossvein ***Aethriamantha*** **23**	
b	Fusion of sectors of arculus more extensive, stalk extending to level of second antenodal crossvein ***Nannodiplax rubra***	

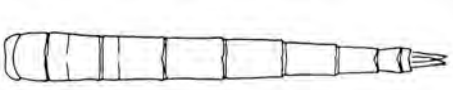
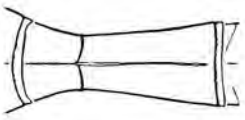
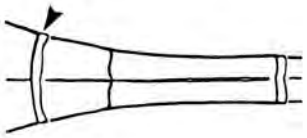
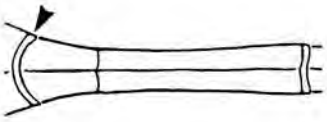
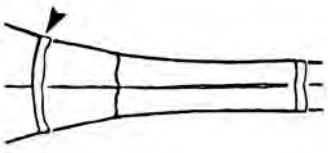
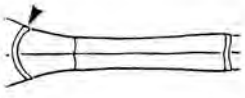
23a	Base of hind wing extensively marked with dark brown between C and R+M, CuP and 1A, and in the anal field, commonly extending to or beyond level of arculus ***Aethriamanta circumsignata***	
b	Base of hind wing often marked only with yellow, otherwise with dark brown marks restricted to L-shaped patch consisting of bar between CuP and 1A and stripe at extreme base of anal field, with or without dark fleck between Sc and R+M ***Aethriamata nymphaeae***	
24a	Forewing triangle free **25**	
b	Forewing triangle crossed **27**	
25a	More than nine antenodal crossveins ***Rhodothemis Iieftincki*** (part)	
b	Fewer than nine antenodal crossveins **26**	
26a	Abdomen of male red above except for small, mid-dorsal dark spots on segment 8-9; vulvar scale of female elongate, extending the length of segment 9 ***Urothemis aliena***	 
b	Abdomen of male red with mid-dorsal black stripe, vulvar scale of female vestigial ***Macrodiplax cora***	 
27a	Small tongue-like evagination from central hind margin of eye ***Austrothemis nigrescens*** (part)	
b	Hind margin of eye uniformly curved **28**	

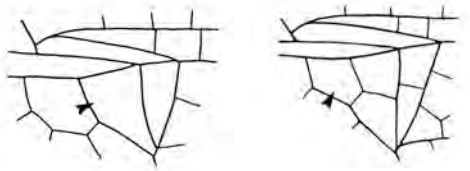
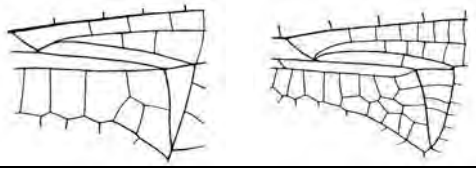
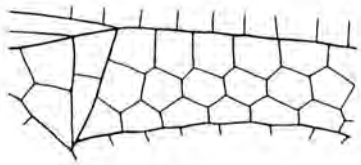
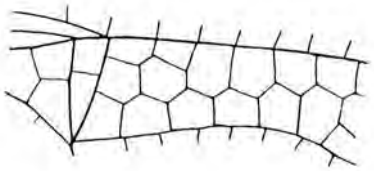
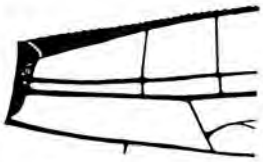
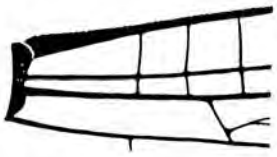
28a	Some double cells between IR3 and Rspl ***Orthetrum*** **29**	
b	Only one row of cells between IR3 and Rspl ***Rhodothemis lieftincki*** (part)	
29a	Small reddish-brown to yellowish-brown spot at base of hind wing **30**	
b	Hind wing clear at base **34**	
30a	Side of synthorax striped black and yellow **31**	
b	Side of synthorax unicolorous, yellowish, red to brown, or pruinescent, lower margins of epimera sometimes darkened **32**	
31a	Yellow markings on abdominal tergum 4 restricted to lateral and anterior parts of tergum ***Orthetrum sabina***	
b	Yellow markings on abdominal tergum 4 more complex, including a posterior, longitudinal stripe on each side of midline, often fused with lateral band ***Orthetrum serapia***	

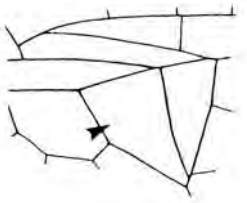
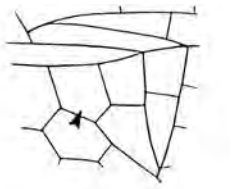
32a	Abdomen yellow, extensively marked with black, becoming pruinescent blue in mature males, mature females slightly pruinescent ***Orthetrum boumiera***	
b	Thorax and abdomen yellow, orange or red **33**	
33a	Male abdomen evenly tapered, not constricted on segment 4; female abdominal segment 4 little narrower than segment 3, approximately equal in width to segment 5 ***Orthetrum migratum***	
b	Abdominal segment 4 markedly narrower than segments 3 and 5 ***Orthetrum villosovittatum***	
34a	Black with yellow markings, side of synthorax substantially dark ***Orthetrum balteatum***	
b	Yellow with black markings, side of synthorax yellow, sutures narrowly lined black; thorax and abdomen of male becoming pruinescent blue when mature, the mature female slightly pruinescent ***Orthetrum caledonicum***	
35a	Hind wing triangle crossed **36**	
b	Hind wing triangle free **39**	

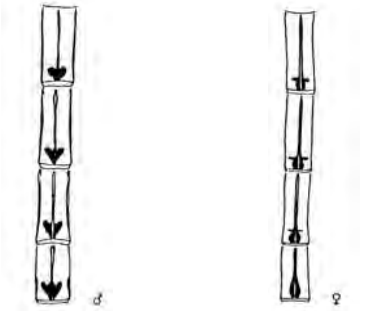
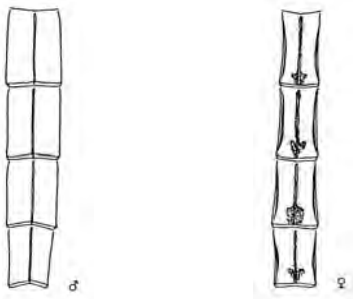
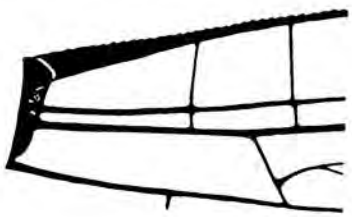
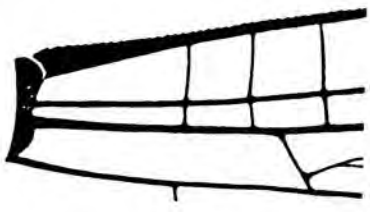
36a	Large dragonflies, hind wing longer than 45 mm ***Camacinia othello*** (part)	
b	Smaller dragonflies, hind wing markedly shorter than 45 mm **37**	
37a	Wings hyaline; hypertriangle generally free; commonly three, sometimes four cells along 'sole' of stocking-shaped anal loop, including cell at 'heel' ***Potamarcha congener***	
b	Wings usually patterned with dark brown, reddish-brown or orange markings, sometimes only at base, but sometimes hyaline; hypertriangle of forewing traversed by one or more crossveins; generally five or more, rarely four, cells along 'sole' of stocking-shaped anal loop, including cell at 'heel' ***Neurothemis*** **38**	
38a	Wing markings, if present, extending only to level of forewing triangle, when fully developed almost black ***Neurothemis oligoneura***	
b	Wing markings extending to beyond nodus, and at wing tip in females, reddish-brown ***Neurothemis stigmatizans***	

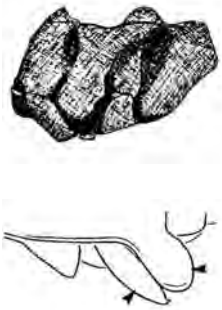
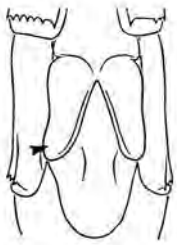
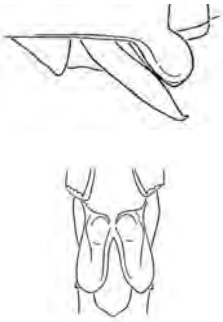
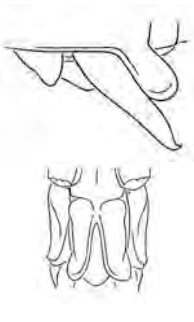
39a	Small (hind wing c. 25 mm); synthorax and abdomen black with well-defined pale yellowish-green markings ***Huonia melvillensis*** (part)	 
b	Not as above **40**	
40a	Base of hind wing triangle well beyond arculus ***Raphismia bispina***	
b	Base of hind wing triangle at or slightly proximal to arculus **41**	
41a	Tip of anal loop usually open on one or both sides of midvein, the bounding veins of loop extending to wing margin, occasionally closed, the bounding veins meeting at wing margin **42**	
b	Tip of anal loop closed, the bounding veins meeting midvein one row of cells away from wing margin **45**	

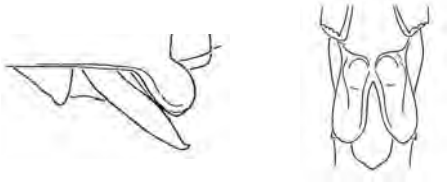
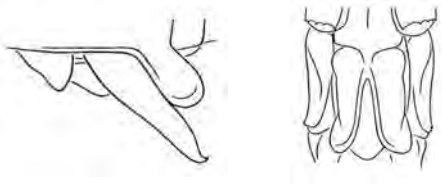
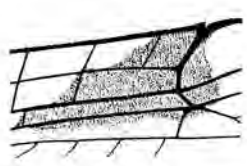
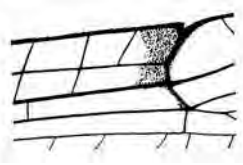
42a	Abdomen tapering progressively from segment 3 to tip; variable, yellowish-brown patch between triangle and nodus of hind wing, sometimes very faint; male abdomen orange-brown ***Tholymis tillarga***	
b	Abdomen narrowing abruptly within the length of segment 3; wing tips variably darkened, sometimes hyaline, rest of wing membrane hyaline except for dark flecks at extreme base and, in some, a dark costal band, or with general yellowish-brown suffusion; male abdomen dull brown to blackish brown ***Zyxomma*** **43**	
43a	Abdomen segment 4 strongly constricted at supplementary transverse carina, anterior and posterior widths of segment approximately equal ***Zyxomma multinervorum***	
b	Abdomen segment 4 not strongly constricted at supplementary transverse carina, posterior width of segment commonly less than anterior width **44**	 
44a	Abdomen not longer than hind wing; junction of abdominal segments 3 and 4 almost straight ***Zyxomma elgneri***	
b	Abdomen several mm longer than hind wing; junction of abdominal segments 3 and 4 strongly bowed forwards ***Zyxomma petiolatum***	

45a	Subtriangle of forewing with one to three cells, its basal side well-defined **46**	
b	Basal side of forewing subtriangle poorly defined; if recognisable, containing more than three cells **56**	
46a	Large dragonflies, hind wing longer than 38 mm; male abdomen black, with dorsal pairs of yellow spots ***Hydrobasileus brevistylus*** (part)	
b	Smaller dragonflies, hind wing shorter than 38 mm **47**	
47a	Discoidal field of forewing containing three rows of cells, occasionally four, between triangle and level of origin of IR3 **48**	
b	Discoidal field of forewing, between triangle and level of origin of IR3, starting with two or three rows of cells, followed by two rows **49**	
48a	Arculus situated between first two antenodal crossveins; male abdomen pruinose, blue over black ***Crocothemis nigrifrons***	
b	Arculus situated between second and third antenodal crossveins; male abdomen orange-red with black tip ***Lathrecista asiatica festa*** (part)	
49a	Hind wing 30 mm or longer **50**	
b	Hind wing shorter than 30 mm **51**	
50a	Fewer than nine antenodal crossveins ***Urothemis aIiena*** (part)	
b	More than nine antenodal crossveins ***Rhodothemis lieftincki*** (part)	

51a	Small tongue-like evagination from central hind margin of eye ***Austrothemis nigrescens*** (part)	
b	Hind margin of eye uniformly curved ***Diplacodes*** 52	
52a	Subtriangle of forewing single-celled; wings with brownish-black tips, sometimes hyaline or tinged yellow near base in female; male abdomen black ***Diplacodes nebulosa***	
b	Subtriangle of forewing subdivided into two or three cells; wings hyaline, or yellow to yellowish brown at base or tips **53**	
53a	Abdomen black marked with yellow, becoming pruinescent bluish grey in mature males ***Diplacodes trivialis***	
b	Abdomen yellowish-brown to bright red, with or without black markings **54**	
54a	No small dark spot on intersegmental suture just above level of metastigma ***Diplacodes melanopsis***	
b	A small dark brown to black spot on intersegmental suture just above level of metastigma **55**	

55a	Male abdomen with prominent black lateral markings on terga 4-7; female abdominal segments 4-7 with well-defined, black mid-dorsal line expanded into spot at end of each segment; wings hyaline except for brownish-yellow spot at base ***Diplacodes bipunctata***	
b	Male abdomen lacking lateral black markings; female abdominal segments 4-7 with poorly-defined brownish-red mid-dorsal line of similar shape, sometimes absent; base of male hind wing yellow to level of triangle, tip of female wings commonly brownish-yellow ***Diplacodes haematodes***	
56a	Wing membrane hyaline or yellow, with, at most, dark markings at extreme wing tip, beyond pterostigma **57**	
b	Wing membrane with reddish-brown, dark brown or black markings, at least at base of hind wing **59**	
57a	Abdomen black, with dorsal pair of yellow spots ***Hydrobasileus brevistylus*** (part)	
b	Abdomen brownish yellow to orange red, with black markings on some segments **58**	
58a	Arculus situated between first two antenodal crossveins; male abdomen brownish-yellow to orange-red, with black dorsal markings, broadest on segments 8-9 ***Pantala flavescens***	
b	Arculus situated between second and third antenodal crossveins; male abdomen orange-red with black tip ***Lathrecista asiatica festa*** (part)	

59a	Wing membrane hyaline except for narrow to broad, dark reddish-brown patch at base of hind wing and variable, small reddish patch at base of forewing, often lacking; male abdomen orange-red, red, or reddish-brown, the last few segments marked with black ***Tramea*** **60**	
b	Both forewing and hind wing with dark brown to black markings; male abdomen black ***Ryothemis*** **63**	
60a	Dark mark at base of hind wing narrow, elongate, not extending far beyond Ac, and not reaching base of triangle; clear patch behind membranule, if present, narrow, not extending beyond level of first vein descending into anal field ***Tramea propinqua***	
b	Dark mark at base of hind wing broader, generally reaching to or beyond base of triangle; if not, clear patch behind membranule broad, extending well beyond level of first vein descending into anal field **61**	
61a	Areas along sutures on side of synthorax darker than areas between them, giving impression of two dull yellowish to brown stripes on dark purplish background; male genital hamule, when retracted, only slightly longer than genital lobe; vulvar scale of female less than 1.8 mm long, not reaching end of abdominal segment 9 ***Tramea loewii***	 
b	Synthorax almost uniformly red, top of pleural sutures darkened; male genital hamule, when retracted, extending well beyond end of genital lobe; vulvar scale of female more than 1.8 mm long, reaching to or beyond end of segment 9 **62**	 

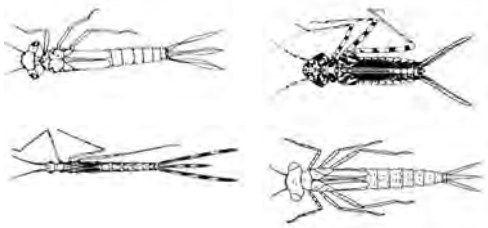
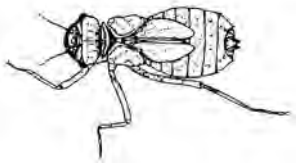
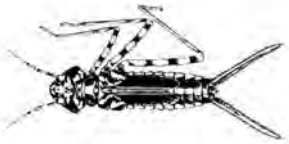
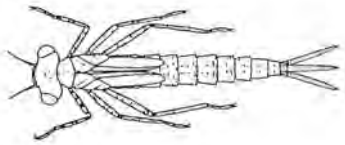
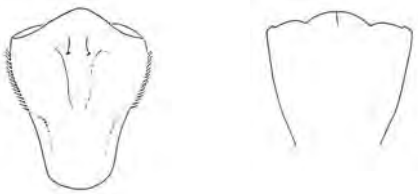
62a	Hamule 1.7-2.2 mm long when retracted; male genital lobe relatively broad, length:breadth 1.2 to 1.5, posterior margin rounded; end of vulvar scale reaching to, or almost to, end of tergum 9 ***Tramea eurybia***	
b	Hamule 2.1-2.5 mm long when retracted; male genital lobe relatively narrow, length:breadth 1.4 to 2.0, tending to be parallel-sided; vulvar scale ending at or beyond end of tergum 9 ***Tramea stenoloba***	
63a	Wings with some yellowish-brown colouration, overall or at base of hind wing, combined with dark brown or black markings **64**	
b	Wing markings dark brown to black, with or without metallic reflections **66**	
64a	Wing tips pale; wing membrane brownish-yellow with darker brown mottlings ***Rhyothemis graphiptera***	
b	Wing tips dark; wing membrane colourless or tinged yellow, and marked with brownish-black patches, including major brownish-black area traversed by yellow cross-band at base of hind wing ***Rhyothemis phyllis*** **65**	
65a	Dark nodal spots well-developed, those of male extending into subnodal space, that of female hind wing extending outside alignment of last antenodal cells, often far outside them ***Rhyothemis phyllis chloe***	
b	Dark nodal spots small or absent. those of male restricted to costal and subcostal spaces, that of female hind wing generally not extending outside alignment of last antenodal cells ***Rhyothemis phyllis beatricis***	

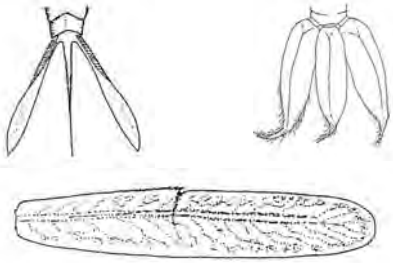
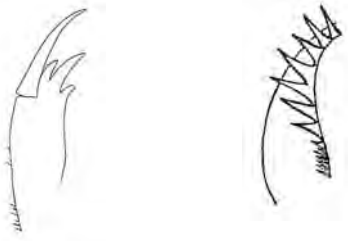
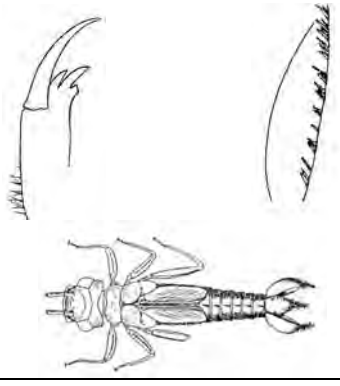
66a	Distal part of wings extensively dark brownish-black ***Rhyothemis princeps***	
b	Only basal part of wings dark **67**	
67a	Dark basal area of hind wing extending farther than that of forewing, in female usually enclosing two pale spots; male hind wing less than 24 mm long ***Rhyothemis resplendens***	
b	Dark basal areas of almost similar length in forewing and hind wing, lacking pale spots; male hind wing more than 24 mm long ***Rhyothemis braganza***	

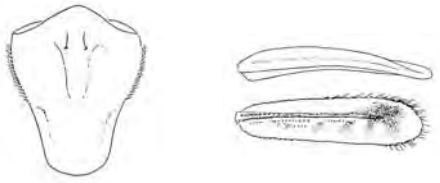
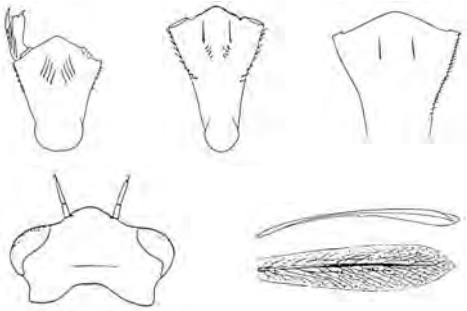
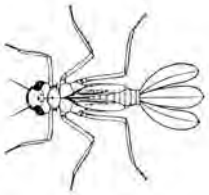
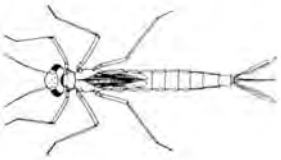
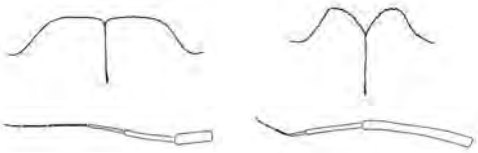
6 Keys to the larvae

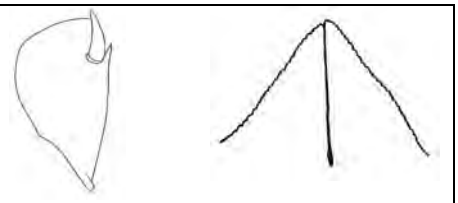
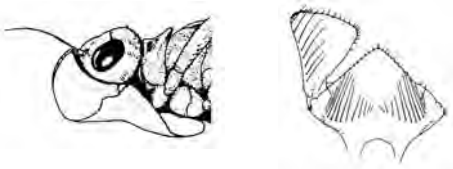
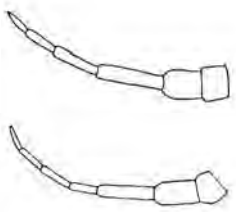
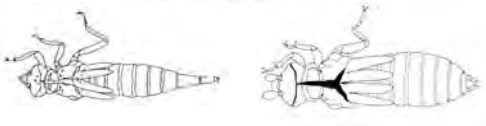
Key to suborders and families

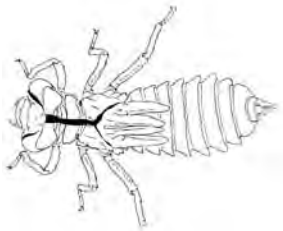
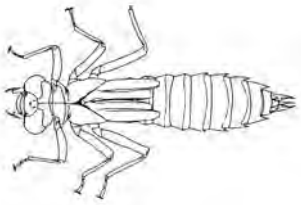
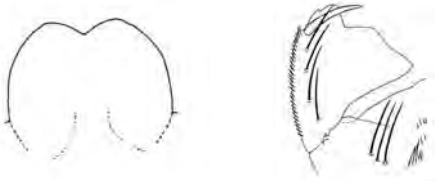
(Genera and species which are the sole representatives of a family in Australia may also key out here.)

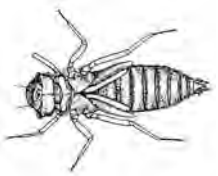
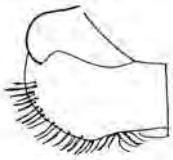
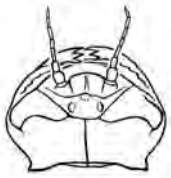
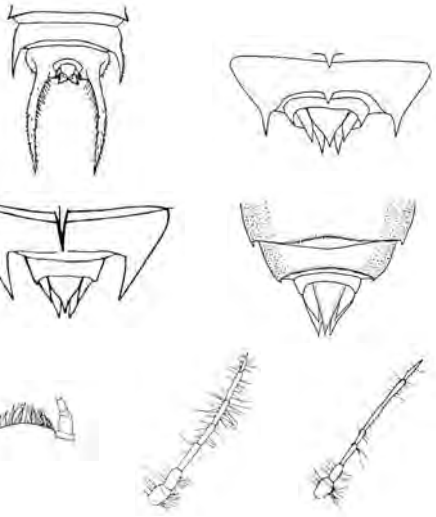
1 a	Larvae usually slender, with three leaf-like or saccoid tracheal caudal gills Suborder **Zygoptera** (damselflies) **2**	
b	Larvae usually stout, without external caudal gills, but with three conspicuous substantial spine-like or triangular processes at tip of abdomen, forming 'anal pyramid' Suborder **Epiprocta** (dragonflies) **12**	
2 a	Median caudal gill strongly reduced **Chlorocyphidae**: ***Rhinocypha tincta semitincta***	
b	Median gill lamellate, laterals triquetral **Calopterygidae**: ***Neurobasis australis***	
c	Median and lateral gills similar in form **3**	
3a	Prementum with paraglossae; small, mature larvae approximately 14 mm or less long **Hemiphlebiidae**: ***Hemiphlebia mirabilis***	
b	Paraglossae absent, but premental setae may be present; various sizes **4**	

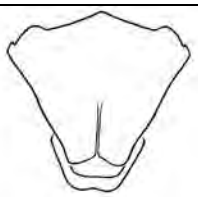
4a	Movable hook of labial palp armed with setae **Lestidae**	
b	Movable hook of labial palp lacking setae **5**	
5a	Gills with strong constriction or node **Isostictidae**	
b	Gills without strong constriction or node may be subnodate or with apical stylus or filament **6**	
6a	Gills saccoid **7**	
b	Gills lamellate **8**	
7a	Outer margin of labial palps with row of short stout setae, inner tooth of palps longer than wide; anterior portion of inner ventral eye margin convex and spinose; caudal gills about half as long as rest of body **Diphlebiidae**: ***Diphlebia***	
b	Outer margin of labial palp with basal tuft of long setae, inner tooth of palps not longer than wide; inner ventral eye margin concave and setose; caudal gills about one quarter the length of rest of body **Lestoideidae: *Lestoidea***	

8a	Premental ligula without distinct median cleft **9**	
b	Premental ligula with distinct median cleft **10**	
9a	Only one pair of` premental setae and postocular lobes rounded; lateral caudal gills with main tracheole laterally prominent **Platycnemididae**: **Disparoneurinae:** ***Nososticta***	
b	More than one pair of large premental setae, or, if one pair of large premental setae, then postocular lobes strongly expanded; lateral caudal gills with main tracheole not laterally prominent **Coenagrionidae**	
10a	Caudal gills spread horizontally **Megapodagrionidae**	
b	Caudal gills arranged vertically **11**	
11a	Lobes of premental ligula semicircular, antennal segment 2 and 3 subequal in length **Chorismagrionidae**: ***Chorismagrion risi***	
b	Lobes of premental ligula not semicircular, antennal segment 2 markedly longer than segment 3 **Synlestidae**	

12a	Labial palps with small spine at base of movable hook; premental ligula subtriangular, strongly produced and with distinctive median cleft **Petaluridae**: ***Petalura***	
b	No spine at base of movable hook; premental ligula strongly produced without median cleft or not strongly produced and with or without median cleft **13**	
13a	Prementum flat or nearly so and lacking setae; labial palps not broadened distally, lying below head when closed **14**	
b	Prementum flat or variably concave, ladle-shaped and bearing setae; labial palps much broadened distally, forming mask in front of head when closed **18**	
14a	Antennae four-segmented, usually flattened; at least pro- and mesotarsus two-segmented **15**	
b	Antennae very rarely four-, generally five- to seven-segmented; tarsi of all legs three-segmented **16**	
15a	All tarsi two-segmented; abdomen broad, rounded, almost as wide as long **Lindeniidae**: ***Ictinogomphus***	
b	Only pro- and mesotarsus two-segmented; abdomen much longer than wide **Gomphidae**	

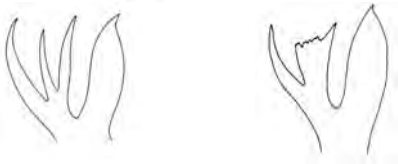
16a	Clypeus bilobed; abdominal segments with broad, rounded to subtriangular lateral lobes, which are absent from segment 9 **Austropetaliidae**	
b	Clypeus not bilobed; some abdominal segments, including segment 9, with sharp lateral spines **17**	
17a	Epiproct only slightly tapered, most of it almost parallel-sided, with apex distinctly bifid **Aeshnidae**	
b	Epiproct strongly tapered, with apex generally pointed, rarely variously truncate or slightly bifid **Telephlebiidae** and **Brachytronidae**	
18a	Distal border of labial palps variably toothed, the teeth lacking setae or spines **19**	
b	Distal border of labial palps toothed or without teeth, but always with some setae or spines **21**	
19a	Frontal plate large, markedly longer than half its width; palpal dentations very wide and short **Gomphomacromiidae**: ***Archaeophya***	
b	Frontal plate not longer than half its width; palpal dentations markedly narrower, or, at least some of them, longer and more distinct **20**	

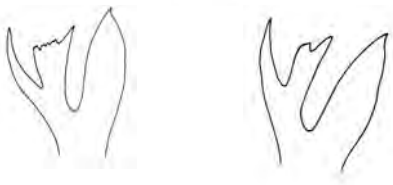
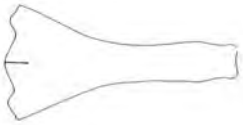
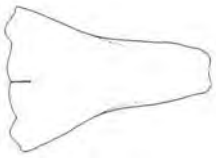
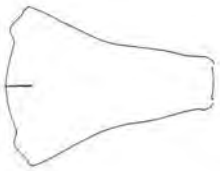
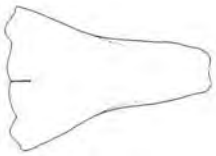
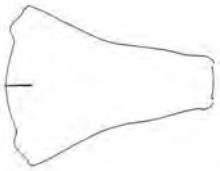
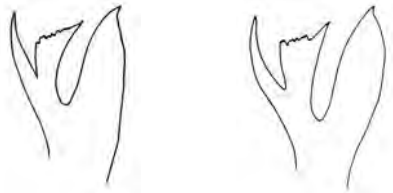
20a	Wing pads parallel; head very short and unusually wide, with eyes strongly protruding laterally and somewhat anteriorly **Pseudocorduliidae**: ***Pseudocordulia***	
b	Wing pads divergent; head not very short and wide, with eyes not or only slightly protruding laterally **Synthemistidae**	 
21a	Top of head with nipple-like projection or low tubercle near posterolateral angle **Macromiidae**: ***Macromia***	
b	Top of head without nipple-like projection or tubercle near posterolateral angle **22**	
22a	Eyes strongly protruding laterally; abdomen very wide and flat with segment 10 distinctly directed dorsally, or, frontal plate produced beyond scape, or, scape+pedicel and flagellum of antennae subequal in length, or abdomen almost three times as long as wide and armed with small lateral spines on segment 9 only **Austrocorduliidae**	  
b	Eyes variably protruding laterally; abdomen not very wide and flat and with segment 10 not directed dorsally, or, frontal plate not produced beyond scape; flagellum of antennae much longer than scape+pedicel; abdomen no more than twice as long as wide and generally differently armed, or, unarmed **23**	

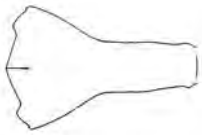
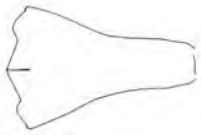
23a	Dentations of labial palps highly irregular (some very long, some short) **Cordulephyidae**: ***Cordulephya***	
b	Dentations of labial palps absent or regular (subequal in length) **24**	
24a	Base of prementum ventrally with distinct midline or narrow groove **Corduliidae**	
b	Base of prementum ventrally without distinct midline or narrow groove **Libellulidae**	

Lestidae

Key to genera and species of **Lestidae**

1a	Outer portion of labial palps shaped like a fork of two subequal branches ***Indolestes*** [Thelarvae of *I. alleni* and *I. obiri*) remain undescribed.]	
b	Outer portion of labial palps shaped like a fork of three branches or of two dissimilar branches **2**	
2a	Inner portion of labial palps with apex long, thin, claw-shaped ***Lestes concinnus***	
b	Inner portion of labial palps with apex short, subtriangular and only slightly curved ***Austrolestes*** **3** [The larvae of *A. insularis* remains undescribed.]	

3a	Outer portion of labial palps bearing fork of three subequal branches **4**	
b	Outer portion of labial palps bearing fork of two dissimilar branches **7**	
4a	Prementum petiolate, with lateral margins strongly concave, more than twice as long as wide; premental ligula strongly produced medially ***Austrolestes. minjerriba***	
b	Prementum not petiolate, with lateral margins straighter, not more than 1.5 times as long as wide; premental ligula not strongly produced medially **5**	 
5a	Premental ligula slightly bilobed **6**	
b	Premental ligula slightly convex ***Austrolestes annulosus***	
6a	From eastern Australia ***Austrolestes psyche***	
b	From south-western Australia ***Austrolestes aleison***	
7a	Inner branch of outer portion of labial palps widening into a broad serrated edge **8**	
b	Inner branch of outer portion of labial palps subdivided into a longer pointed lobe and a shorter generally truncate lobe **9**	

8a	Lateral spines on abdominal segments 5-9 or 6-9 ***Austrolestes analis***	
b	Lateral spines on abdominal segments 3-9 or 4-9 ***Austrolestes aridus***	
9a	Shorter lobe of inner branch of outer portion of labial palps distinctly longer than wide ***Austrolestes cingulatus***	
b	Shorter lobe of inner branch of outer portion of labial palps shorter than wide **10**	 
10a	Prementum petiolate ***Austrolestes io***	
b	Prementum not petiolate ***Austrolestes leda***	

Hemiphlebiidae

Key to genus and species of **Hemiphlebiidae**

This family contains only the single genus and species ***Hemiphlebia mirabilis***.

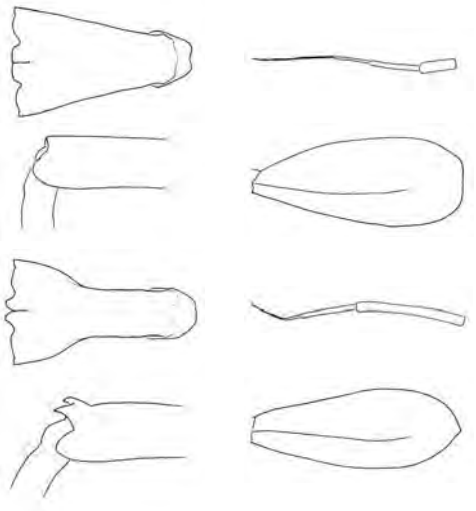
Chorismagrionidae

Key to genus and species of **Chorismagrionidae**

This family contains only the single genus and species ***Chorismagrion risi.***

Synlestidae

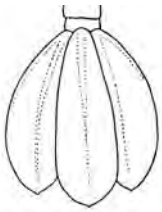
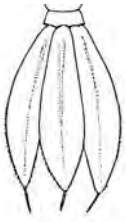
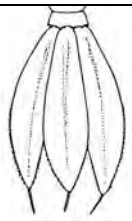
Key to genera and species of **Synlestidae**

1a	Lateral margins of prementum straight or almost so; segment 1 of antennae shorter than segment 2; apices of femora without heavy spines; caudal gills apically rounded or truncate ***Episynlestes*** **2**	
b	Lateral margins of prementum strongly concave; segment 1 of antennae longer than segments 2, 3 and 4 together; apices of femora armed with two heavy spines; caudal gills apically bluntly pointed ***Synlestes*** **4**	
2a	Lateral spines on abdominal segments 5-9; from north-eastern New South Wales and south-eastern Queensland, north to Blackdown Tableland and Carnarvon Gorge ***Episynlestes albicauda***	
b	Lateral spines on abdominal segments 5-9 or 6-9; north-eastern Queensland, north from the Mackay region **3**	
3a	North from Paluma ***Episynlestes cristatus***	
b	Known only from Eungella region ***Episynlestes intermedius***	
4a	Lateral caudal gill generally shorter than 4.7 mm, measured from base; metafemur 5.9 mm or more long ***Synlestes weyersii***	
b	Lateral caudal gill longer than 4.7 mm, measured from base; metafemur shorter than 6.0 mm **5**	
5a	Length of prementum 3.5 mm or less; north to Eungella region ***Synlestes selysi***	
b	Length of prementum 3.4 mm or more; north-eastern Queensland, from Paluma northwards ***Synlestes tropicus***	

Megapodagrionidae

Key to genera and species of **Megapodagrionidae**

1a	Large,length excluding gills 20 mm; labial palps tridentate with innermost tooth small and adpressed; four or five palpal setae; gills short and wide, much shorter than wing pads ***Podopteryx selysi***	
b	Smaller (length excluding gills < 20 mm); labial palps bidentate or tridentate with innermost tooth small but prominent; at the most one palpal seta on each palp; gills mostly long and narrow, never much shorter than wing pads **2**	
2a	Labial palps bidentate; no palpal setae ***Griseargiolestes*** **3** [The larvae of *G. intermedius* and *G. metallicus* remain undescribed.]	
b	Labial palps tridentate; palpal setae present (one on each palp) or absent **6**	 
3a	Prementum stout, ratio of length:greatest width 1.05 to 1.10; approximately 20 denticles each side of premental ligula ***Griseargiolestes eboracus***	 
b	Prementum elongate, ratio of length:greatest width 1.15 to 1.30; approximately 15 denticles each side of premental ligula **4**	 
4a	Caudal gills narrow and slightly pointed ***Griseargiolestes albescens***	
b	Caudal gills widely oval **5**	

5a	From north of the Hunter River ***Griseargioletes bucki***	
b	From south of the Hunter River ***Griseargiolestes griseus***	
6a	From eastern Australia; no palpal setae; gills with apical portion rather parallel-sided and without styli (final instar) ***Austroargiolestes*** [Characters to distinguish the species of *Austroargiolestes* are not available.]	
b	From south-western Australia; palpal setae present (one on each palp) or absent; gills with apical portion distinctly tapered and with terminal styli **7**	 
7a	No palpal setae; postocular lobe prominent; gills with substantial spines along apical portion of lateral margins ***Miniargiolestes minimus***	
b	Palpal setae (one on each palp) may be present; postocular lobe not prominent; gills only spinulate along apical portion of lateral margins ***Archiargiolestes*** [Characters to distinguish the species of *Archiargiolestes* are not available.]	

Chlorocyphidae

Key to genus and species of **Chlorocyphidae**

The only species of this family recorded from Australia is ***Rhinocypha tincta semitincta.***

Calopterygidae

Key to genus and species of **Calopterygidae**

The only species of this family recorded from Australia is ***Neurobasis australis.***

Lestoideidae

Key to genus and species of **Lestoideidae**

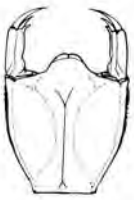
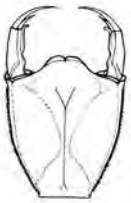
The only genus of this family recorded from Australia is *Lestoidea*. The larvae of *L. barbarae* and *L. lewisiana*, recorded only from Mount Lewis are still not available. The larvae of *L. brevicauda* cannot yet be distinguished from larvae of *L. conjuncta* and possible larvae of *L. barbarae.*

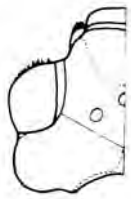
1a	Mossman and north from Mossman (tropical Queensland) ***Lestoidea brevicauda***	
b	South from Mossman (tropical Queensland) ***Lestoidea conjuncta***	

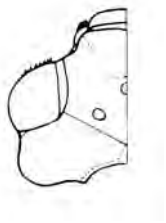
Diphlebiidae

Key to genus and species of **Diphlebiidae**

This key largely follows Stewart (1980).

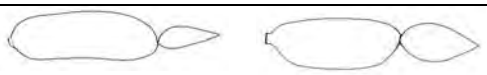
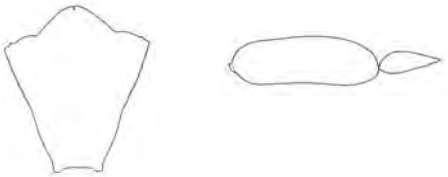
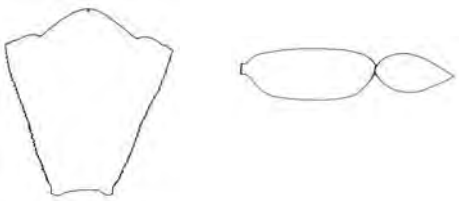
1a	Prementum squarish, width across top greater than the mid-dorsal length; basal width greater than half mid-dorsal length **2**	
b	Prementum elongate; width across top less than or just equal to the mid-dorsal length; basal width at most half the mid-dorsal length **3**	

2a	Basal margin of ventral surface of prementum with a few small, rounded protuberances with small setae; basal third of lateral spines of prementum distinct; basal segment of labial palp short and stout with long, finely serrated inner margin extending over two-thirds the length; moveable hooks long and incurved; third hook long and broad; head wide, body slim and gently tapered; gills short and stout ***Diphlebia euphoeoides***	
b	Basal margin of prementum smooth or with a few small hairs only; basal third of lateral spines of prementum reduced; labial palps long and heavily built; all hooks of palp smaller and less curved; serrated margin reduced; head wide, eyes almost square; body robust, abdomen relatively short and stout; gills long and slender ***Diphlebia nymphoides***	
3a	Basal margins of ventral surface of prementum with a group of at least three to six distinct rounded protuberances with short setae ***Diphlebia hybridoides***	
b	Basal margins without a group of distinct protuberances **4**	
4a	Median lobe of prementum short with distal margin broadly rounded; basal segment of labial palp long and slender with serrated inner margin half as long as segment, gently curved; movable hooks short, c. three-quarters the length of segment; large larva with a relatively narrow head; eyes narrow and elongate; postocular lobes large and broadly curved; antennae and legs very long; gills large and broad ending in long, slender hairy tails; ***Diphlebia lestoides***	

b	Median lobe long with distal margin steeply rounded; labial palps long, slender; movable hooks c. four-fifths as long as basal segment; small, dark larva; large head with posterior margins rather angulate; eyes almost square; body short and slender; gills and gill tails short ***Diphlebia coerulescens***	

Isostictidae

Key to genera and species of **Isostictidae**

1a	Three or four pairs of premental setae ***Austrosticta fieldi*** [The hitherto unknown larvae of *A. frater* and *A. soror* will probably also key out here.]	
b	Only two pairs of premental setae **2**	
2a	Large, with metafemur longer than 4 mm; more than five palpal setae ***Lithosticta macra***	
b	Smaller, with metafemur generally shorter than 4 mm; five or fewer palpal setae **3**	
3a	Basal section of caudal gills saccoid, sausage-shaped, with apex rounded **4**	
b	Basal section of caudal gills flat or triquetral, with apex generally truncate **6**	
4a	Lateral edges of prementum smooth in basal half; basal section of caudal gills more than twice as long as apical section ***Labidiosticta vallisi***	
b	Lateral edges of prementum serrated throughout; basal section of caudal gills less than twice as long as apical section ***Neosticta*** **5**	

5a	From south-eastern Queensland and eastern New South Wales	***Neosticta canescens***
b	From north-eastern Queensland	***Neosticta fraseri***
6a	Three palpal setae; segment 2 of antennae about as long as segment 3	***Rhadinosticta*** **7**
b	Two to five palpal setae; segment 2 of antennae markedly shorter than segment 3	**8**
7a	Femora with three dark bands	***Rhadinosticta banksi***
b	Femora with four dark bands	***Rhadinosticta simplex***
8a	Five palpal setae	***Orosticta filicola***
b	Two to four palpal setae [The larva of *E. reevesi* remains undescribed.]	***Eurysticta*** **9**
9a	Two palpal setae	***Eurysticta coolawanyah***
b	Three palpal setae	***Eurysticta kununurra***
c	Four palpal setae	***Eurysticta coomalie***

Platycnemididae: Disparoneurinae

Key to genus and species of **Platycnemididae: Disparoneurinae**

The only genus of this family recorded from Australia is *Nososticta*. The larvae of *N. baroalba*, *N. coelestina*, *N. kalumburu*, *N. koolpinyah*, *N. liveringa*, *N. mouldsi*, *N. solitaria* and *N. taracumbi* remain undescribed and may possibly key out under one or the other of the keyed species.

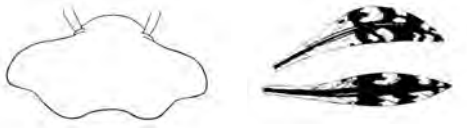
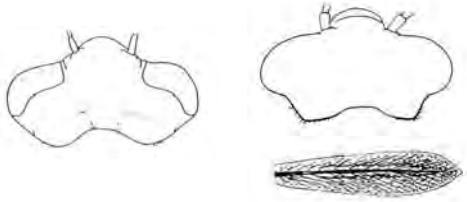
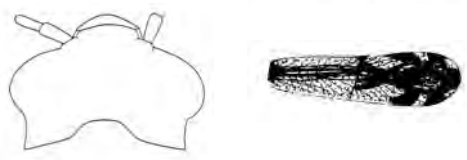
1a	Premental ligula rounded	**2**
b	Premental ligula angular	**3**

2a	Three palpal setae ***Nososticta fraterna***	
b	Two palpal setae ***Nososticta koongarra***	
3a	From north-western Australia ***Nososticta pilbara***	
b	From eastern Australia ***Nososticta solida***	

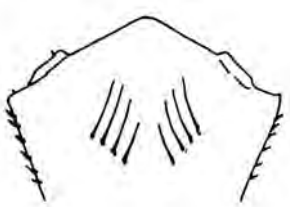
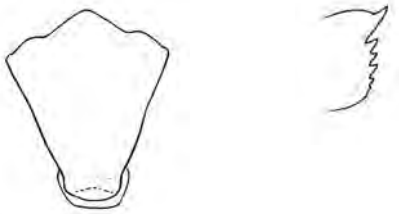
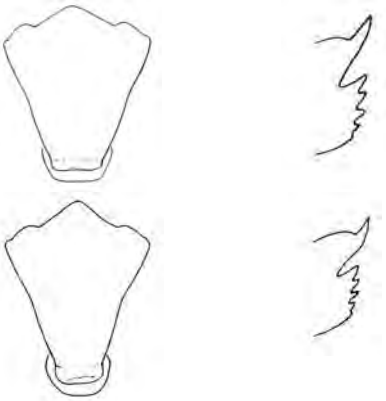
Coenagrionidae

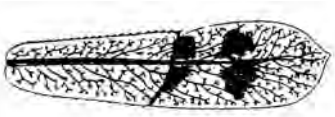
Key to genera and species of **Coenagrionidae**

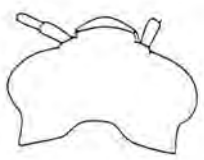
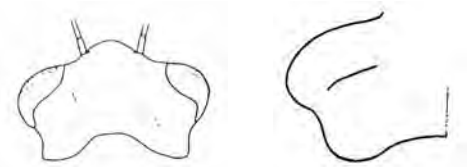
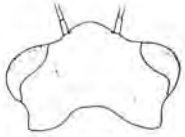
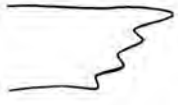
The larva of *Archibasis mimetes* remains undescribed.

1a	Head very short and wide with eyes strongly protruding; and postocular lobes very widely rounded; legs long and thin, ratio of length:width of metafemur approximately 12; wing pads raised from the body at an angle of approximately 30-40°; abdomen very long and thin; caudal gills denodate, long and slim, petiolate, median gill distinctly arched ***Austrocnemis*** **2** [The larva of *A. obscura* remains undescribed.]	
b	General appearance not as above **3**	
2a	Two pairs of premental setae; three palpal setae; from northern Australia ***Austrocnemis maccullochi***	
b	Three pairs of premental setae; four palpal setae; only from north-western Australia ***Austrocnemis splendida***	
3a	Posterior corners of head rounded or slightly angular; caudal gills denodate **4**	
b	Posterior corners of head rounded (rarely), angular or flared (generally); caudal gills subnodate **17**	

4a	Only one pair of long premental setae **5**	
b	More than one pair of long premental setae **6**	
5a	Prementum markedly longer than wide; six palpal setae ***Ceriagrion aeruginosum***	
b	Prementum about as long as wide; fewer than six palpal setae *Teinobasis ariel* [*T. ariel* is a Micronesian species. The larva of the Australian ***Teinobasis rufithorax*** is still unknown but may also key out here.]	
6a	Very small; posterior corners of head somewhat angular and caudal gills very narrow and drawn out into long pointed tails ***Agriocnemis*** **7** [*A. thoracalis* cannot be interpreted. The larvae of *A. argentea*, *A. dobsoni* and *A. rubricauda* are still unknown, and details of *A. femina* are not available.]	
b	Larger; posterior corners of head mostly rounded; caudal gills not drawn out into long pointed tails **8**	
7a	Five pairs of premental setae; five palpal setae; lateral edges of abdominal segments, in particular 7-9, with short, thick, spine-like setae; only from north-western Australia ***Agriocnemis kunjina***	
b	Four to five pairs of premental setae; five or six palpal setae; lateral edges of abdominal segments lacking short, thick, spine-like setae; from northern and eastern Australia ***Agriocnemis pygmaea***	

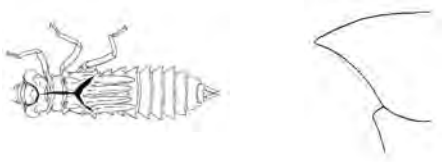
8a	Premental setae in straight line **9**	
b	Premental setae in curved row **13**	
9a	Eyes distinctly protruding laterally and posterior corners of head angular; caudal gills narrow ***Argiocnemis rubescens***	
b	Eyes not distinctly protruding laterally and posterior corners of head widely rounded; caudal gills wider **10**	
10a	Only two pairs of long premental setae ***Aciagrion fragile***	
b	Four or five pairs of long premental setae ***Ischnura*** **11**	
11a	Prementum c. 1.5 mm long; dorsal branch of labial palps basally narrower than ventral branch ***Ischnura aurora***	
b	Prementum 2.3 to 2.5 mm long; dorsal branch of labial palps basally about as wide as ventral branch **12**	

12a	Prementum stout, length:greatest width ratio c. 1.15; six to seven palpal setae ***Ischnura heterosticta***	
b	Prementum slimmer, length:greatest width ratio c. 1.25; generally five palpal setae ***Ischnura pruinescens***	
13a	Prementum square (ratio of length:greatest width c. 1.05) ***Coenagrion lyelli***	
b	Prementum more elongate (ratio of length:greatest width equal or greater than 1.2) **14**	
14a	Prementum stouter, ratio of length:greatest width c. 1.2; spines on ventral edge of median gill extending to approximately one-sixth to one-fifth length of gill ***Xanthagrion erythroneurum***	
b	Prementum slender, ratio of length:greatest width approximately 1.3; spines on ventral edge of median gill extending to approximately one-third to one-half length of gill ***Austroagrion*** **15** [The larva of *A. pindrina* remains undescribed.]	
15a	Five pairs of premental setae; four palpal setae ***Austroagrion exclamationis***	
b	Four to five pairs of long and and one to two pairs of short premental setae; five to seven palpal setae **16**	
16a	From Western Australia and South Australia ***Austroagrion cyane***	
b	Mainly from northern Australia ***Austroagrion watsoni***	

17a	Large larvae (total length approximately 30 mm) with posterior corners of head flared; caudal gills with apical section not wider than basal section ***Caliagrion billinghursti***	
b	Larvae with posterior corners of head rounded, or, smaller larvae (total length up to 25 mm) with posterior corners of head flared; caudal gills with apical section usually wider than basal section ***Pseudagrion*** **18** [The larvae of *P. cingillum* and *P. jedda* remain undescribed.]	
18a	Posterior corners of head rounded **19**	
b	Posterior corners of head flared **20**	
19a	Premental ligula moderately produced medially; movable hook not particularly long and slender ***Pseudagrion ignifer***	
b	Premental ligula strongly produced medially; movable hook very long and slender ***Pseudagrion lucifer***	
20a	Generally three rather slender palpal setae, or, if four, basal seta very thin; dorsal branch of labial palps not acutely pointed ***Pseudagrion aureofrons***	
b	Generally four palpal setae of similar thickness; dorsal branch of labial palps acutely pointed ***Pseudagrion microcephalum***	

Austropetaliidae

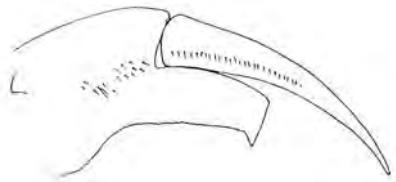
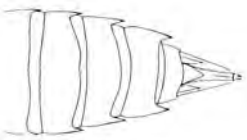
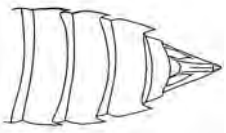
Key to genera and species of **Austropetaliidae**

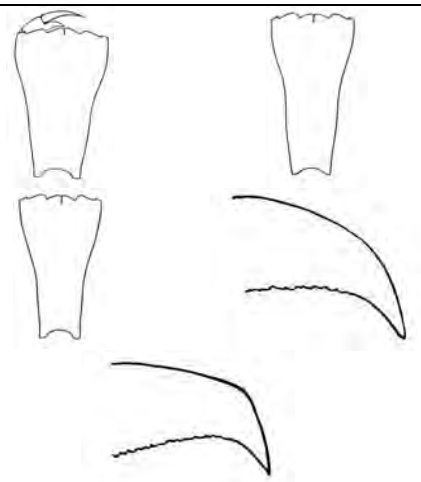
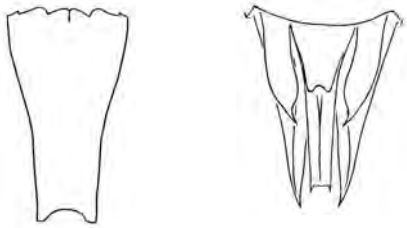
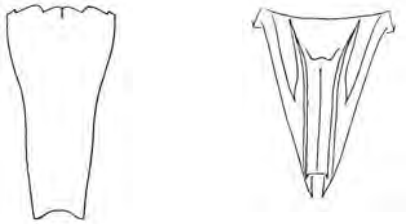
1a	Mesothorax laterally produced into a pointed triangular lobe ***Archipetalia auriculata***	
b	Mesothorax not laterally produced ***Austropetalia*** **2**	
2a	From north of latitude 35°S ***Austropetalia patricia***	
b	From south of latitude 35°S ***Austropetalia tonyana***	

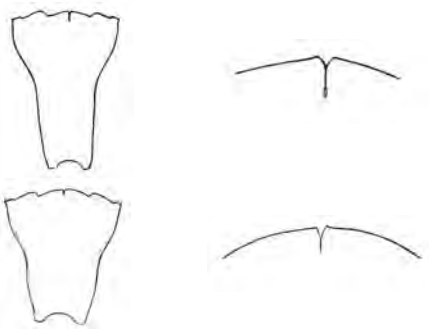
Aeshnidae

Key to genera and species of **Aeshnidae**

The larva of *Agyrtacantha dirupta* remains undescribed.

1a	Labial palps without conspicuous lateral (palpal) setae **2**	
b	Labial palps with conspicuous lateral (palpal) setae **6**	
2a	Lateral spines on abdominal segments 6-9 ***Adversaeschna brevistyla***	
b	Lateral spines on abdominal segments 7-9 only ***Anax*** **3**	

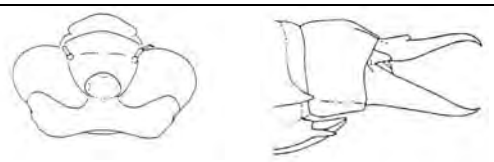
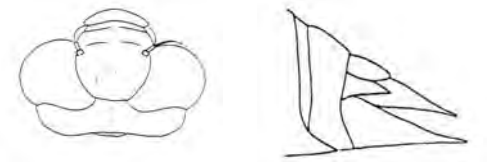
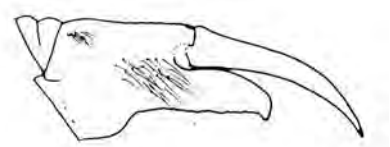
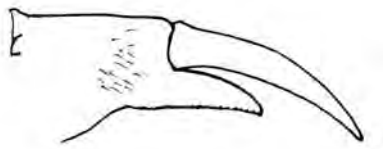
3a	Prementum long and slender, length:width ratio 1.6 or greater; labial palps somewhat tapered and hooked (end hook substantial) **4**	
b	Prementum shorter and stouter, length:width ratio <1.6; labial palps subrectangular (end hook small) ***Anax papuensis***	
4a	Length:width ratio of prementum c. 1.60; labial palps evenly curved ***Anax gibbosulus***	
b	Length:width ratio of prementum 1.70 to 2.00; labial palps not evenly curved **5**	
5a	Length:width ratio of prementum c. 1.70; male cerci distinctly curved and c. 1.5 times as long as male projection ***Anax georgius***	
b	Length:width ratio of prementum c. 2.00; male cerci almost straight and more than twice as long as male projection ***Anax guttatus***	

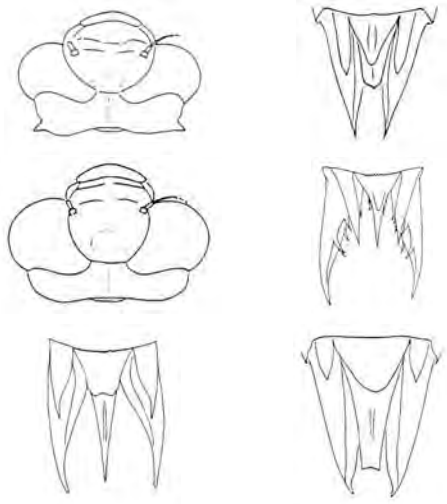
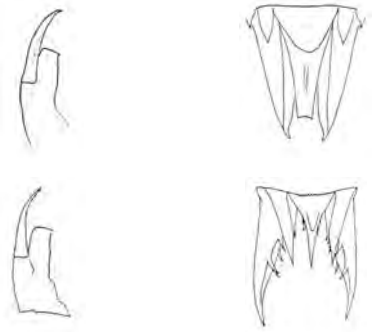
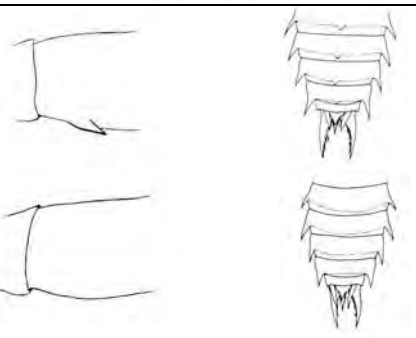
6a	Numerous (more than eight) long palpal setae ***Austrogynacantha heterogena***	
b	Fewer than six long palpal setae **7**	
7a	Labial palps with end hook not or hardly developed; some setae on movable hook long ***Anaciaeschna jaspidea***	
b	Labial palps with end hook prominent; only short setae on movable hook ***Gynacantha*** **8**	
8a	Premental ligula with substantial tooth each side of median cleft ***Gynacantha mocsaryi***	
b	Premental ligula virtually unarmed **9**	
9a	Prementum slender; labial palps with five to seven long setae ***Gynacantha dobsoni*/ *rosenbergi***	
b	Prementum stout; labial palps with two to three long setae ***Gynacantha nourlangie***	

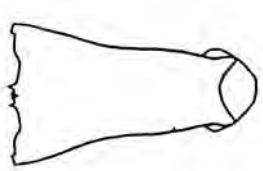
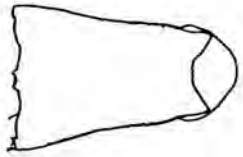
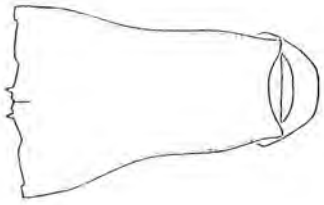
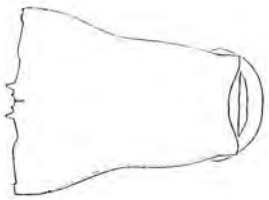
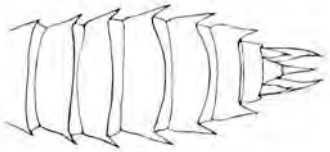
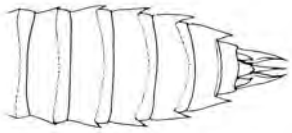
Telephlebiidae and Brachytronidae

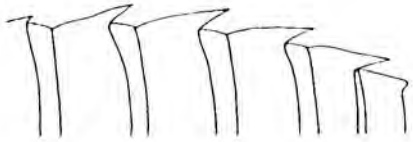
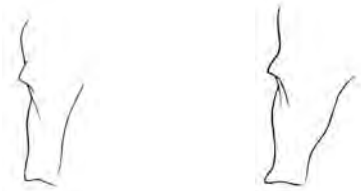
Key to genera, subgenera and species of **Telephlebiidae** and **Brachytronidae**

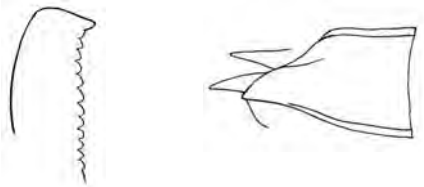
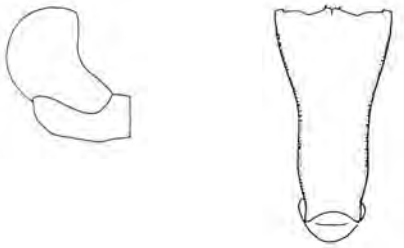
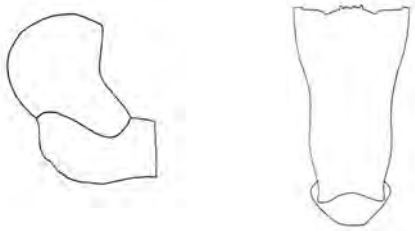
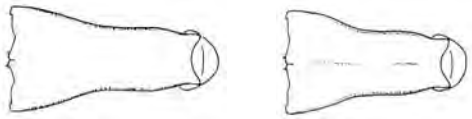
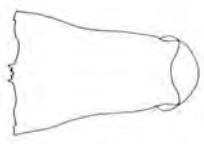
Only ***Dendroaeschna conspersa*** is considered to belong in **Brachytronidae**, all other species make up the **Telephlebiidae.**

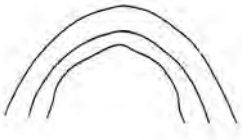
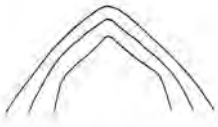
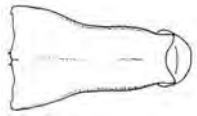
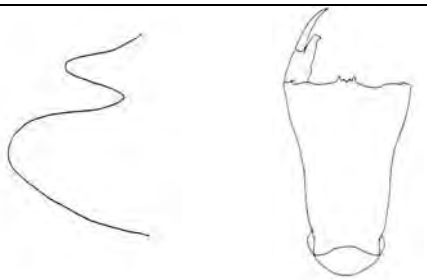
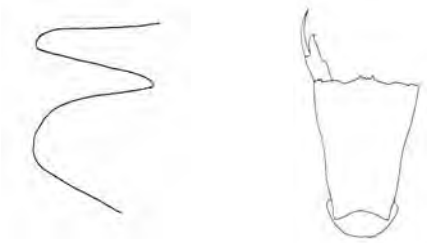
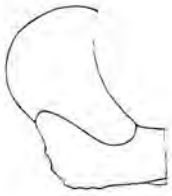
1a	Vertex raised and prominent; tergum 10 with mid-dorsal hump; epiproct sharply downcurved **2**	
b	Vertex rather flat; tergum 10 lacking mid-dorsal hump; epiproct not sharply downcurved **7**	
2a	Labial palps with lobe subrectangular; antennae five-segmented; lateral spines on segments 7-9 ***Antipodophlebia asthenes***	
b	Labial palps with lobe subconical; antennae six-segmented; lateral spines on segments 6-9 ***Telephlebia*** **3**	
3a	From eastern Australia north of latitude 20°S ***Telephlebia tillyardi***	
b	From eastern Australia south of latitude 20°S **4**	
4a	Only from Carnarvon Range in southern inland Queensland ***Telephlebia undia***	
b	From elsewhere in eastern Australia south of latitude 20°S **5**	
5a	From south of latitude 35° 30’S ***Telephlebia brevicauda***	
b	From north of latitude 35° 30’S **6**	
6a	From coastal fringe and nearby islands between latitudes 22°S and 30°S ***Telephlebia tryoni***	
b	From more montane rainforests between latitudes 20°S and 32°S ***Telephlebia cyclops***	
c	From eastern Australia between latitudes 28°S and 35° 30’S ***Telephlebia godeffroyi***	

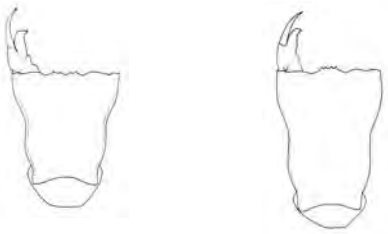
7a	Postocular lobes with substantial lateral horn; epiproct short with apex irregularly truncate ***Dendroaeschna conspersa***	
b	Postocular lobes without lateral horns; epiproct short with apex pointed, or long with apex generally pointed, rarely slightly bifid **8**	
8a	Labial palps including movable hook with some (inconspicuous) setae; epiproct slightly bifid ***Acanthaeschna victoria***	
b	Labial palps including movable hook lacking setae; epiproct pointed **9**	
9a	Epiproct and paraprocts armed with long spines; epiproct much shorter than paraprocts **10**	
b	Epiproct and paraprocts unarmed and subequal in length **13**	
10a	Profemur with sharp spine; mid-dorsal spines on abdominal segments 2-9 ***Notoaeschna*** **11**	
b	Profemur unarmed; no mid-dorsal abdominal spines ***Spinaeshna*** **12**	
11a	From eastern Australia north of Hunter River (latitude approximately 33°S) ***Notoaeschna geminata***	
b	From eastern Australia south of Hunter River (latitude approximately 33°S) ***Notoaeschna sagittata***	

12a	Subtropical eastern Australian species; prementum slender, ratio of length:width at distal end >1.60 ***Spinaeschna tripunctata***	
b	Tropical eastern Australian species; prementum stout, ratio of length:width at distal end 1.40 to 1.45 ***Spinaeschna watsoni***	
13a	Large(total length generally > 45 mm); lateroventral edges of epiproct narrowly and regularly denticulate ***Austrophlebia*** **14**	
b	Small (total length < 45 mm); lateroventral edges of epiproct almost smooth, or widely and irregularly denticulate, and often obscured by dense hair ***Austroaeschna*** and ***Dromaeschna*** **15**	
14a	From eastern Australia south of latitude 20°S; prementum slender, ratio of length:width at distal end approximately 1.50 ***Austrophlebia costalis***	
b	From Australia north of latitude 20°S; prementum stout, ratio of length:width at distal end < 1.40 ***Austrophlebia subcostalis***	
15a	Lateral spines on abdominal segments 4-9 **16**	
b	No lateral spines on abdominal segment 4 **18**	
16a	From mainland Australia (Victoria, south-eastern New South Wales) ***Austroaeschna inermis***	
b	From Tasmania **17**	

17a	Anterior prothoracic process very slim ***Austroaeschna hardyi***	
b	Anterior prothoracic process stouter, more conical ***Austroaeschna tasmanica***	
18a	Ratio of length:width at distal end of prementum about 1 .00 to 1.10 **19**	
b	Prementum elongate, ratio of length:width at distal end generally greater than 1.10 **20**	
19a	Lateral spines of abdomen rather slim and pointing backward; known only from the Australian Alps ***Austroaeschna atrata***	
b	Lateral spines of abdomen stronger and pointing slightly laterad; widely distributed in south-eastern Australia ***Austroaeschna subapicalis***	
20a	Meso- and metathorax each with pair of distinct lateral spines (the mesothoracic spine may be rudimentary or not directed laterally) **21**	
b	Meso- and metathorax each without distinct lateral spines **23**	

21a	Labial palp slim and with well-developed endhook; pronotal lobe rather short; only from coastal south-eastern Queensland. ***Austroaeschna cooloola***	
b	Labial palp stout and with insignificant endhook; pronotal lobe rather prominent; from eastern Australia **22**	
22a	Metathoracic spine rudimentary, not directed laterally; tropical species (known only from north of latitude 18°S) ***Austroaeschna speciosa***	
b	Metathoracic spine prominent, directed laterally; non-tropical species (known only from south of 23°30'S) ***Austroaeschna unicornis/ pinheyi***	
23a	Eyes much larger than postocular lobes; prementum at distal end approximately 1.8 to 2.0 times as wide as at base ***Austroaeschna (Pulchaeschna)* and *Dromaeschna* 24**	
b	Eyes not much larger than postocular lobes; prementum at distal end markedly less than 1.8 times as wide as at base ***Austroaeschna (Austroaeschna)* 28**	
24a	From eastern Australia south of latitude 20°S; prementum long and narrow, ratio length:width at distal end > 1.60 ***Austroaeschna (Pulchaeschna)* 25**	
b	From eastern Australia north of latitude 20°S; prementum stouter, ratio length:width at distal end not > 1.60 ***Dromaeschna* 27**	

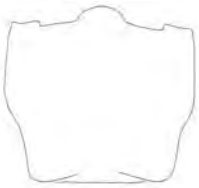
25a	Terga 8-10 well arched; from Carnarvon Range in southern inland Queensland ***Austroaeschna muelleri***	
b	Terga 8-10 or 9 and 10 pitched; from elsewhere in eastern Australia **26**	
26a	Subtropical species (known from south of latitude 26°S); prementum ratio length:width at distal end > l.80 ***Austroaeschna pulchra***	
b	Tropical species (known only from the Eungella and Jaxut areas); prementum ratio length:width at distal end < 1.70 ***Austroaeschna eungella***	
27a	Anterior prothoracic process much shorter than posterior; prementum ratio length:width at distal end 1.55 to 1.60 ***Dromaeschna forcipata***	
b	Prothoracic processes subequal in length; prementum ratio length:width at distal end approximately 1.40 ***Dromaeschna weiskei***	
28a	From south-western Australia; postocular lobes angulated ***Austroaeschna anacantha***	
b	From eastern Australia; postocular lobes rounded **29**	

29a	Prementum long, ratio length:width at distal end approximately 1.60 ***Austroaeschna obscura***	
b	Prementum shorter, ratio length:width at distal end 1.10 to 1.50 **30**	
30a	Ratio of length:width at distal end of prementum 1.10 to 1.20; only from the Australian Alps ***Austroaeschna flavomaculata***	
b	Ratio of length:width at distal end of prementum > 1.20 **31**	
31a	Labial palps with 13 to 14 ill-defined teeth ***Austroaeschna parvistigma***	
b	Labial palps with at least 15 rather well-defined teeth **32**	
32a	Tropical species (known only from the Eungella area) ***Austroaeschna christine***	
b	Subtropical species **33**	
33a	From north of latitude 33°30'S ***Austroaeschna sigma***	
b	From south of latitude 35°30'S, but excluding the Grampians ***Austroaeschna multipunctata***	
c	From the Grampians ***Austroaeschna ingrid***	

Lindeniidae

Key to genus and species of **Lindeniidae**

The only genus of this family recorded from Australia is *Ictinogomphus*. The larva of *Ictinogomphus paulini*, recorded only from Cape York Peninsula, remains undescribed.

1a	Prementum usually only slightly wider than long; known from the Kimberley region in Western Australia, Northern Territory, Queensland and New South Wales ***Ictinogomphus australis***	
b	Prementum usually markedly wider than long; known from the Pilbara region or further south in Western Australia ***Ictinogomphus dobsoni***	

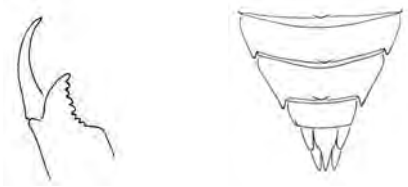
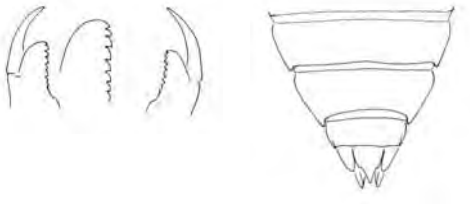
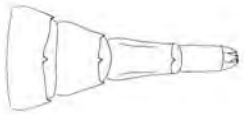
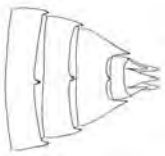
Gomphidae

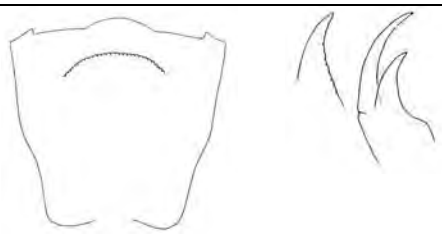
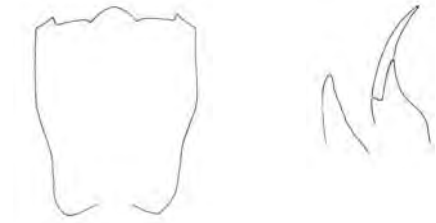
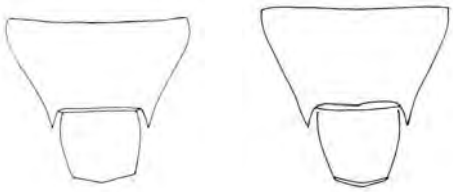
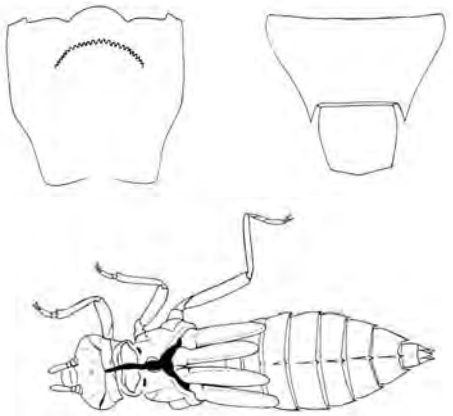
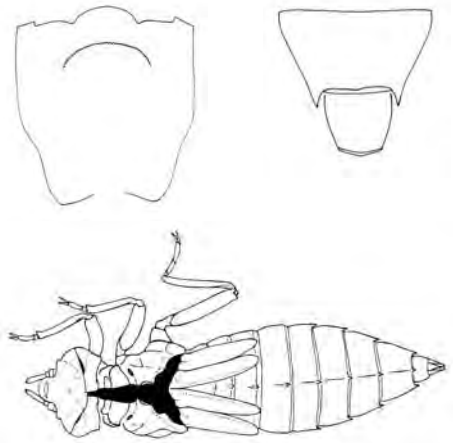
Key to genera, subgenera and species of **Gomphidae**

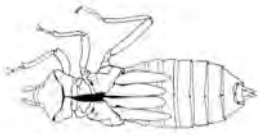
The larvae of *Austrogomphus angelorum*, *doddi*, *mouldsorum* and *pusillus* are still unknown.

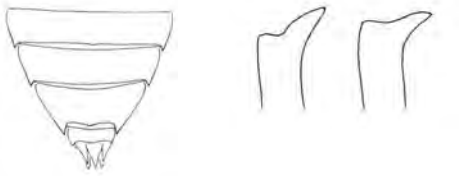
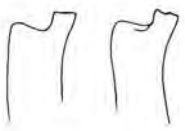
Austroepigomphus melaleucae is condidered to be a synonym of *Austroepigomphus praeruptus.*

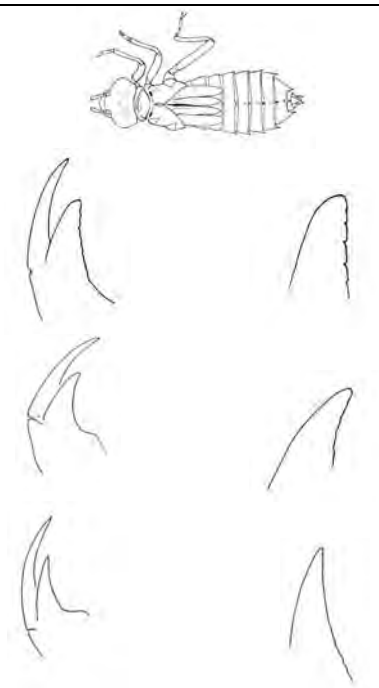
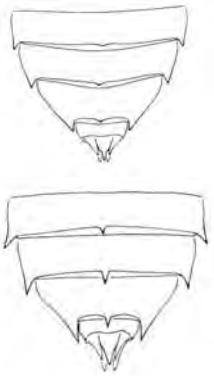
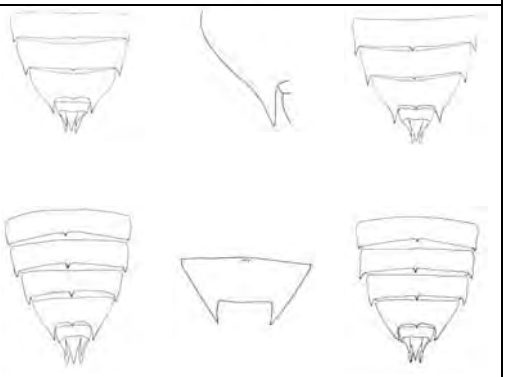
1a	Ligula of prementum armed with two prominent denticles **2**	 
b	Premental ligula not so armed **5**	 
2a	Ligula usually protuberant, the two denticles rounded and close together; small lateral spines on abdominal segments 8 and 9 only ***Hemigomphus*** **3**	 
b	Distal margin of ligula almost straight, the two denticles subtriangular and widely separated; small lateral spines on abdominal segments 7-9 ***Odontogomphus donnellyi***	 
3a	Known only from Northern Territory ***Hemigomphus magela***	
b	From elsewhere in Australia **4**	

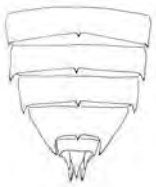
4a	Labial palp curved with apex bluntly pointed; abdominal segments 7-9 with distinct, narrowly rounded, mid-dorsal hump ***Hemigomphus cooloola***	
b	Labial palp rather straight with apex rounded; abdominal segments 7-9 with, at most, low, usually widely rounded mid-dorsal hump ***Hemigomphus comitatus/ gouldii/ heteroclytus/ theischingeri*** [Separation of this cluster at the present is not possible even though moderately consistent differences in slenderness/stoutness of anal pyramid have been noted.]	
5a	Ligula of prementum strongly protuberant, semicircular; fore and middle tibia bearing strong, elongate distal outer claw ***Armagomphus armiger***	
b	Ligula of prementum less protuberant, not semicircular; fore and middle tibia with shorter distal outer claw, or unarmed **4**	
6a	Abdominal segments 8-10 produced into long tube ***Antipodogomphus*** **7**	
b	Abdominal segments 8-10 not so produced **10**	
7a	Segment 9 long (mid-dorsal length 3.2 mm or more) **8**	
b	Segment 9 short (mid-dorsal length not more than 2.8 mm) **9**	
8a	Known from northern Australia ***Antipodogomphus neophytus***	
b	Known only from north-western Australia ***Antipodogomphus hodgkini***	

9a	Prementum about as long as wide, ligula at the most slightly protruding; labial palp sickle-shaped, end hook distinctly curved ***Antipodogomphus acolythus*/*proselythus***	
b	Prementum markedly longer than wide, ligula strongly protruding; labial palp subtriangular and almost straight, end hook only slightly curved ***Antipodogomphus dentosus***	
10a	Abdominal segment 9 elongate; ratio of ventral basal width:mid-ventral length < 2.0; abdominal segment 10 almost as long as wide **11**	
b	Abdominal segment 9 short; ratio of ventral basal width:mid ventral length > 2.5; abdominal segment 10 much wider than long **13**	
11a	Fewer than 30 denticles along margin of premental ligula; abdominal segment 10 about as wide basally as apically ***Austroepigomphus*** (***Austroepigomphus***) ***praeruptus***	
b	Well over 40 denticles along margin of premental ligula; abdominal segment 10 markedly wider basally than apically ***Austroepigomphus*** (***Xerogomphus***) **12**	

12a	Lateral spines of segment 9 reaching to at the most one fifth the length of segment 10; lateral margins of abdominal segment 10 almost straight; known from the north-west of Western Australia and from inland Australia in Northern Territory ***Austroepigomhus gordoni***	
b	Lateral spines of segment 9 reaching to about one quarter the length of segment 10; lateral margins of abdominal segment 10 distinctly curved; known from the Kimberley region in Western Australia, the 'Top End' of the Northern Territory, Cape York Peninsula and eastern Queensland ***Austroepigomphus turneri***	
13a	Postocular lobe angulate or protuberant; lateral spines on abdominal segments 3-9, that on 9 not reaching end of segment 10 ***Austrogomphus*** (***Pleiogomphus***) **14**	 
b	Postocular lobe rounded or angulate; lateral spines on abdominal segments 4-5-, 6- or 7-9; if lateral spines on segment 3, then lateral spines on 9 reaching to or beyond end of segment **15**	 
14a	Mid-dorsal spine on abdominal segment 8 about as large as lateral spines of segment 8 ***Austrogomphus amphiclitus***	
b	Mid-dorsal spine on abdominal segment 8 markedly smaller than lateral spines of segment 8 ***Austrogomphus bifurcatus/divaricatus/prasinus***	

15a	Ligula of prementum slightly bilobed, its margin armed with a series of well-defined, sometimes irregularly shaped and spaced teeth ***Zephyrogomphus*** **16**	
b	Ligula of prementum not bilobed, its margin only crenulate or weakly denticulate without well-defined teeth ***Austrogomphus*** (***Austrogomphus***) **17**	
16a	Prementum about 1.1 times as long as wide; from Western Australia ***Zephyrogomphus lateralis***	
b	Prementum about 1.4 times as long as wide; from north-eastern Queensland ***Zephyrogomphus longipositor***	
17a	Abdomen without mid-dorsal armature; distal claw of pro- and mesotibia almost as long as width of tibiae ***Austrogomphus cornutus***	
b	Abdomen generally with, rarely without, mid-dorsal armature; distal claw of pro- and mesotibia markedly shorter than width of tibiae **18**	

18a	Small species (not longer than 16 mm); apex of labial palp rounded; known only from northern Australia (north of 24°S) **19**	
b	Larger species (longer than 18 mm); apex of labial palp rather pointed; known only from more southern Australia (south of 23°S) **20**	
19a	Lateral spine of abdominal segment 9 not reaching to end of segment 10, mid-dorsal spines on abdomen stout ***Austrogomphus arbustorum***	
b	Lateral spine of abdominal segment 9 reaching well beyond end of segment 10, mid-dorsal spines on abdomen slim ***Austrogomphus mjobergi***	
20a	Mid-dorsal abdominal spines absent or very short and rather stout; lateral margins of segment 9 slightly S-curved **21**	
b	Mid-dorsal abdominal spines short but well-developed or very small; lateral margins of segment 9 not S-curved **22**	
21a	Known from Queensland, New South Wales, Victoria and South Australia ***Austrogomphus australis***	
b	Known only from Western Australia ***Austrogomphus collaris***	

22a	Lateral spines on abdominal segments 7-9 only ***Austrogomphus guerini***	
b	Lateral spines on abdominal segment 3-, 4-, 5- or 6-9 ***Austrogomphus ochraceus***	

Petaluridae

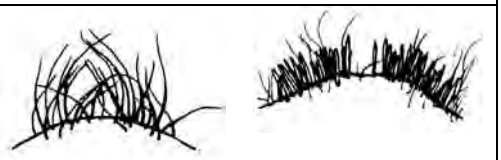
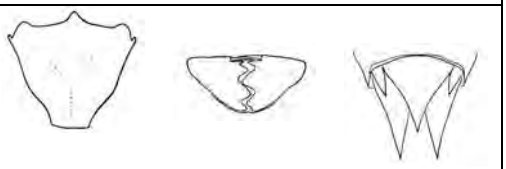
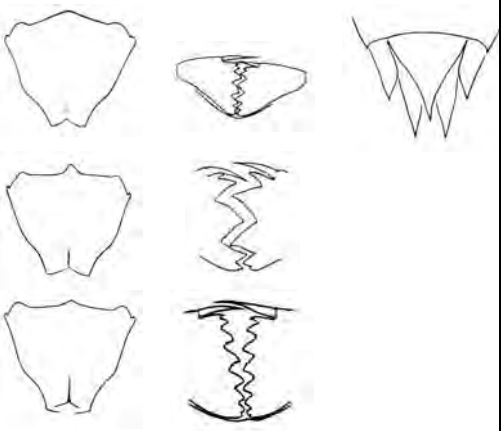
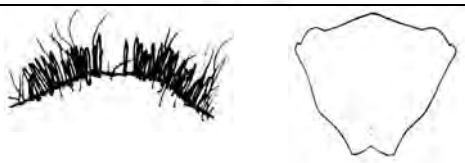
Key to genus and species of **Petaluridae**

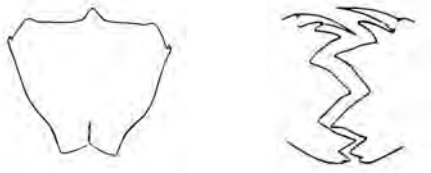
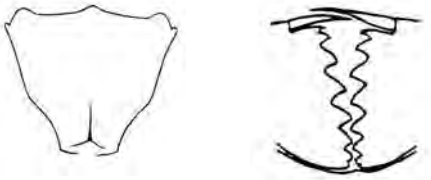
1a	From south-western Australia ***Petalura hesperia***
b	From eastern Australia **2**
2a	North of latitude 20°S (the hitherto unknown larva of ***Petalura pulcherrima*** will key out here also) ***Petalura ingentissima***
b	South of latitude 20°S **3**
3a	From Queensland or from coastal New South Wales north of latitude 30°S ***Petalura litorea***
b	From New South Wales except for the coastal areas north of latitude 30°S ***Petalura gigantea***

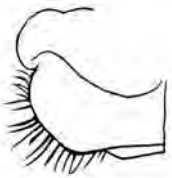
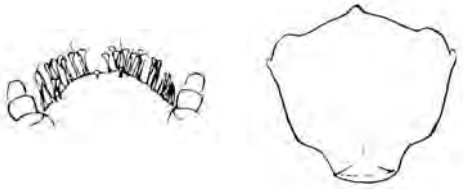
Synthemistidae

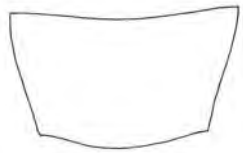
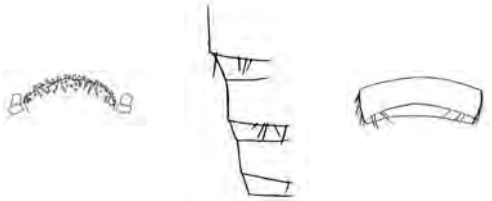
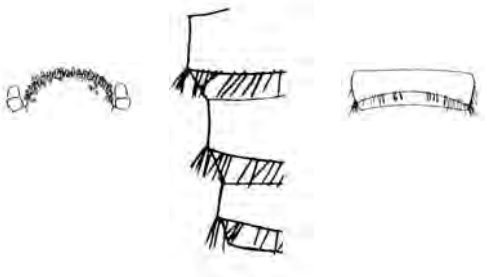
Key to genera and species of **Synthemistidae**

1a	Pronotal lobes mainly with short adpressed setal structures; abdominal segments 4-9 with paired laterodorsal processes ***Tonyosynthemis*** **2**	
b	Pronotal lobes with long, prominent setae; abdominal segments 4-9 without any processes **3**	

2a	North of latitude 20°S ***Tonyosynthemis claviculata***	
b	South of latitude 20°S ***Tonyosynthemis ofarrelli***	
3a	Frontal plate small, with hairs and setae, or long sausage-shaped setal structures, along margins **4**	
b	Frontal plate of variable size, with short, usually flat and often distally widened, scale-like setal structures **11**	
4a	Premental ligula with very large median lobe; only four dentations on each labial palp; posterior eye margin without hair fringes; cerci less than one-third length of paraprocts ***Synthemiopsis gomphomacromioides***	
b	Premental ligula with up to moderately large, or without, median lobe; more than 4/4 palpal dentations; posterior eye margin with well-developed hair fringes; cerci greater than one-third length of paraprocts **5**	
5a	Frontal plate with long sausage-shaped setal structures along margins; premental ligula without median lobe; at least seven palpal setae ***Parasynthemis regina***	
b	Frontal plate with only long setae or hairs along margins; premental ligula with median lobe; generally not more than six palpal setae **6**	

6a	Premental ligula with large median lobe; generally not more than 6/6 palpal dentations, at least 2/2 of them large ***Archaeosynthemis*** **7**	
b	Premental ligula with small median lobe; generally at least 7/7 palpal dentations, none particularly large ***Synthemis*** **10**	
7a	From south-eastern Australia ***Archaeosynthemis orientalis***	
b	From south-western Australia **8**	
8a	Abdominal terga sparsely haired, lacking row of long hairs on posterior border or on dorso-lateral surface ***Archaeosynthemis spiniger***	
b	Abdominal terga set with dense transverse rows or dorso-lateral patches of hair **9**	
9a	Generally six pairs of primary and six or seven pairs of secondary premental setae; top of abdominal terga sparsely set with short, pale setae, densely set with long setae on posterior border and dorso-lateral surface; body length 19-23 mm ***Archaeosynthemis occidentalis***	
b	Generally five pairs of primary and four or five pairs of secondary premental setae; top of abdominal terga densely set with short, dark setae, posterior border almost devoid of long setae but dorsolateral patches present; body length 25-28 mm ***Archaeosynthemis leachii***	
10a	From mainland Australia ***Synthemis eustalacta***	
b	From Tasmania ***Synthemis tasmanica***	

11a	Postocular lobe slightly bilobed; known only from south-western Australia ***Austrosynthemis cyanitincta***	
b	Postocular lobe simply rounded; known only from eastern Australia **12**	
12a	Frontal plate small, not reaching beyond second antennal segment; prementum widened abruptly from narrow base; abdominal terga lacking stiff or flattened/split setae ***Choristhemis flavoterminata*/ *olivei*** [Whereas *C. flavoterminata* is widely distributed in eastern Australia, *C. olivei* is exclusively tropical.]	
b	Frontal plate larger, generally reaching beyond second antennal segment; prementum widened gradually from base; abdominal terga at least with some stiff or flattened/split setae ***Eusynthemis*** **13**	
13a	Frontal plate very wide, with posterior margin straight for much of its length; prementum with medial lobe retracted and rounded; only three or four palpal dentations and only four palpal setae* ***Eusynthemis ursula*** [The hitherto undescribed larva of *Eusythemis ursa* may or may not key out here.]	
b	Frontal plate narrower, with posterior margins evenly curved; prementum with medial lobe projecting and subtriangular; markedly more than three or four palpal dentations and more than four palpal setae **14**	

14a	Abdomen narrow and sharply pointed, ratio greatest width:length of segment 10 (ventral view) approximately 1.7 **15**	
b	Abdomen wider and less sharply pointed, ratio greatest width:length of segment 10 (ventral view) approximately 2.5 **16**	
15a	Generally five palpal setae and 5-9 pairs of secondary premental setae ***Eusynthemis brevistyla***	
b	Generally six palpal setae and four to five pairs of secondary premental setae ***Eusynthemis virgula***	
16a	Frontal plate widely rounded, setal structures hardly longer than wide; abdomen without distinct stiff setae on mid-dorsal surface (e.g. tergum 7) ***Eusynthemis nigra***	
b	Frontal plate more narrowly rounded, setal structures mostly markedly longer than wide; abdomen with distinct stiff setae on mid-dorsal surface (e.g. tergum 7) **17**	
17a	From Carnarvon Gorge and Mount Moffat in southern Queensland ***Eusynthemis deniseae***	
b	From elsewhere in eastern Australia **18**	
18a	From north of latitude 20°S* ***Eusynthemis barbarae*** [The hitherto undescribed larva of *Eusynthemis tenera* may or may not key out here.]	
b	From south of latitude 20°S **19**	

19a	Median lobe of prementum large; generally five palpal setae **20**	
b	Median lobe of prementum of moderate size; generally six palpal setae **21**	
20a	Some dentations of labial palps very large; south of latitude 35°30'S ***Eusynthemis guttata***	
b	Dentations of labial palps more uniform in size; north from Hunter River ***Eusynthemis aurolineata***	
21a	Terga 4-9 with single, simple setae; south from Hunter River ***Eusynthemis tillyardi***	
b	Terga 4-9 with distinct groups of flattened/split setae; generally north from Hunter River ***Eusynthemis rentziana***	

Gomphomacromiidae

Key to genus and species of **Gomphomacromiidae**

The only genus of this family recorded from Australia is *Archaeophya.*

1a	Basal posterior margin of postmentum (at the base of the labium) generally concave; recorded from south-eastern Queensland and south-eastern New South Wales ***Archaeophya adamsi***	
b	Basal posterior margin of postmentum (at the base of the labium) generally straight; recorded only from north-eastern Queensland ***Archaeophya magnifica***	

Pseudocorduliidae

Key to genus and species of **Pseudocorduliidae**

This family contains only the single genus *Pseudocordulia*. The larvae of this family and genus have been identified by supposition only, and the specific identification of the available material is not possible at present. The adults of *Pseudocordulia circularis* and *Pseudocordulia elliptica* usually coexist in the same localities and habitats.

Cordulephyidae

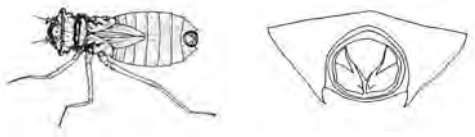
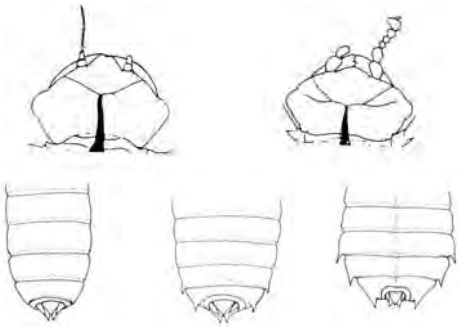
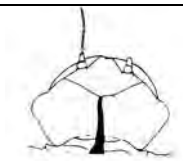
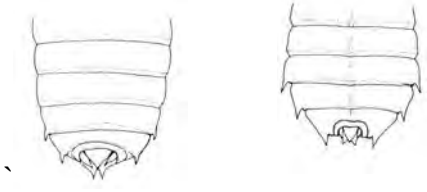
Key to genus and species of **Cordulephyidae**

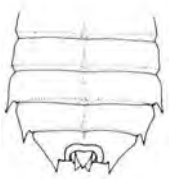
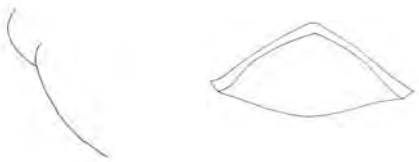
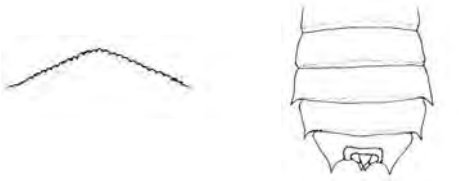
The only genus of this family recorded from Australia is *Cordulephya*.

1a	From north-eastern Queensland, north from Paluma ***Cordulephya bidens***	
b	From eastern Australia, south from the Eungella region **2**	
2a	Total length approximately 14 mm; labial palps with some of the long outer dentations club-shaped, about as wide as spaces between them ***Cordulephya pygmaea***	
b	Total length approximately 16 mm; labial palps with the long outer dentations very thin and parallel-sided, much narrower than the spaces between them ***C. montana/divergens*** [Characters to distinguish *C. montana* and *C. divergens* are not available at the present.]	

Austrocorduliidae

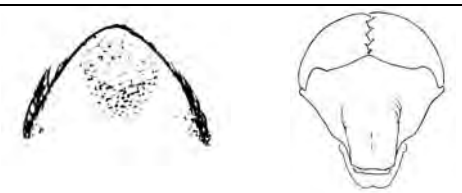
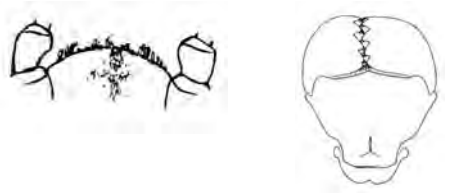
Key to genera and species of **Austrocorduliidae**

1a	Eyes strongly protruding laterally; abdomen very wide and flat with segment 10 distinctly directed dorsally ***Hesperocordulia berthoudi***	
b	Eyes variably protruding laterally; abdomen not very wide and flat and with segment 10 not directed dorsally **2**	
2a	Frontal plate prominent, with narrow bilobed apex; antennae with more than eight segments ***Apocordulia macrops***	
b	Frontal plate not prominent, with straight or slightly convex border; antennae seven- or eight-segmented **3**	
3a	Segments 3-6 of antennae very broad and flattened ***Austrophya mystica***	
b	Segments 3-6 of antennae filiform **4**	
4a	Lateral spines on abdominal segment 9 only, very inconspicuous ***Micromidia*** **5** The larva of *Micromidia rodericki* remains undescribed	
b	Conspicuous lateral spines on abdominal segments 8 and 9 or 7-9 **6**	

5a	Prementum wider than long ***Micromidia atrifrons***	
b	Prementum longer than wide ***Micromidia convergens***	
6a	Lateral spines on abdominal segments 8 and 9 only; from south-western Australia ***Lathrocordulia metallica*** [The hitherto unknown larva of *Lathrocordulia garrisoni* from tropical Queensland may or may not key out here.]	
b	Lateral spines on abdominal segments 7-9 ***Austrocordulia*** **7**	
7a	No lateral processes behind eyes; abdominal terga angulated along midline ***Austrocordulia refracta***	
b	A lateral process behind each eye; abdominal terga uniformly arched **8**	
8a	Distal margin of premental ligula uniformly convex, not angulated; inner margins of lateral spines on abdominal segment 9 almost parallel ***Austrocordulia leonardi***	
b	Distal margin of premental ligula angulated; inner margins of lateral spines on abdominal segment 9 strongly divergent ***Austrocordulia territoria***	

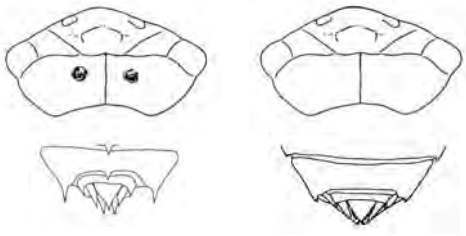
Macromiidae

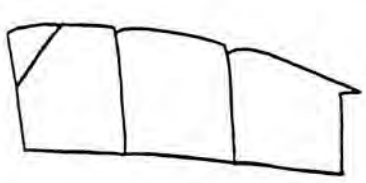
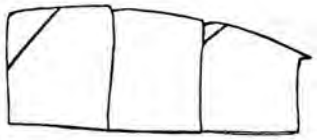
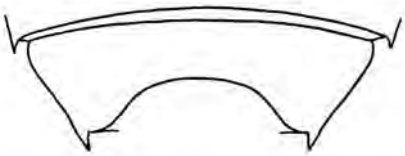
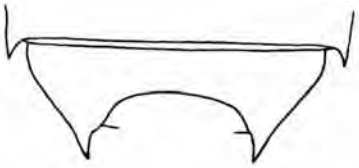
Key to genus and species of **Macromiidae**

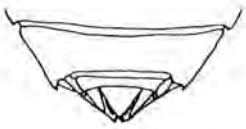
1a	Frontal plate developed into an anterdorsally directed cone; prementum with long, narrow base; more than ten pairs of primary premental setae ***Macromia tillyardi***	
b	Frontal plate rather flat with anterior margin convex; prementum with shorter, wider base; not more than six pairs of primary premental setae ***Macromia viridescens***	

Corduliidae

Key to genera and species of **Corduliidae**

1a	Lateral spines on abdominal segment 9 extremely long, about six times mid-dorsal length of segment 9 ***Pentathemis membranulata***	
b	Lateral spines on abdominal segment 9 not extremely long, not more than three times mid-dorsal length of segment 9 **2**	
2a	Eyes not protruding laterally; no mid-dorsal abdominal spines; lateral spines on abdominal segment 9 as long as mid-dorsal length of segment 9 *Metaphya elongata* [*M. elongata* is a species from New Caledonia; ***Metaphya tillyardi***, a Papua New Guinea species, recorded from Bramble Cay, an Australian island off the Papuan coast may also key out here.]	 
b	Eyes protruding laterally; mid-dorsal and lateral spines present or absent; if mid-dorsal spines absent, lateral spines of segment 9 markedly shorter than mid-dorsal length of segment 9 **3**	

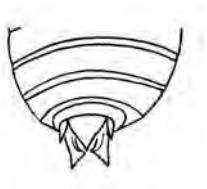
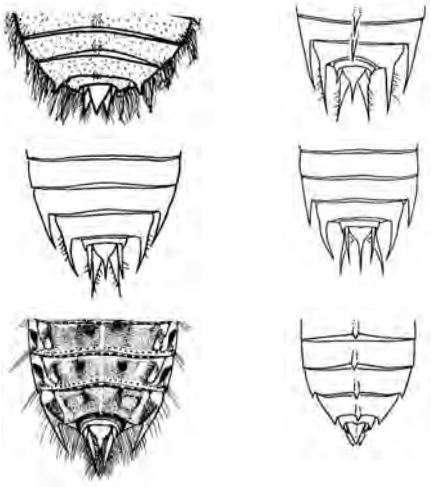
3a	Lateral triangular sclerites on abdominal stema 3-6 (absent from segments 7 and 8); lateral spines on abdominal segments 8 and 9 ***Procordulia*** **4**	
b	Lateral triangular sclerites on abdominal sterna 3-6, and 8 (absent from segment 7 only); and lateral spines on abdominal segments 8 and 9; or lateral triangular sclerites absent from abdominal segments 7 and 8, and abdomen unarmed ***Hemicordulia*** **5** [The status of *H. novaehollandiae* is obscure. The larva of *H. kalliste* remains undescribed.]	
4a	Lateral spines on abdominal segments 8 and 9 small; from south-eastern Australia ***Procordulia jacksoniensis***	
b	Lateral spines on abdominal segments 8 and 9 substantial; from south-westem Australia ***Procordulia affinis***	
5a	Abdomen unarmed (mid-dorsal and lateral abdominal spines absent) ***Hemicordulia flava***	
b	Abdomen with lateral spines on segments 8 and 9 and mostly with mid-dorsal spines **6**	
6a	Mid-dorsal abdominal spines well developed **7**	  
b	Mid-dorsal abdominal spines absent or poorly developed **10**	

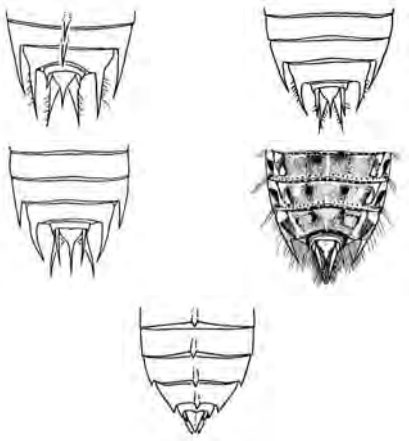
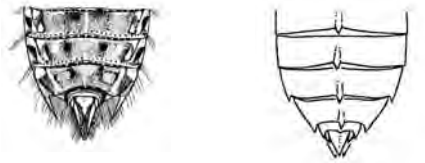
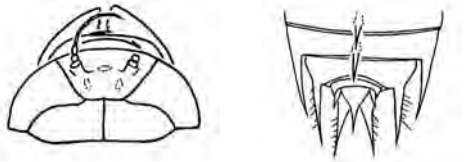
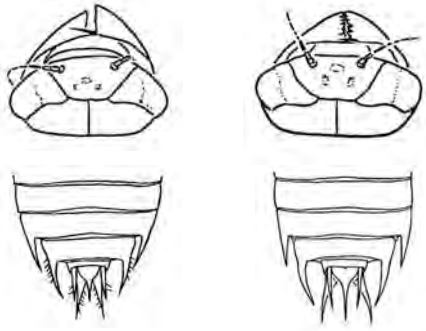
7a	Prominent mid-dorsal spines on abdominal segments 4-8 **8**	
b	Mid-dorsal spines on abdominal segments 4-9 **9**	 
8a	From north-westem Australia ***Hemicordulia koomina***	
b	From elsewhere ***Hemicordulia intermedia***	
9a	Postocular section with an elevation each side of, and close to, the mid-dorsal line; mid-dorsal abdominal spines prominent ***Hemicordulia superba***	 
b	Postocular section smooth; mid-dorsal abdominal spines rather flat ***Hemicordulia australiae***	 
10a	Lateral spines on abdominal segment 9 small, markedly less than half mid-dorsal length of that segment ***Hemicordulia tau***	
b	Lateral spines on abdominal segment 9 larger, about half mid-dorsal length of that segment ***Hemicordulia continentalis***	

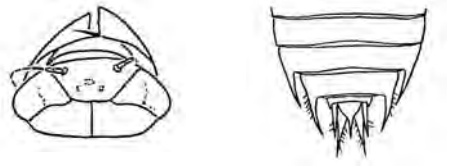
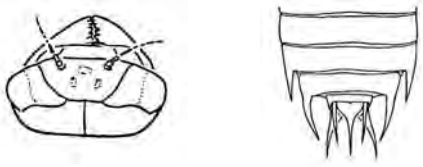
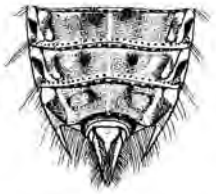
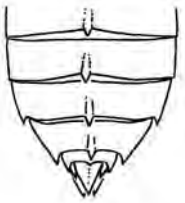
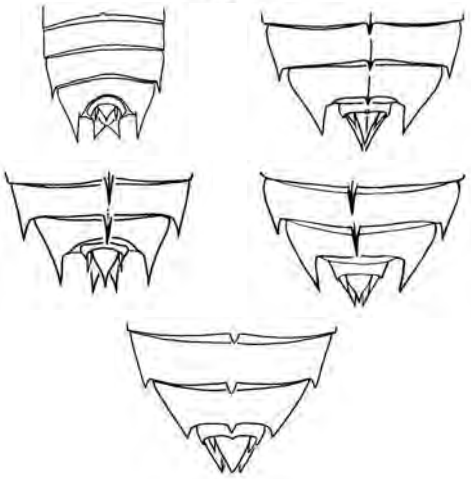
Libellulidae

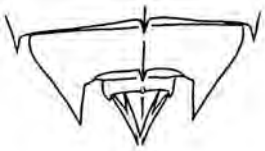
Key to genera and species of **Libellulidae**

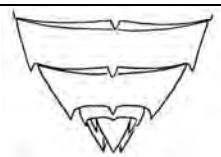
The supposed larva of *Lathrecista asiatica festa* (see Theischinger 2007) is not included; the larvae of *Notolibellula bicolor* and *Raphismia bispina* remain undescribed.

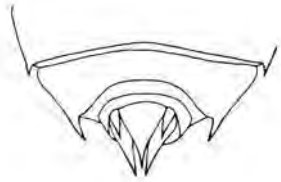
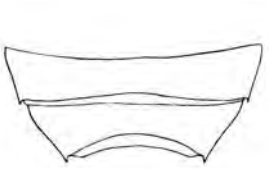
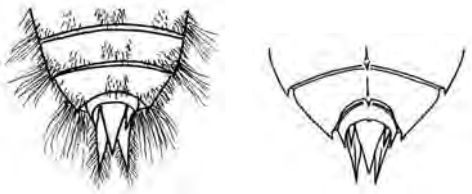
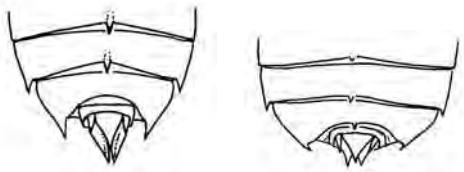
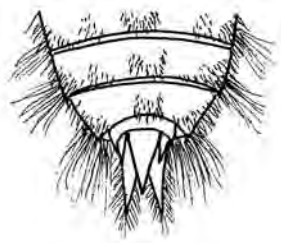
1a	Total length less than 12 mm; labial palps without dentations; abdomen without dorsal or lateral spines ***Nannophya*** **2** [The larva of *Nannophya paulsoni* remains undescribed.]	
b	Not with above combination of characters **4**	
2a	From south-western Australia ***Nannophya occidentalis***	
b	From elsewhere in Australia **3**	
3a	More than 30 setae along distal border of labial palps, set mostly in groups of three (one long, two short); only from south-eastern Australia ***Nannophya dalei***	
b	Approximately 20 setae along distal border of labial palps, set mostly in groups of two (one long, one short); from eastern Australia ***Nannophya australis***	

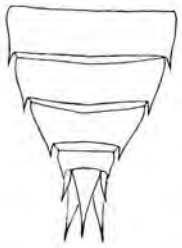
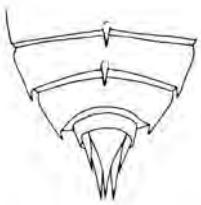
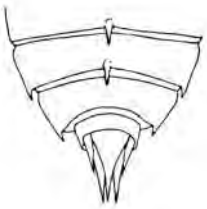
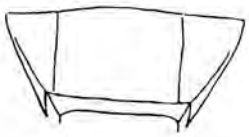
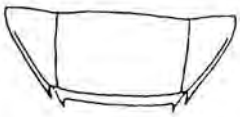
4a	Lateral spines on abdominal segment 9 only ***Rhodothemis lieftincki***	
b	Lateral spines on segments 8 and 9 **5**	
5a	Lateral spines on abdominal segments 8 and 9 both at least as long as mid-dorsal length of respective segment **6**	
b	Lateral spine on abdominal segment 8 shorter than mid-dorsal length of segment 8 **8**	
6a	Eyes extended to the posterior corners of head and pointed; mid-dorsal abdominal spines very distinct ***Hydrobasileus brevistylus***	
b	Eyes not extended to the posterior comers of head and not pointed; mid-dorsal abdominal spines hard to detect or absent **7**	

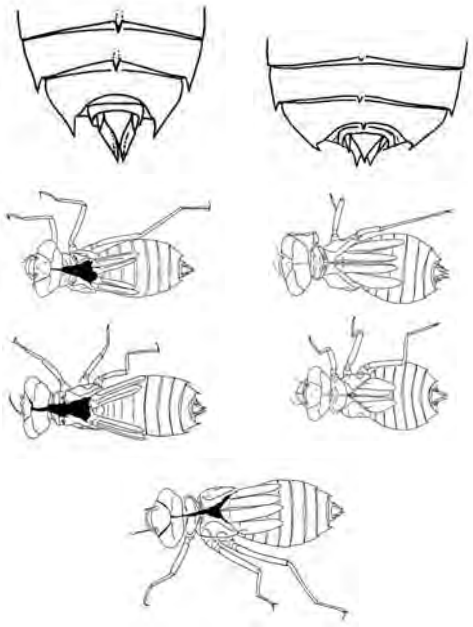
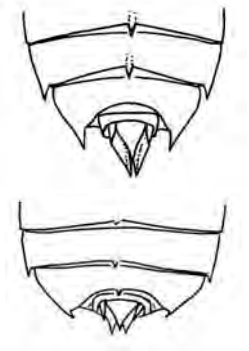
7a	Eyes laterally protruding; epiproct markedly shorter than paraprocts; no mid-dorsal abdominal spines ***Tramea*** [Even though illustrations and descriptions of at least three species of *Tramea* from Australia are available, diagnostic characters cannot yet be presented.]	
b	Eyes not laterally protruding; epiproct and paraprocts subequal in length; small mid-dorsal spines on abdominal segments 2-4 ***Pantala flavescens***	
8a	Lateral spines on abdominal segment 9 substantial, as long as or longer than mid-dorsal length of segment 9 **9**	
b	Lateral spines on abdominal segment 9 small, not longer than mid-dorsal length of segment 9 **15**	
9a	Abdomen lacking mid-dorsal spines **10**	
b	Mid-dorsal abdominal spines present **11**	

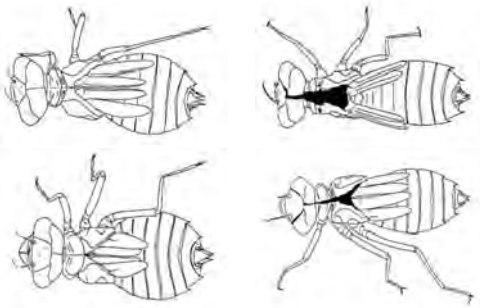
10a	Large species; total length well over 20 mm; lateral spine on abdominal segment 9 very thin ***Camacinia othello***	
b	Smaller species; total length well under 20 mm; lateral spine on abdominal segment 9 much stouter ***Austrothemis nigrescens*** (part)	
11a	Abdominal segment 9 with mid-dorsal spine ***Zyxomma*** **12** [The larva of *Z. multinervorum* remains undescribed.]	
b	Abdominal segment 9 lacking mid-dorsal spine **13**	
12a	Lateral edges of segment 9 rather evenly curved ***Zyxomma elgneri***	
b	Lateral edges of segment 9 slightly S-curved ***Zyxomma petiolatum***	
13a	Mid-dorsal abdominal spines very short ***Austrothemis nigrescens*** (part)	
b	Mid-dorsal abdominal spines long, in some segments almost as long as mid-dorsal length of subsequent segment **14**	
14a	Lateral spines on abdominal segment 9 acutely pointed; outer edge of segment slightly S-curved ***Macrodiplax cora***	
b	Lateral spines of abdominal segment 9 less sharply pointed; outer edge of segment straight or widely and evenly curved ***Urothemis aliena***	

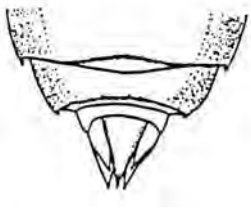
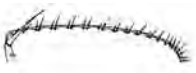
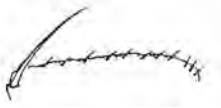
15a	Abdominal segment 10 extending beyond segment 9 to form smooth outline with anal pyramid **16**	
b	Abdominal segment 10 set off from, or sunken into segment 9 **17**	
16a	Mid-dorsal abdominal spines small ***Huonia melvillensis***	
b	Mid-dorsal abdominal spines large ***Nannophlebia*** [Even though, most probably, larvae or final instar exuviae of all Australian species are available, diagnostic characters cannot yet be presented.]	
17a	Labial palps with distinct dentations **18**	
b	Labial palps without dentations, but may possess minor crenations and thus appear somewhat serrated **21**	
18a	Shorter than 10 mm ***Tetrathemis irregularis cladophila***	
b	Longer than 10 mm **19**	
19a	Larvae very hairy; eyes dorsally, not laterally, protuberant; lateral edge of eye and postocular lobe not forming flat slope ***Potamarcha congener***	
b	Larvae not particularly hairy; eyes laterally protuberant, lateral edge of eye and postocular lobe forming flat slope ***Agrionoptera*** **20**	

20a	Lateral spines on abdominal segment 8 less than half mid-dorsal length of segment 8, lateral spines of abdominal segment 9 almost as long as mid-dorsal length of segment 9; from northern and eastern Australia ***Agrionoptera insignis allogenes***	
b	Lateral spines on abdominal segment 8 hardly detectable, lateral spines of abdominal segment 9 less than one quarter mid-dorsal length of segment 9; only from tropical Queensland ***Agrionoptera longitudinalis biserialis***	
21a	Abdomen with anal pyramid distinctly protruding, reaching beyond imaginary crossing-point of lateral edges of segment 9 and thus appearing distinctly pointed **22**	
b	Abdomen with anal pyramid not distinctly protruding, reaching short of imaginary crossing-point of lateral edges of segment 9 and thus appearing more obtuse **27**	
22a	Mid-dorsal spines on abdominal segments 3-10 ***Tholymis tillarga***	
b	Mid-dorsal abdominal spines absent, or at least absent from segments 9 and 10 ***Orthetrum*** **23** [The larva of *O. serapia* remains undescribed.]	

23a	Lateral spines present on abdominal segments 7-9 ***Orthetrum balteatum***	
b	Lateral spines present on abdominal segments 8 and 9 only **24**	
24a	Mid-dorsal abdominal spines present **25**	
b	Mid-dorsal abdominal spines absent **26**	
25a	Mid-dorsal spines on abdominal segments 4-7 ***Orthetrum sabina***	
b	Mid-dorsal spines on abdominal segments 4-8 ***Orthetrum migratum/ villosovittatum*** [The larvae of *O. migratum* and *O. villosovittatum* cannot be distinguished at the present.]	
26a	Four to five palpal setae; lateral spines on abdominal segment 9 approximately half mid-dorsal length of segment 9, their inner length greater than 0.35 mm ***Orthetrum boumiera***	
b	Six to seven palpal setae; lateral spines on abdominal segment 9 approximately one third mid-dorsal length of segment 9, their inner length less than 0.30 mm ***Orthetrum caledonicum***	

27a	Mid-dorsal abdominal spines present **28**	
b	Mid-dorsal abdominal spines absent **32**	
28a	No mid-dorsal spine on abdominal segment 9 ***Brachydiplax denticauda*** [The larva of *Brachydiplax. duivenbodei* remains undescribed.]	
b	Mid-dorsal armature including spine on segment 9 ***Rhyothemis*** **29** [The larva of *R. resplendens* remains undescribed.]	
29a	One pair of long premental setae; four or five palpal setae **30**	
b	Two pairs of long premental setae; five palpal setae **31**	
30a	Four palpal setae; lateral premental setae absent ***Rhyothemis princeps***	
b	Five palpal setae; lateral premental setae present ***Rhyothemis phyllis***	
31a	Lateral premental setae absent ***Rhyothemis braganza***	
b	Lateral premental setae present ***Rhyothemis graphiptera***	

32a	A distinct, narrow, pale, mid-dorsal stripe across most of abdomen ***Neurothemis stigmatizans*** [The larva of *N. oligoneura* remains undescribed.]	
b	No distinct, narrow, pale, mid dorsal stripe across abdomen **33**	
33a	Distal border of labial palps bearing between 9 and 13 setae, generally set individually ***Diplacodes*** & ***Nannodiplax rubra*** **34** [Characters to distinguish all Australian species of *Diplacodes* from *N. rubra* are not available at the present.]	
b	Distal border of labial palps bearing between 17 and 25 setae, in groups; one or two setae in each group may be small **37**	
34a	Lateral edges of prementum with row of small setae ***Diplacodes haematodes***	
b	Lateral edges of prementum lacking small setae **35**	

35a	Lateral spines of segments 8 and 9 less than half mid-dorsal length of respective segment ***Diplacodes. bipunctata/trivialis*** [The larvae of *D. bipunctata* and *D. trivialis* cannot be distinguished at the present.]	
b	Lateral spines of segment 9 at least half mid-dorsal length of segment 9 **36**	
36a	Large, total length greater than 13.0 mm; lateral spines of segments 8 and 9 at least half mid-dorsal length of respective segment ***Diplacodes melanopsis***	
b	Smaller, total length generally less than 11.0 mm; lateral spines of segment almost half, lateral spines of segment 9 at least two-thirds mid-dorsal length of respective segment ***Diplacodes nebulosa/ Nannodiplax rubra*** [The larvae of *D. nebulosa* and *N. rubra* cannot be distinguished at the present.]	
37a	Setae grouped in pairs, with both setae similar in length; body length greater than 17.5 mm ***Crocothemis nigrifrons***	
b	Setae set in groups of three, one long and two short; body length smaller than 16.0 mm ***Aethriamanta*** [The hitherto studied morphological characters of *A. circumsignata* and *A. nymphaeae* are not considered sufficient to allow specific diagnosis.]	

7 Distribution maps

These distribution maps were produced from specimen collection data that was available electronically. Those collections include:

Australian National Insect Collection

Australian Museum (part)

Melbourne Museum

South Australian Museum

Museums and Art Galleries of the Northern Territory)

Queen Victoria Museum & Art Gallery

Tasmanian Museum and Art Gallery

Western Australian Museum

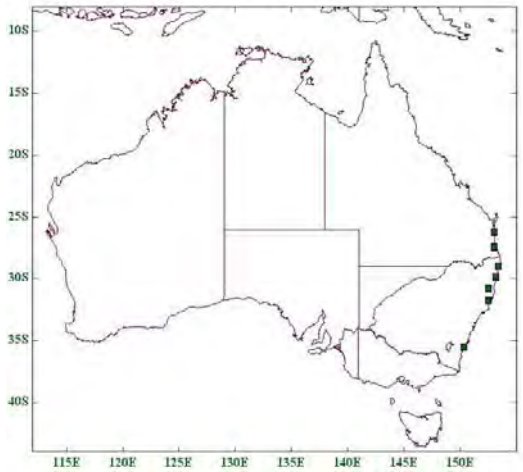
Dennis Paulson (USA).

The maps are almost exclusively based on reliable identifications of adult specimens. Outliers which were obviously erroneous have been removed.

The maps are presented in alphabetical order of genus and species names. This facilitates their consultation when identifications, particularly of larvae, are doubtful or cannot be achieved, and for similar species whose larvae remain undescribed.

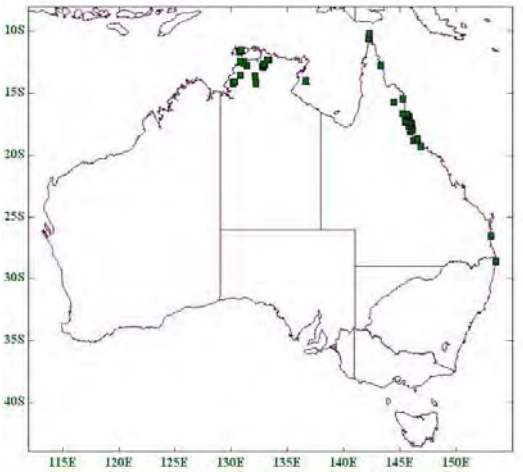
Literature references have been used to supplement those species for which no, or very few, specimens could be located.

Acanthaeschna victoria



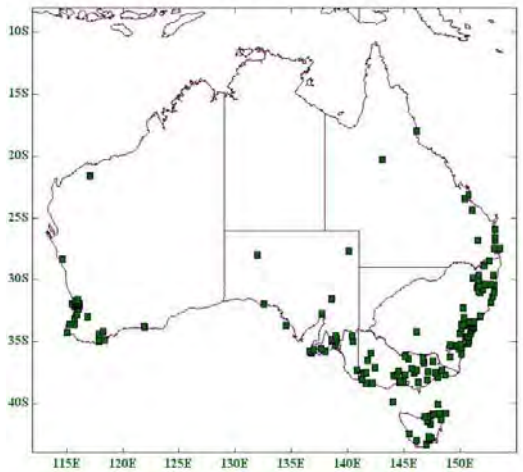
Inhabits slow, possibly temporary streams

Aciagrion fragile



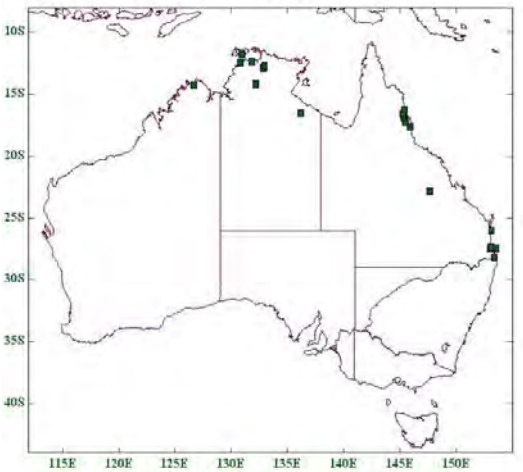
Inhabits still waters, particularly swamps

Adversaeschna brevistyla



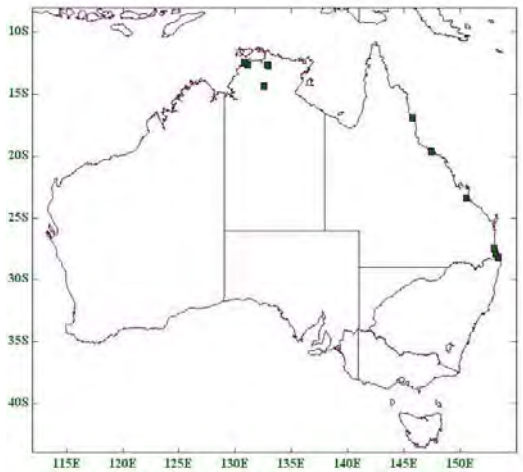
Inhabits still waters (lakes and permanent ponds); sometimes flowing water (riverine pools and quiet areas)

Aethriamanta circumsignata



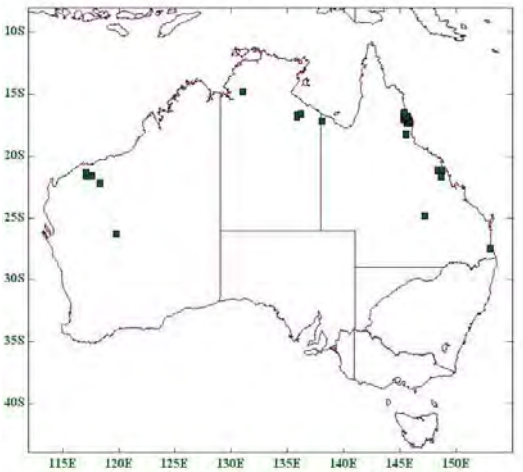
Inhabits riverine lagoons, ponds and swamps

Aethriamanta nymphaeae



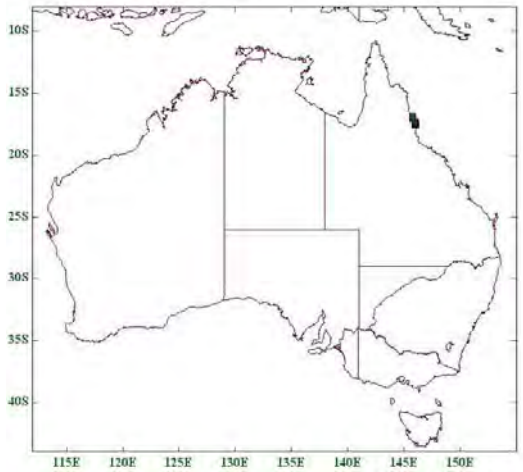
Inhabits riverine lagoons, ponds and swamps

Agriocnemis argentea



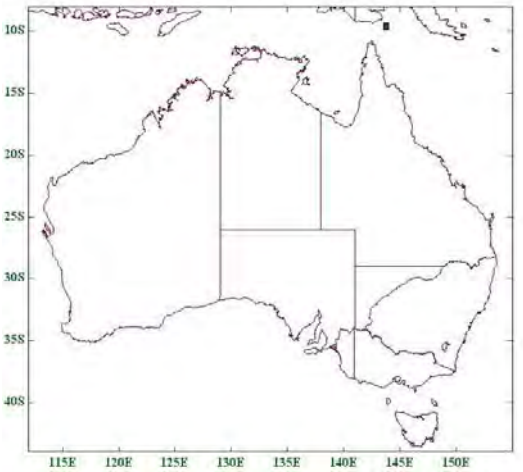
Inhabits still and flowing waters and temporary ponds

Agriocnemis dobsoni



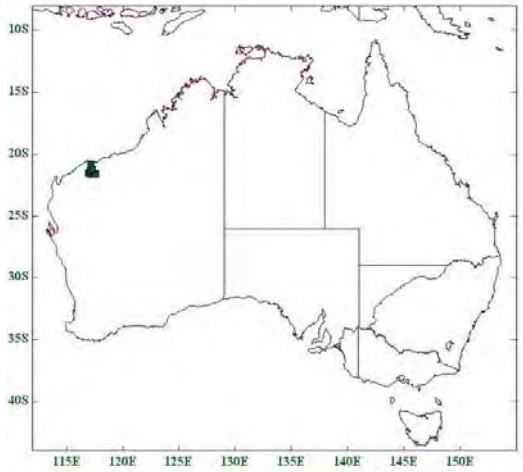
Inhabits ponds and swamps

Agriocnemis femina



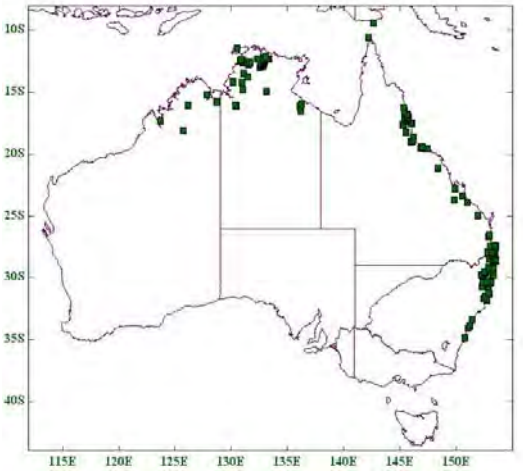
Inhabits still, stagnant and sluggish waters

Agriocnemis kunjina



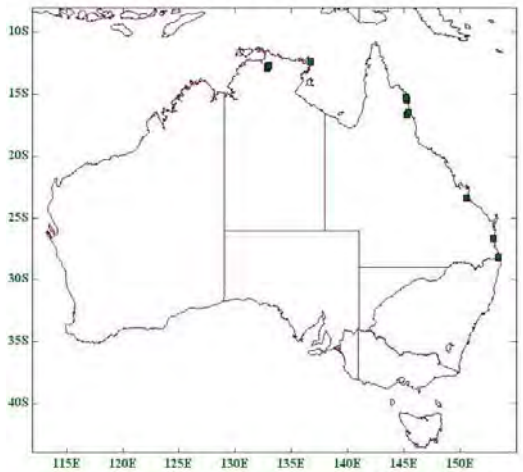
Inhabits still and flowing waters

Agriocnemis pygmaea



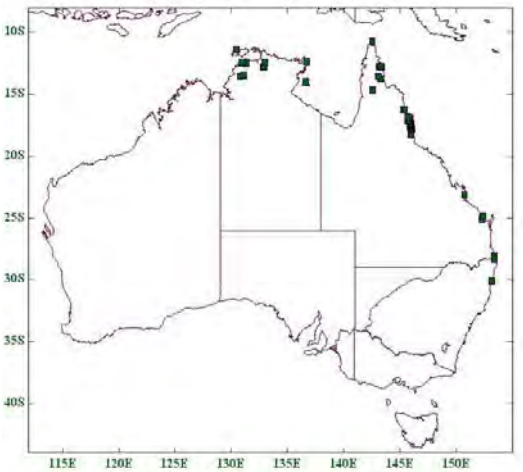
Inhabits slow sections of streams, ponds (including temporary ponds) and swamps

Agriocnemis rubricauda



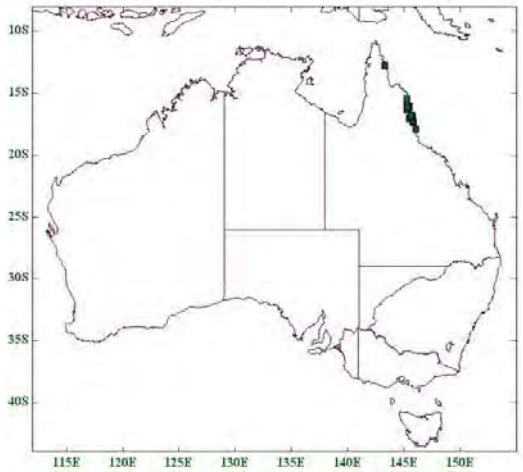
Inhabits boggy seepages and swamps

Agrionoptera insignis allogenes



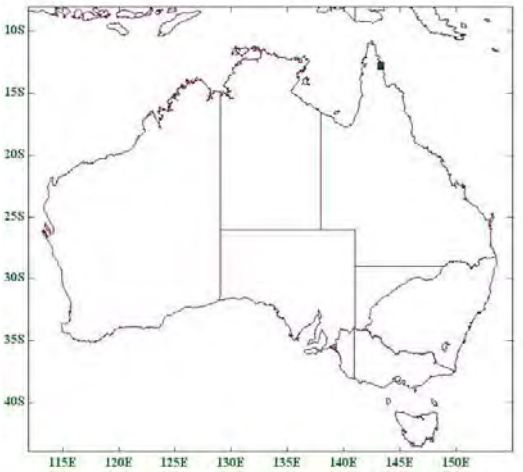
Inhabits streams, riverine pools, shaded ponds and swamps

Agrionoptera longitudinalis biserialis



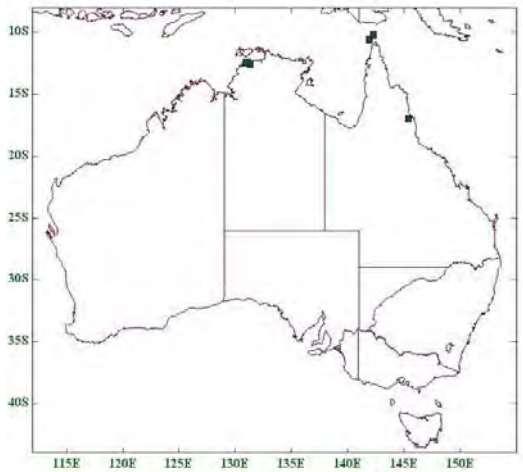
Inhabits shady pools and tree holes

Agyrtacantha dirupta



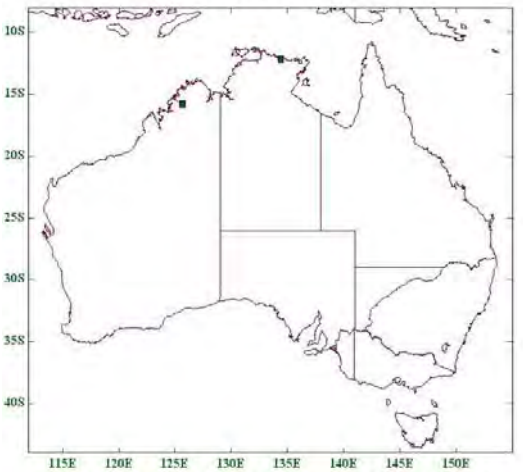
Habitats unknown

Anaciaeschna jaspidea



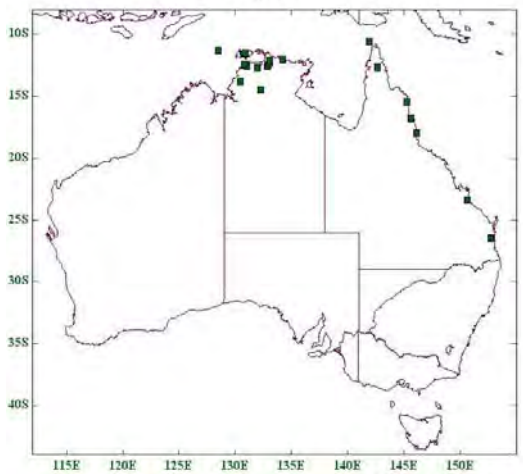
Inhabits wide range of still waters, including slightly brackish waters

Anax georgius



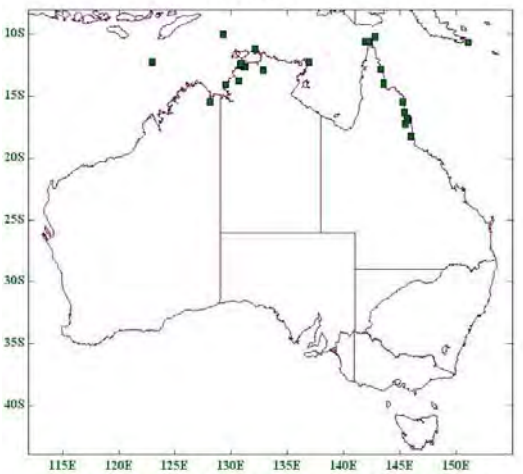
Inhabits ?ponds

Anax gibbosulus



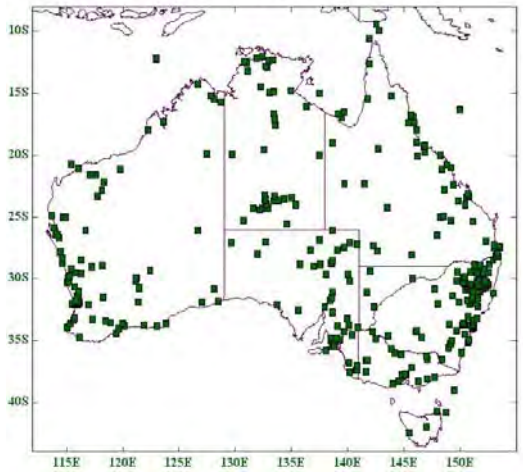
Inhabits wide range of still waters, particularly swamps, and including slightly brackish waters

Anax guttatus



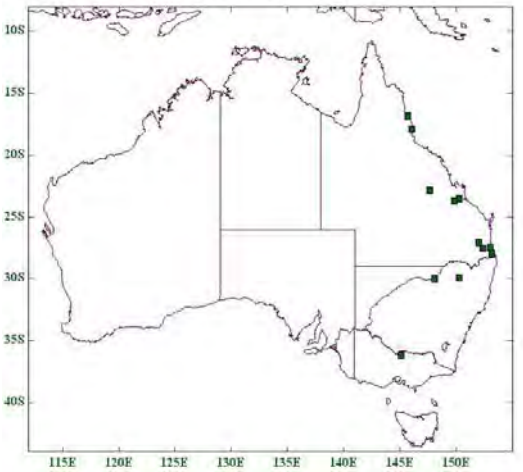
Inhabits wide range of still waters, particularly swamps, and including slightly brackish waters

Anax papuensis



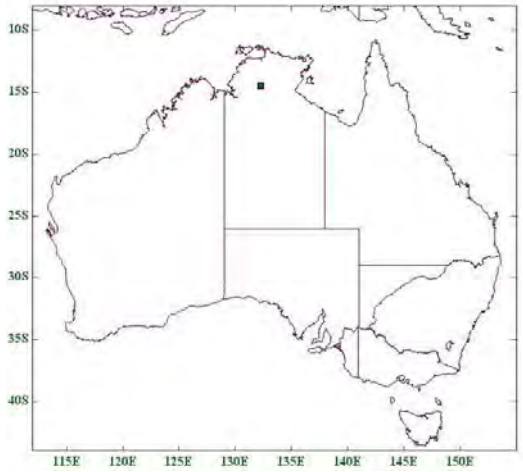
Inhabits wide range of still waters, slow streams

Antipodogomphus acolythus



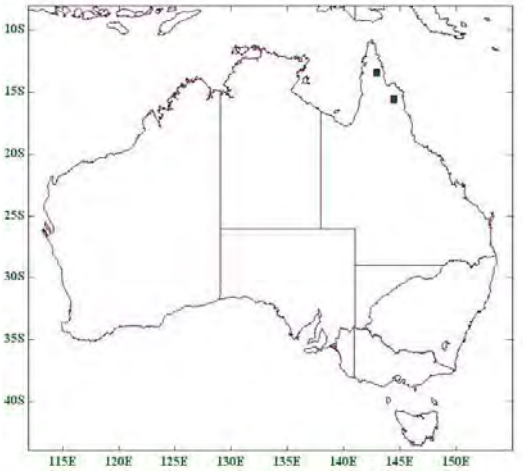
Inhabits streams, rivers and riverine pools

Antipodogomphus dentosus



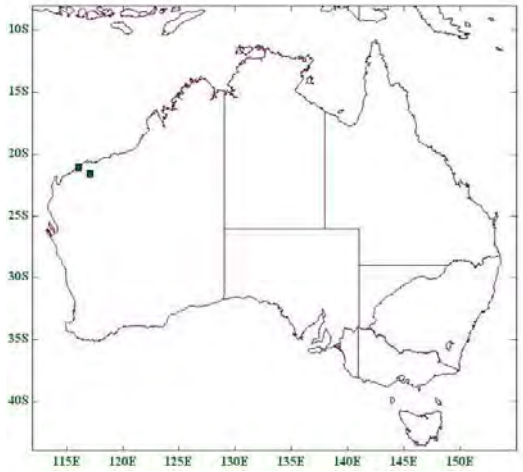
Inhabits rivers

Antipodogomphus edentulus



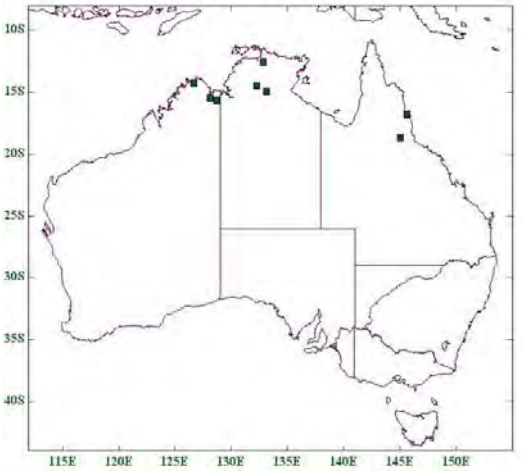
Inhabits rivers

Antipodogomphus hodgkini



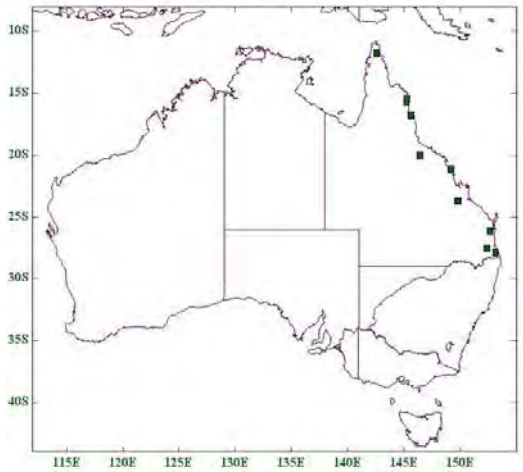
Inhabits streams, rivers and riverine pools

Antipodogomphus neophytus



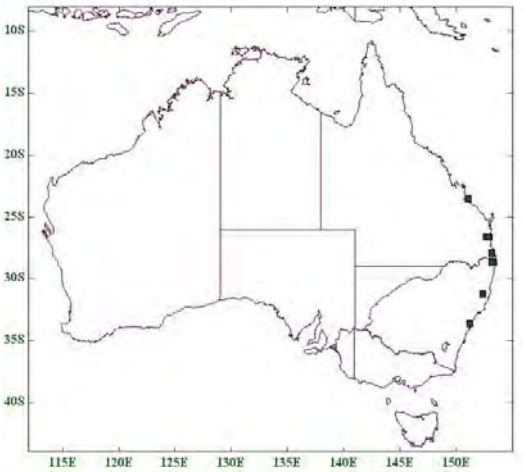
Inhabits rivers and riverine pools

Antipodogomphus proselythus



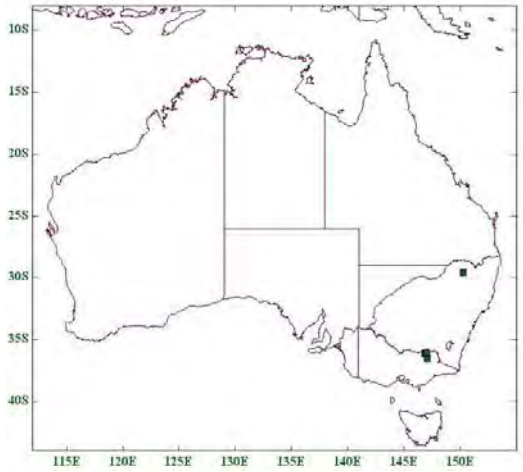
Inhabits streams, rivers and riverine pools

Antipodophlebia asthenes



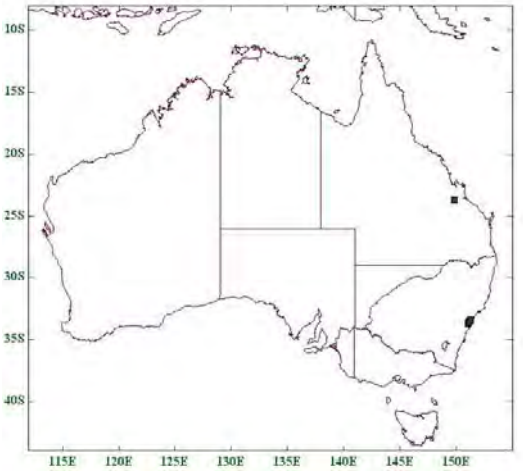
Inhabits terrestrial situations along small streams

Apocordulia macrops



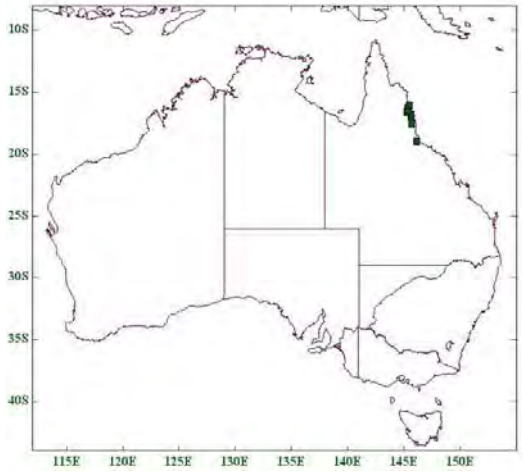
Inhabits rivers

Archaeophya adamsi



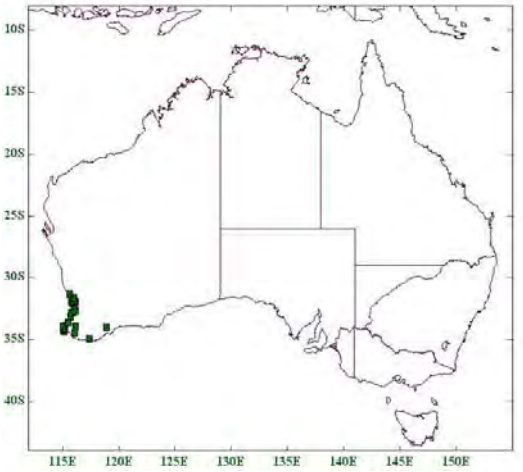
Inhabits streams and small rivers

Archaeophya magnifica



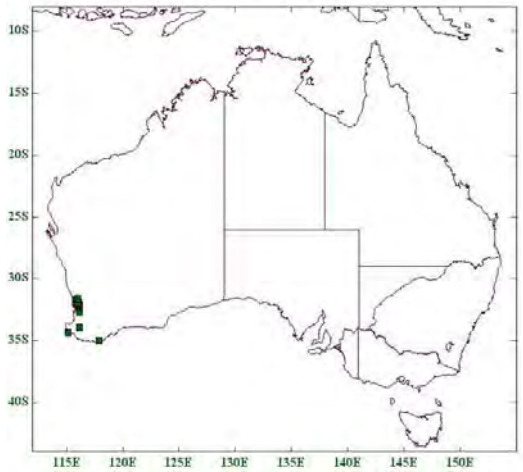
Inhabits streams in rainforest

Archaeosynthemis leachii



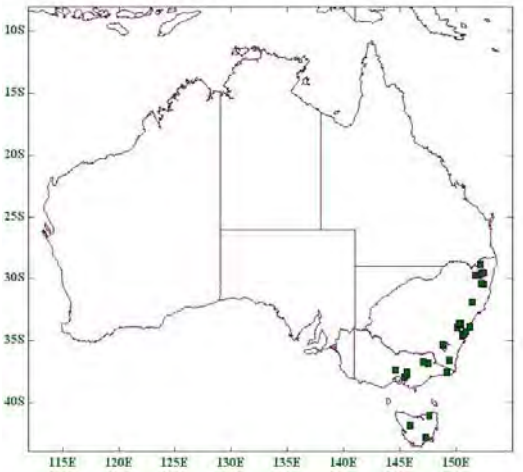
Inhabits streams, boggy seepages and swamps that may dry out

Archaeosynthemis occidentalis



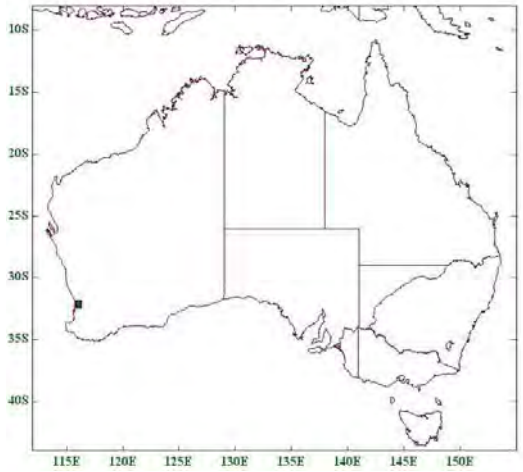
Inhabits streams, boggy seepages and swamps

Archaeosynthemis orientalis



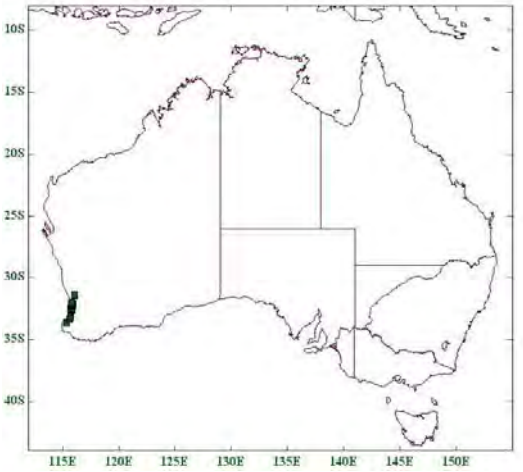
Inhabits boggy seepages and swamps

Archaeosynthemis spiniger



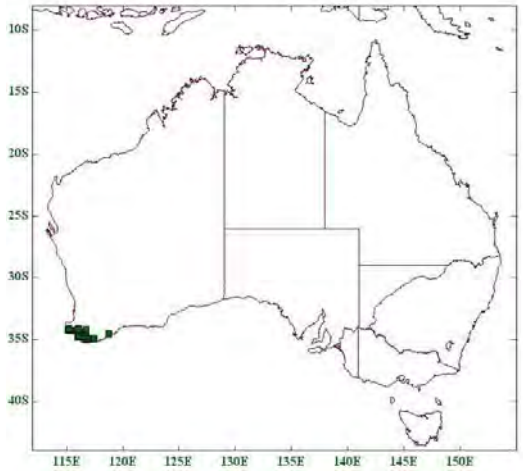
Inhabits streams and rapid rivers

Archiargiolestes parvulus



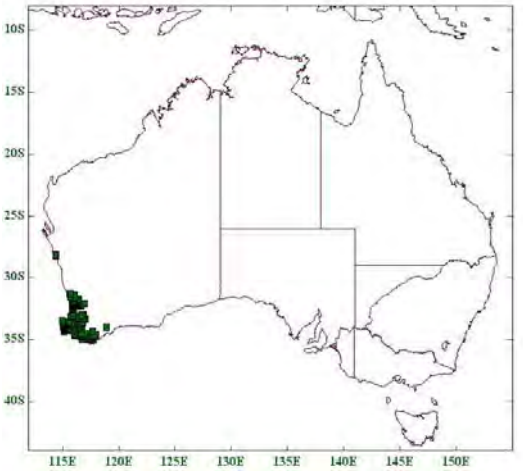
Inhabits boggy seepages and swamps, including summer-dry swamps

Archiargiolestes pusillissimus



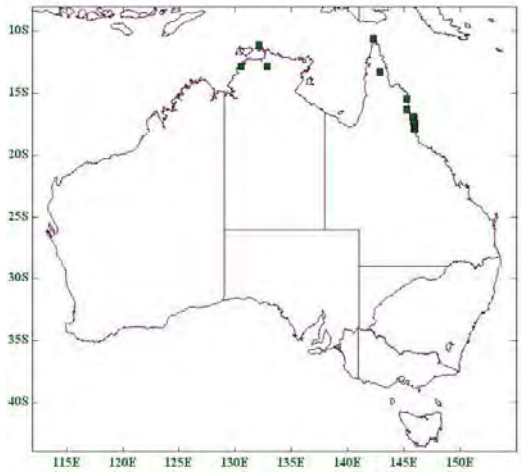
Inhabits streams, boggy seepages and swamps, including summer-dry swamps

Archiargiolestes pusillus



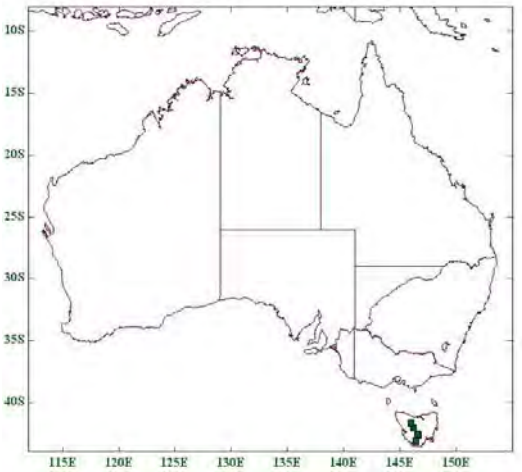
Inhabits streams, boggy seepages and swamps, including summer-dry swamps

Archibasis mimetes



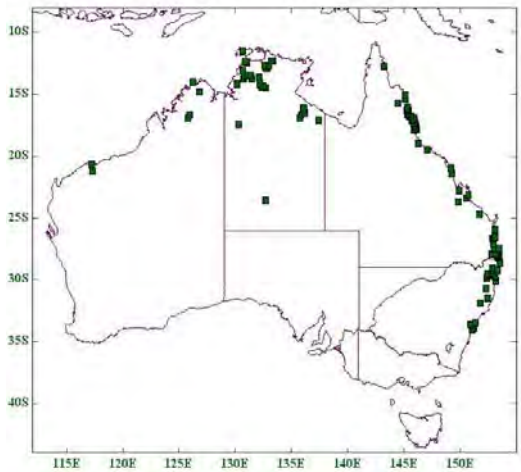
Inhabits streams

Archipetalia auriculata



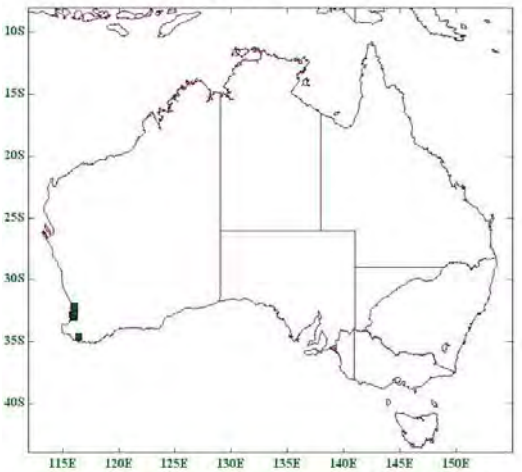
Inhabits streams and boggy seepages

Argiocnemis rubescens



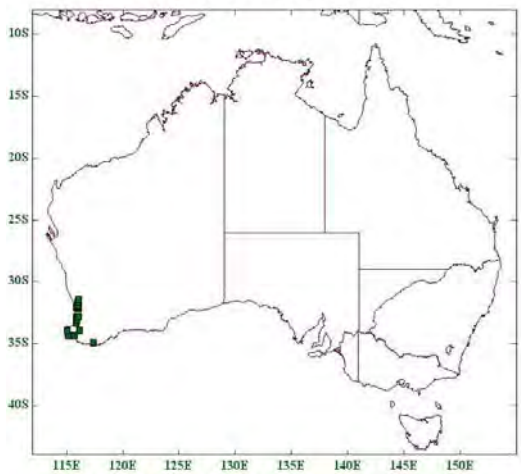
Inhabits streams, rivers, ponds, boggy seepages and swamps

Armagomphus armiger



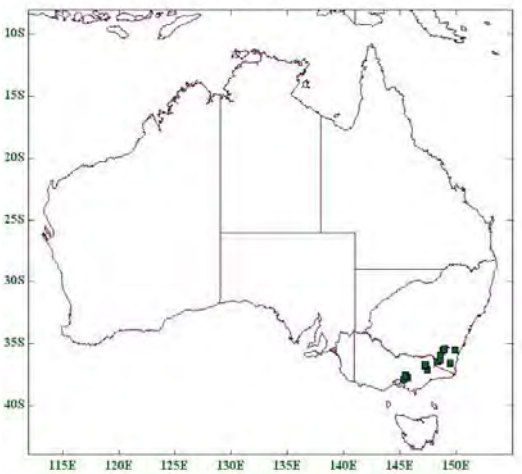
Inhabits clear rapid streams

Austroaeschna anacantha



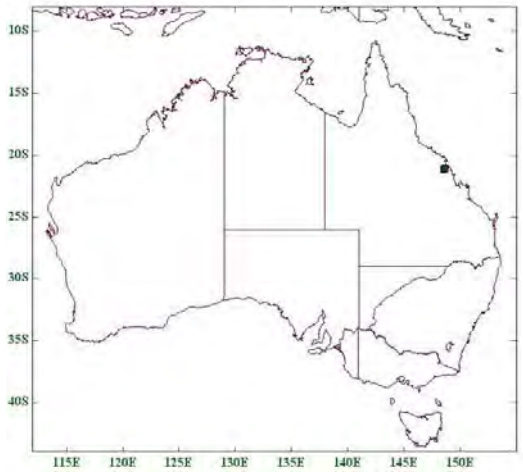
Inhabits streams and rivers

Austroaeschna atrata



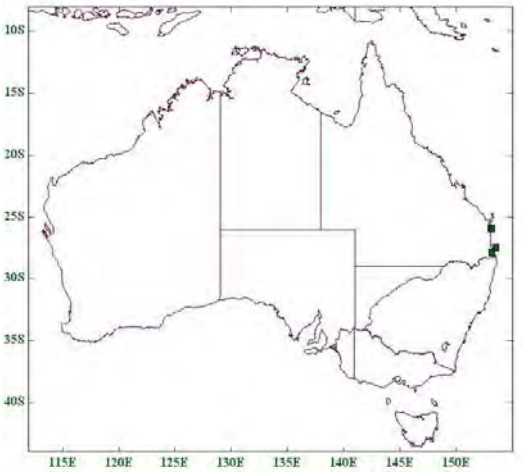
Inhabits montane streams, generally upper reaches

Austroaeschna christine



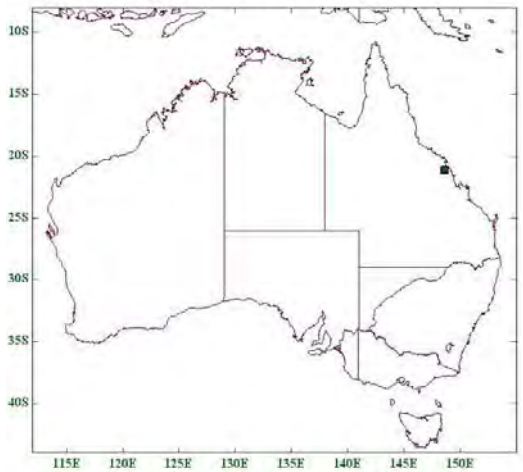
Inhabits small streams in montane rainforest, generally the upper reaches

Austroaeschna cooloola



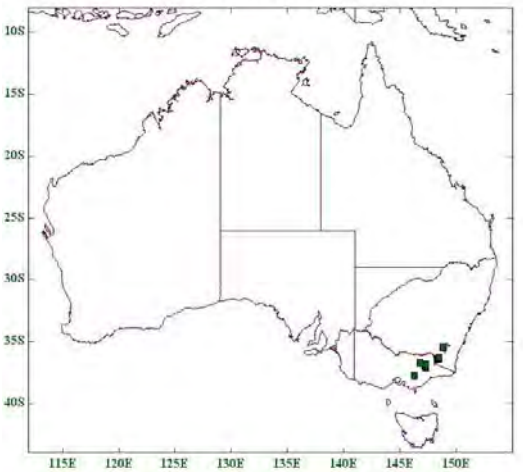
Inhabits sandy, mostly densely vegetated streams, often in dune situations

Austroaeschna eungella



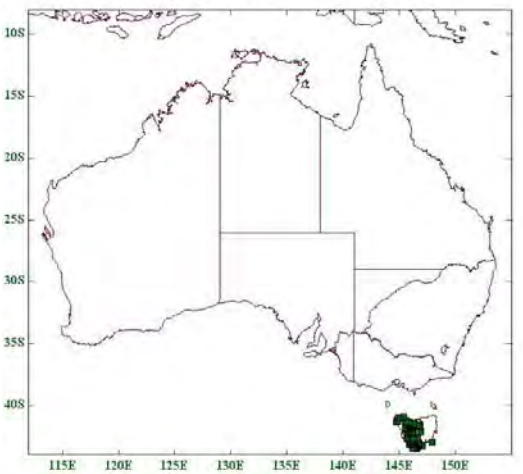
Inhabits rainforest streams dominated by bedrock and boulders

Austroaeschna flavomaculata



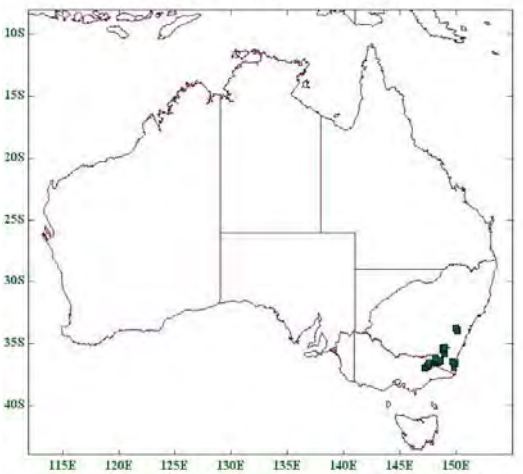
Inhabits alpine trickles and run-off waters

Austroaeschna hardyi



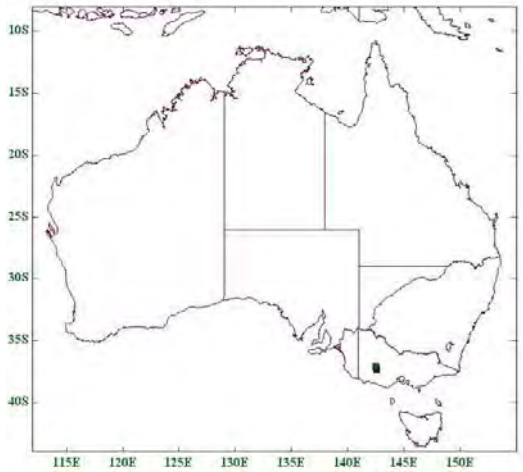
Inhabits streams and rivers

Austroaeschna inermis



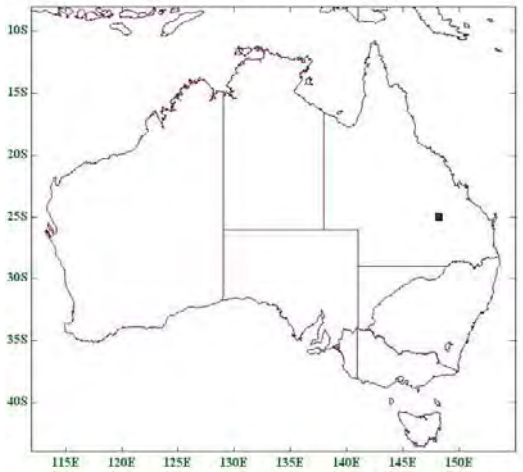
Inhabits montane rivers and streams

Austroaeschna ingrid



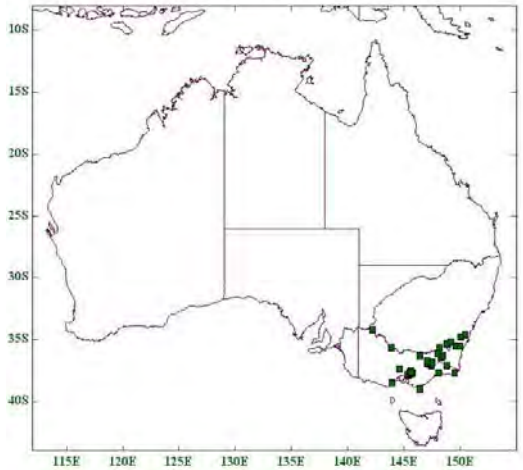
Inhabits small streams, including waterfall and bog conditions in headwaters

Austroaeschna muelleri



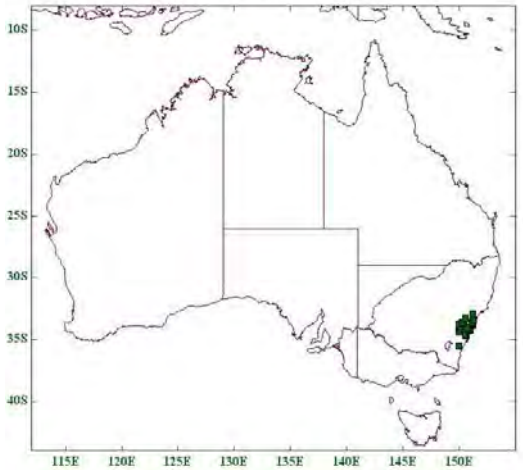
Inhabits small streams dominated by bedrock and boulders

Austroaeschna multipunctata



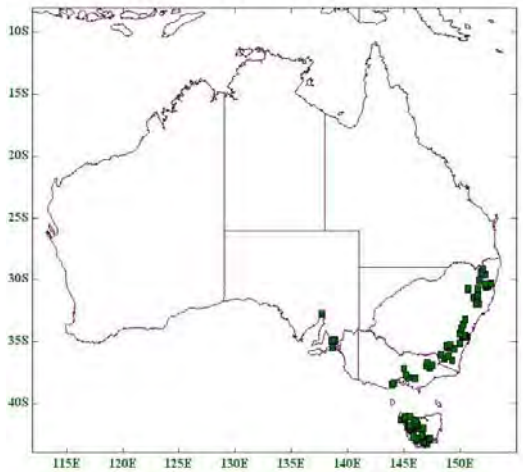
Inhabits small montane streams

Austroaeschna obscura



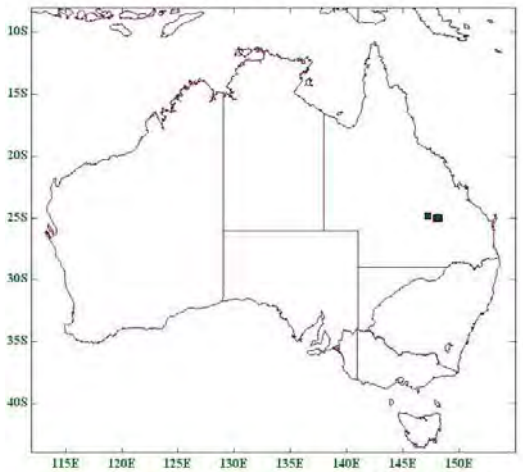
Inhabits rivers, streams, temporary streams and streams that dry to pools

Austroaeschna parvistigma



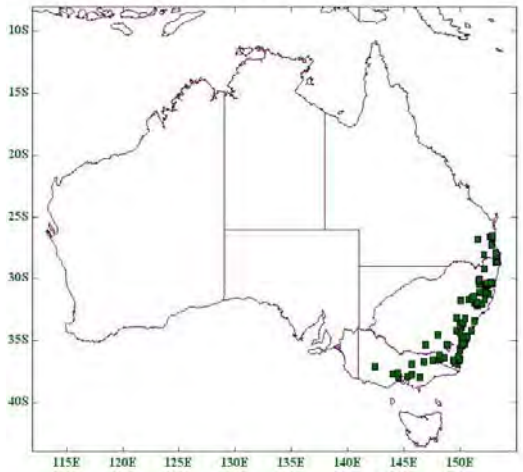
Inhabits rivers and small streams that are predominantly slow-flowing and heavily vegetated

Austroaeschna pinheyi



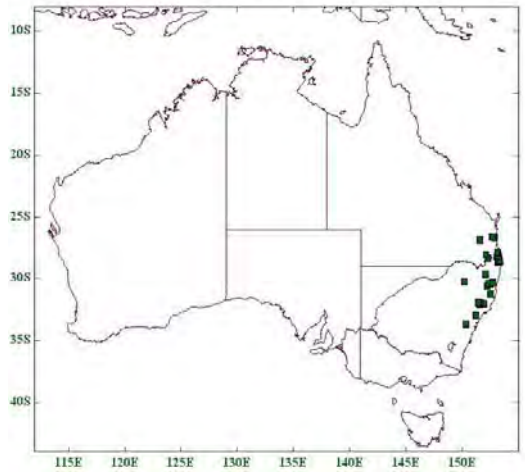
Inhabits streams, rocky as well as sandy

Austroaeschna pulchra



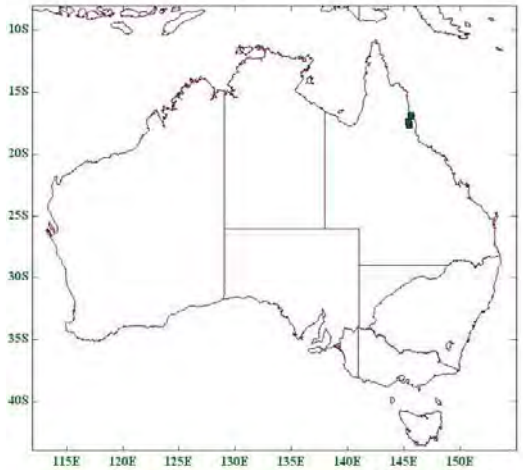
Inhabits streams and rivers

Austroaeschna sigma



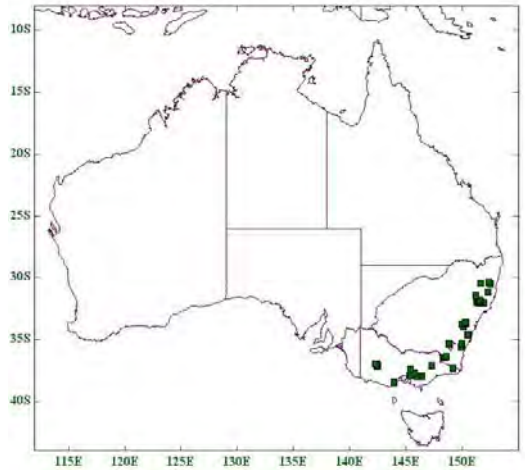
Inhabits small mountain streams, generally upper reaches

Austroaeschna speciosa



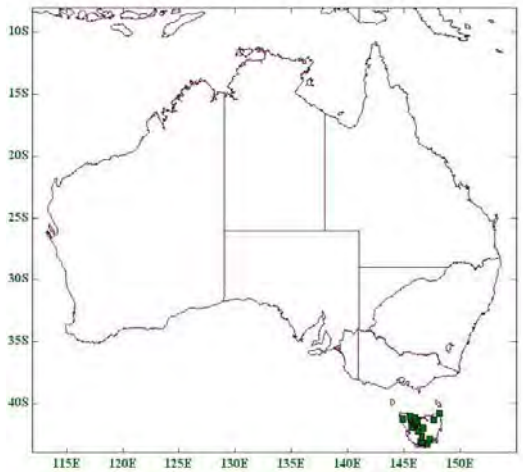
Inhabits rocky sections of streams and rivers

Austroaeschna subapicalis



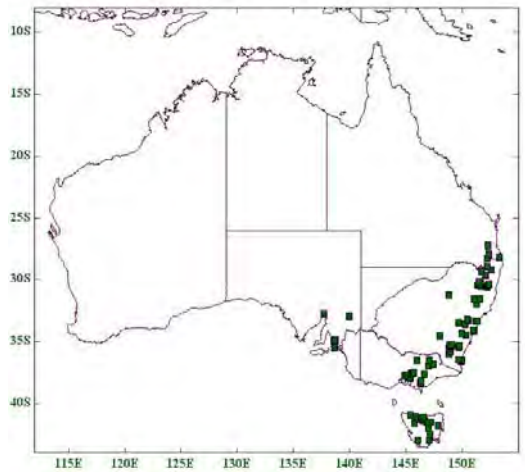
Inhabits montane streams

Austroaeschna tasmanica



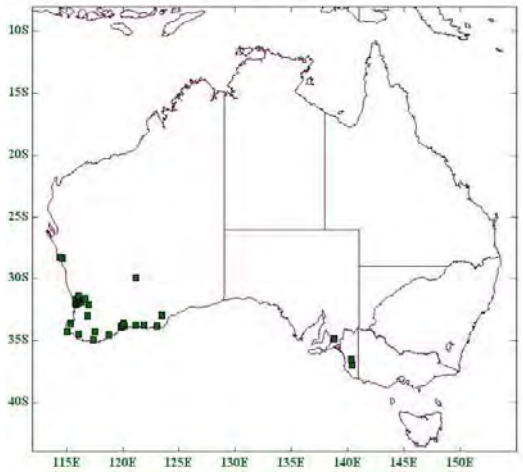
Inhabits streams and rivers

Austroaeschna unicornis



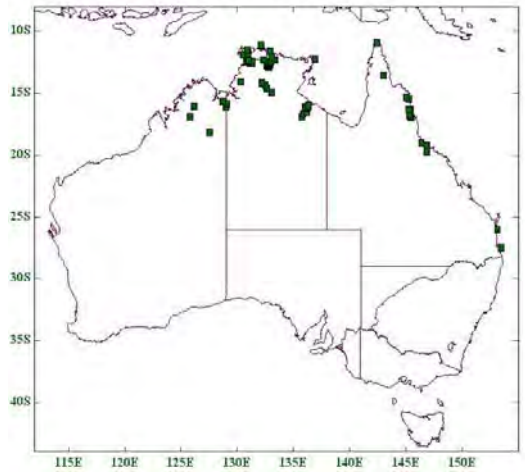
Inhabits rivers and streams

Austroagrion cyane



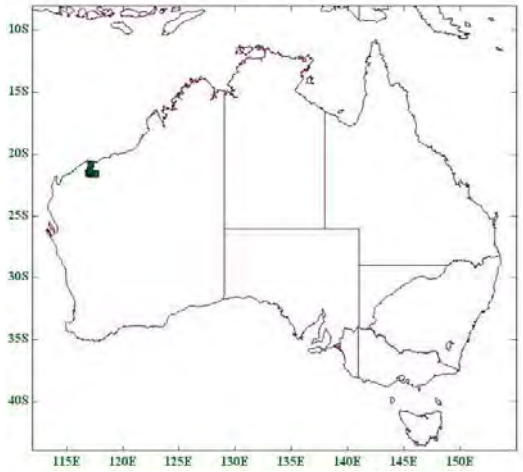
Inhabits still and sluggish waters, riverine pools, lakes ponds and swamps

Austroagrion exclamationis



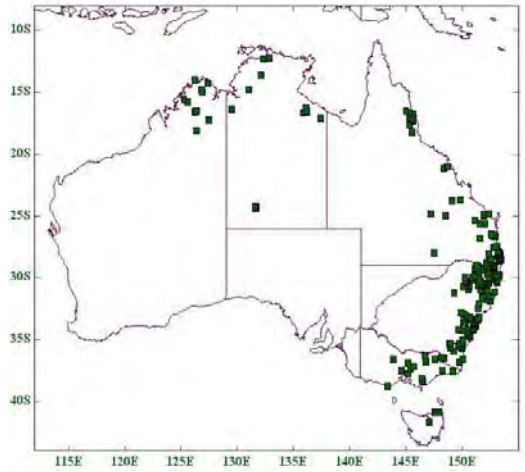
Inhabits still and flowing waters

Austroagrion pindrina



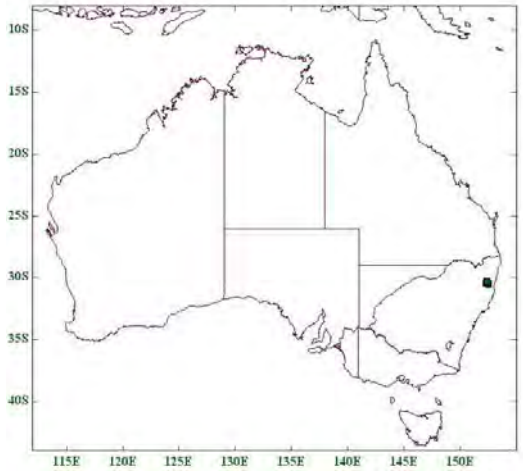
Inhabits still and flowing waters

Austroagrion watsoni



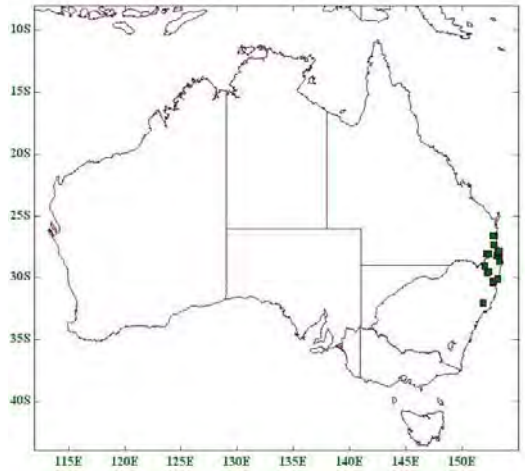
Inhabits still and flowing waters

Austroargiolestes alpinus



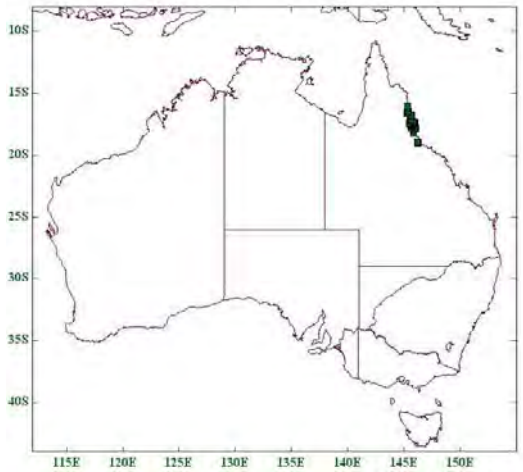
Inhabits streams and boggy seepages

Austroargiolestes amabilis



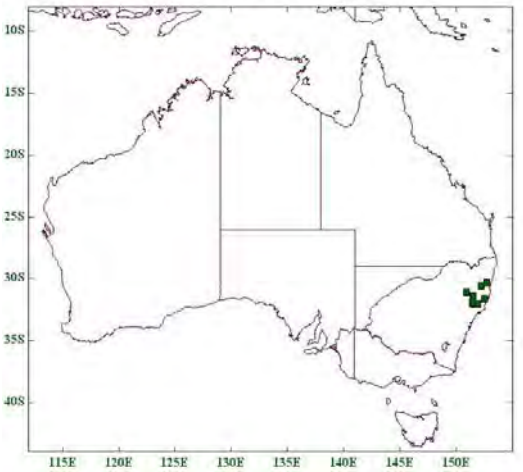
Inhabits streams, usually in rainforest

Austroargiolestes aureus



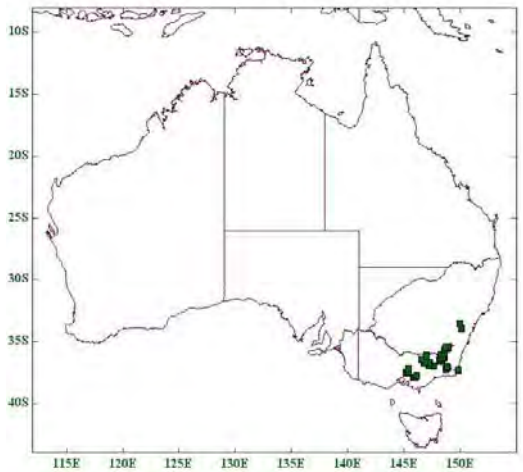
Inhabits streams, usually in rainforest

Austroargiolestes brookhousei



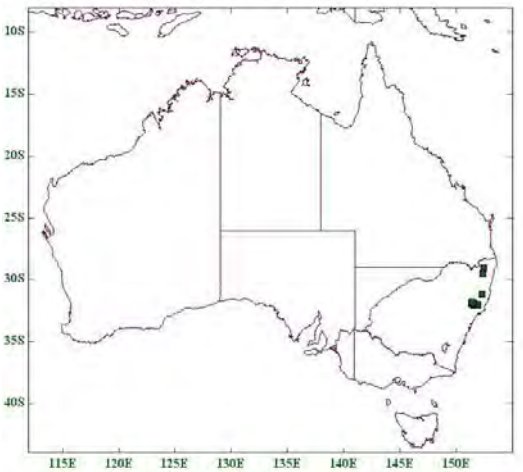
Inhabits streams and boggy seepages

Austroargiolestes calcaris



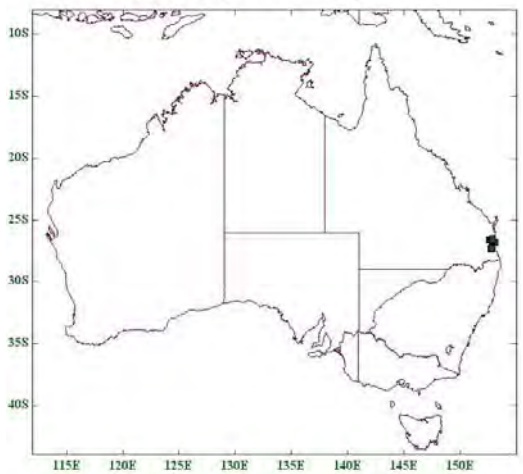
Inhabits streams, deep pools and boggy seepages

Austroargiolestes christine



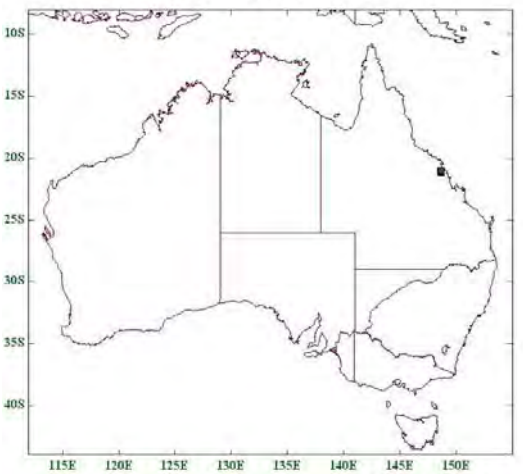
Inhabits streams and boggy seepages

Austroargiolestes chrysoides



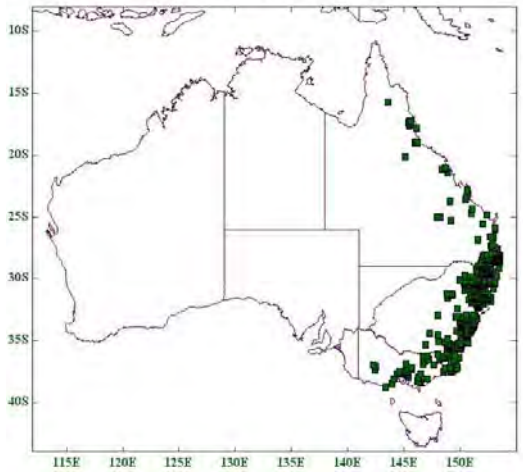
Inhabits streams, usually in rainforest

Austroargiolestes elke



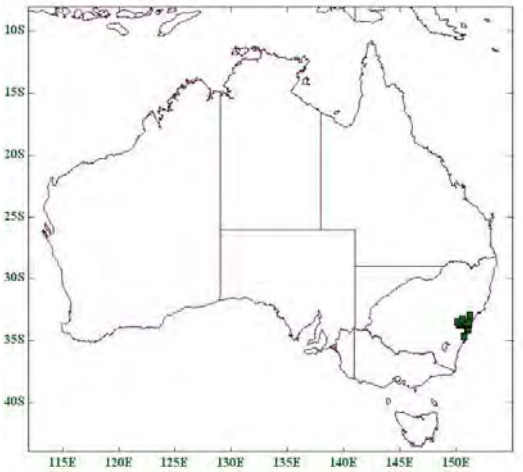
Inhabits streams in rainforest

Austroargiolestes icteromelas



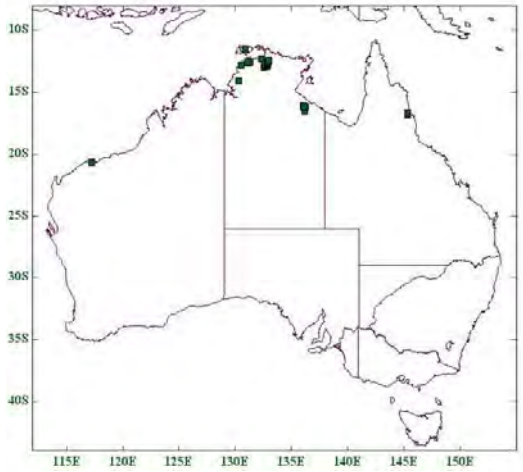
Inhabits streams and rivers, including those that dry to pools

Austroargiolestes isabellae



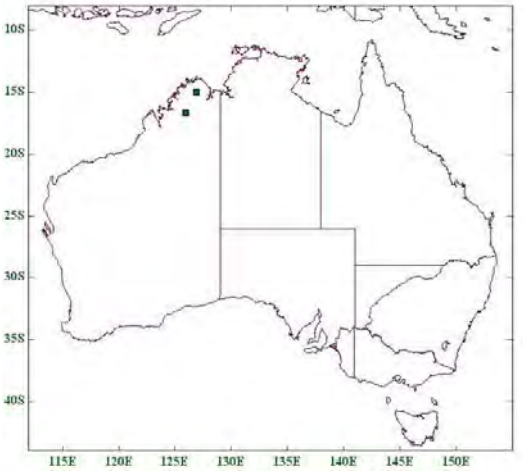
Inhabits streams and boggy seepages

Austrocnemis maccullochi



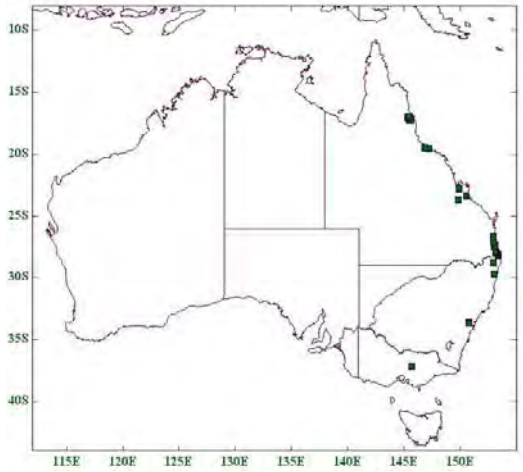
Inhabits primarily still and sluggish waters

Austrocnemis obscura



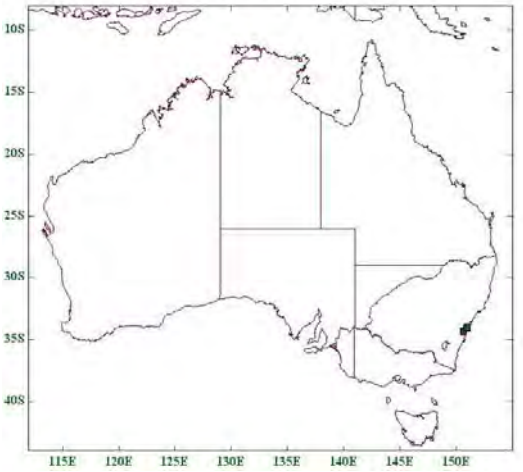
Inhabits streams and still and sluggish waters

Austrocnemis splendida



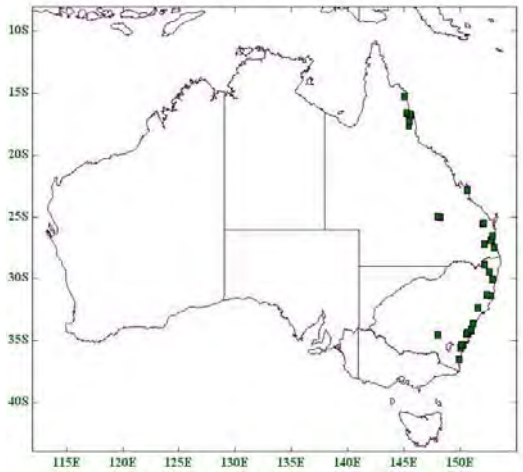
Inhabits still and sluggish waters

Austrocordulia leonardi



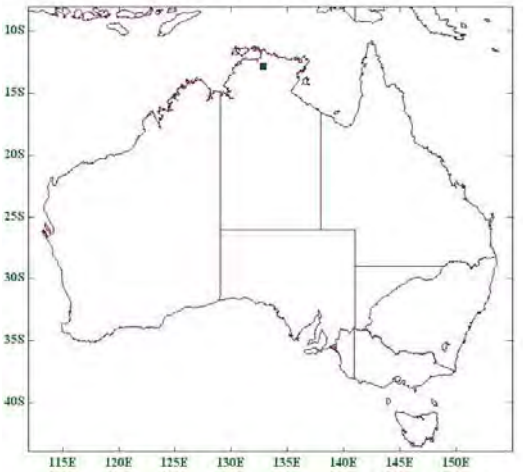
Inhabits rivers, particularly dams

Austrocordulia refracta



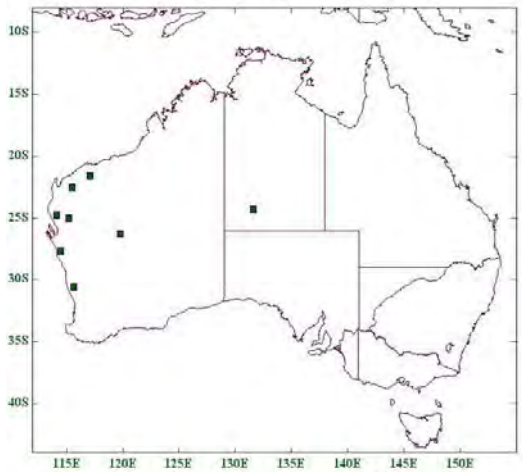
Inhabits streams, rivers and riverine pools

Austrocordulia territoria



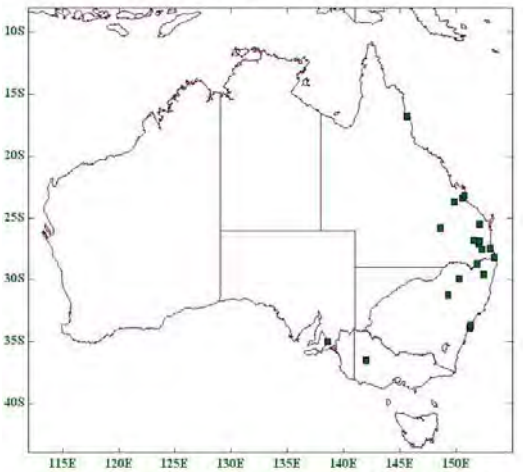
Inhabits streams

Austroepigomphus gordoni



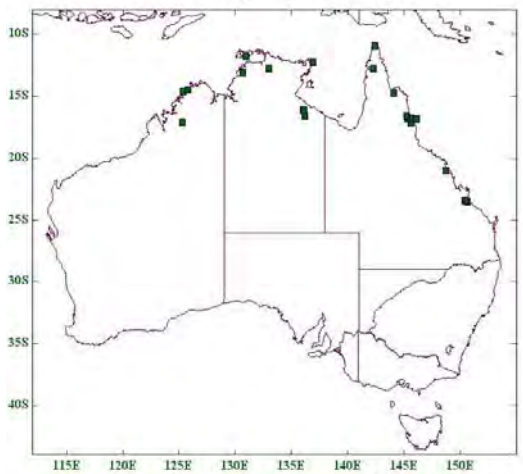
Inhabits streams and riverine pools

Austroepigomphus praeruptus



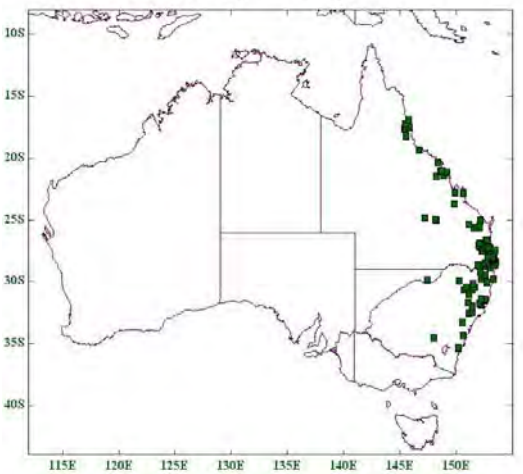
Inhabits sluggish streams and rivers, including isolated river pools

Austroepigomphus turneri



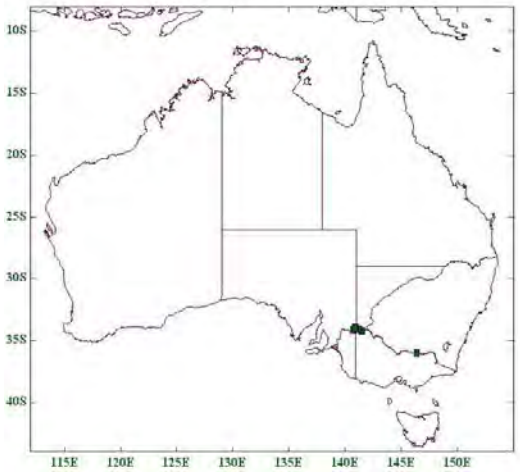
Inhabits rapid and sluggish streams and riverine pools

Austrogomphus amphiclitus



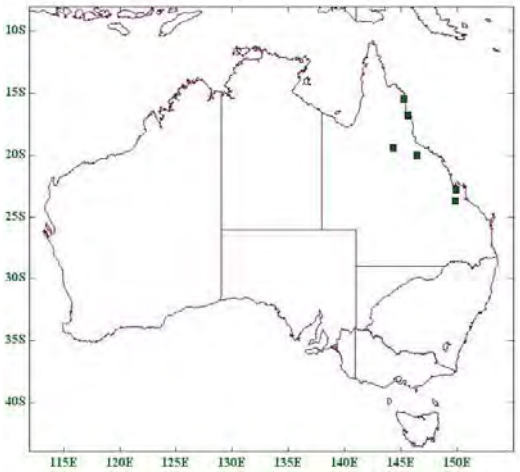
Inhabits streams and rivers

Austrogomphus angelorum



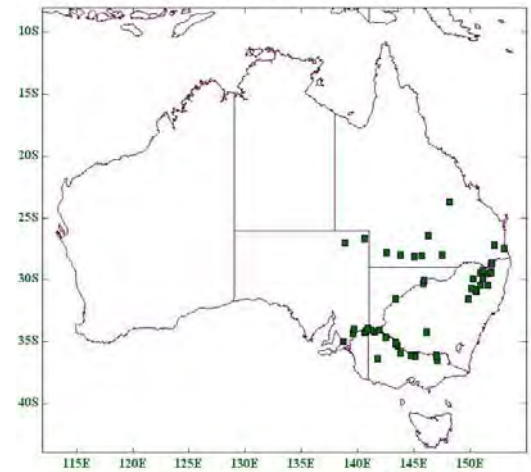
Inhabits mature slow-flowing parts of the Murray River

Austrogomphus arbustorum



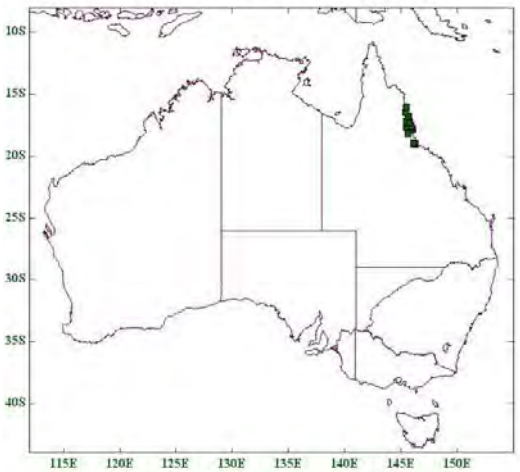
Inhabits rivers and riverine pools

Austrogomphus australis



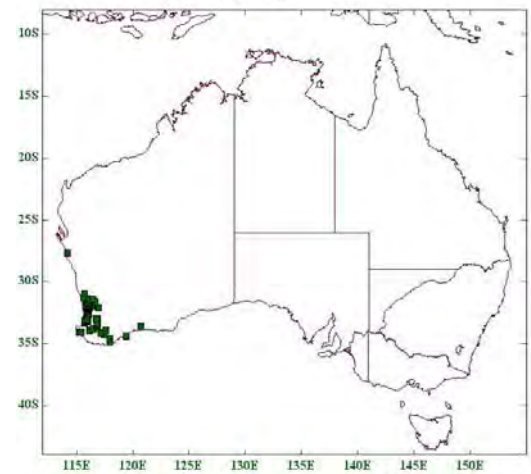
Inhabits rivers and riverine pools

Austrogomphus bifurcatus



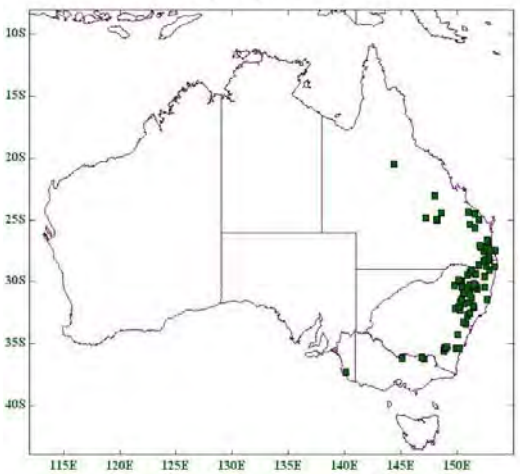
Inhabits streams and rivers

Austrogomphus collaris



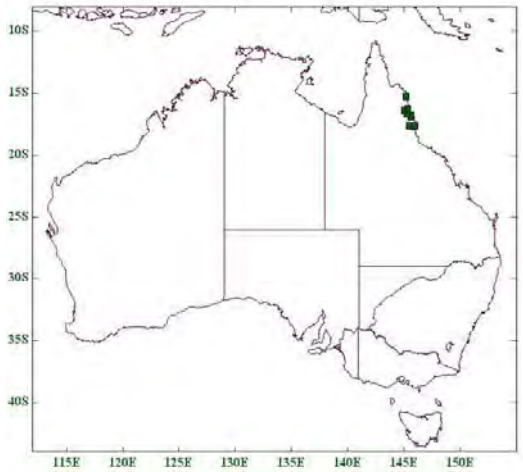
Inhabits rivers and riverine pools

Austrogomphus cornutus



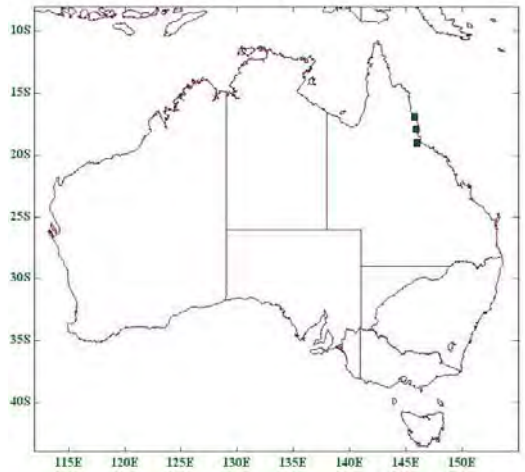
Inhabits streams and rivers

Austrogomphus divaricatus



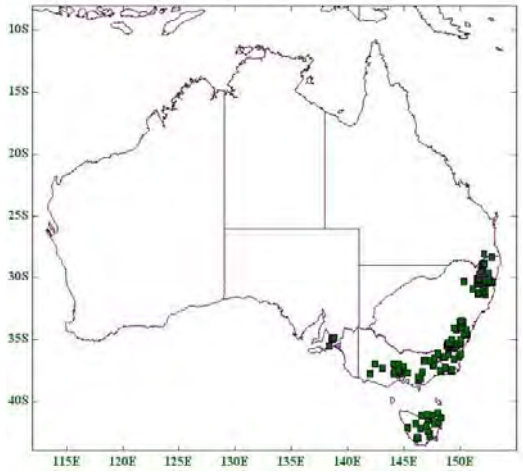
Inhabits streams and rivers

Austrogomphus doddi



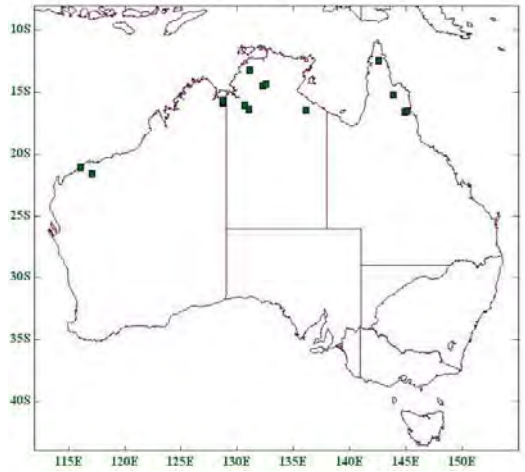
Inhabits streams and rivers

Austrogomphus guerini



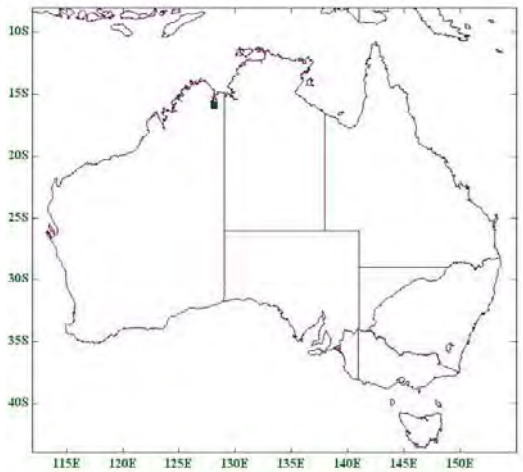
Inhabits streams, rivers and lakes

Austrogomphus mjobergi



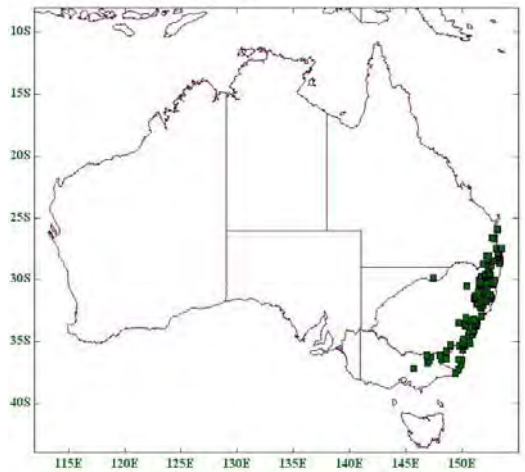
Inhabits streams, rivers and riverine pools

Austrogomphus mouldsorum



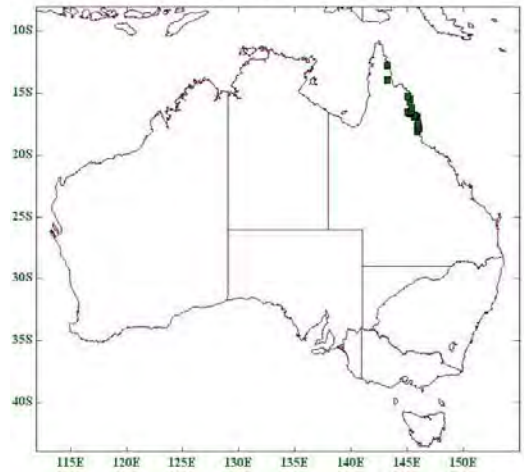
Inhabits probably rivers

Austrogomphus ochraceus



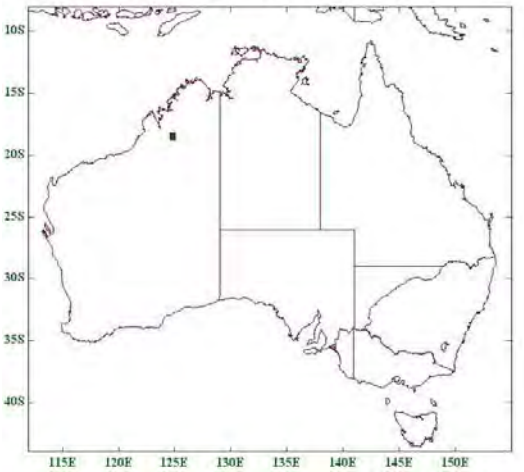
Inhabits streams, rivers and lakes

Austrogomphus prasinus



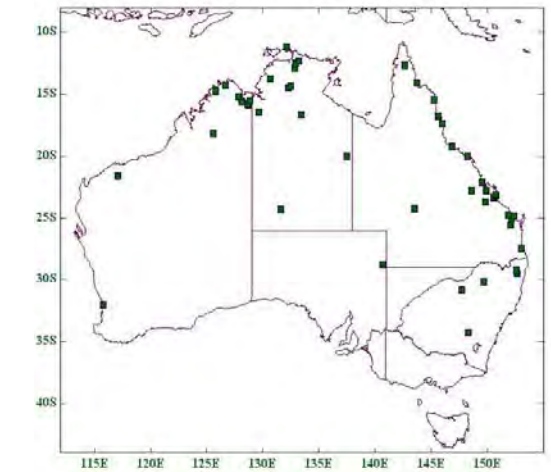
Inhabits streams and rivers

Austrogomphus pusillus



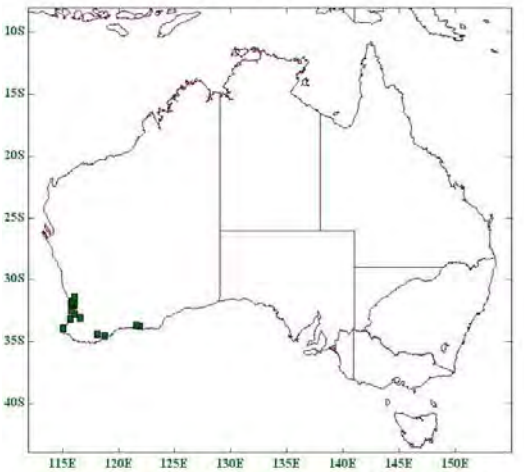
Inhabits rivers

Austrogynacantha heterogena



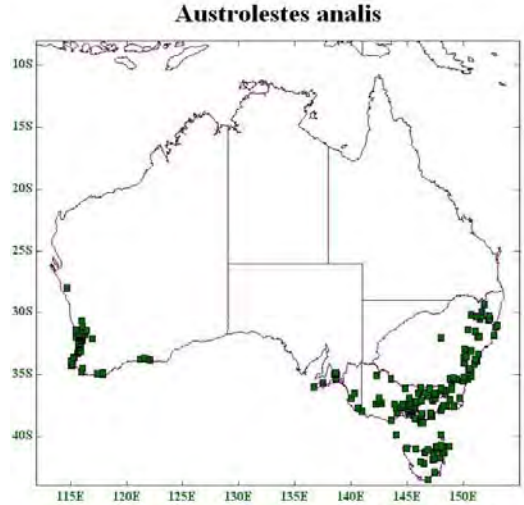
Inhabits wide range of still waters

Austrolestes aleison



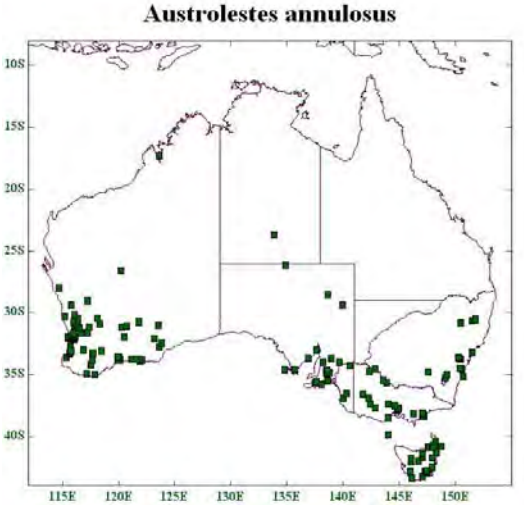
Inhabits riverine pools, lakes and ponds, including temporary ponds

Austrolestes analis



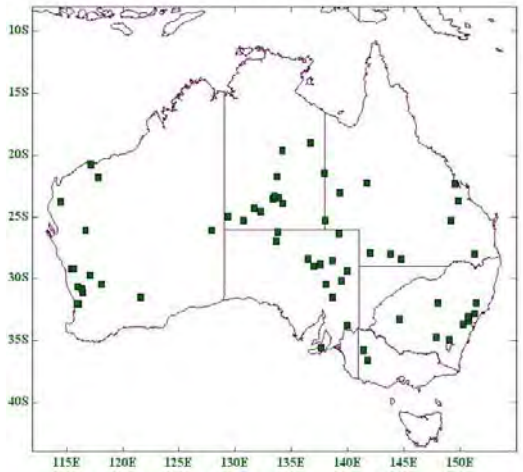
Inhabits riverine pools, lakes, swamps and ponds, including temporary ponds

Austrolestes annulosus



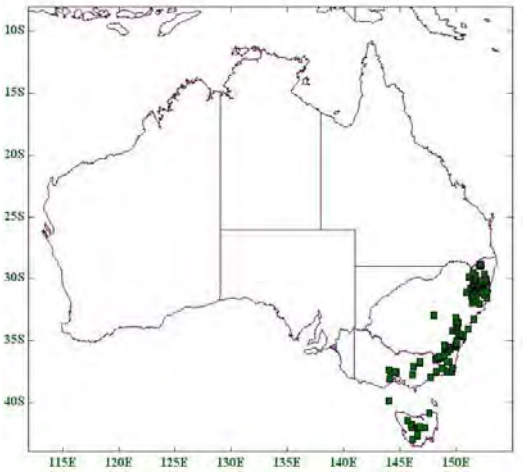
Inhabits riverine pools, lakes and ponds, including temporary ponds

Austrolestes aridus



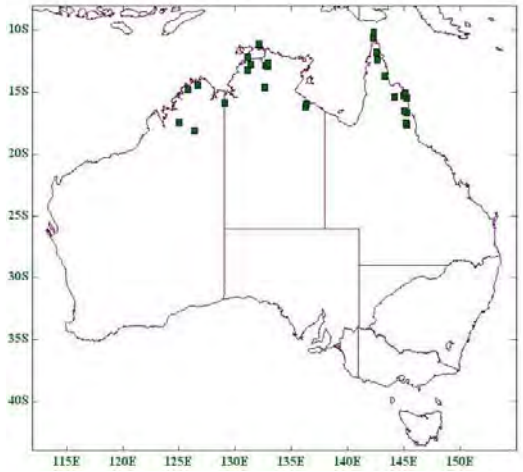
Inhabits streams, riverine pools, lakes and ponds, including temporary ponds

Austrolestes cingulatus



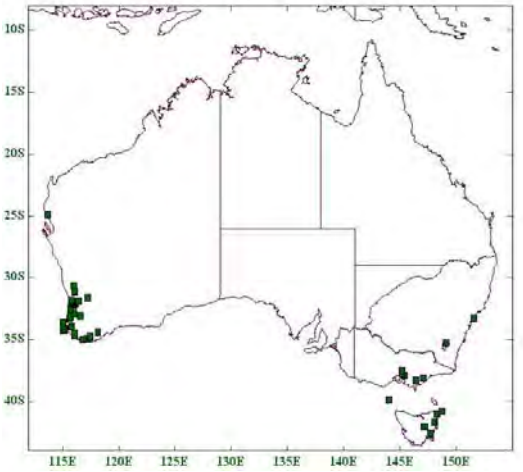
Inhabits rivers, lakes, ponds, swamps and alpine bogs

Austrolestes insularis



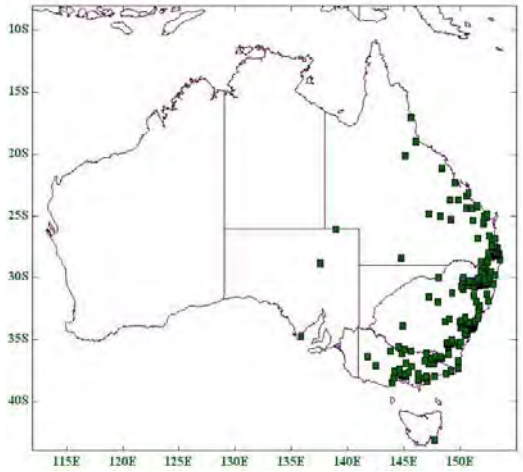
Inhabits riverine lagoons and ponds, including temporary ponds

Austrolestes io



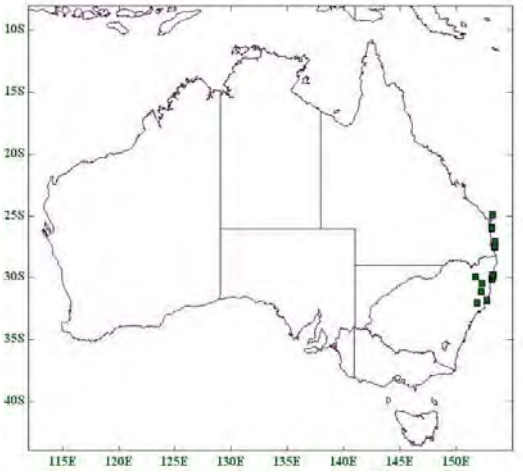
Inhabits riverine pools, lakes, ponds (including temporary ponds) and swamps

Austrolestes leda



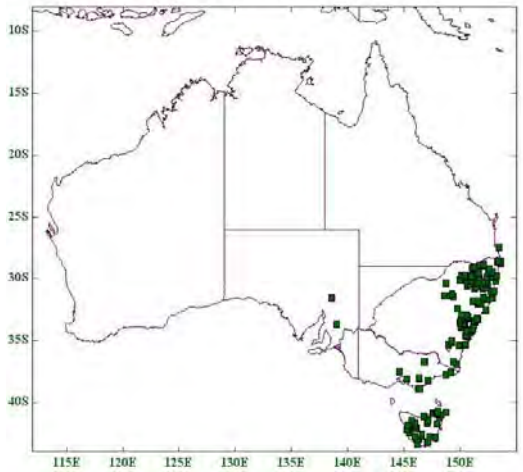
Inhabits wide range of still and sluggish waters

Austrolestes minjerriba



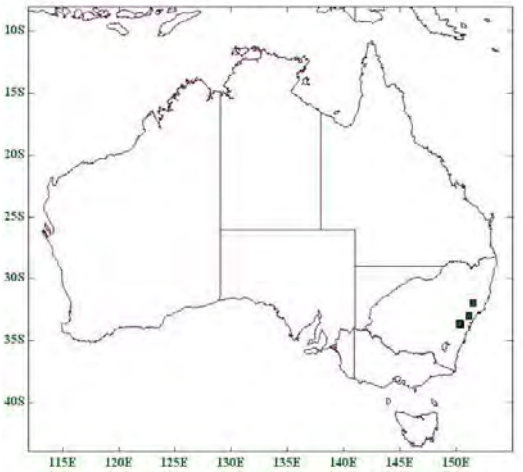
Inhabits brown, acidic dune lakes and swamps

Austrolestes psyche



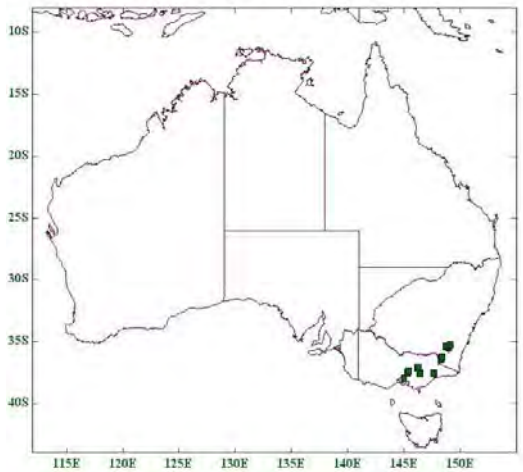
Inhabits riverine pools, lakes, swamps and ponds, sometimes temporary

Austropetalia patricia



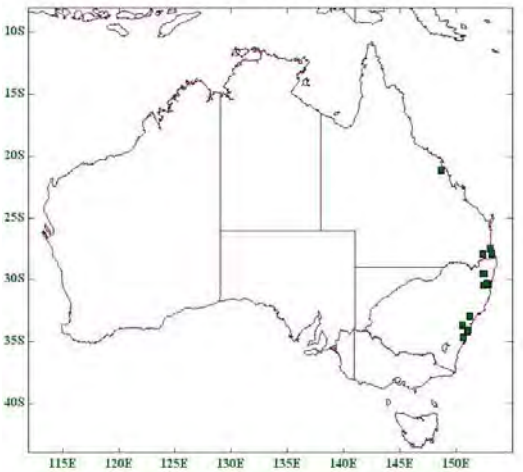
Inhabits narrow, trickles, sphagnum swamps and splash zone of waterfalls

Austropetalia tonyana



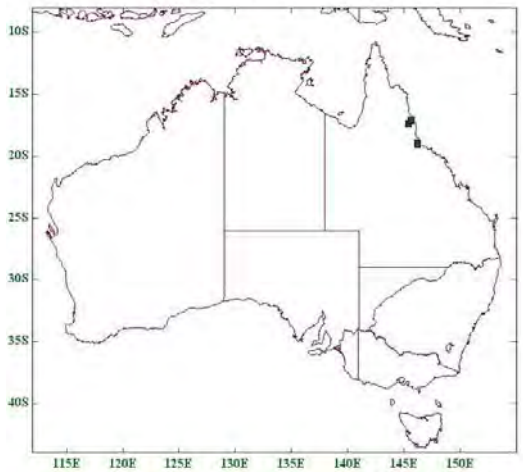
Inhabits narrow, trickles, sphagnum swamps and splash zone of waterfalls

Austrophlebia costalis



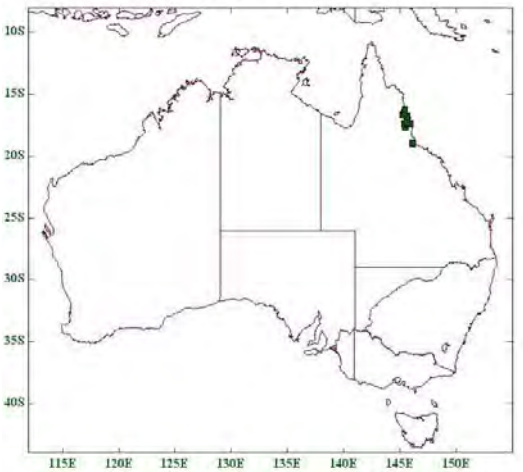
Inhabits small to medium-sized streams, occasionally temporary

Austrophlebia subcostalis



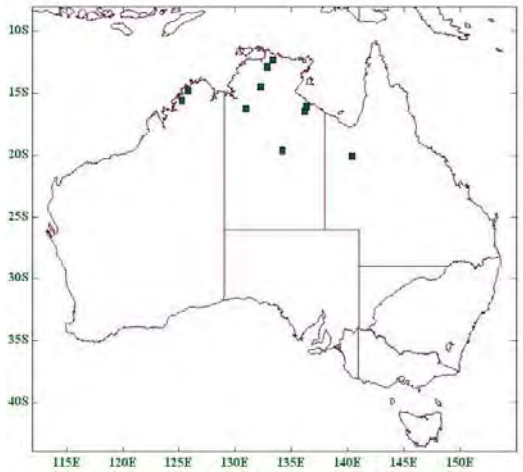
Inhabits rainforest streams

Austrophya mystica



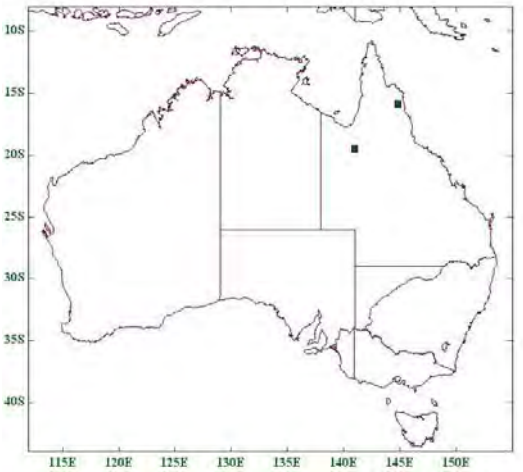
Inhabits streams, generally in rainforest

Austrosticta fieldi



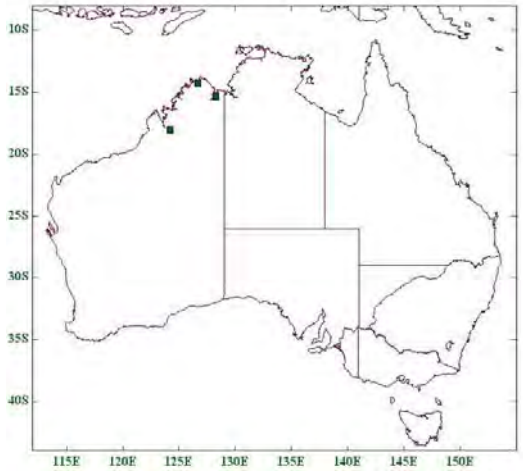
Inhabits streams and rivers

Austrosticta frater



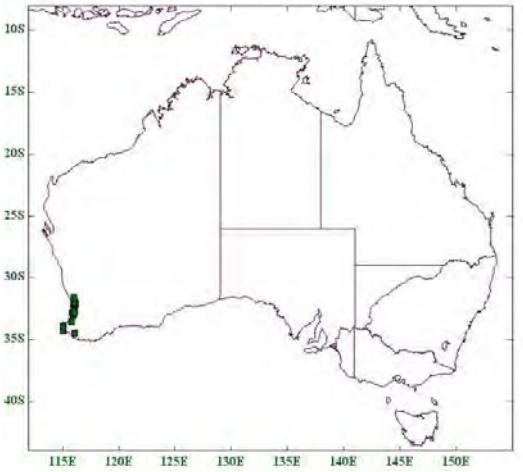
Inhabits streams, ?ponds

Austrosticta soror



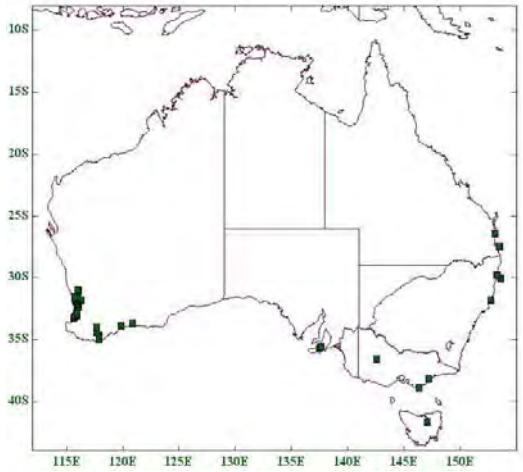
Inhabits streams, pools in gorges

Austrosynthemis cyanitincta



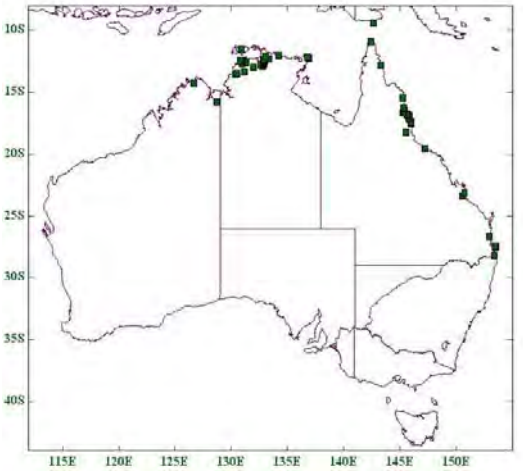
Inhabits streams

Austrothemis nigrescens



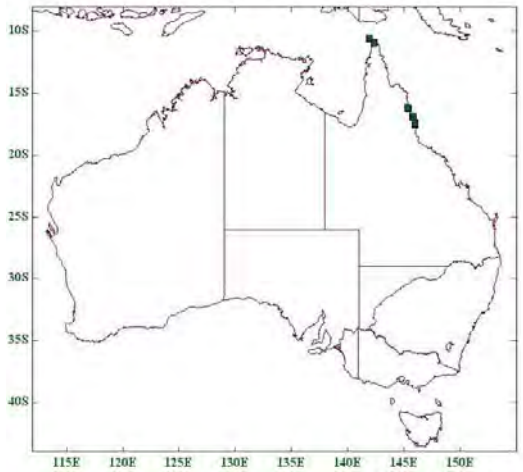
Inhabits lakes, permanent ponds and swamps

Brachydiplax denticauda



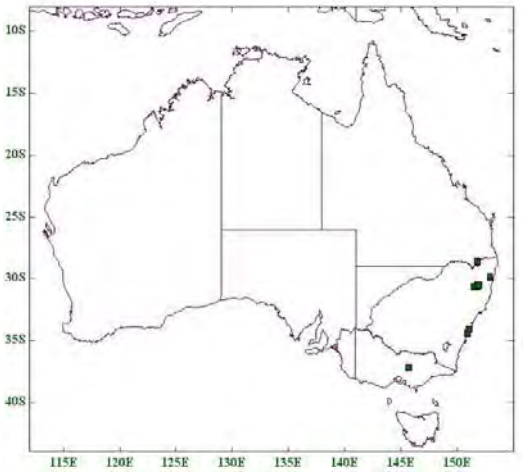
Inhabits still and sluggish waters

Brachydiplax duivenbodei



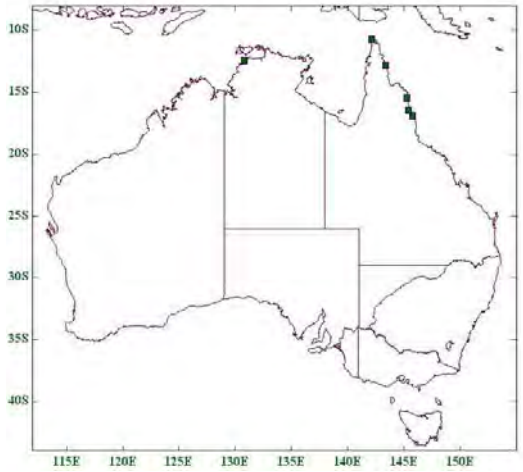
Inhabits probably still and sluggish waters

Caliagrion billinghursti



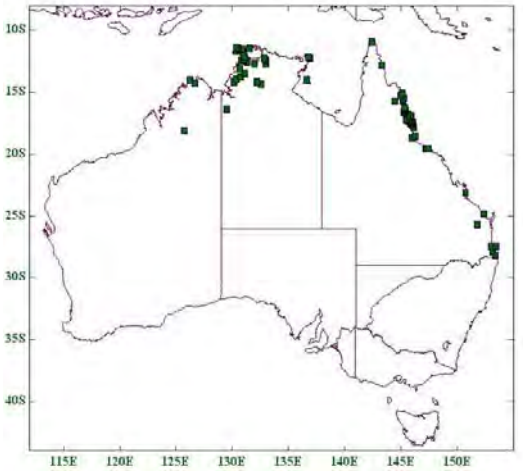
Inhabits sluggish rivers, riverine pools, lakes and ponds

Camacinia othello



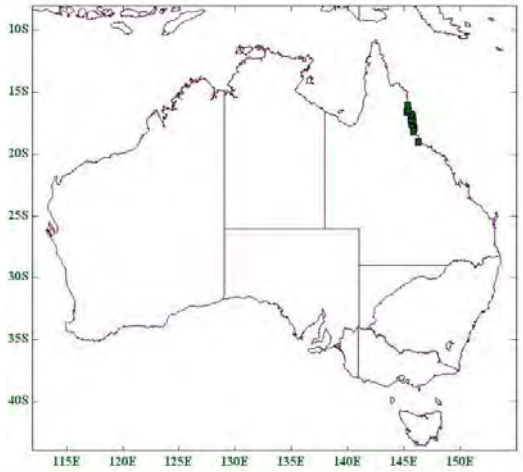
Inhabits probably still waters

Ceriagrion aeruginosum



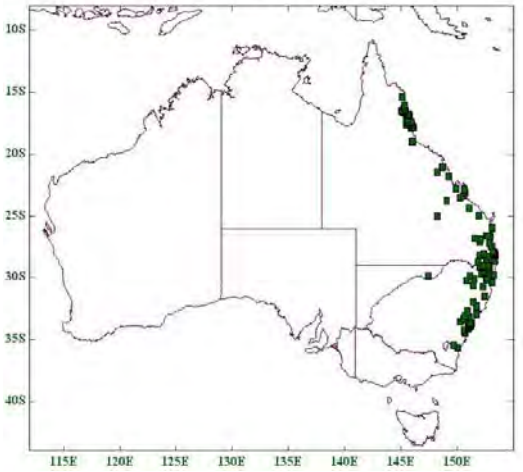
Inhabits slow streams, ponds and swamps

Chorismagrion risi



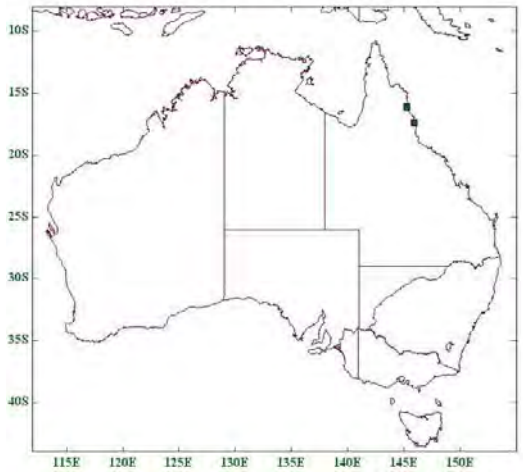
Inhabits rainforest streams, particularly in larger pools

Choristhemis flavoterminata



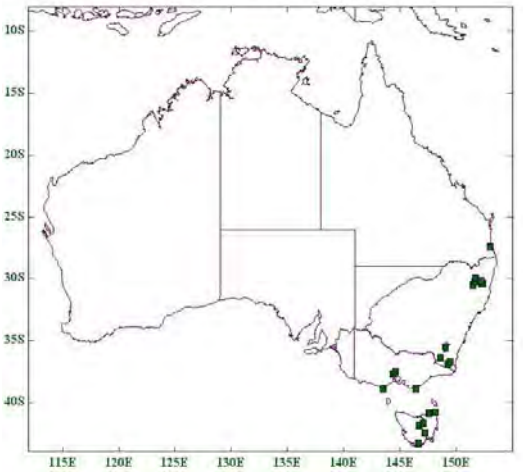
Inhabits streams and rivers

Choristhemis olivei



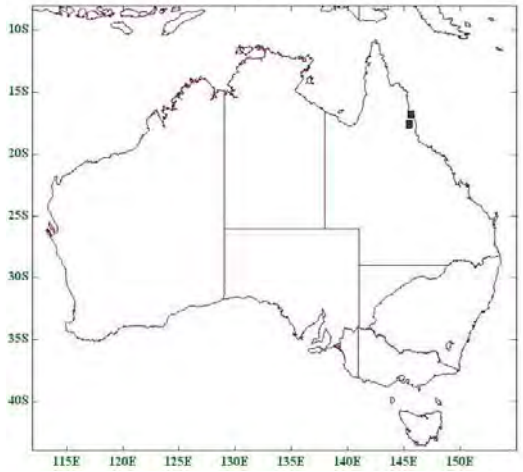
Inhabits rainforest streams

Coenagrion lyelli



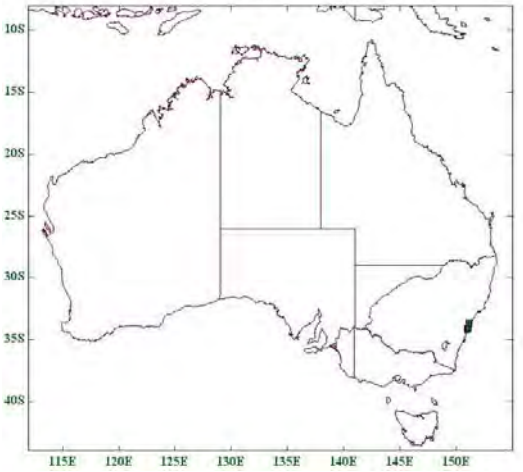
Inhabits still and sluggish waters; streams, riverine pools, lakes, ponds and swamps

Cordulephya bidens



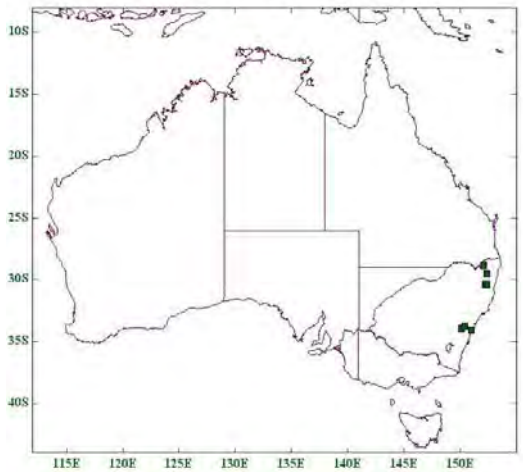
Inhabits streams in rainforest

Cordulephya divergens



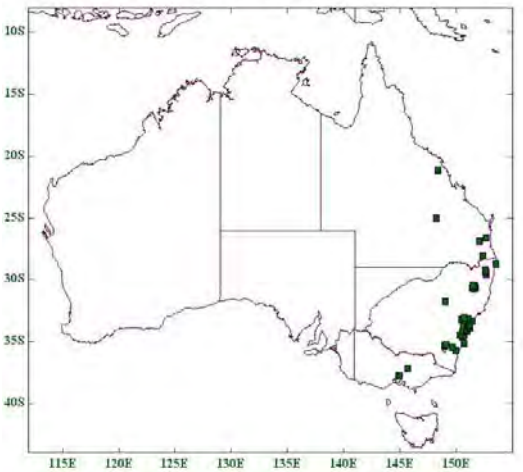
Inhabits streams

Cordulephya montana



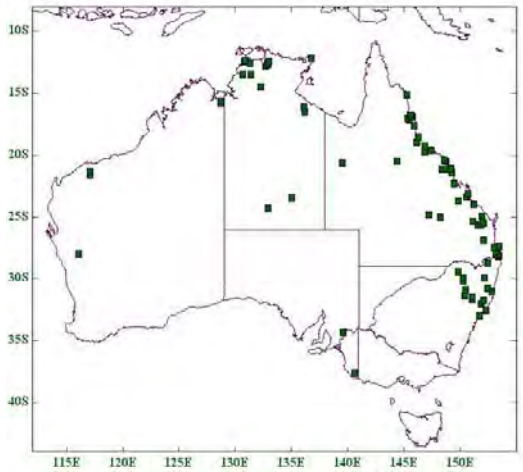
Inhabits streams and rivers

Cordulephya pygmaea



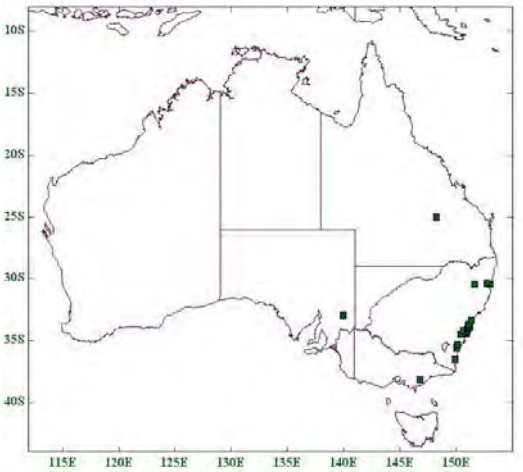
Inhabits streams and rivers

Crocothemis nigrifrons



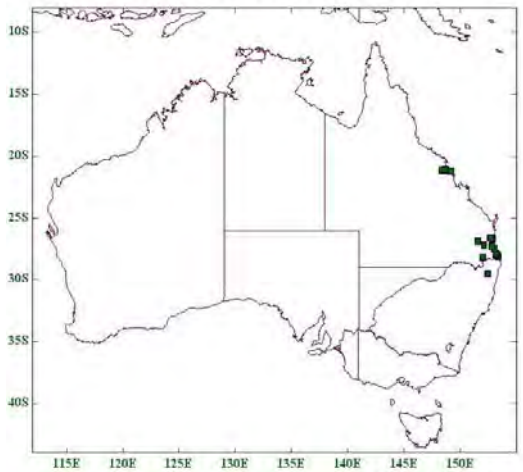
Inhabits wide range of still and sluggish waters

Dendroaeschna conspersa



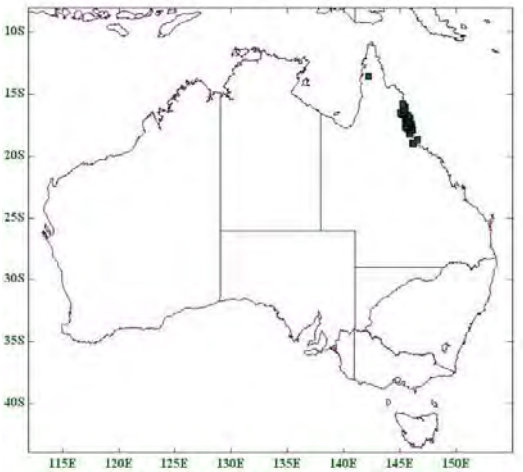
Inhabits lowland streams

Diphlebia coerulescens



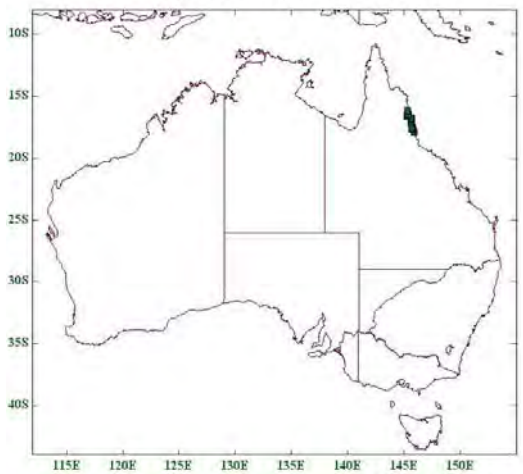
Inhabits streams and rapid rivers

Diphlebia euphoeoides



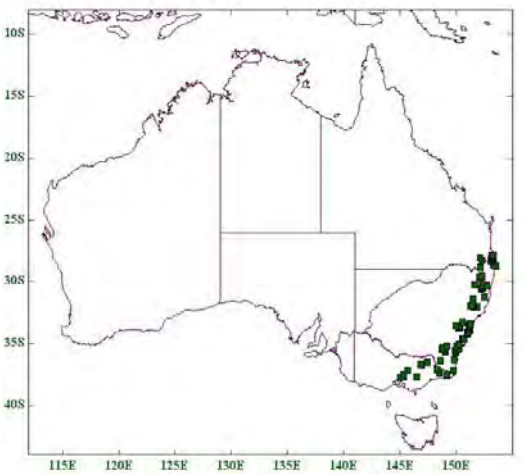
Inhabits streams and rivers, including those that dry to pools

Diphlebia hybridoides



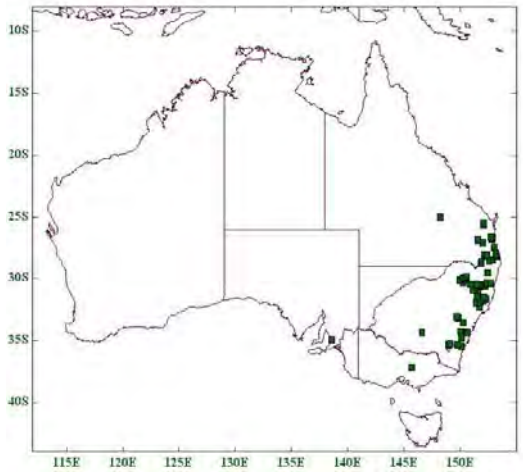
Inhabits streams in closed canopy forest

Diphlebia lestoides



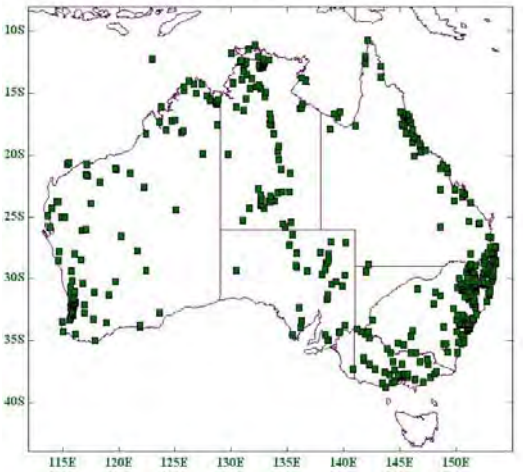
Inhabits streams and rivers

Diphlebia nymphoides



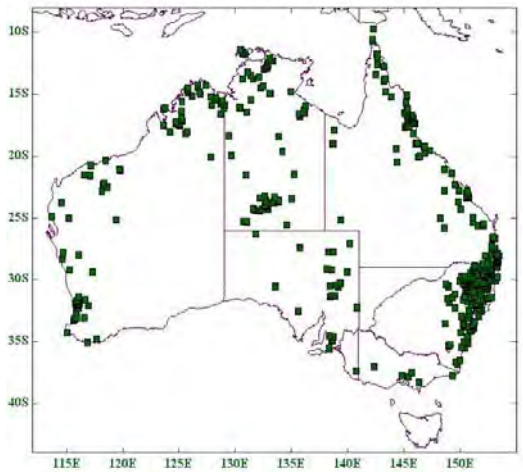
Inhabits streams and rivers, including slow and intermittently flowing rivers

Diplacodes bipunctata



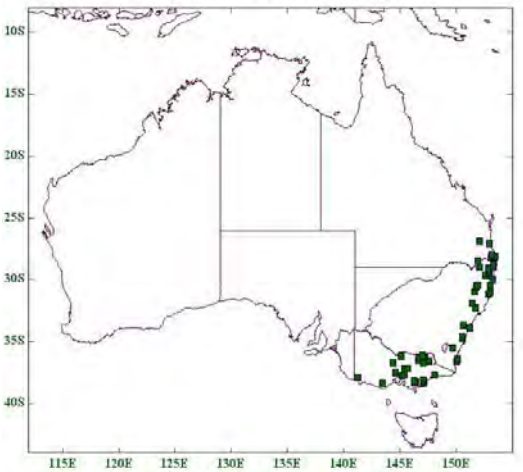
Inhabits wide range of still and sluggish waters, including temporary ponds and swamps

Diplacodes haematodes



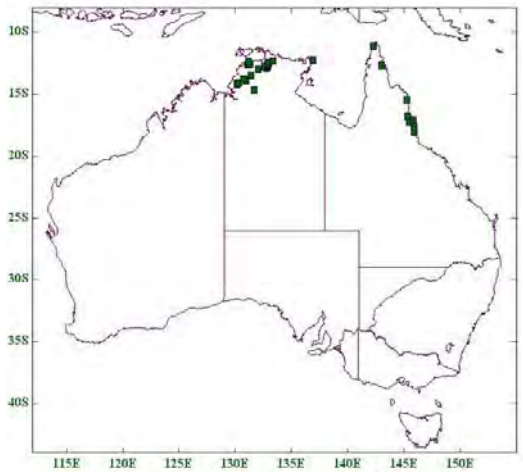
Inhabits streams and rivers as well as still waters

Diplacodes melanopsis



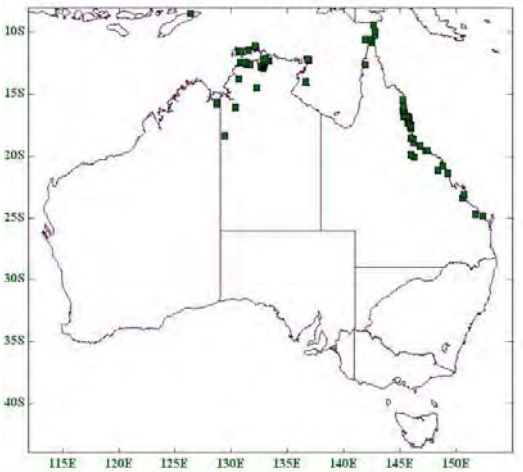
Inhabits riverine pools, lakes, ponds and swamps

Diplacodes nebulosa



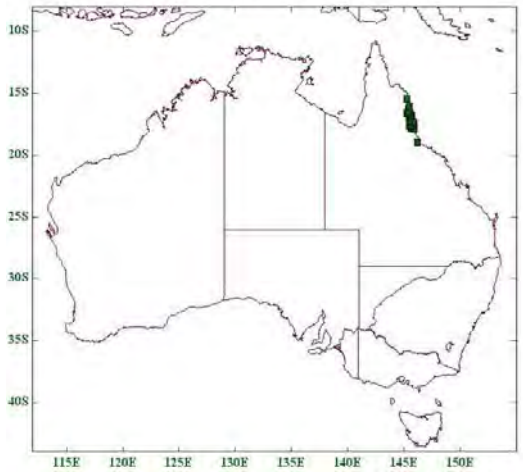
Inhabits ponds, including temporary ponds, and swamps

Diplacodes trivialis



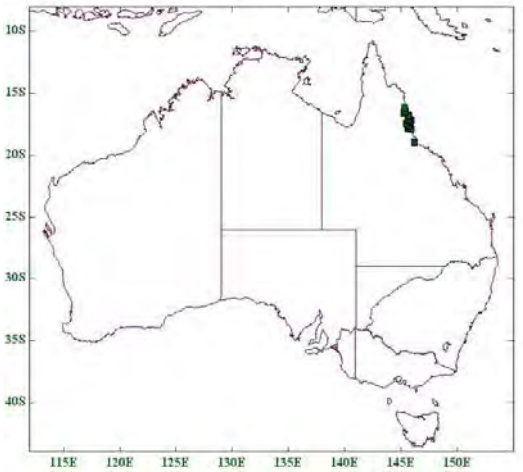
Inhabits ponds, including temporary ponds, and swamps

Dromaeschna forcipata



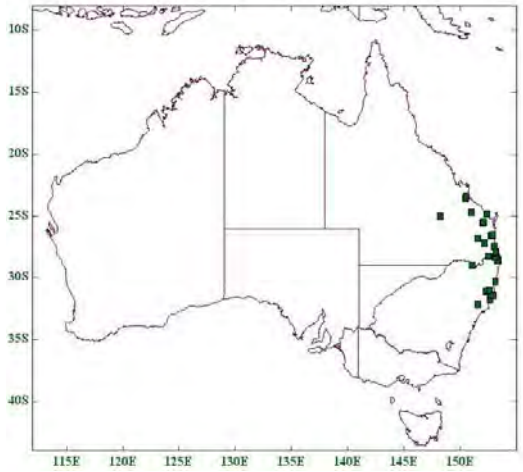
Inhabits streams, often in rainforest

Dromaeschna weiskei



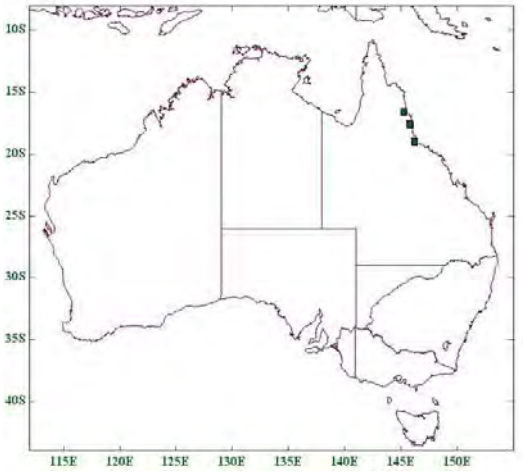
Inhabits rainforest streams

Episynlestes albicauda



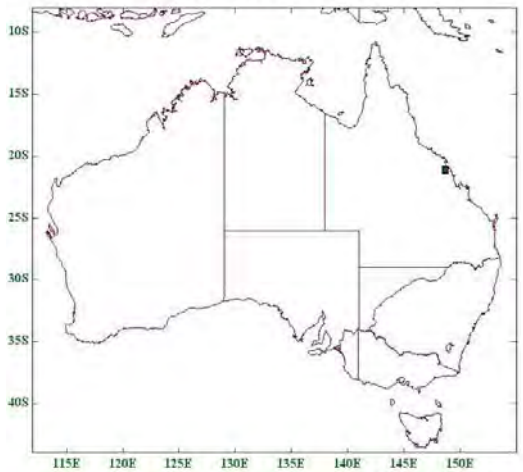
Inhabits streams, usually in rainforest, often in pools

Episynlestes cristatus



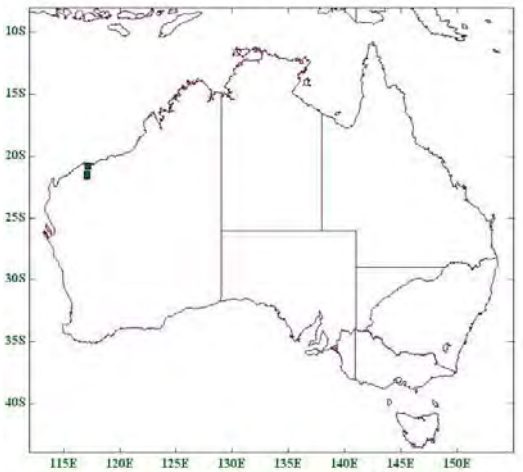
Inhabits streams, usually in rainforest

Episynlestes intermedius



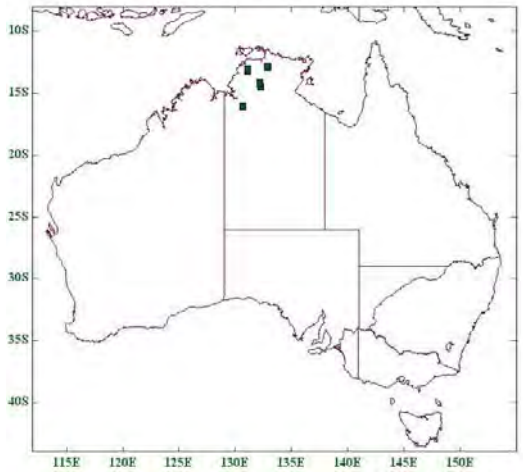
Inhabits streams in rainforest

Eurysticta coolawanyah



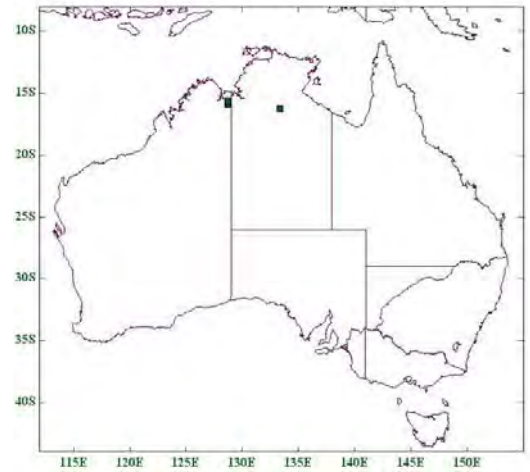
Inhabits riverine pools

Eurysticta coomalie



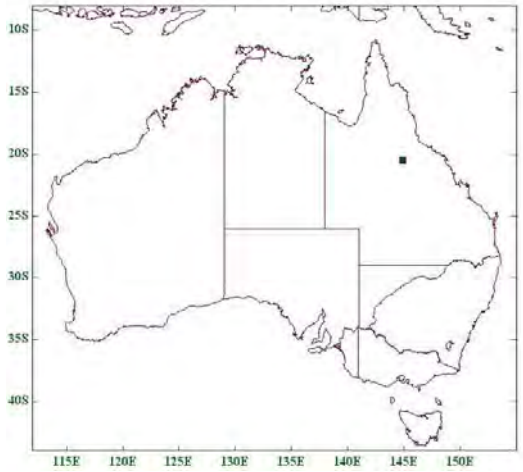
Inhabits streams, rivers and riverine pools

Eurysticta kununurra



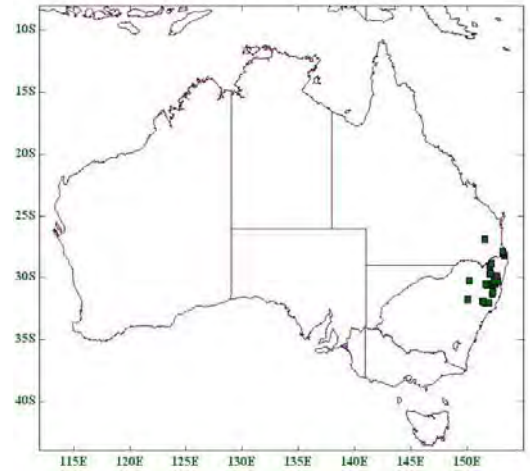
Inhabits rivers

Eurysticta reevesi



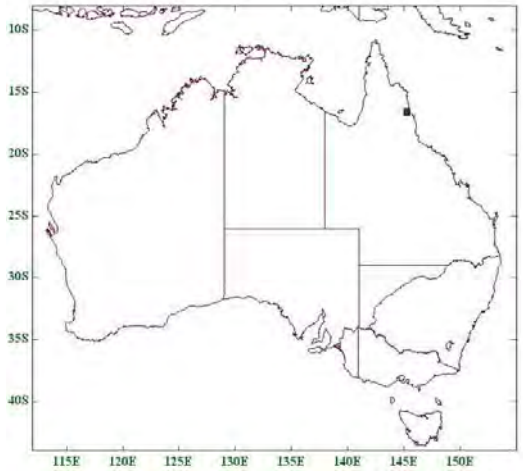
Inhabits riverine pools

Eusynthemis aurolineata



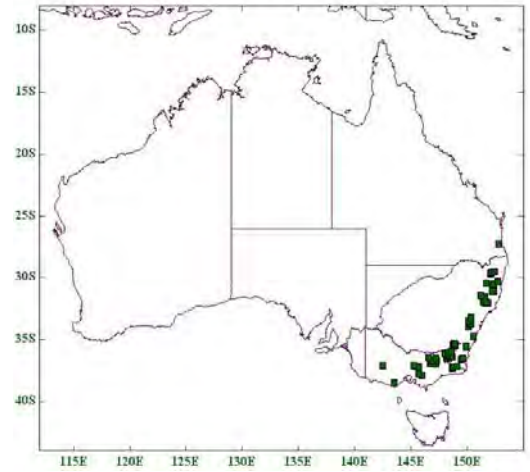
Inhabits montane swamps and small streams

Eusynthemis barbarae



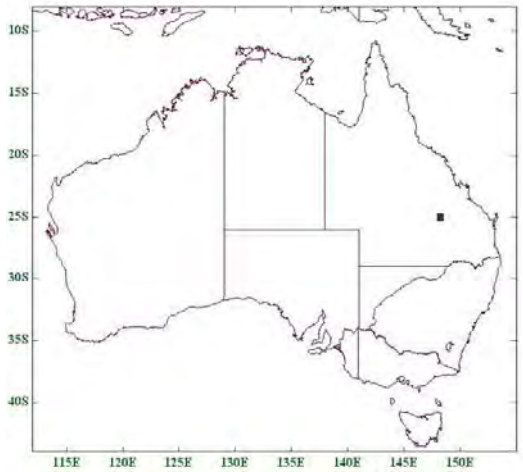
Inhabits rainforest streams

Eusynthemis brevistyla



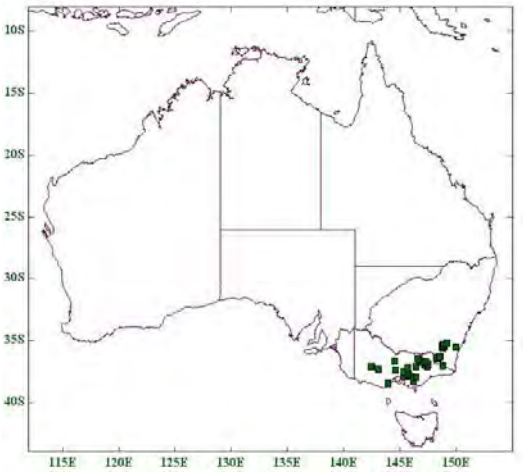
Inhabits upland streams and rivers

Eusynthemis deniseae



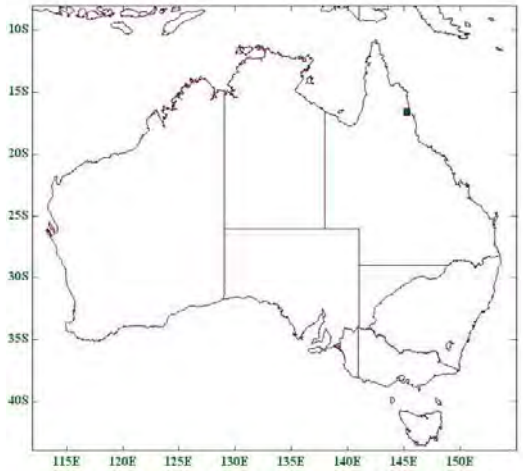
Inhabits streams

Eusynthemis guttata



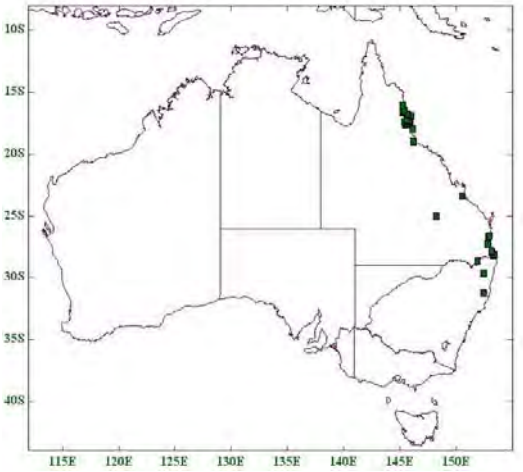
Inhabits alpine and montane streams

Eusynthemis netta



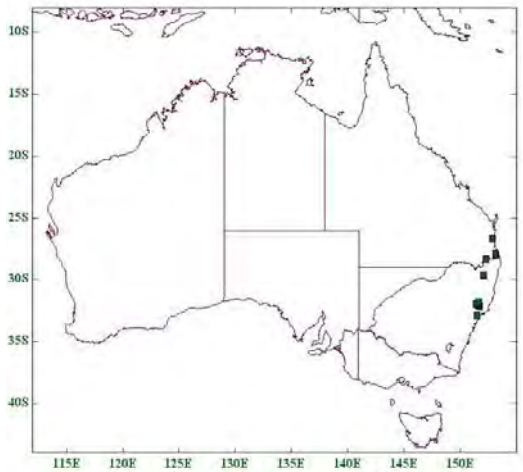
Inhabits rainforest streams

Eusynthemis nigra



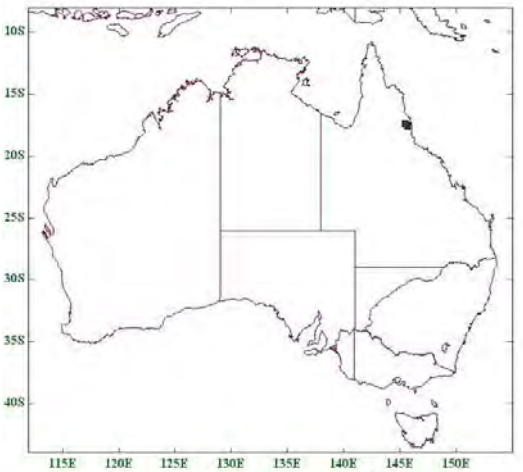
Inhabits streams

Eusynthemis rentziana



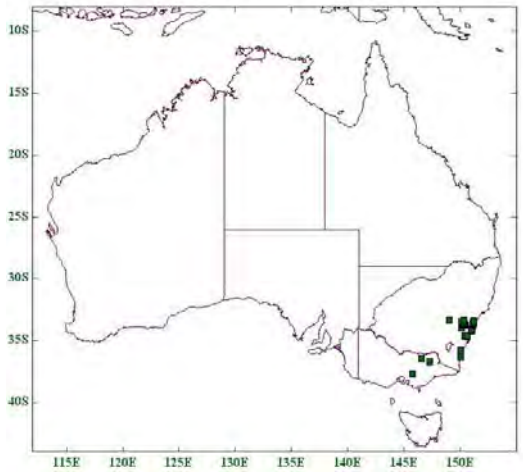
Inhabits streams

Eusynthemis tenera



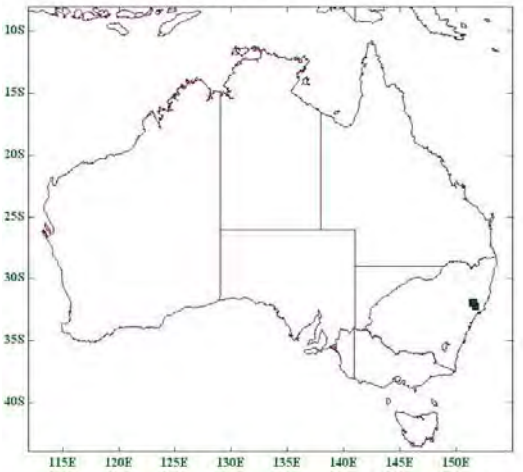
Inhabits rainforest streams

Eusynthemis tillyardi



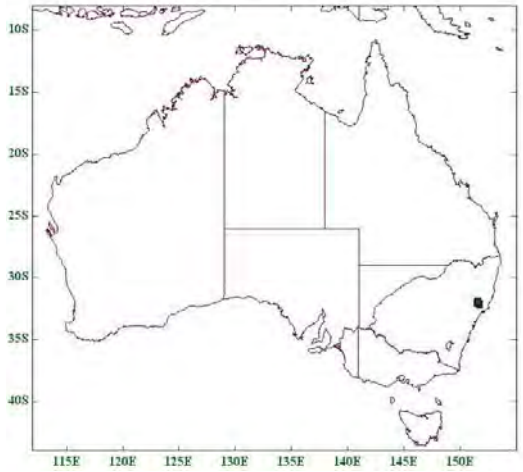
Inhabits coastal and montane streams

Eusynthemis ursa



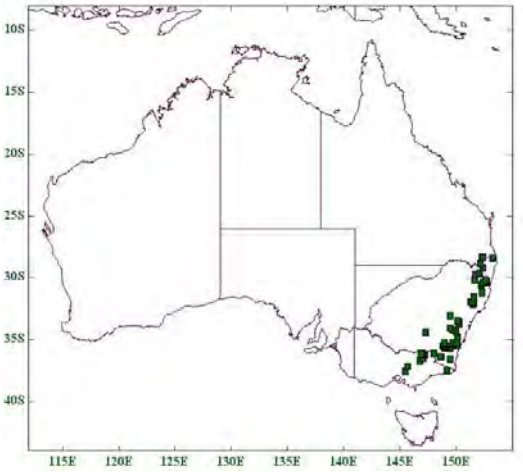
Habitats unknown, supposedly at high altitude

Eusynthemis ursula



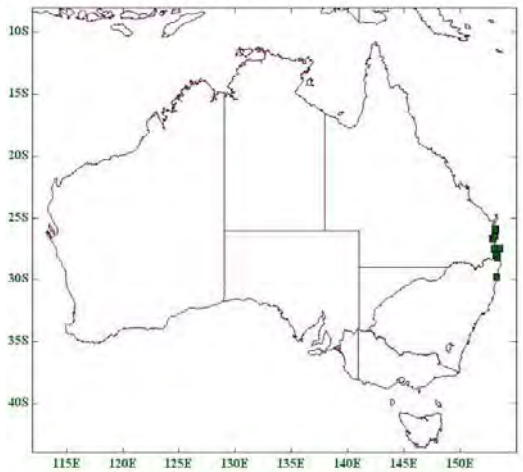
Inhabits small streams very close to their origin (altitude ca 980 m)

Eusynthemis virgula



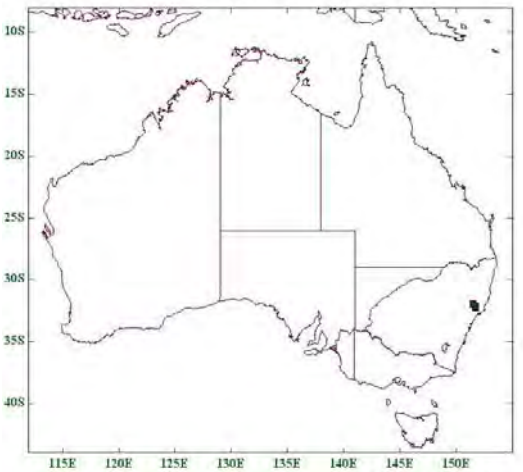
Inhabits streams and rivers

Griseargiolestes albescens



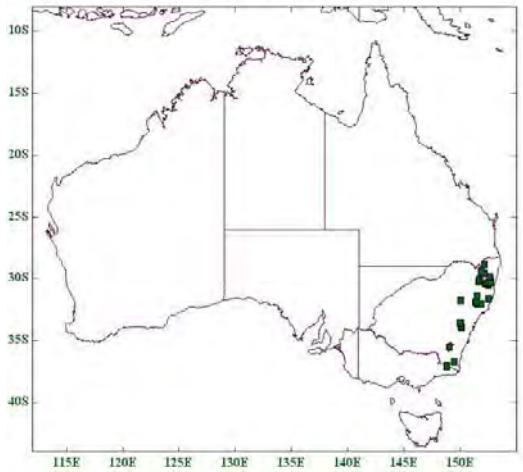
Inhabits streams, boggy seepages, swamps and possibly dune lakes

Griseargiolestes bucki



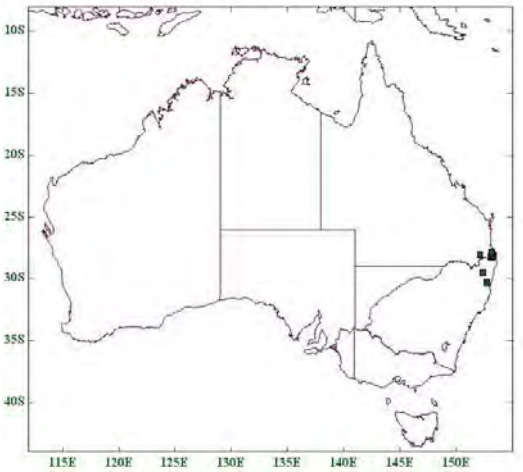
Inhabits seepage along streams and possibly sphagnum bogs

Griseargiolestes eboracus



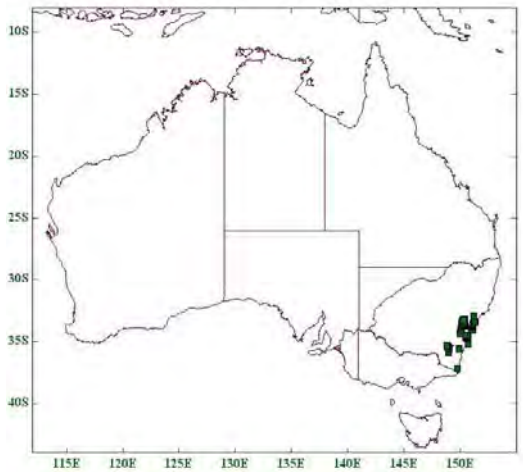
Inhabits boggy seepages and sphagnum bogs

Griseargiolestes fontanus



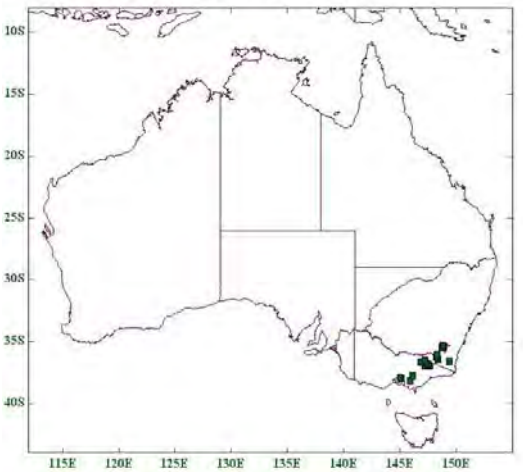
Inhabits streams, particularly near their springs

Griseargiolestes griseus



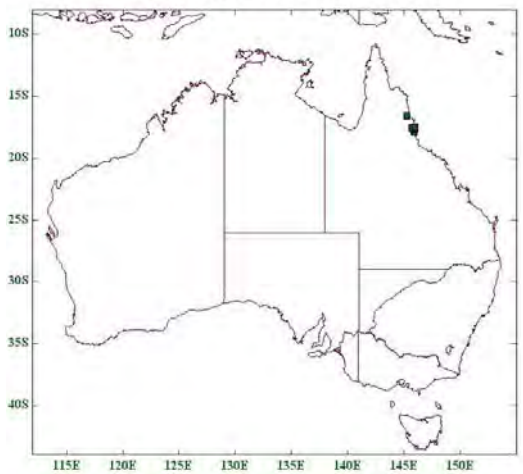
Inhabits boggy seepages and peat bogs along the margins of small streams

Griseargiolestes intermedius



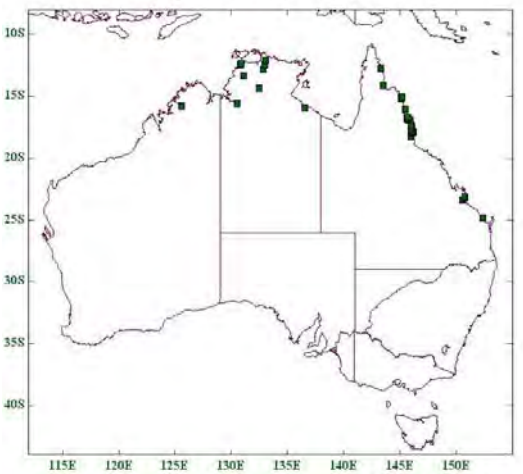
Inhabits boggy seepages, swamps and bogs associated with streams

Griseargiolestes metallicus



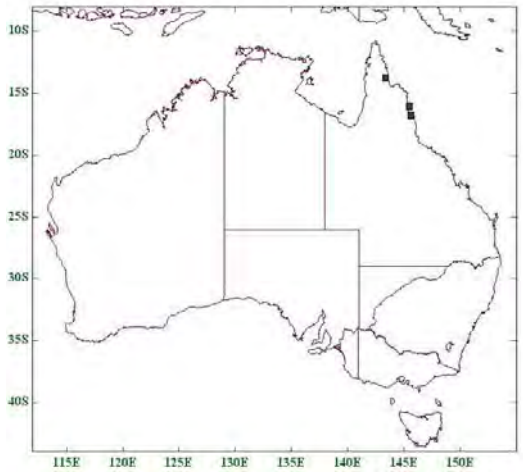
Inhabits streams

Gynacantha dobsoni



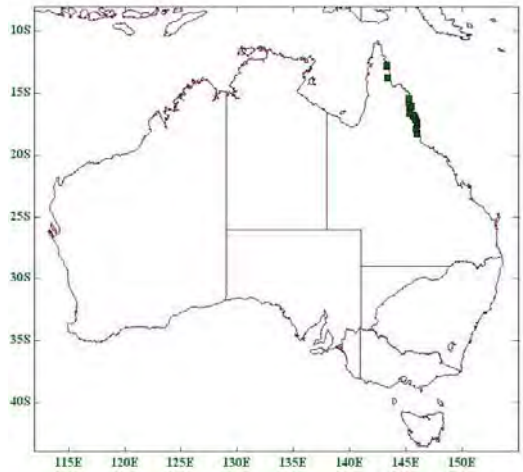
Inhabits pools, ponds and swamps

Gynacantha kirbyi



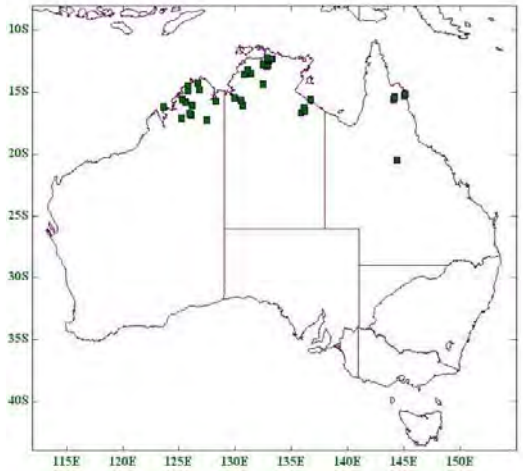
Habitats unknown

Gynacantha mocsaryi



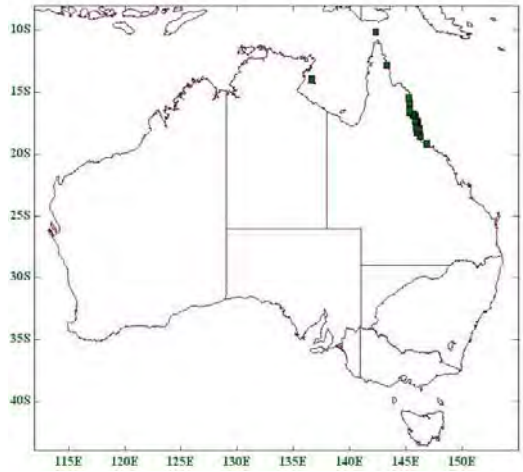
Inhabits ponds, possibly temporary ponds

Gynacantha nourlangie



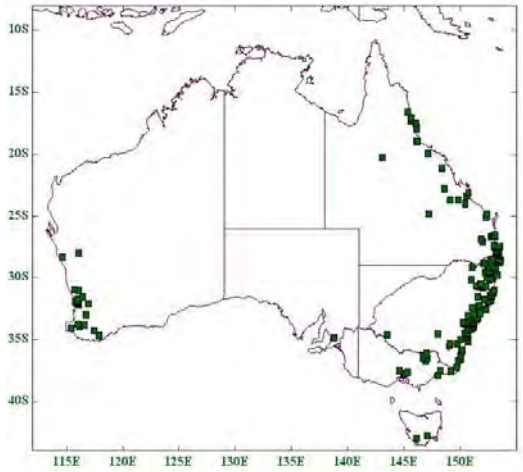
Inhabits pools in caves and other still waters

Gynacantha rosenbergi



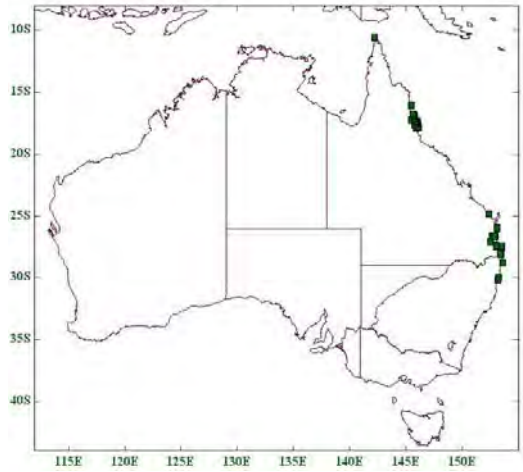
Inhabits still waters

Hemicordulia australiae



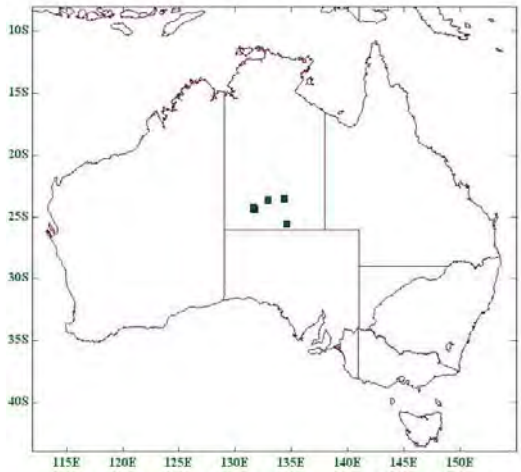
Inhabits rivers, riverine pools, lakes, and permanent ponds

Hemicordulia continentalis



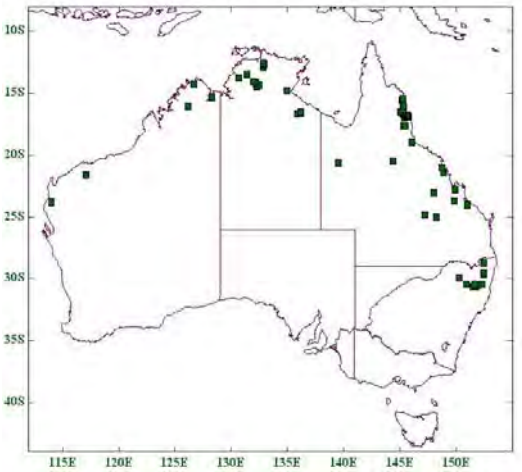
Inhabits riverine pools, lakes, permanent ponds and swamps

Hemicordulia flava



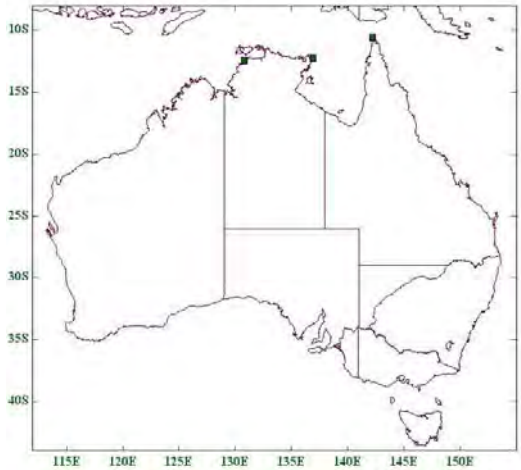
Inhabits still pools

Hemicordulia intermedia



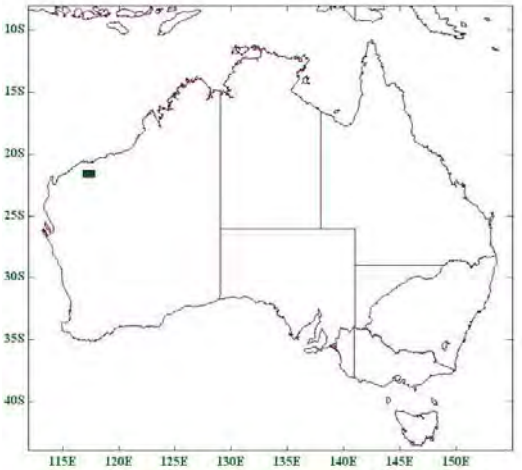
Inhabits sluggish rivers, riverine lagoons, lakes and ponds

Hemicordulia kalliste



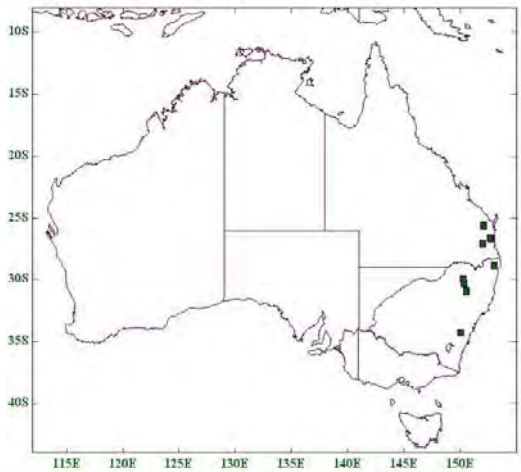
Habitats unknown

Hemicordulia koomina



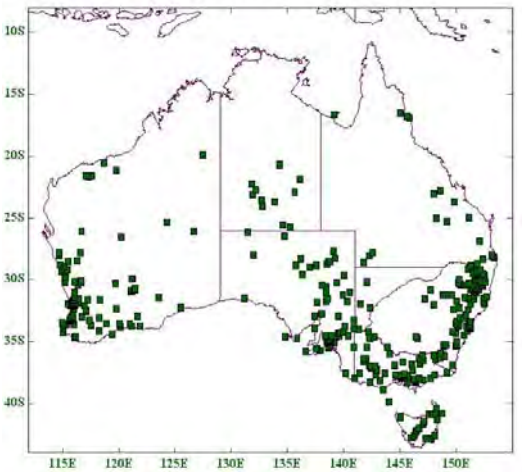
Inhabits streams, rivers and riverine pools

Hemicordulia superba



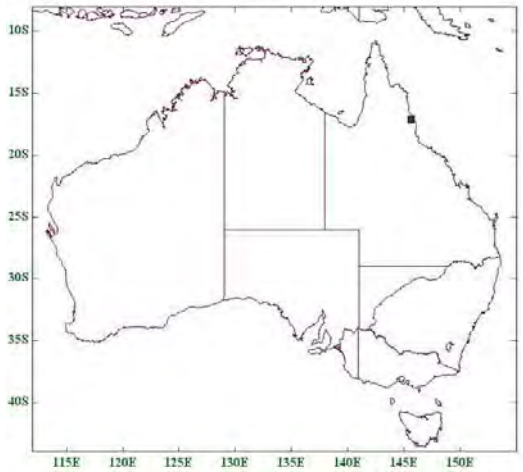
Inhabits rivers, riverine pools, lakes and possibly permanent ponds

Hemicordulia tau



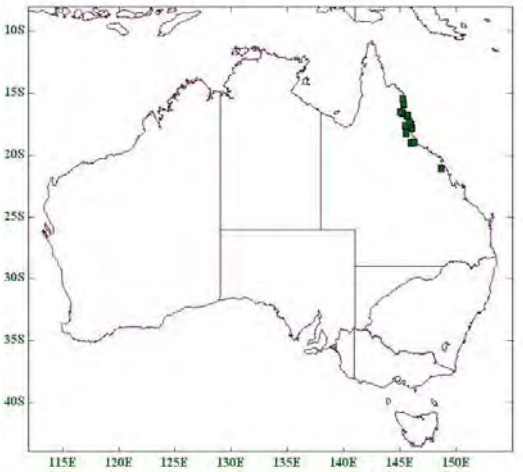
Inhabits riverine pools, lakes, ponds (including temporary ponds), swamps;occasionally streams and rivers

Hemigomphus atratus



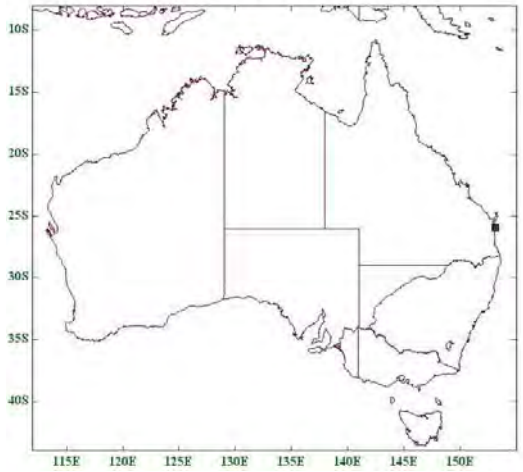
Inhabits rainforest streams

Hemigomphus comitatus



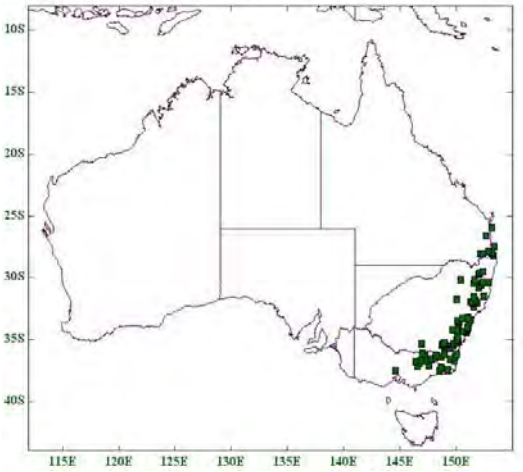
Inhabits streams and rivers, not necessarily in rainforest

Hemigomphus cooloola



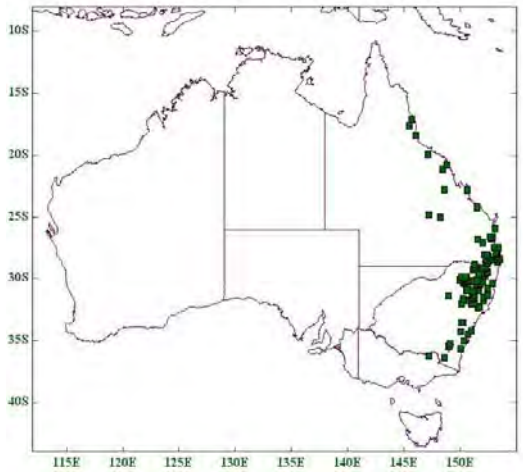
Inhabits sandy and sluggish streams and lakes

Hemigomphus gouldii



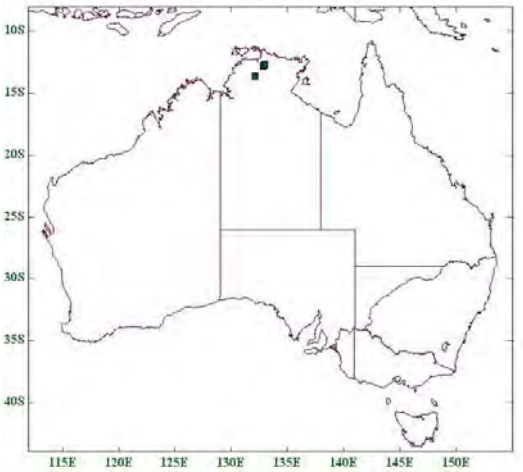
Inhabits permanent streams and rivers

Hemigomphus heteroclytus



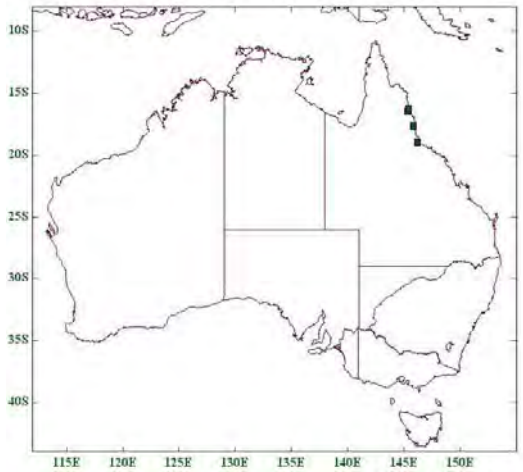
Inhabits streams and rivers, which during summer are often reduced to trickles between the pools

Hemigomphus magela



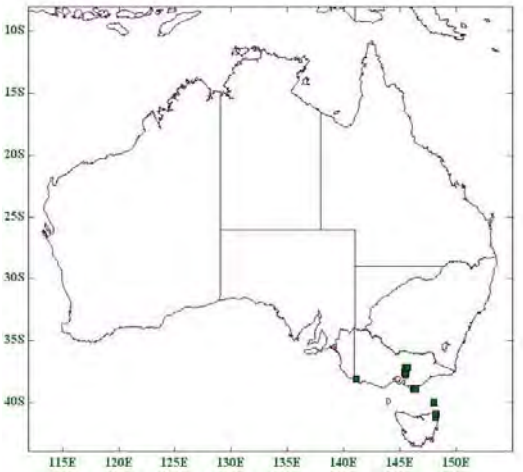
Inhabits streams

Hemigomphus theischingeri



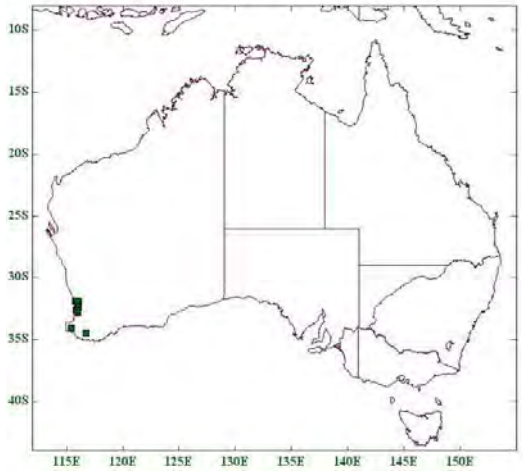
Inhabits streams and rivers in rainforest

Hemiphlebia mirabilis



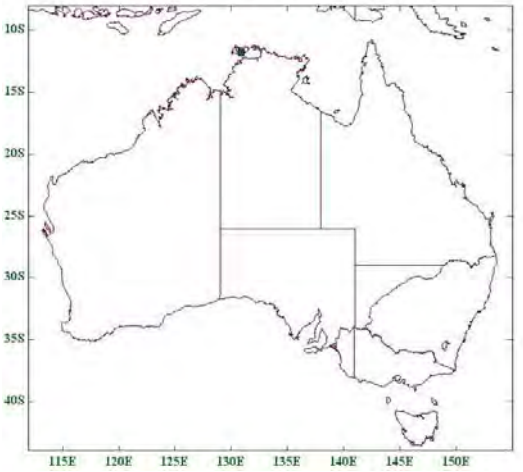
Inhabits rivers, riverine lagoons, permanent ponds and swamps that may dry out in summer

Hesperocordulia berthoudi



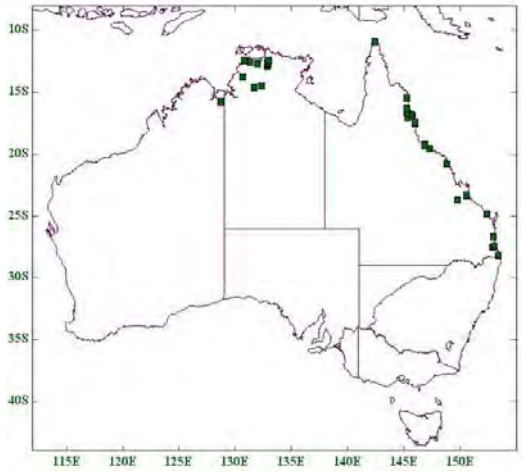
Inhabits streams, rivers and riverine pools

Huonia melvillensis



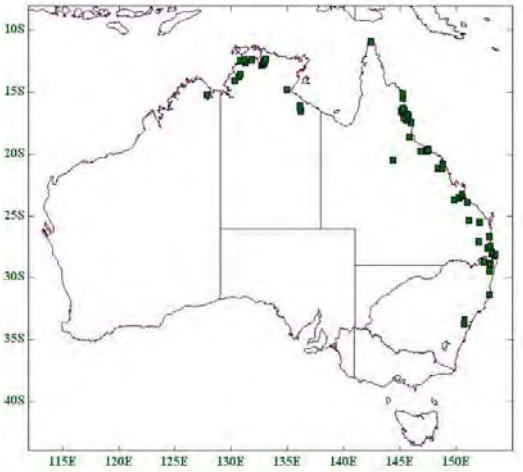
Inhabits pools in streams

Hydrobasileus brevistylus



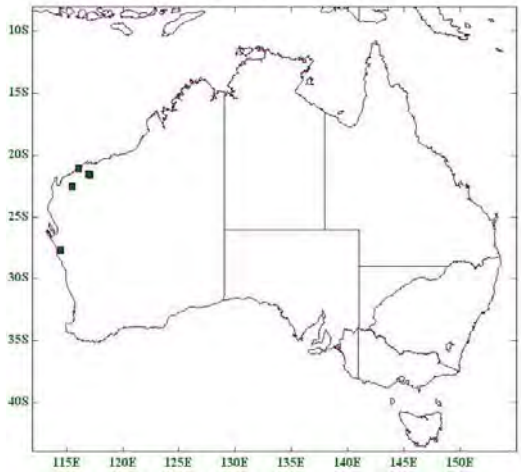
Inhabits lakes, ponds and swamps, possibly including temporary ponds

Ictinogomphus australis



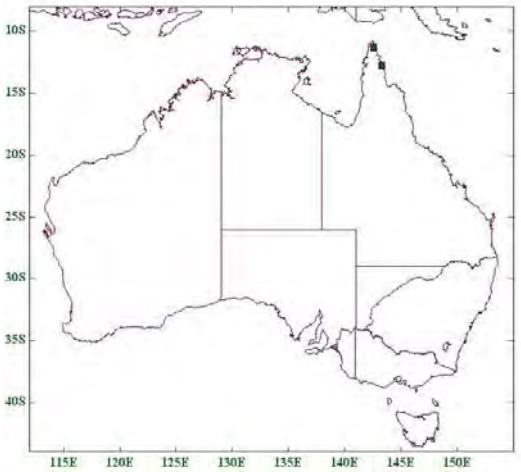
Inhabits rivers, riverine lagoons, lakes and ponds

Ictinogomphus dobsoni



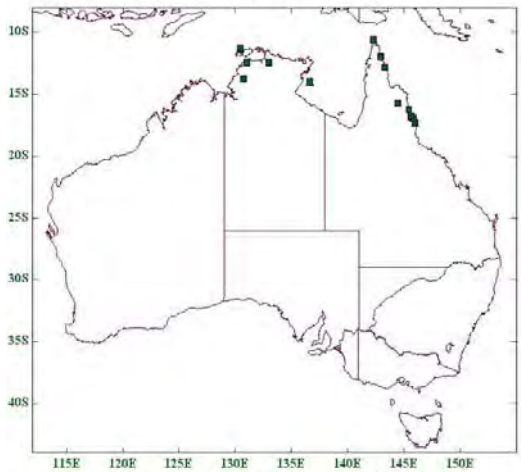
Inhabits rivers, riverine lagoons and ponds

Ictinogomphus paulini



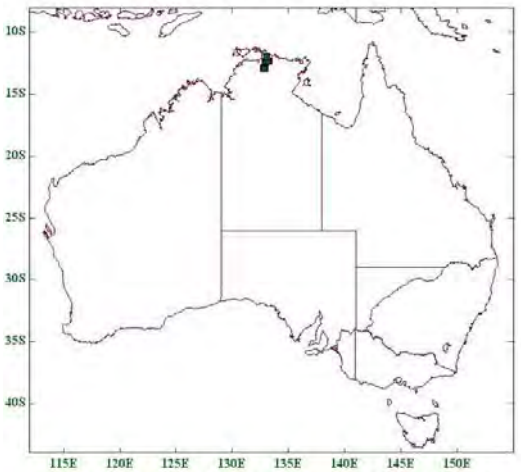
Inhabits rivers

Indolestes alleni



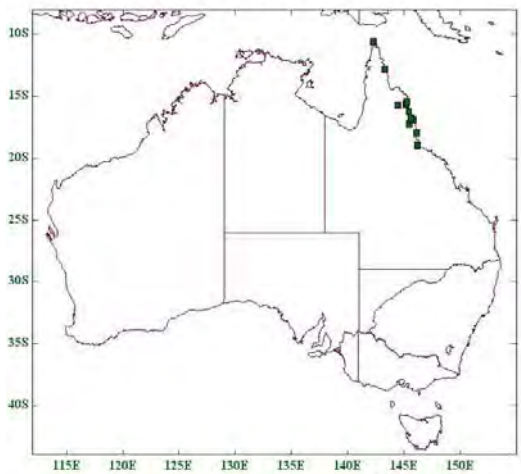
Inhabits riverine lagoons, ponds and swamps

Indolestes obiri



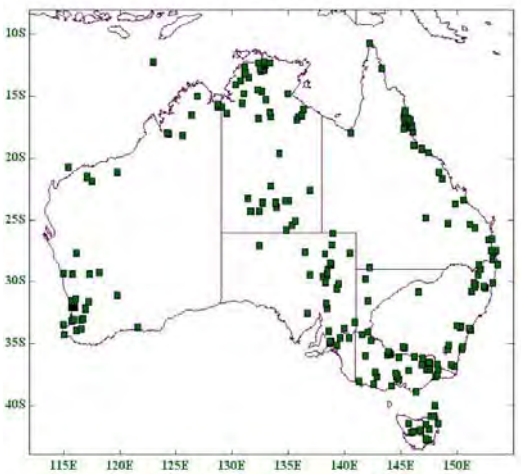
Inhabits shallow pools in rocky areas

Indolestes tenuissimus



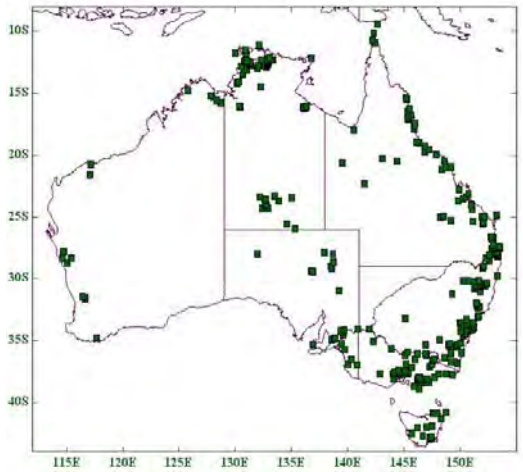
Inhabits riverine pools, ponds and swamps

Ischnura aurora



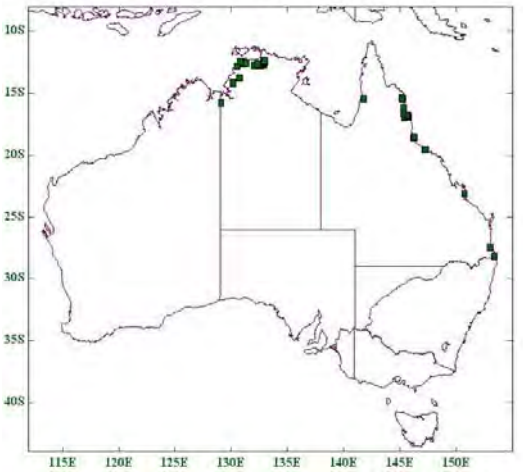
Inhabits still and sluggish waters, including temporary ponds

Ischnura heterosticta



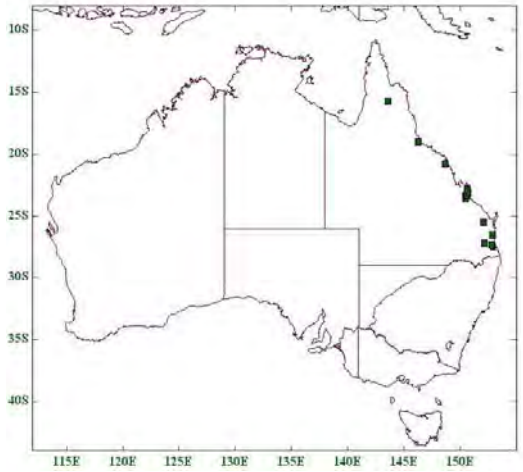
Inhabits still and sluggish waters, including temporary ponds

Ischnura pruinescens



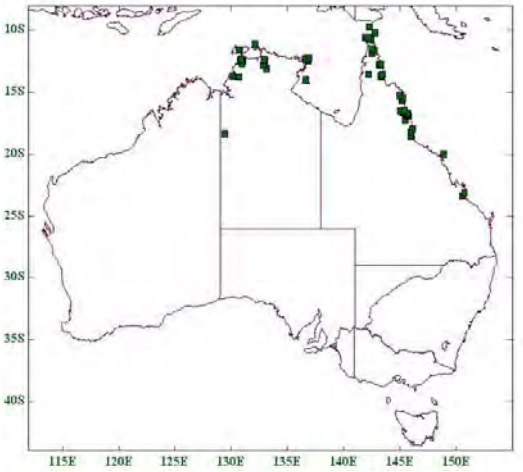
Inhabits riverine pools, lakes, ponds and swamps

Labidiosticta vallisi



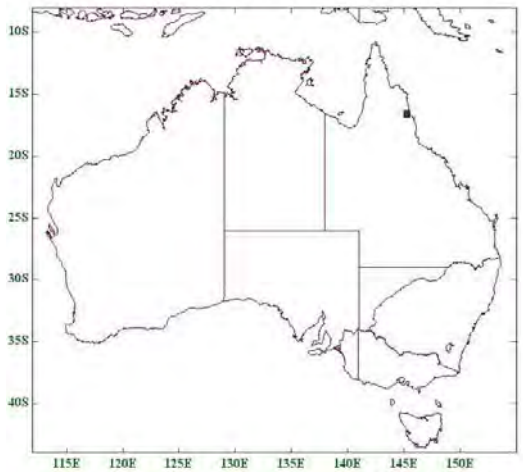
Inhabits streams and rivers

Lathrecista asiatica festa



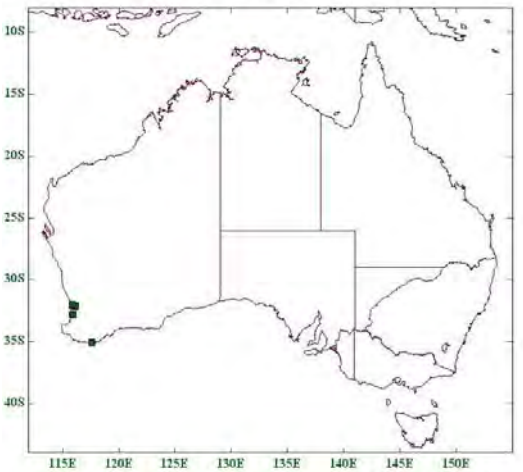
Inhabits streams and rivers and at riverine lagoons and swamps

Lathrocordulia garrisoni



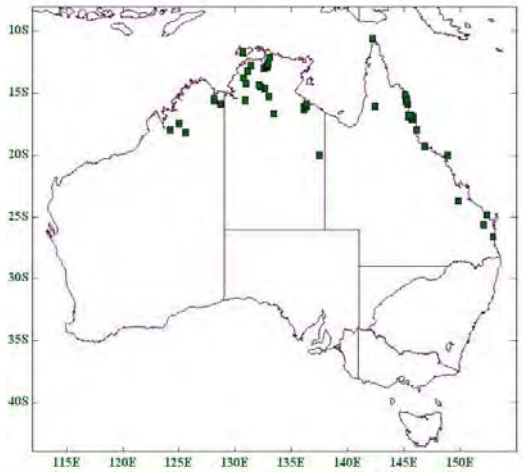
Inhabits probably rainforest streams

Lathrocordulia metallica



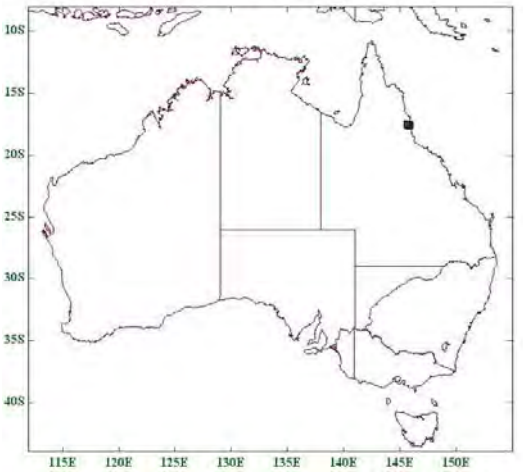
Inhabits streams

Lestes concinnus



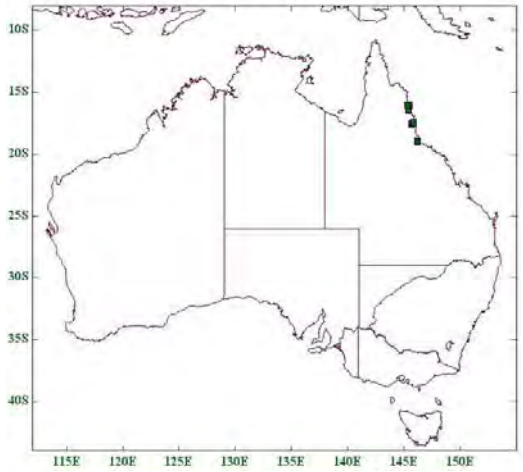
Inhabits riverine lagoons, ponds (including temporary ponds) and swamps

Lestoidea barbarae



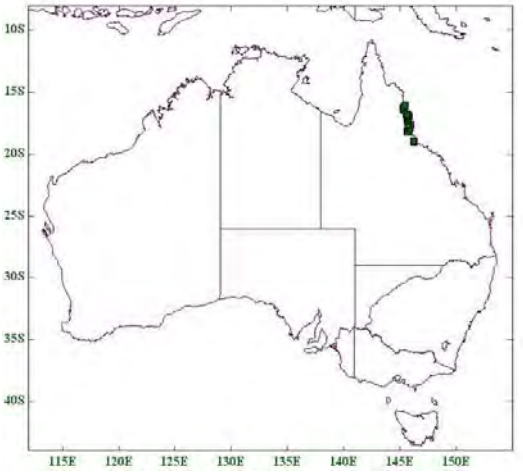
Inhabits streams in rainforest

Lestoidea brevicauda



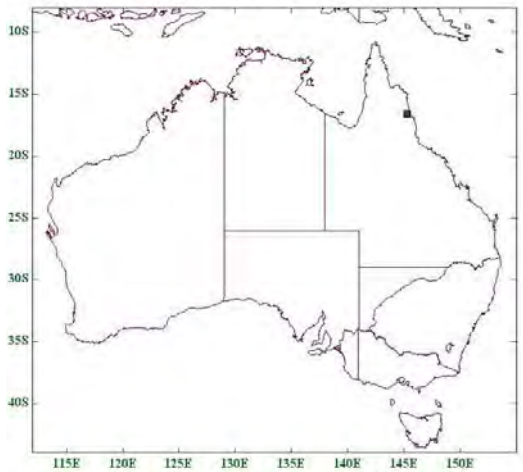
Inhabits streams in rainforest

Lestoidea conjuncta



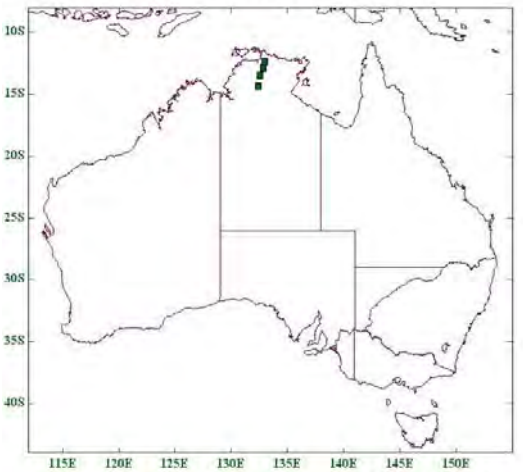
Inhabits streams in rainforest

Lestoidea lewisiana



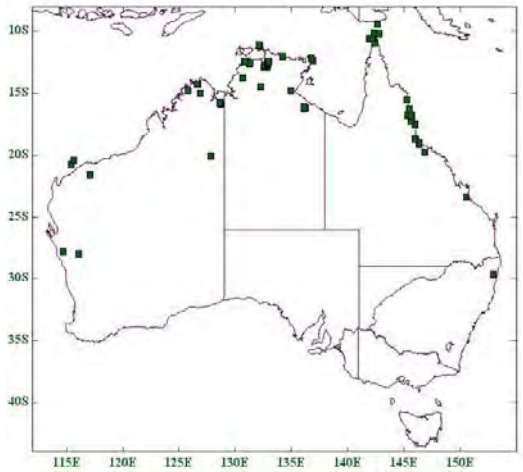
Inhabits streams in rainforest

Lithosticta macra



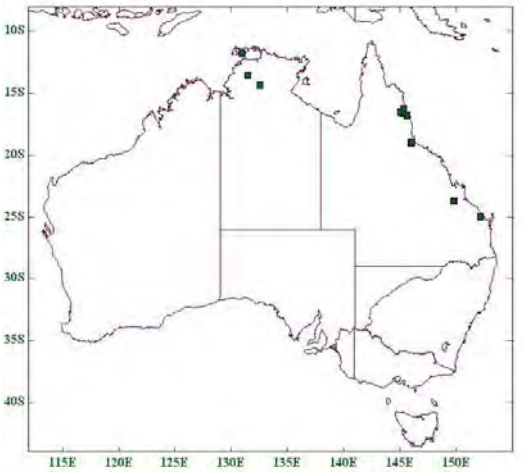
Inhabits streams and rivers

Macrodiplax cora



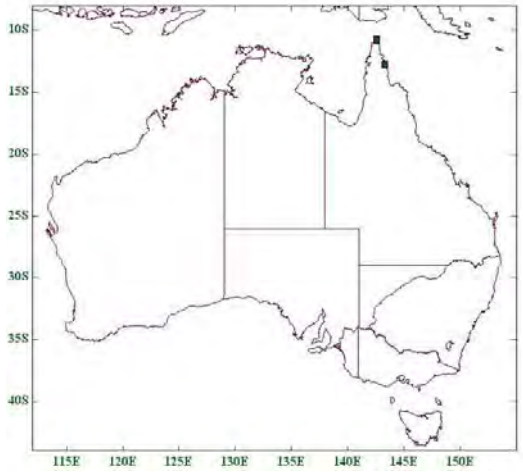
Inhabits riverine pools and lagoons, ponds (including temporary ponds), swamps

Macromia tillyardi



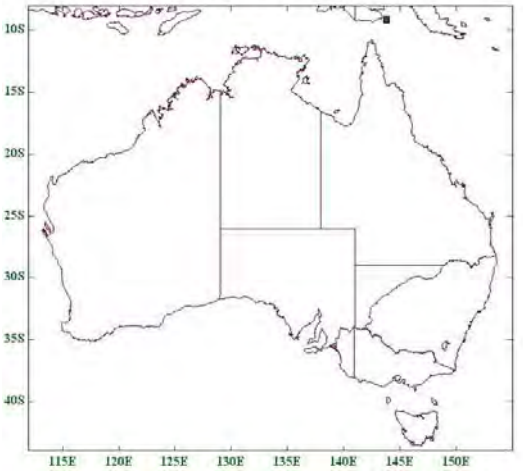
Inhabits streams, rivers and riverine pools

Macromia viridescens



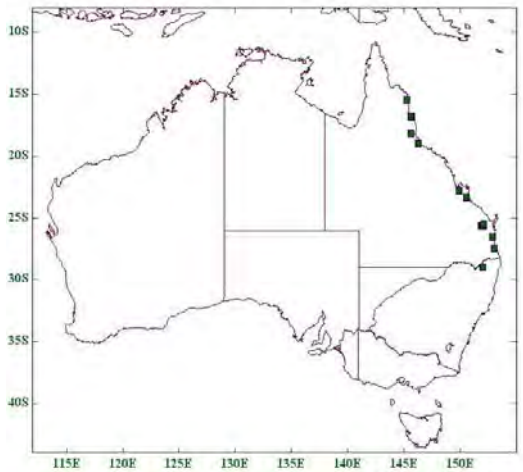
Inhabits streams

Metaphya tillyardi



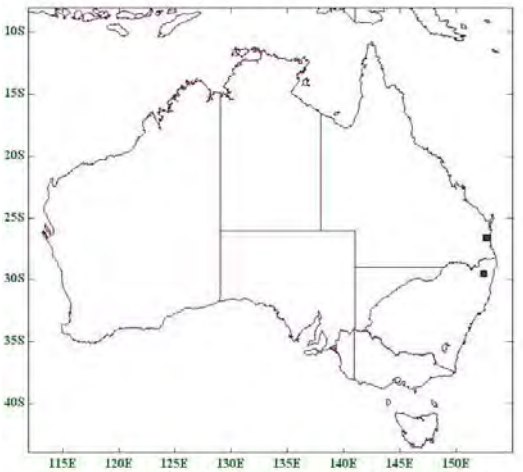
Habitats unknown

Micromidia atrifrons



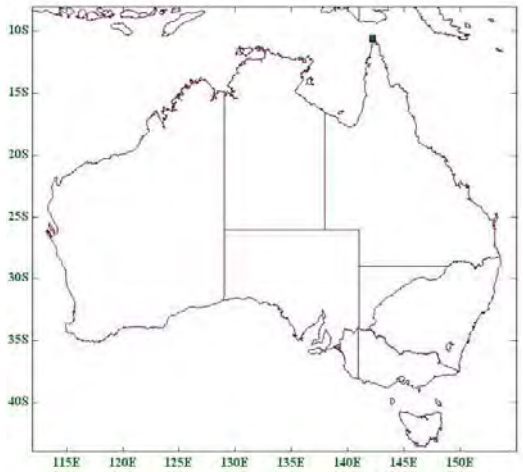
Inhabits streams, including sluggish and intermittent ones

Micromidia convergens



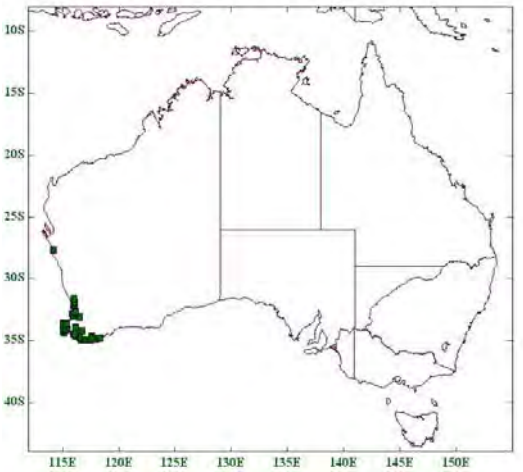
Inhabits streams, often in rainforest

Micromidia rodericki



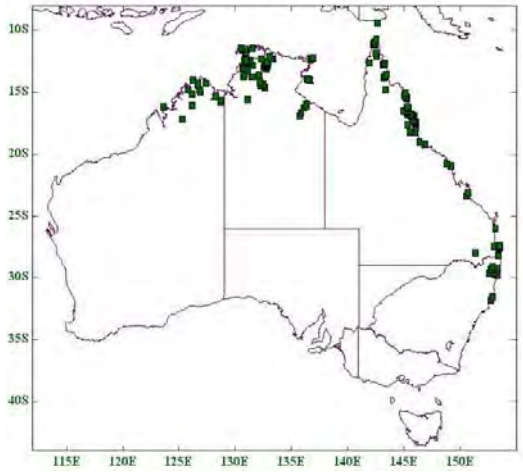
Inhabits rainforest streams

Miniargiolestes minimus



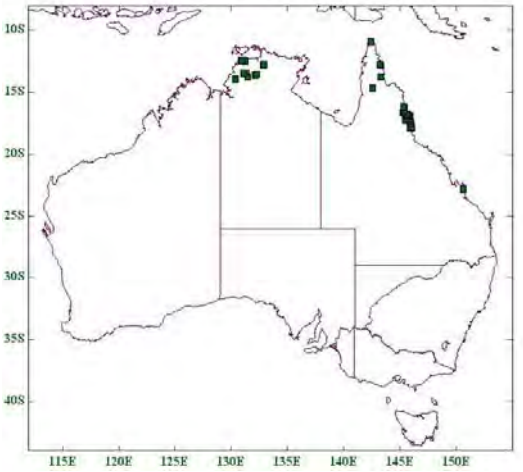
Inhabits streams and rivers

Nannodiplax rubra



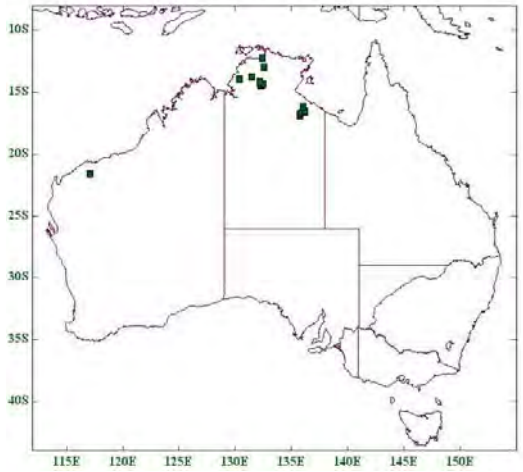
Inhabits wide range of still and flowing waters

Nannophlebia eludens



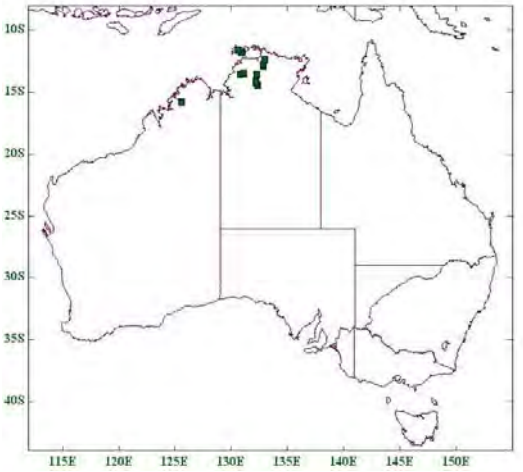
Inhabits streams and rivers

Nannophlebia injibandi



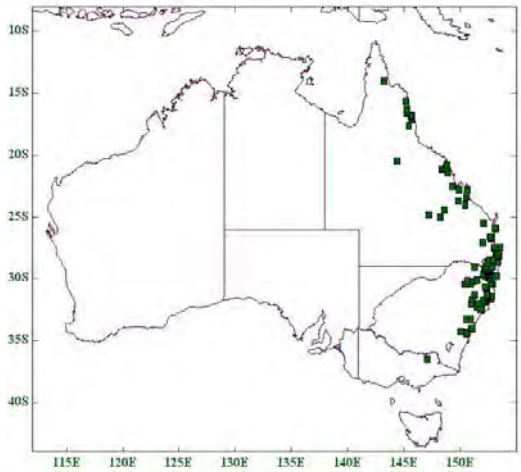
Inhabits streams and rivers

Nannophlebia mudginberri



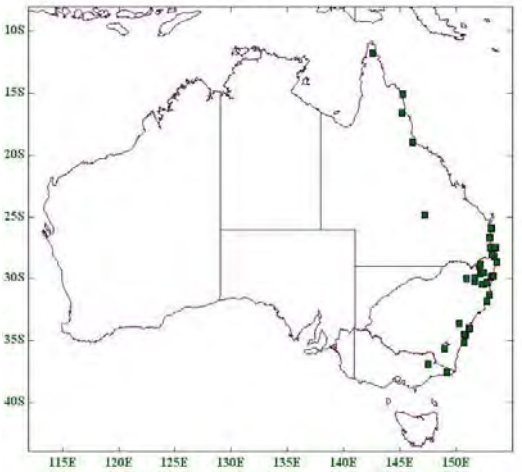
Inhabits streams

Nannophlebia risi



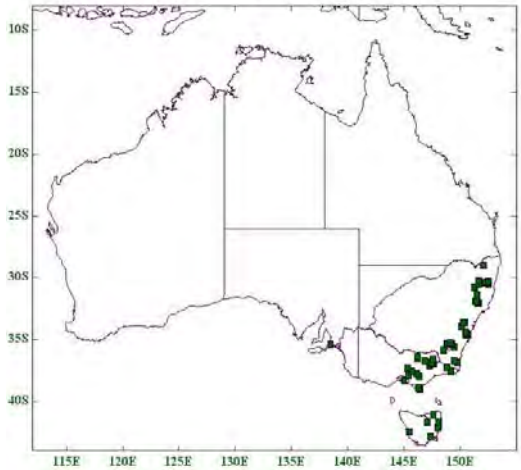
Inhabits streams and rivers

Nannophya australis



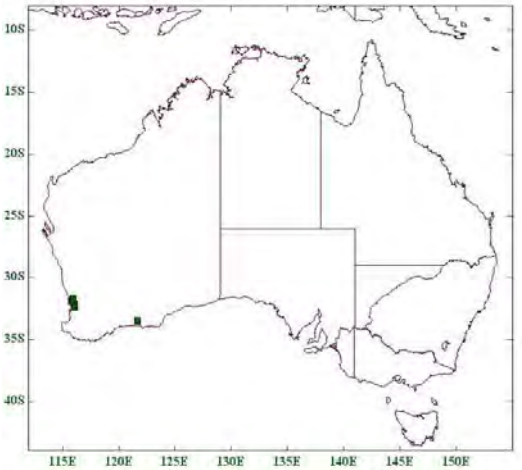
Inhabits boggy seepages and swamps

Nannophya dalei



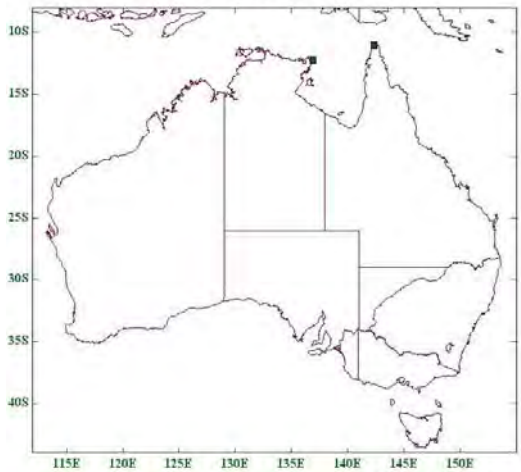
Inhabits boggy seepages and swamps

Nannophya occidentalis



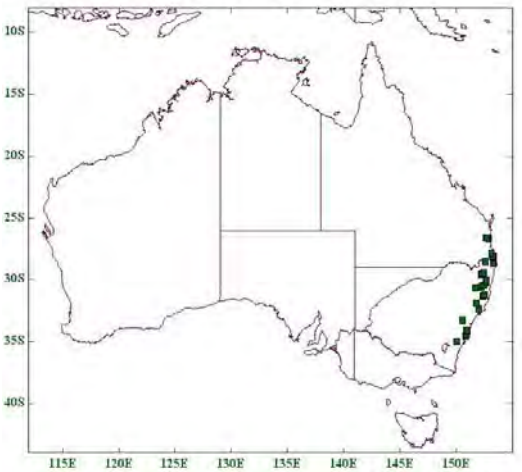
Inhabits boggy seepages and swamps

Nannophya paulsoni



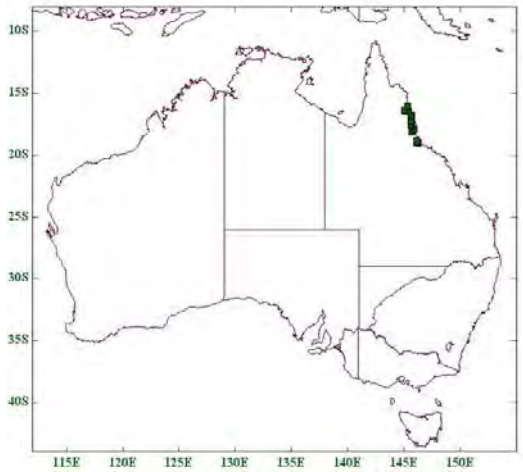
Inhabits ?small streams

Neosticta canescens



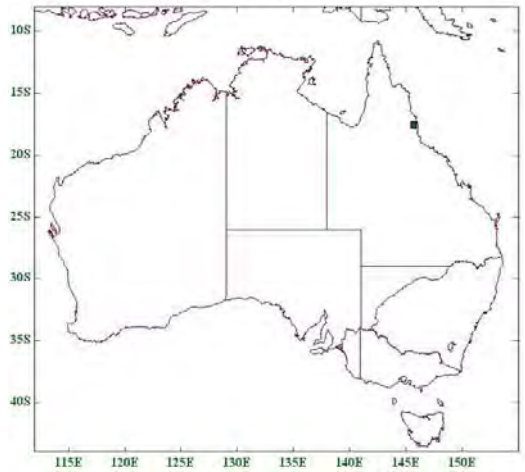
Inhabits streams and rivers

Neosticta fraseri



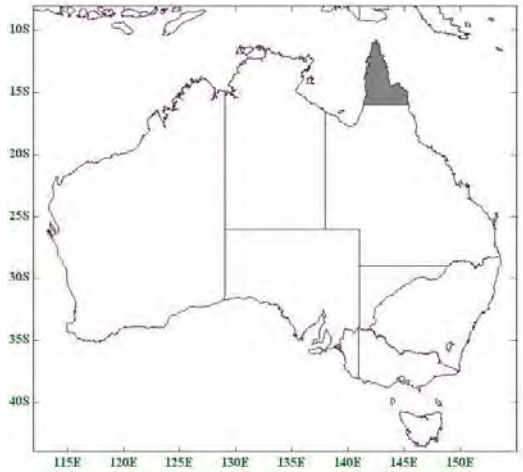
Inhabits streams, possibly rivers

Neosticta silvarum



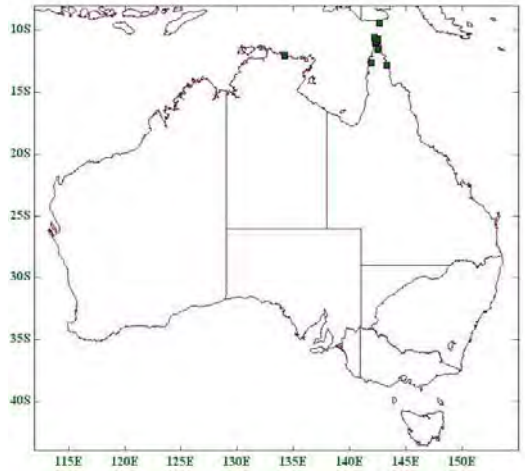
Inhabits streams in rainforest

Neurobasis australis



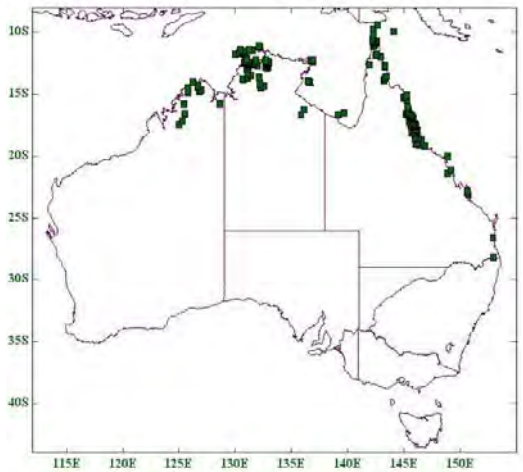
Inhabits streams and rivers; Australian record not confirmed

Neurothemis oligoneura



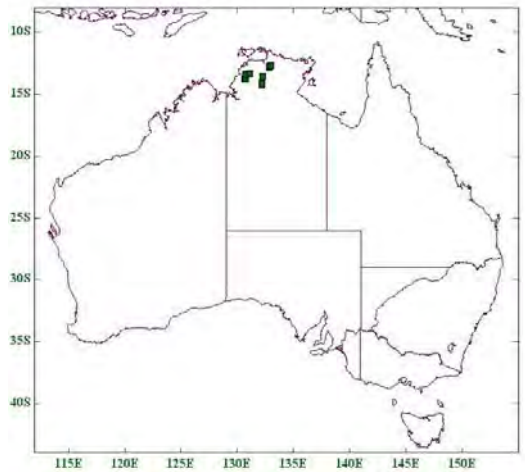
Habitats unknown

Neurothemis stigmatizans



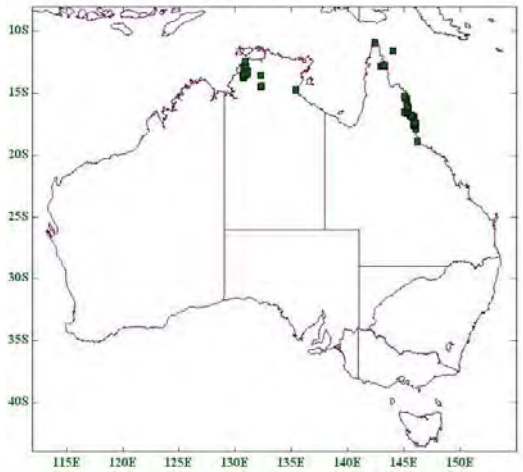
Inhabits range of still waters

Nososticta baroalba



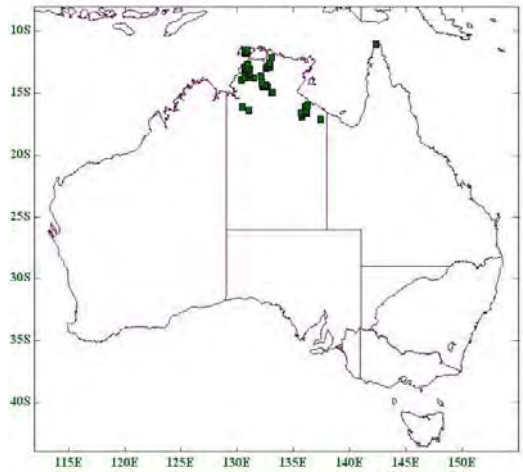
Inhabits streams

Nosostricta coelestina



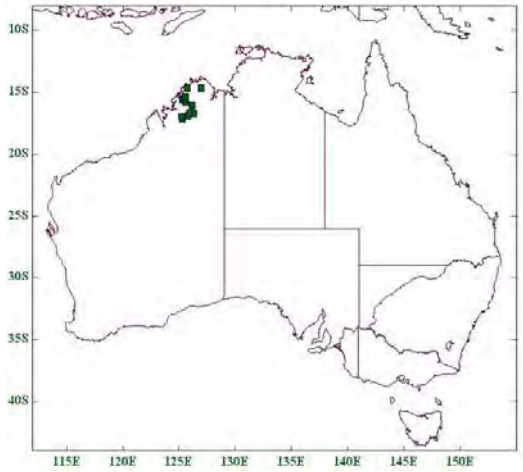
Inhabits streams and rivers

Nosostricta fraterna



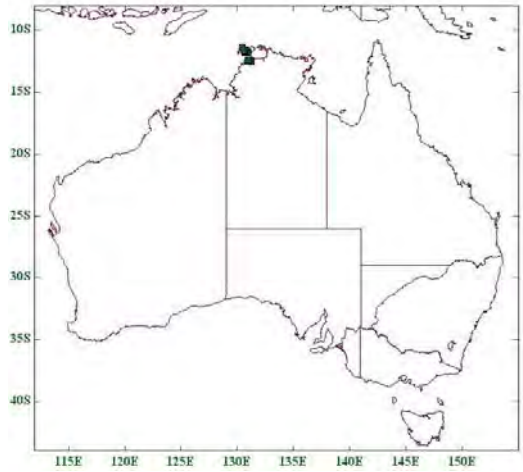
Inhabits streams, rivers and riverine lagoons

Nosostricta kalumburu



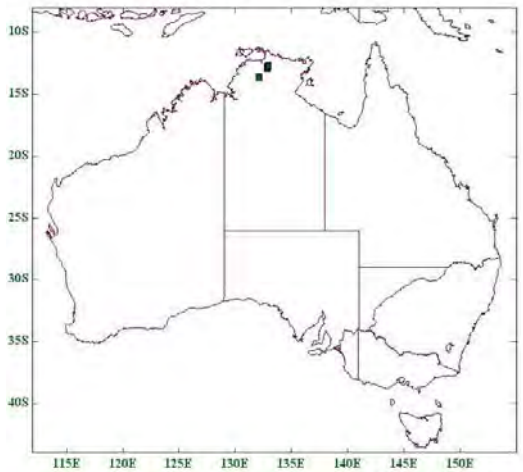
Inhabits streams

Nosostricta koolpinyah



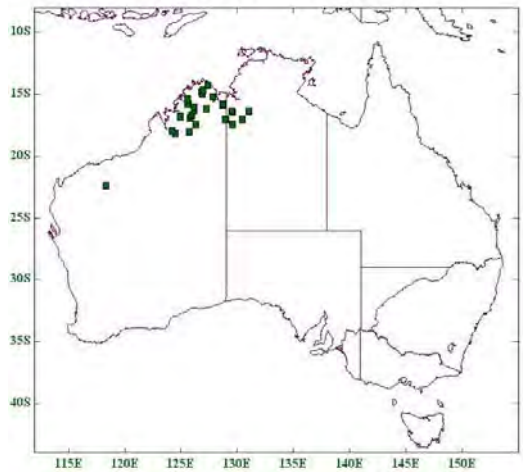
Inhabits streams

Nosostricta koongarra



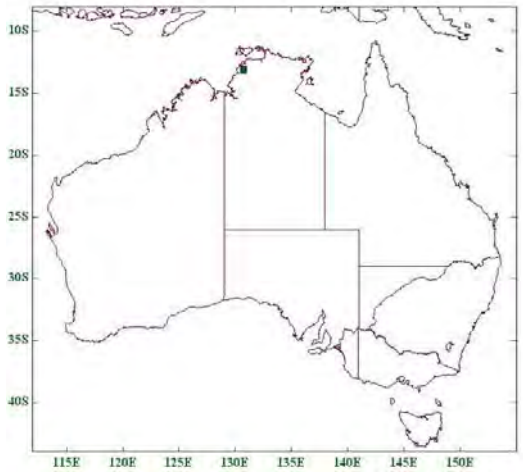
Inhabits streams

Nosostricta liveringa



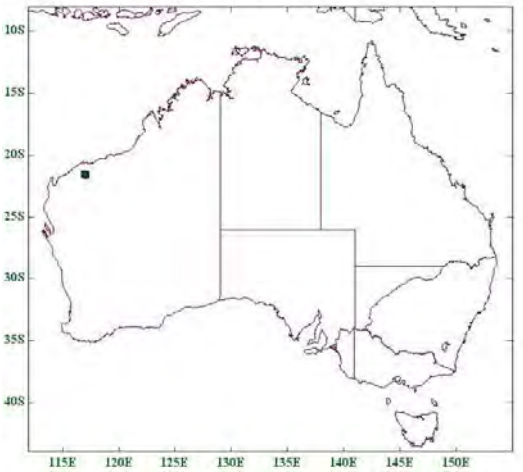
Inhabits streams, rivers and riverine lagoons

Nososticta mouldsi



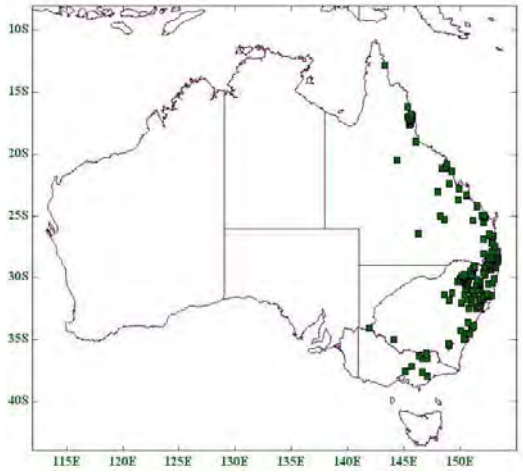
Inhabits small rainforest streams

Nososticta pilbara



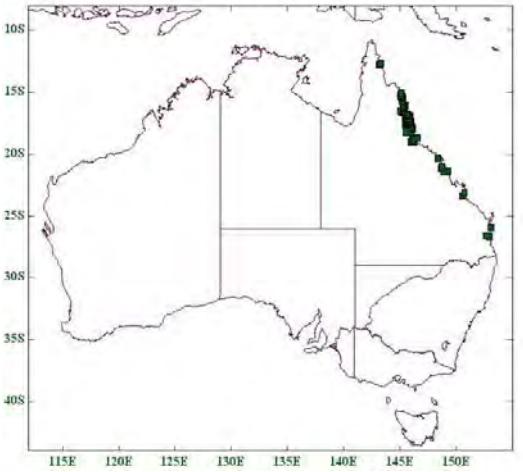
Inhabits streams and riverine pools

Nososticta solida



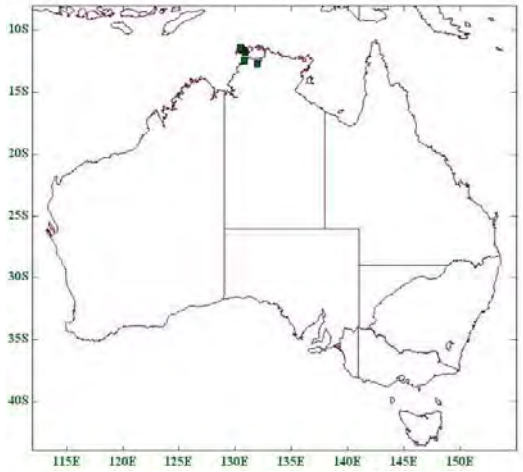
Inhabits streams, rivers and riverine pools, including small stagnant pools and lakes

Nososticta solitaria



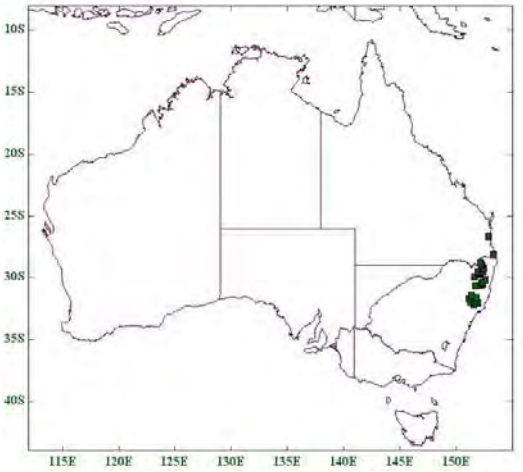
Inhabits streams and rivers, including those that dry to pools

Nososticta taracumbi



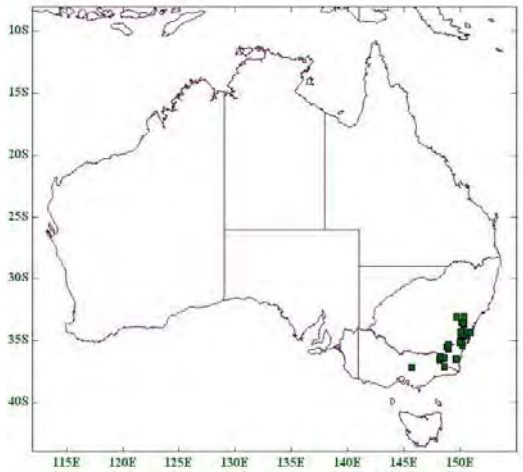
Inhabits streams

Notoaeschna geminata



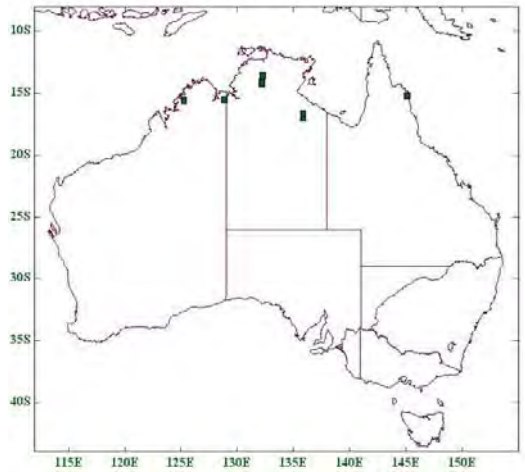
Inhabits rapid streams and rivers

Notoaeschna sagittata



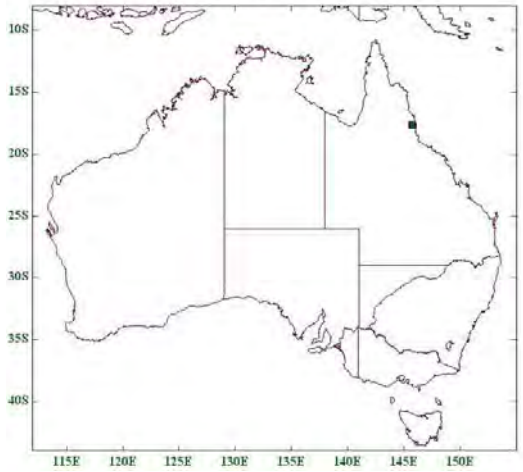
Inhabits rapid streams and rivers

Notolibellula bicolor



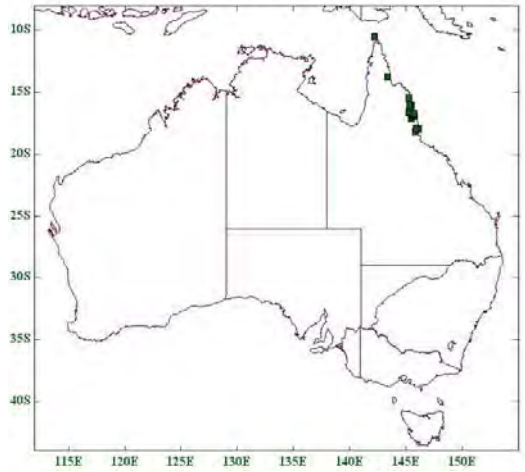
Inhabits rock-holes, other still waters and small streams

Odontogomphus donnellyi



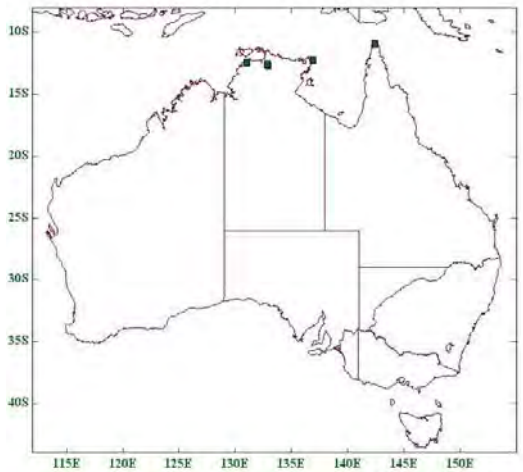
Inhabits rainforest streams

Oristicta filicicola



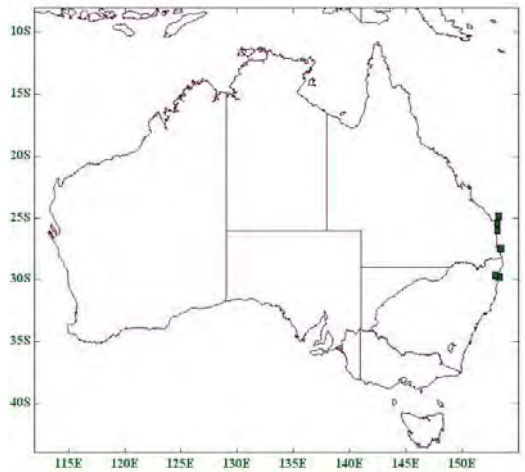
Inhabits rainforest streams

Orthetrum balteatum



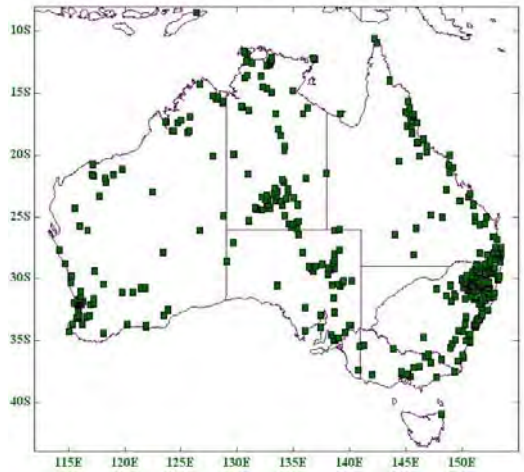
Inhabits streams, rivers, riverine lagoons and swamps

Orthetrum boumiera



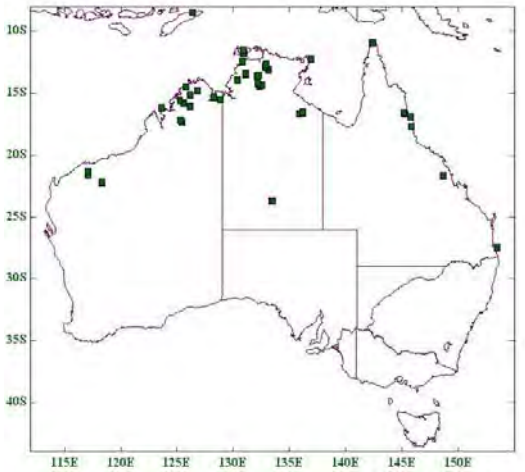
Inhabits brown, acidic dune lakes with shallow littoral margins

Orthetrum caledonicum



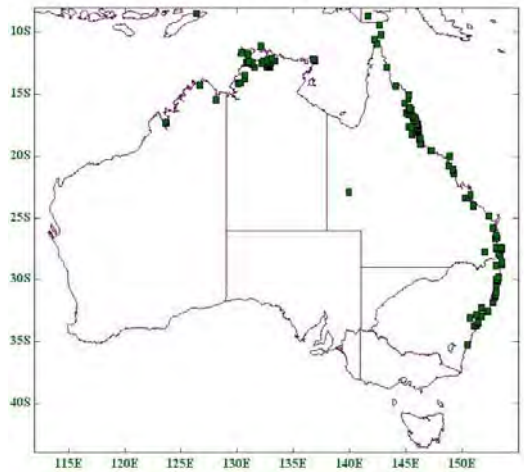
Inhabits wide range of still and flowing waters, including temporary waters

Orthetrum migratum



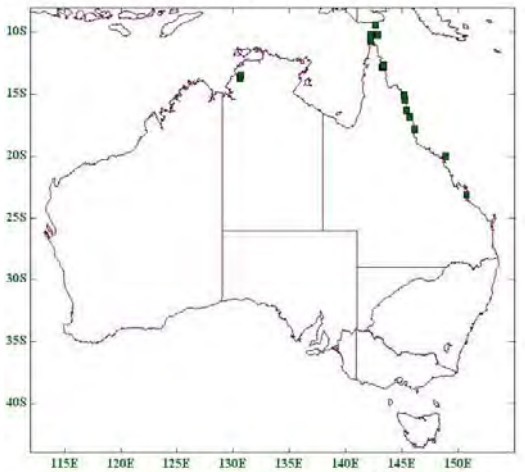
Inhabits streams, boggy seepages, riverine pools and swamps

Orthetrum sabina



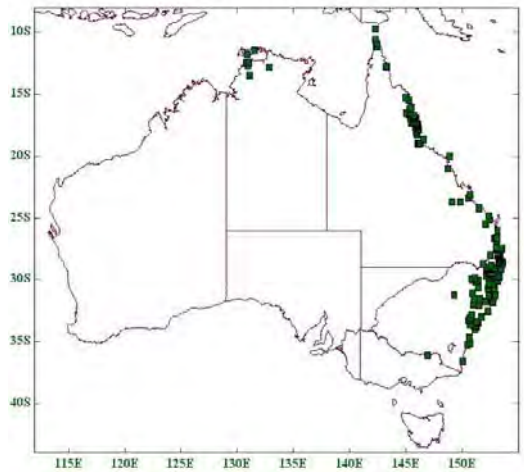
Inhabits wide range of still and sluggish waters, often shallow, sometimes temporary

Orthetrum serapia



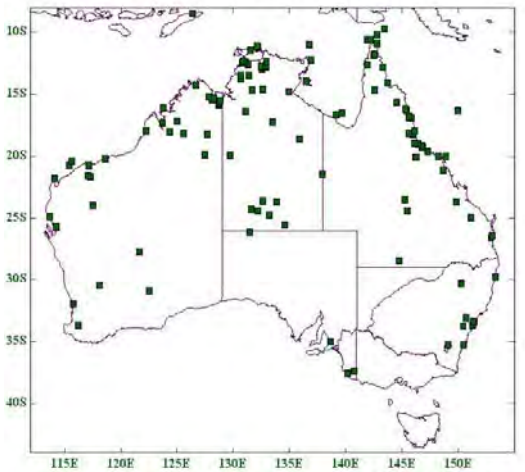
Inhabits wide range of still and sluggish waters, often shallow, sometimes temporary

Orthetrum villosovittatum



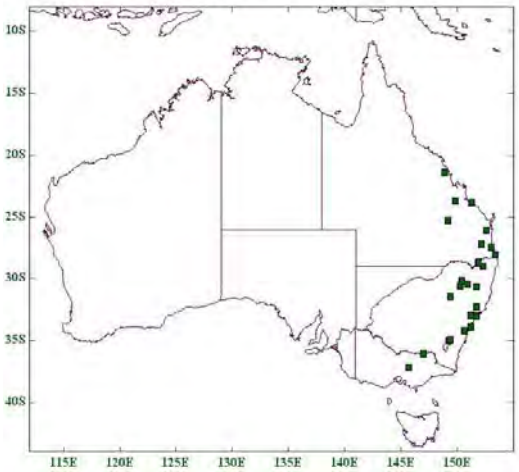
Inhabits streams, boggy seepages, lakes, ponds swamps and trickles

Pantala flavescens



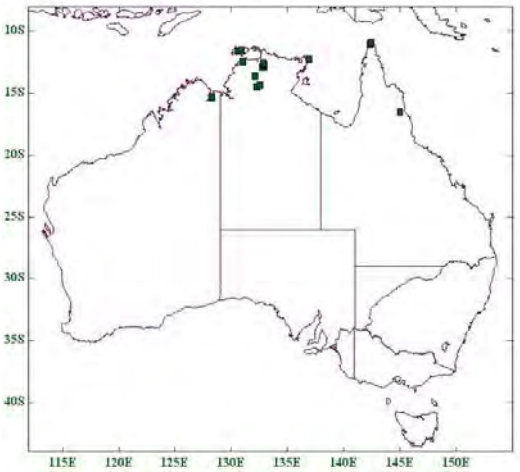
Inhabits wide range of still waters, including ephemeral ponds and swamps

Parasynthemis regina



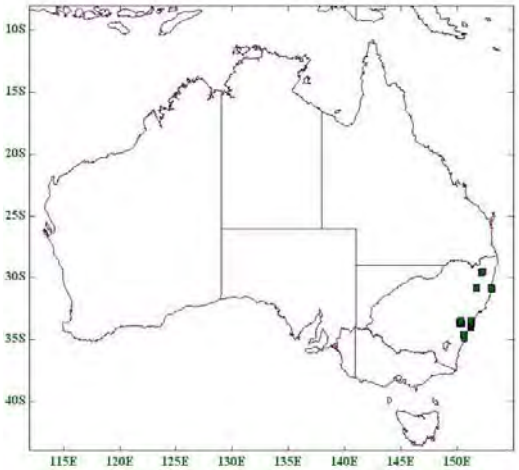
Inhabits sluggish streams that dry to pools, stagnant riverine pools and swamps

Pentathemis membranulata



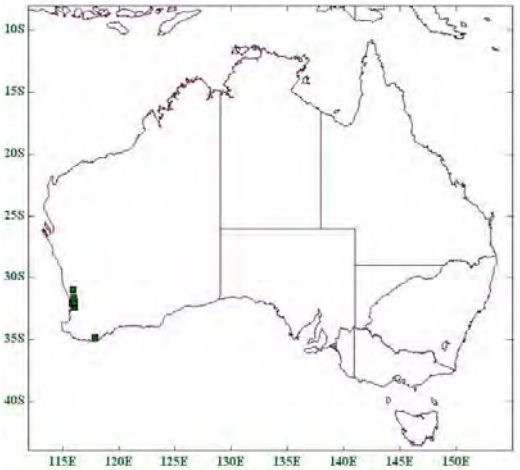
Inhabits streams, rivers, riverine lagoons, possibly ponds

Petalura gigantea



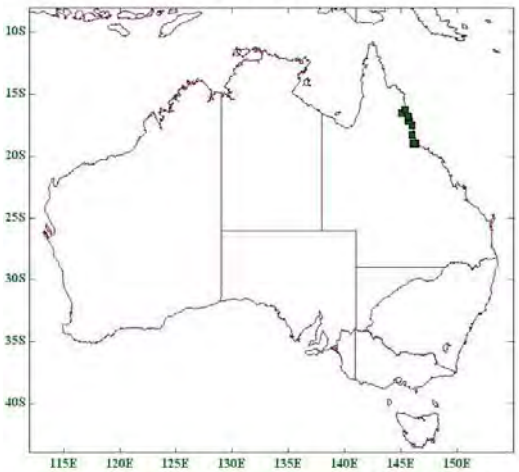
Inhabits boggy seepages and swamps (altitude 0-1150 m)

Petalura hesperia



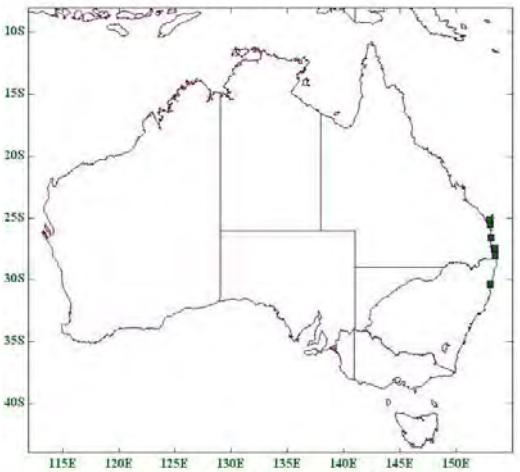
Inhabits boggy seepages

Petalura ingentissima



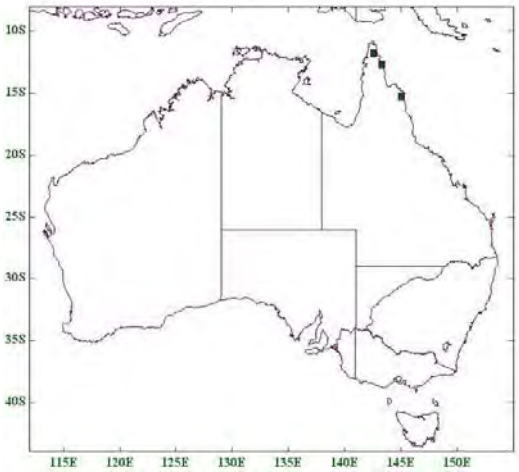
Inhabits stream margins in rainforests

Petalura litorea



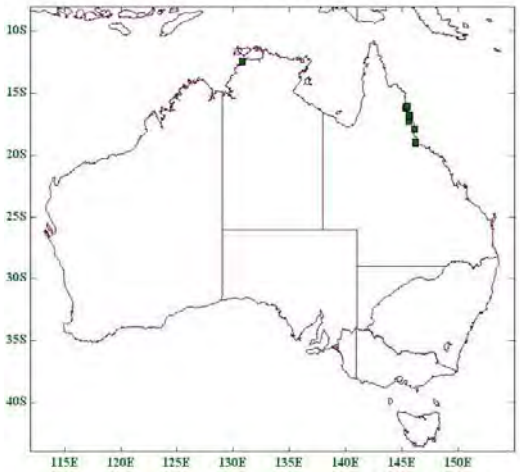
Inhabits boggy seepages and swamps at low altitude

Petalura pulcherrima



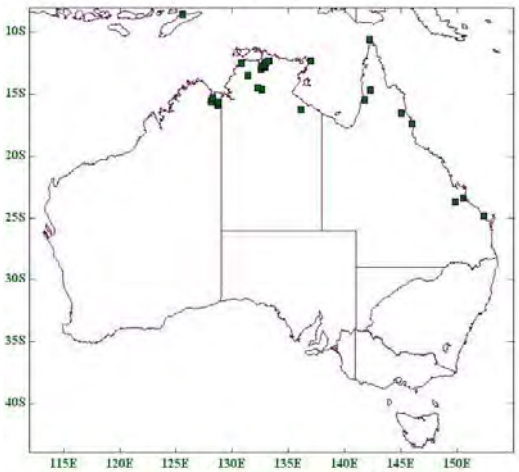
Inhabits rainforest and monsoon-forest streams

Podopteryx selysi



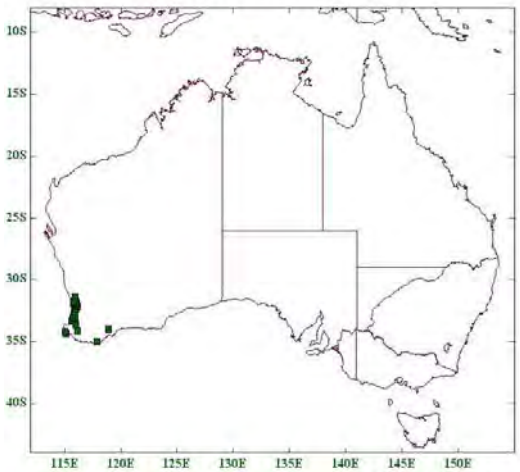
Inhabits water-filled tree-holes in rainforest

Potamarcha congener



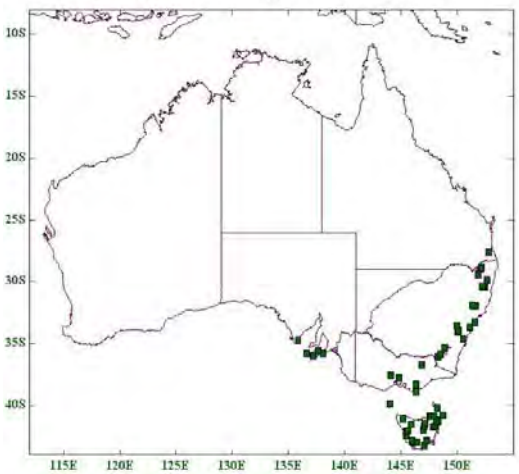
Inhabits riverine lagoons, ponds and swamps

Procordulia affinis



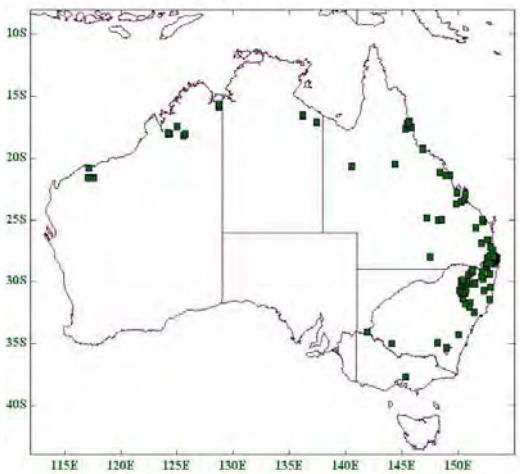
Inhabits rivers, riverine pools, lakes and ponds

Procordulia jacksoniensis



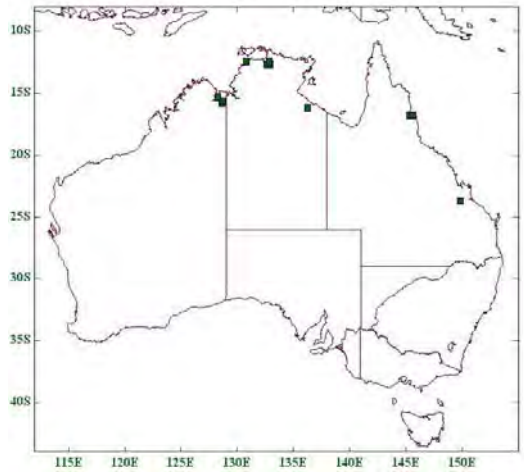
Inhabits rivers, riverine pools, lakes and ponds

Pseudagrion aureofrons



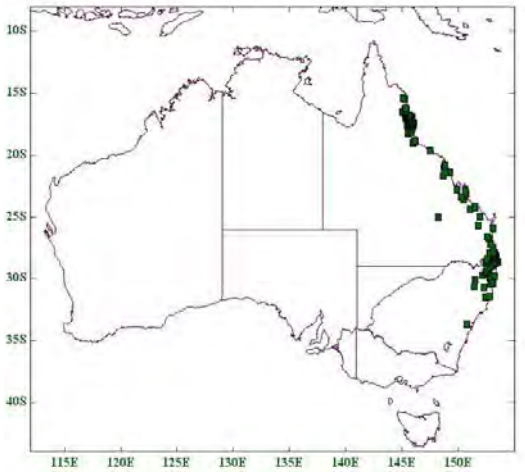
Inhabits streams, rivers, riverine pools and lagoons

Pseudagrion cingillum



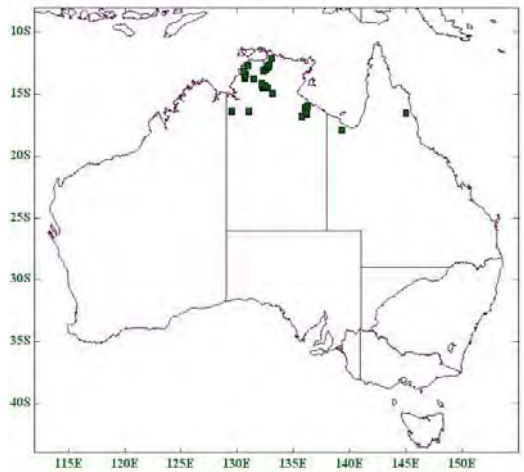
Inhabits still and sluggish waters; streams, rivers, riverine pools and pools

Pseudagrion ignifer



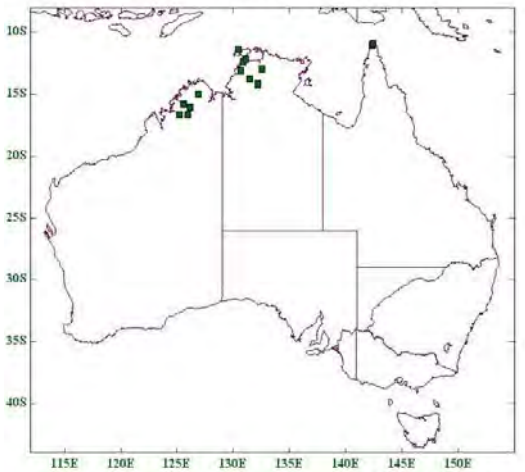
Inhabits streams and rivers

Pseudagrion jedda



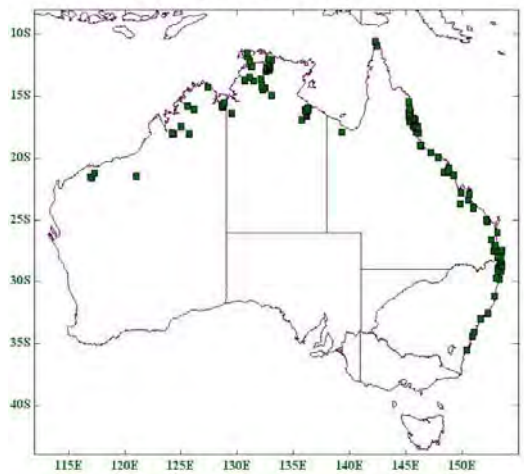
Inhabits streams, rivers and riverine lagoons

Pseudagrion lucifer



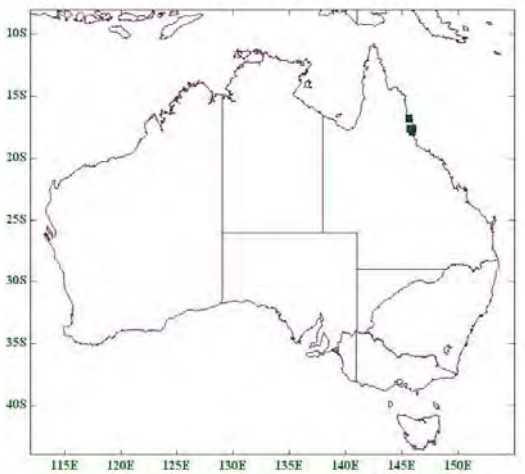
Inhabits streams

Pseudagrion microcephalum



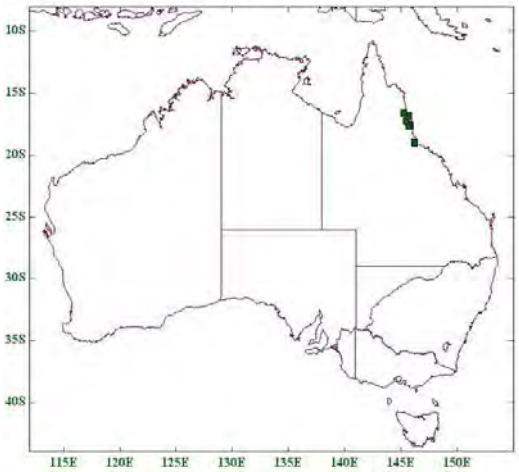
Inhabits still and flowing waters; streams, rivers, riverine lagoons, lakes and ponds

Pseudocordulia circularis



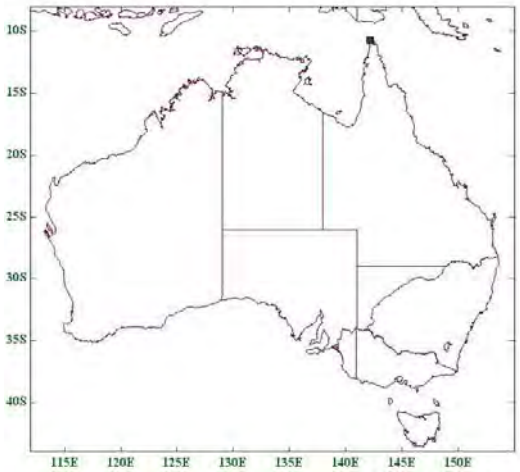
Inhabits adults along rainforest streams; larvae in leaf-litter

Pseudocordulia elliptica



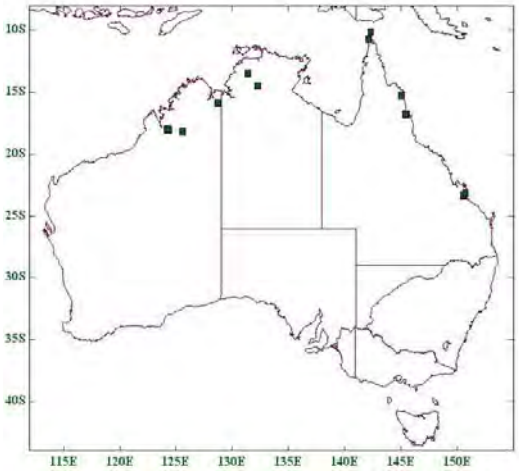
Inhabits adults along rainforest streams; larvae in leaf-litter

Raphismia bispina



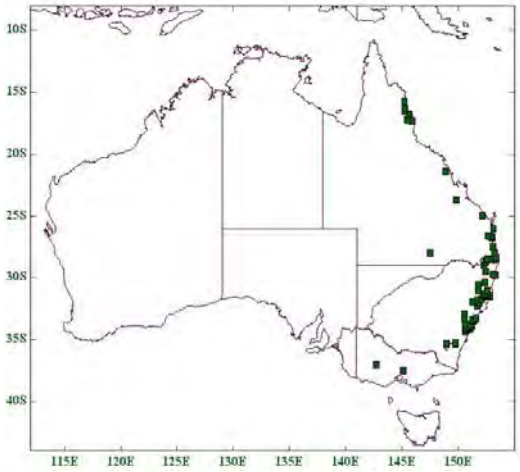
Adults inhabit mangrove swamps; larval habitats unknown

Rhadinosticta banksi



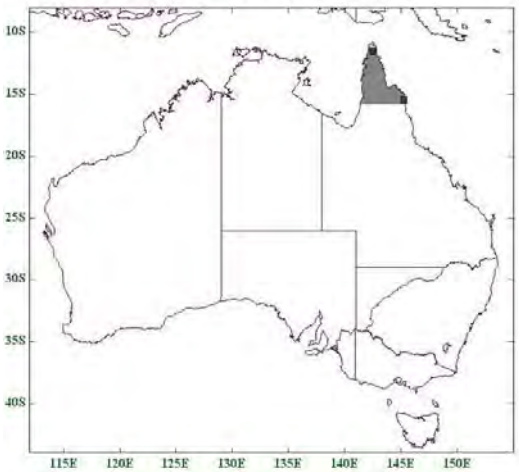
Inhabits streams and riverine pools

Rhadinosticta simplex



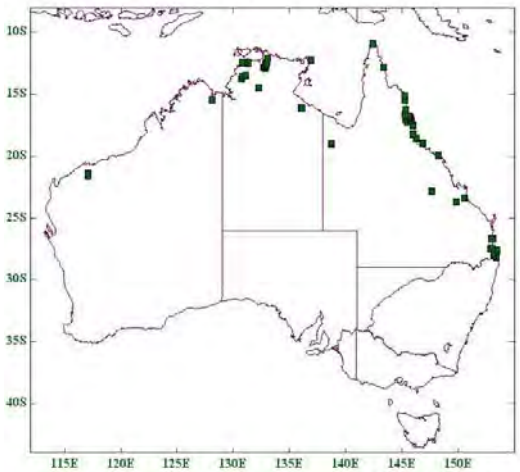
Inhabits streams and rivers

Rhinocypha tincta semitincta



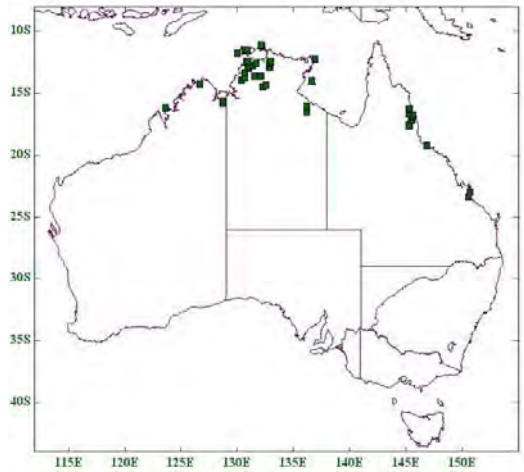
Inhabits streams and rivers; Australian records not confirmed

Rhodothemis lieftincki



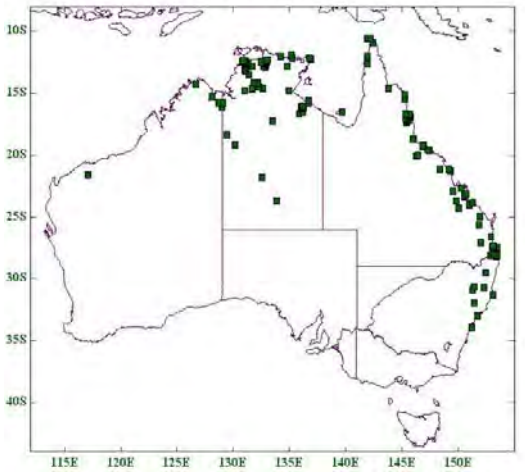
Inhabits streams, rivers, riverine lagoons and ponds

Rhyothemis braganza



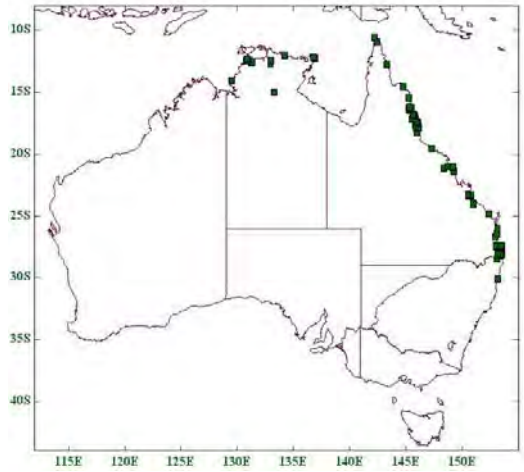
Inhabits streams, rivers and riverine pools

Rhyothemis graphiptera



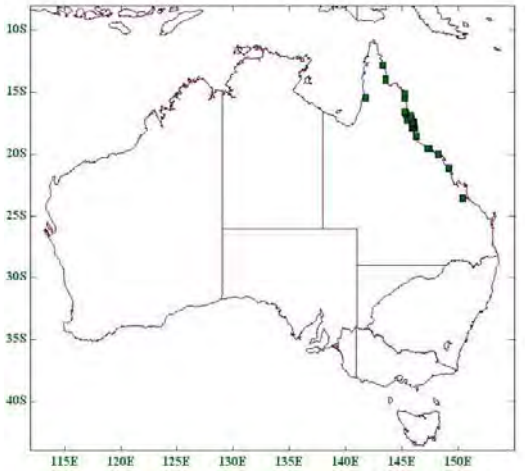
Inhabits riverine lagoons, lakes, ponds and swamps

Rhyothemis phyllis



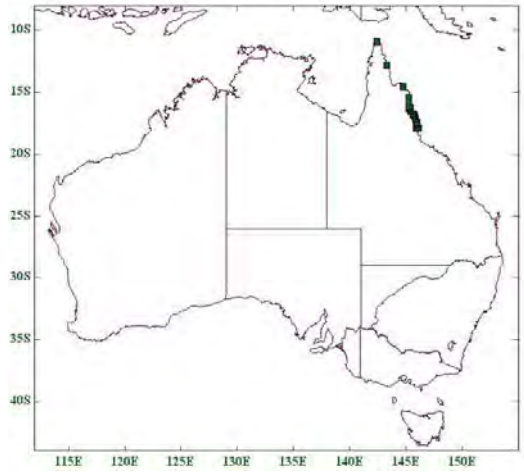
Inhabits wide range of still waters

Rhyothemis princeps



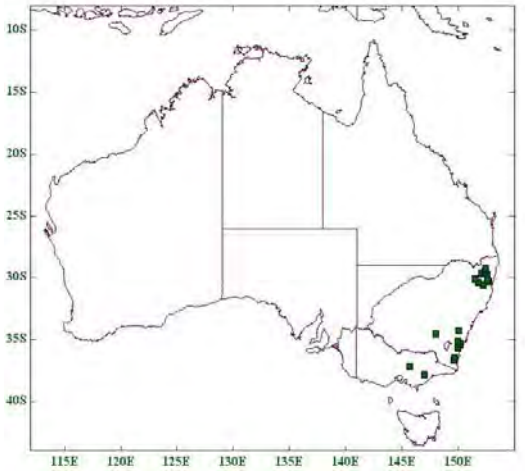
Inhabits range of still waters

Rhyothemis resplendens



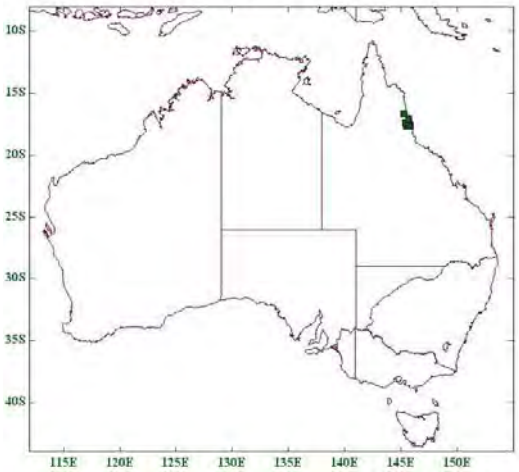
Inhabits streams and rivers, plus still waters

Spinaeschna tripunctata



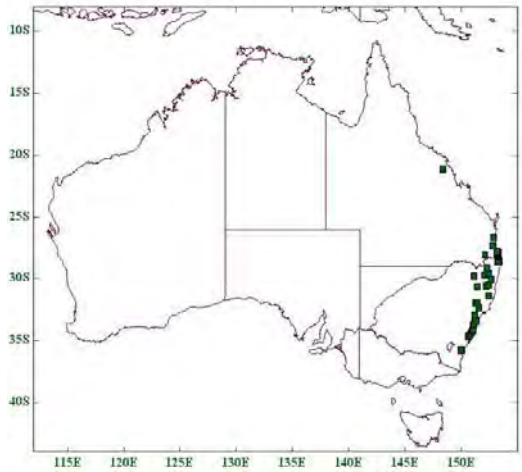
Inhabits streams and rivers

Spinaeschna watsoni



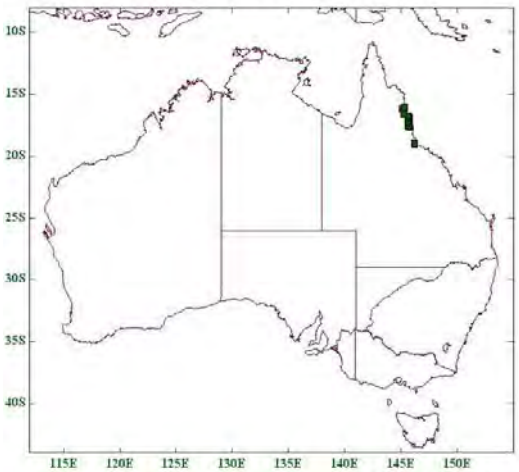
Inhabits streams and rivers

Synlestes selysi



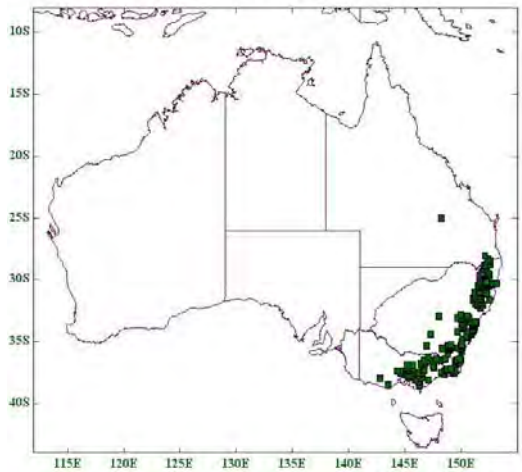
Inhabits streams

Synlestes tropicus



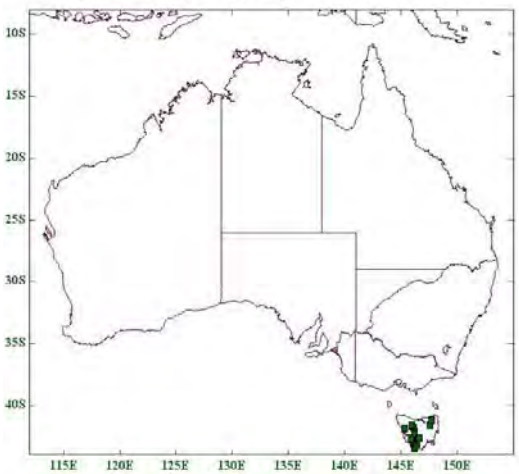
Inhabits streams, usually in rainforest

Synlestes weyersii



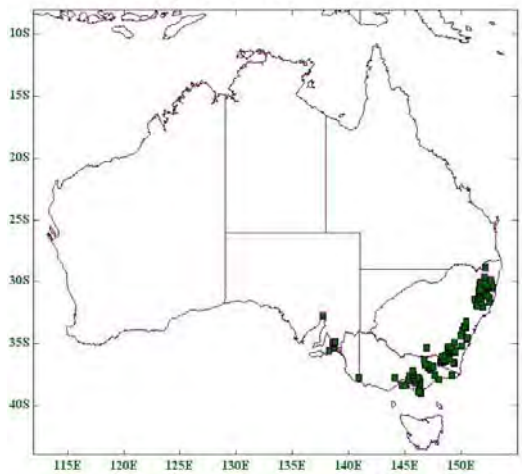
Inhabits streams and rivers

Synthemiopsis gomphomacromioides



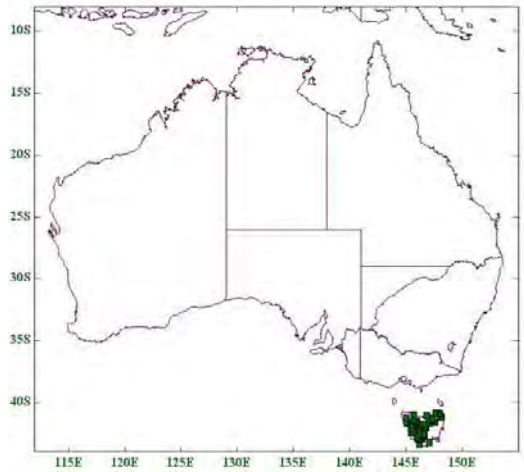
Inhabits montane trickles and swampy buttongrass plains

Synthemis eustalacta



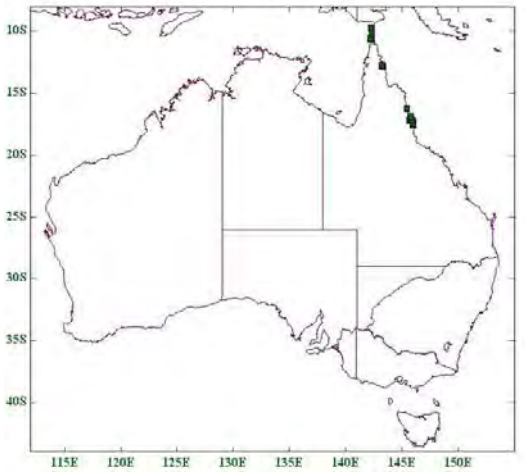
Inhabits boggy seepages and swamps

Synthemis tasmanica



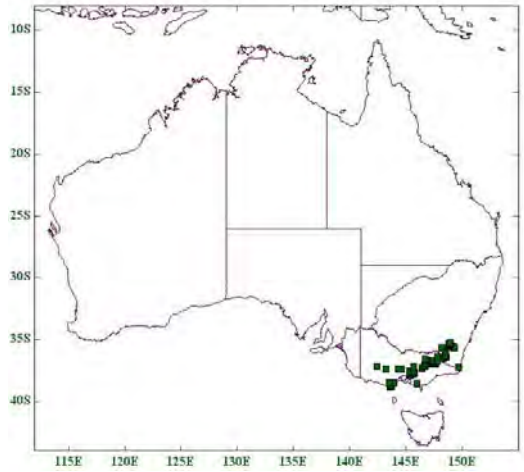
Inhabits seepages, swamps and montane trickles

Teinobasis rufithorax



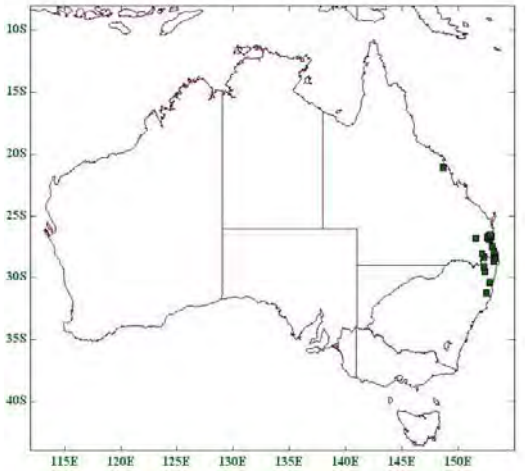
Inhabits still and flowing waters in deep shade

Telephlebia brevicauda



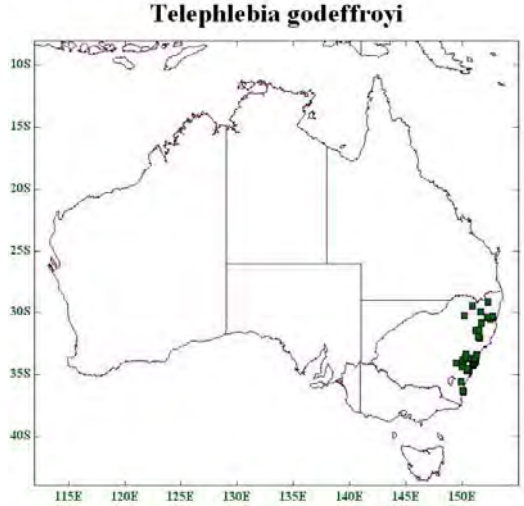
Inhabits margins of small streams, small alpine bogs

Telephlebia cyclops



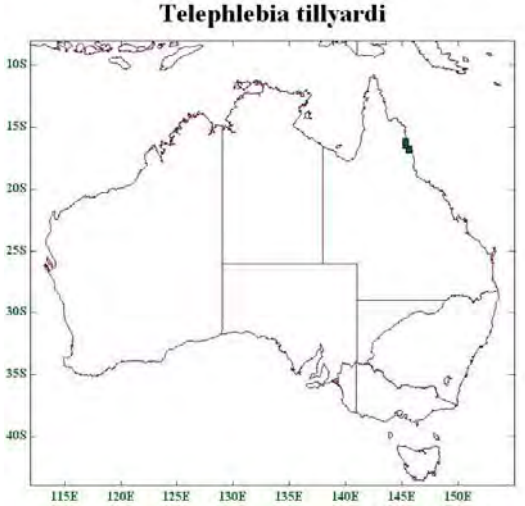
Inhabits margins of rainforest streams, often near waterfalls

Telephlebia godeffroyi



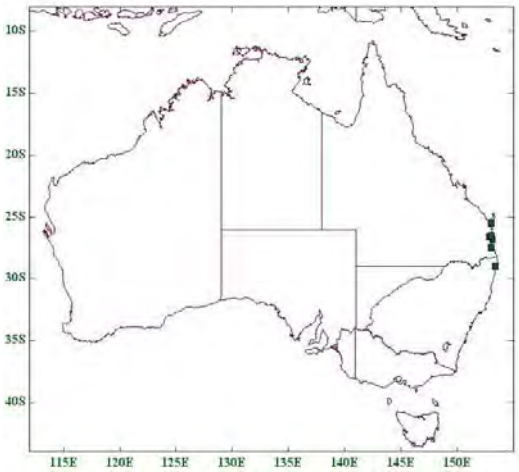
Inhabits margins of small streams, splash zones of small waterfalls

Telephlebia tillyardi



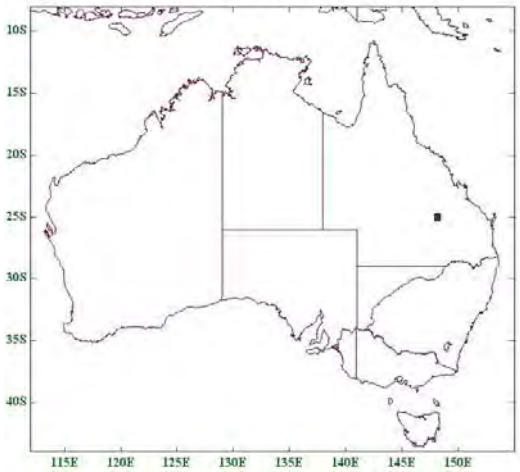
Inhabits margins of streams, often somewhat separated from main stream

Telephlebia tryoni



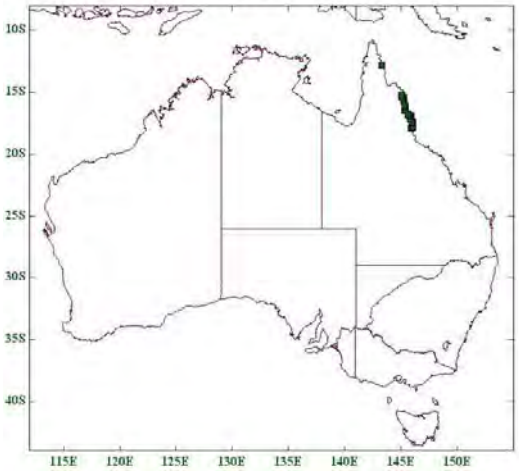
Inhabits stream margins, in rainforest and in open country

Telephlebia undia



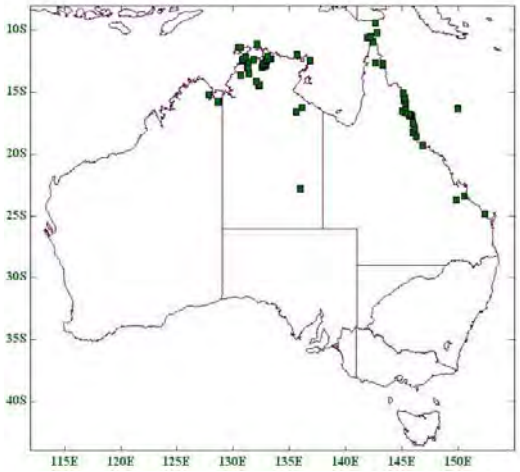
Inhabits streams and stream margins near waterfalls

Tetrathemis irregularis cladophila



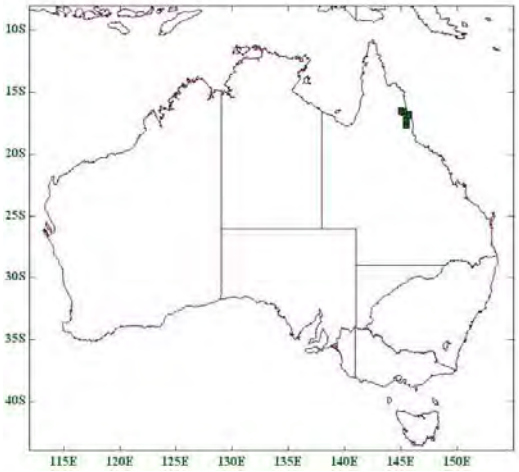
Inhabits streams in rainforest

Tholymis tillarga



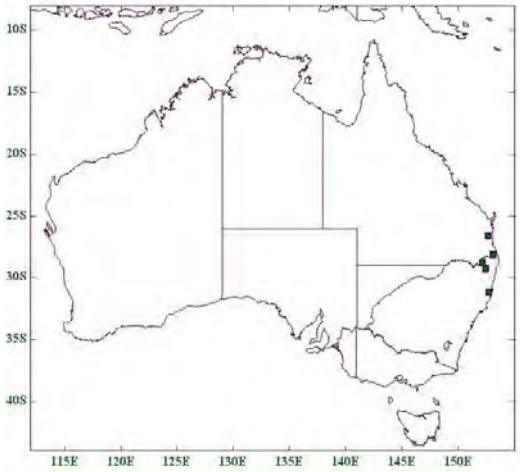
Inhabits ponds and swamps, including temporary and brackish waters

Tonyosynthemis claviculata



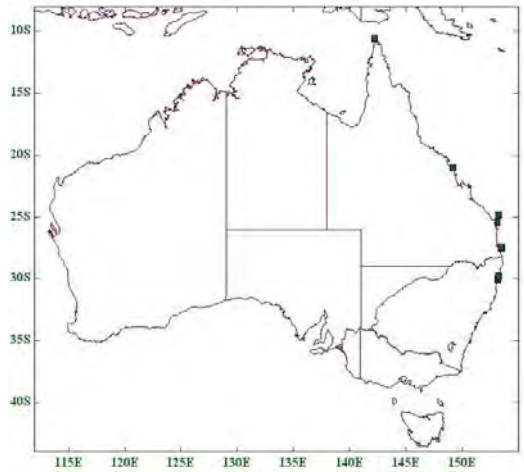
Inhabits streams and rapid rivers

Tonyosynthemis ofarrelli



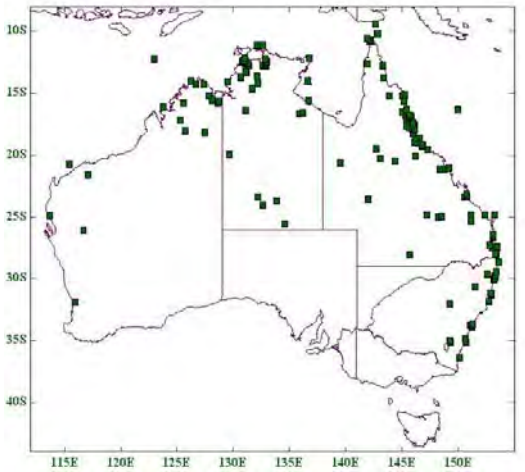
Inhabits streams and rivers

Tramea eurybia



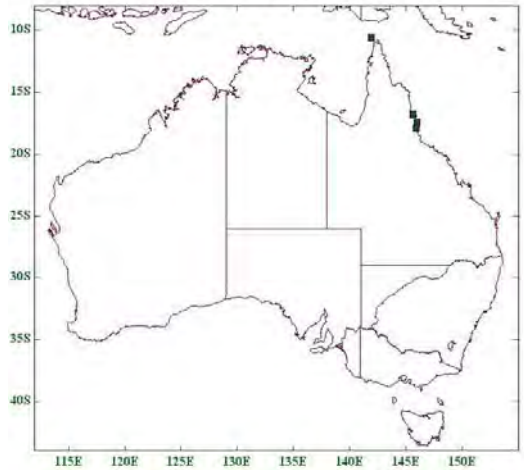
Inhabits dune lakes

Tramea loewii



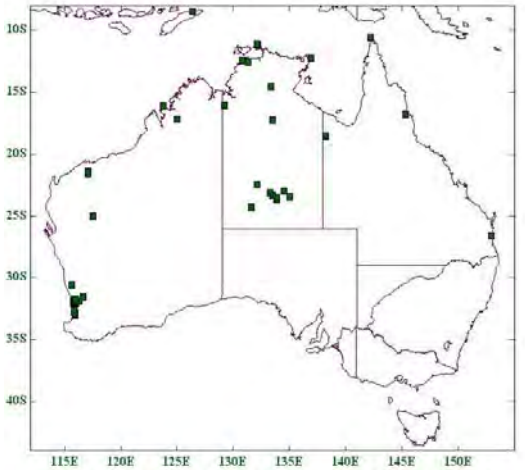
Inhabits wide range of still waters, including temporary ponds and swamps

Tramea propinqua



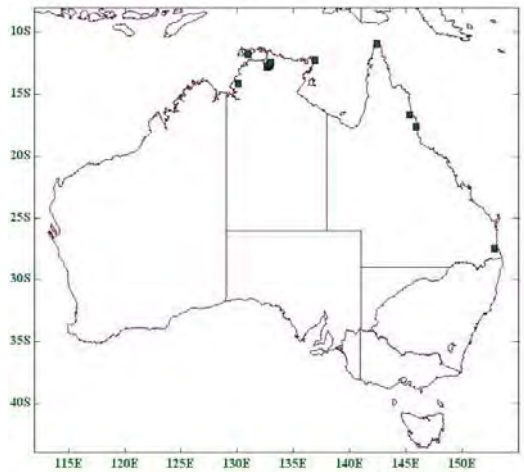
Habitats unknown

Tramea stenoloba



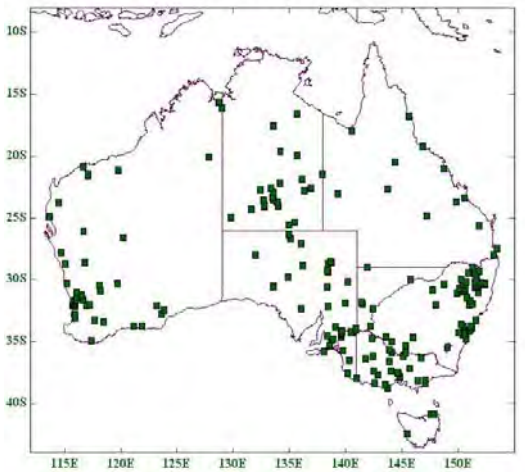
Inhabits riverine lagoons, lakes, ponds, including temporary ponds

Urothemis aliena



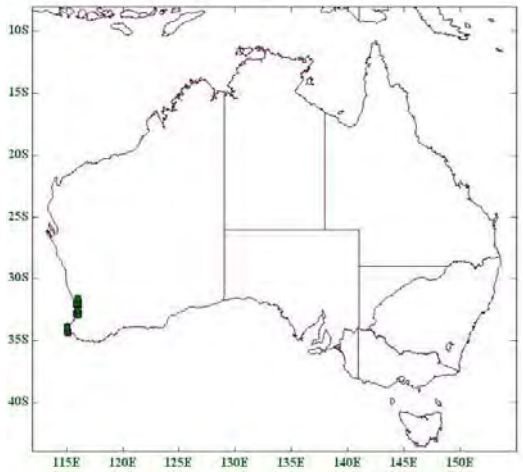
Inhabits riverine lagoons and ponds

Xanthagrion erythroneurum



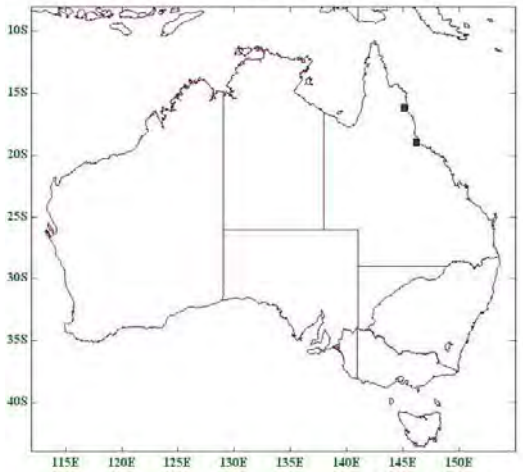
Inhabits slow sections of mostly wider streams and still waters

Zephyrogomphus lateralis



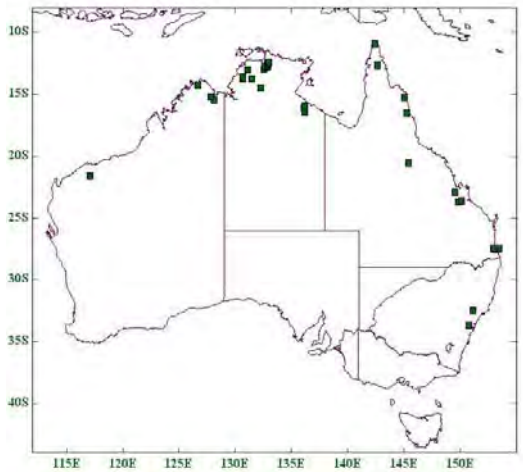
Inhabits streams, possibly swamps

Zephyrogomphus longipositor



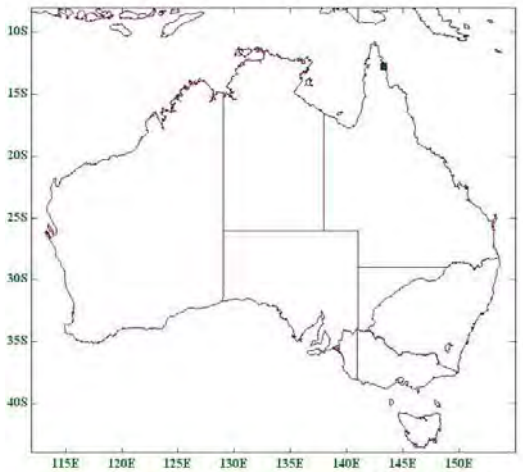
Inhabits stream pools in rainforest

Zyxomma elgneri



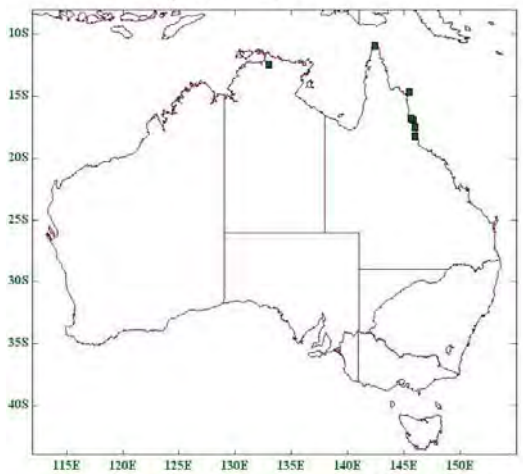
Inhabits streams, rivers, riverine pools, ponds and swamps

Zyxomma multinervorum



Habitats unknown

Zyxomma petiolatum



Inhabits riverine pools, ponds and swamps (permanent and temporary)

8 Species of conservation concern

Hawking & Theischinger (2004) evaluated the conservation status of the Australian Odonata, identified the endangered species and listed and discussed endemic species, species with unusual biology and species most likely to become extinct in the foreseeable future. In the following section Australia's species of the highest conservation concern (species that are now protected by law or have been included in international red lists) are briefly introduced. They are: *Hemiphlebia mirabilis, Acanthaeschna victoria, Petalura gigantea, Petalura litorea, Petalura pulcherrima, Archaeophya adamsi* and *Austrocordulia leonardi*.

Hemiphlebia mirabilis Selys, 1869

The Australian endemic damselfly *Hemiphlebia mirabilis* (Ancient Greenling) (Appendix 1, Photos 1 and 2) is notable for its apparent archaic phylogeny, its male mating displays, and its biogeography.

The absence of an arculus in the forewing leading to an open discoidal cell (albeit shared with *Chorismagrion risi*), and the presence of paraglossae on the larval prementum, have led a number of authors to consider *Hemiphlebia* to be archaic. This started with Tillyard's (1928b) statement that '… this incomplete arculus formation remained throughout the Permian, and is still to be seen in the wings of *Hemiphlebia* and *Chorismagrion*'. As well as the premental paraglossae, Tillyard (1928a) described as primitive, chitinous folds within the larval gizzard and aspects of the larval wing tracheation in addition to the open discoidal cell. Kennedy (1920) added the structure of the penis as another ancient characteristic.

Trueman (1999) argues that the open cell and paraglossae characteristics are derived; he has examined a female specimen in which the discoidal cell is closed, and he also concludes that the projections on the larval prementum are not homologous with the glossae or paraglossae of fossil forms. Tillyard (1917) had noted that the elimination of the basal side of the quadrilateral occurs in the forewing of the male and occasionally in the female also. In 2007, Kjer, Carle & May (unpublished) presented a conference paper reporting preliminary results from a molecular phylogenetic study of a wide range of odonate taxa. *Hemiphlebia* was a sister group to the rest of the Zygoptera but, as with most molecular studies, further sampling of additional species and of sites within the genome are required for corroboration.

The species is cryptic within its reed habitat except when, particularly the males, display by waving their expanded, white anal appendages (Tillyard 1912). He describes how the male bends its abdomen to expose the anal appendages, the female responds by moving the abdomen to show the whitened end of her abdomen, and the two then perform an aerial dance before pairing. Sant & New (1988) conducted a more rigorous behavioural analysis from video recordings.

Originally thought to have been a Victorian endemic, the species was subsequently found in north-eastern Tasmania (Trueman et al. 1992) and then on Flinders Island (Endersby 1993). This suggests that the species would have occupied the Bassian Ridge when it was exposed during glacial times and this may have been a dispersal route at some time.

Conservation status

Hemiphlebia mirabilis has been listed as a threatened taxon on Schedule 2 of the *Flora and Fauna Guarantee Act 1988* (Victoria). The decision to list was based on the species being in a demonstrable state of decline which is likely to result in extinction; significantly prone to future threats which are likely to result in extinction; and very rare in terms of abundance and distribution (Birkin et al. 2003).

It is included in the category VU B1+2c in the IUCN *Red List of Threatened Species* (www.redlist.org accessed 25 July 2008).

Populations at Wilsons Promontory (Victoria) and Mount William (Tasmania) occur in national parks (Trueman et al. 1992).

Brief characteristics and diagnostics

Hemiphlebia mirabilis is the only known species of the genus and of the family Hemiphlebiidae.

Adult: A tiny metallic green damselfly, less than 25 mm long, with very long body compared with its short, clear wings. Discoidal cell of the forewing open. CuP almost straight in first cell beyond discoidal cell. Male inferior anal appendages and female anal appendages large, pale.

Larva: Labium with paraglossae. Caudal gills lamellate, denodate and arranged vertically.

Biological notes: Inhabits rivers, riverine lagoons, permanent ponds, and swamps that may be summer-dry.

History of discovery

Selys (1869) originally described the species from ‘Port Denison (Queensland) Australie’, now Bowen, in Queensland.

Recent published speculation that the correct type locality was probably Lake Denison in coastal Victoria, based on the coincidence of the name and the proximity to the Wilsons Promontory populations, does not withstand careful scrutiny. 18 of the 78 species in the Zoological Catalogue of Australia, with the type locality of Port Denison, do not occur in that region of Australia. Some serious mis-labelling has occurred. There are reports that the lake has been open to the sea and therefore saline. Given the known history of Port Denison as an entomological locality with dubious types ascribed to it, together with the fact that Lake Denison has had saline periods, it is highly unlikely to be the type locality of, not only *Hemiphlebia mirabilis*, but *Synlestes weyersii* and *Harpabittacus nigriceps* which were received in the same package and described by Selys at the same meeting.

Martin (1901) recorded *H. mirabilis* from Victoria, implying more than one (unspecified) locality. Billinghurst (1902), who provided Martin with specimens from Victoria, states that it was only known from Queensland before he took it at Alexandra. Martin’s additional localities cannot be determined or confirmed. Tillyard (1912) reported that Alexandra was the only locality where he met this species and later described the larva from material collected there in 1927 (Tillyard 1928a). R. Dobson, A. Neboiss and A.N. Burns (in 1954) visited Alexandra 27 years after Tillyard’s last trip and, aided by photographs that Tillyard had taken, successfully located the site and the species (Burns 1955). A museum specimen from Tarrawarra, near Healesville, was confirmed by site visits in 1958 and 1959. Another museum specimen collected at Seville in 1917 is some miles upstream in the Yarra river floodplain. These sites are now severely degraded and the species is no longer to be found there.

Attempts to collect this species in the 1970s proved either difficult (Donnelly 1974; Shiel 1976), or unsuccessful (Watson unpublished). By 1978 it had apparently disappeared from all its known localities, and several years later it was the first Australian dragonfly listed as an endangered species in the IUCN *Invertebrate Red Data Book* (Wells et al. 1983).

Davies (1985) describes how he found a new population of *Hemiphlebia* at Wilsons Promontory and subsequently discovered that a single specimen had been taken at the site by a dipterist in 1977, but the significance of that finding was not realised. Sant & New (1988) have studied the biology of the species at the Wilsons Promontory localities. Since then Trueman et al. (1992) found *H. mirabilis* at three localities, two of them new. It was rediscovered at Alexandra in Victoria, a new site 30 km from Alexandra at Yea near the Goulburn River, and near Mount William in north-eastern Tasmania. In 1993 *H. mirabilis* was found at two further sites in north-eastern Tasmania, and Endersby (1993) reported it from Flinders Island in Bass Strait between Victoria and Tasmania.

Biology

Watson (1995) described the habitat of *Hemiphlebia mirabilis* as relatively shallow (< c. 1 m deep), still water fringed by reeds in which it hides unless the sun is shining. 'To judge from a photograph published by Tillyard (1928), the backwater of the Goulburn River that he studied at Alexandra was heavily vegetated in 1927. In 1954 it was still vegetated and *H. mirabilis* was common. By the late 1970s cattle and drainage had destroyed the reeds and *H. mirabilis* had apparently vanished. At Wilsons Promontory the most important pond is open with fringing reeds but other areas there, also supporting *H. mirabilis*, are more heavily overgrown. At Yea *H. mirabilis* is most abundant in reedy areas that form a margin to the deeper, open waters of the riverine billabongs, and in marshy, vegetated fields nearby. We found *H. mirabilis* again near Tillyard's Alexandra site in an undamaged shallow pond with extensive, tall reeds around the margin. The ponds in north-eastern Tasmania and on Flinders Island are also densely vegetated, at least along their shores.'

H. mirabilis can survive drought, for some of the ponds in which it lives can dry out in summer either as egg, larvae, or both. Trueman et al. (1992), based on Sant & New's (1988) observations of small larvae in spring, believe that the drought-resistant stage is the egg.

New (1993) studied the recovery of *H. mirabilis* from a controlled burn at Wilsons Promontory. Within four years adults had reappeared and after six years the adult population had increased to the level of the unburnt control sites.

Acanthaeschna victoria Martin, 1901

Acanthaeschna victoria (Appendix 1, Photos 3 to 6) was introduced to science by Selys (1883). Generic and specific names were credited to Selys by early workers. However, the generic name *Acanthaeschna* was soon suppressed as a synonym of *Austroaeschna*, and *A. victoria* was considered as a species of *Austroaeschna* (Martin 1909). Under *Austroaeschna victoria* it was also listed and illustrated in colour for 'Genera Insectorum' (Martin 1911). Lieftinck (1951) re-instated *Acanthaeschna* on page priority over *Austroaeschna.* Subsequently all species described in *Austroaeschna, Acanthaeschna*, *Dromaeschna* and some described in *Planaeschna* were included in *Acanthaeschna.* Allbrook & Watson (1979) re-established that *Acanthaeschna* and *Austroaeschna* in their original concepts are distinct genera and that *Acanthaeschna* is monotypic. Allbrook and Watson also, for some nomenclatural interpretation, credited the specific names *victoria* and *unicornis* and *parvistigma* to Martin (1901). However, *Acanthaeschna*, the genus based on *victoria*, and *Austroaeschna*, the genus based on *parvistigma* remained Selysian names.

Only recently (Hawking & Theischinger 2002) *A. victoria* was 'officially' given the English name 'Thylacine Darner'. This name, slightly reminiscent of the now extinct Tasmanian Tiger, was given to *A. victoria* considering its poor collecting record and the extreme environmental pressure it is subjected to, as well as the colouration and colour pattern of the adult.

Conservation status

Acanthaeschna victoria is included in the category VU B1+2 in the IUCN *Red List of Threatened Species* (Hawking & Theischinger 2004).

At least the populations near Brooms Head and near Broadwater occur wholly or partly in national parks.

Systematic position and characteristics in the context of possibly close allies

The adult of *Acanthaeschna victoria* appears telephlebiid. The larva also appears telephlebiid in structure, particularly eyes, labium and anal pyramid in general, but also shows features (setation of labial palps, epiproct) characteristic of Aeshnidae.

Peters & Theischinger (2007), in a comprehensive study of the Gondwanan 'aeshnids' of Australia, consider *Acanthaeschna* with some doubt as belonging in the Telephlebiidae: Austroaeschninae: Austroaeschnini, and within this tribe as the sister taxon of *Austrophlebia*+(*Dromaeschna*+*Austroaeschna*).

Adult: Eyes with blue on top and sharp demarcation of pale and black laterally (unique); enlarged central ocellus (as in Telephlebiinae); thorax pattern with longitudinal dark brown stripe across pleura of pterothorax (unique); wings rounded at apex (unique; appearing similar but actually almost perpendicularly cut off in Telephlebiinae); supplementary radial vein (Rspl 2), running parallel to R4 'down' to the posterior wing border and separated from it by a single row of cells (unique); pterostigma not braced (unique); immediate contact of the posterior angle of discoidal hind wing triangle with the joined CuP/1A vein (unique); slightly broadened terminal abdominal segments (male abdomen distinctly club-shaped) (unique); no crossveins in median space (as in Austroaeschninae); segment 10 of male dorsally not raised, and superior anal appendices short (unique); only weakly developed female dentigerous plate (not protruding, loosely covered with short spines) (unique).

Larva: Labium with only one clearly visible tooth (paraglossa) on each side of the ligula some distance from well-developed median cleft; glossae (the inner pair of small teeth at the distal margin of prementum) absent (unique); labial palps with lobe subrectangular, truncate, with small end-hook; several very small and short palpal setae including some on movable hook (as in *Dendroaeschna*); antennae 7-segmented (as in other Austroaeschnini); postocular lobes unarmed, their lateral margin longer than eye radius (as in most telephlebiids); prothoracic processes and nearly right-angled notal lobes small (unique); metathorax and legs unarmed (unlike some *Austroaeschna* and *Notoaeschna*); lateral spines on abdominal segments 6-9 (as in some otherTelephlebiidae); no mid-dorsal abdominal spines (as in all Telephlebiidae except *Notoaeschna*); all abdominal terga well arched transversely (unlike *Dendroaeschna* and *Austroaeschna (Pulchaeschna)*); tergum 10 without mid-dorsal cone (as in all Austroaeschninae); anal pyramid short, with epiproct straight, stout, trapezoid and very slightly bifid, markedly shorter than very deep paraprocts, and with male projection wide, subtriangular, apically rounded, markedly longer than the very short cerci which are less than ¼ length of paraprocts (unique).

History of discovery, disappearance, rediscovery

Described from Nouvelle-Hollande (Australia) as early as 1883, *Acanthaeschna victoria* was the first Australian species known to science of a group of dragonflies formerly regarded as Brachytroninae, now at least partly and by some as Telephlebiidae. And of this group it is the only Australian species of which more than one specimen was available in the major European collections (Brussels, Paris, possibly London) before 1900.

The species, originally collected most probably not by specialised dragonfly collectors, was apparently not recorded for more than the first half of the twentieth century in spite of the involvement of a number of prominent scientists and collectors in the study of Australian dragonflies. R. J. Tillyard, M.A. Lieftinck, J.A.L. Watson, F.C. Fraser, A.F.L. O'Farrell and R. Dobson have never collected or even seen live *A. victoria*.

It was not until 1979 that Allbrook & Watson (1979) were able to dig out, from the University of Queensland collection, a relatively fresh specimen of *A. victoria.* It was a female collected by a non-odonatologist student (labelled 'Brisbane, 14.X.1958, B.W. Cull'). Shortly after that a male museum specimen labelled 'Herston, 3.X.1966, E. Phipps, above water' was found in the collection of the Queensland Museum.

The apparent occurrence of *A. victoria* in Brisbane, and its peculiar colouration, led to searches in all sorts of habitats from large rivers to mangrove situations and in habitats known for crepuscular, semi-terrestrial and terrestrial dragonflies. However, the species was not found.

The trapping in a malaise trap of two rather old *A. victoria* females in 1987 in New South Wales came as a big surprise. They were trapped at Lorien Creek, 3 km north of Lansdowne near Taree, in a rainforest margin, 13 to 21 December 1987, by G. Williams. Efforts to find out more about the species were now shifted to various rainforest habitats including tree holes and caves but, as in the other biotypes, *A. victoria* remained lost, at least to dragonfly collectors. However, In October 1999, a copula and several males of *A. victoria* were collected near Broadwater, New South Wales, in an apparently at least summer-dry ditch covered with dry sphagnum and with some grass trees (*Xanthorrhoea* sp.) and paperbark (*Melaleuca* sp.) and in a possibly temporal watercourse without noticeable flow and with *Eucalyptus* spp. and wallum (*Banksia aemula*) along one edge (Theischinger 2000a). Also found was another male specimen again in the collection of the University of Queensland and again collected by a non-odonatologist (labelled 'Elanda Point, to Kin Kin Ck, 17.11.1985, G. & A. Daniels'). Not much later, during determinations of aquatic macroinvertebrates from Wooli Wooli River (29.878°S/153.168°E, edge sample, 6.10.99, B. Hughes) for a MRHI (Monitoring River Health Initiative) survey, a single last instar male larva was identified and described as *A. victoria* (Theischinger 2000a, 2002). An even bigger surprise came more than seven years later when, again, a fully grown male larva was identified (Theischinger 2008). It was collected during the Coastal Sustainable Rivers Audit by the Department of Environment and Climate Change on November 29th at Cockwhy Creek (35.52105ºS/150.31211ºE) between Ulladulla and Batemans Bay by C. Rush and J. Miller). This record extended the accepted range of *A. victoria* (Watson et al. 1991, Theischinger & Hawking 2006) more than 300 km further south.

Environmental situation, ecology, biology, distribution

Only six weeks after the discovery of live *Acanthaeschna victoria* at Broadwater it was found that the 'historic' site of the re-discovery was cleared, with all major vegetation bulldozed down and accumulated in a few places and that road-like fragmentation of even larger areas

had taken place. There was of course no more sign of *A. victoria*, nor was there in the appropriate season of the following years.

The available collecting data indicate that *A. victoria* is a spring/early summer species with adults emerging early in October in the north of its range, possibly considerably later in the south. It seems to be partly diurnal, partly crepuscular (this may be reflected in the extremely contrasting eye colouration). At this stage it appears that temporary low-altitude swamps, slow streams and rivers near the coastline are its habitats. The only available larvae were found in what is known in New South Wales as 'black water streams'. This is a type of stream known for very low dissolved oxygen content. The Queensland equivalent is apparently the 'wallum stream'. The latter term pretty well covers the situations where *A. victoria* was found in north-eastern New South Wales.

It is not clear if the poor collecting record of *A. victoria* is due to its rareness or due to its patterns of behaviour and ecology. As most of its supposed larval habitats appear to be at least potentially temporal, they are rather unlikely to be sampled in projects monitoring the health of streams, and the probability to get new information from such work is low.

It is obvious that land containing habitats as described above has been extensively transformed this century by human activities. This land is now settlements, pasture and sugar cane country, and as reported above, these and other kinds of development continue.

The northernmost locality on record for *A. victoria* is now Elanda Point (c. 25º25'S), the southernmost is Cockwhy Creek (35.52105ºS) between Ulladulla and Bateman's Bay (Theischinger 2008). Occurrence in Victoria as given in the old literature (Martin 1901, 1911) is still unconfirmed.

Behaviour

Only very few indications emerge based on anecdotal observation of some facets of the behaviour of *A. victoria*. However, they are all somewhat peculiar.

For several years a malaise trap was run for collecting mainly Diptera along Lorien Creek. During all that time, and in spite of the presence there of a quite adequate dragonfly fauna, only two odonates were ever captured in the trap: two females of *A. victoria*. The pair in copula collected at about 10.15 a.m. near Broadwater was exceedingly quiet and inert. The males observed at Broadwater jumped up and down shaded tree trunks in a way never seen in any other Australian dragonfly. During bright daylight two males observed in Johns River State Forest near Taree, and another individual seen near Foster, mostly just flew from one stem of a tall paper bark (*Melaleuca*) to the other and were very difficult to spot. A female collected close to dusk near Brooms Head was trying first to get under a 4-wheel drive vehicle before it was collected under a camping chair. A female was found dead on a balcony of a first floor unit at Byron Bay.

It appears that in all the situations described above, *A. victoria* was not comfortable flying, at least in daylight, and more than other dragonflies tried to avoid open, and to enter more or less confined, space at any time of the day. This may indicate crepuscularity and a strong tendency for shade and dark, overgrown habitats.

Petalura gigantea Leach, 1815 and ***Petalura litorea*** Theischinger, 1999

Petalura gigantea (South-eastern Petaltail, also called Giant Dragonfly) (Appendix 1, Photos 7 to 9) was described by Leach (1815) as a new genus and species. It is one of the largest dragonflies in the world and probably the fifth largest species in Australia.

Not too long ago (e.g. Bechly 1996) Petaluridae were considered the most basic Anisoptera and possibly the sister group of all other Anisoptera. However, only rather recently, Petaluroidea were hypothesized as the sister group of Libelluloidea only (Carle & Kjer 2002, Carle, Kjer & May 2008).

Conservation status

Petalura gigantea is listed as an endangered species under Schedule 1 Part 1 of the New South Wales *Threatened Species Conservation Act 1995* (TSC Act) (NPWS 1999). The decision was based on declining population size and the loss or degradation of the wetland habitats in which it occurs. At the time of this listing *P. gigantea* also included populations from the north-coast of New South Wales which Theischinger (1999) attributed to *P. litorea* (Coastal Petaltail) (Appendix 1, Photos 10 and 11). Pursuant to Division 5 of Part 2 of the TSC Act, the Scientific Committee made a determination to amend the description of the listed *P. gigantea* and to add *P. litorea* Theischinger to Part 1 Schedule 1 of the Act.

Fortunately some of the populations of *P. gigantea* and *P. litorea* occur in national parks (e.g. Royal N. P., Blue Mountains N. P., Gibraltar Range N.P., Yuraygir N.P.).

Brief characteristics and diagnostics

Petalura gigantea and *P. litorea* are two of possibly five congeneric species endemic to Australia.

Adult: Length of abdomen 60–80 mm; wingspan approximately 100–130 mm. Diurnal, brown-black to black and yellow dragonflies with widely separated eyes; costal side of discoidal triangle shorter than basal side; very long pterostigma; the yellow markings on abdominal segments 3–8 not forming a complete ring; abdominal tergum 9 largely yellow; male superior anal appendages broadly foliate and inferior appendage short and wide, and ovipositor short and curved.

P. litorea is markedly more slender than *P. gigantea.* In addition, in *P. litorea* the yellow portion of the frons is less extensive, the yellow abdominal midline is less uniformly parallel sided, the male superior appendages are wider, shorter and more uniformly coloured and the inferior appendage is markedly darker.

Larva: Total length 45–50 mm. Grub-like, fully but poorly sclerotised. Prementum flat without any large premental setae, ligula triangular and deeply cleft; labial palps without palpal setae but with distinct spine at the base of movable hook; legs long and strong, tibiae armed with distal digging hooks; abdomen elongate, sub-cylindrical without any dorsal or lateral armature.

At this stage the larvae of the two species cannot be distinguished.

History of discovery

Petalura gigantea was described by Leach (1815) based on male and female specimens from New South Wales (New Holland). More information on the adults, the description of the larva and the life history of the species was presented by Tillyard (1908, 1909, 1911, 1917).

Biological notes

Most petalurid larvae utilise a semi-terrestrial burrowing habit occupying permanent long-chambered burrows, built under swamps. As Tillyard (1911) suggests, *Petalura gigantea* may utilise underwater burrow openings on burrow branch tunnels to access water-filled seepage depressions for hunting purposes. *Petalura* larvae may also emerge from terrestrial entrances at night or in wet weather in search of prey. The larval stage duration has not been documented definitively but is probably quite long but also highly flexible.

The adults largely emerge in November–December and fly at least until late January. Their flight is rather poor and not overly continuous, and it seems they do not readily disperse. All *Petalura* species have been found to rest on barbed wire fences. Two different ways of adult emergence have been described for *P. gigantea*. Whereas Tillyard (1917) depicted a 'hanging back' emergence style, typical for all anisopteran families except the Gomphidae, Baird & Ireland (2006) documented an observation of 'upright' emergence.

Distribution

Tillyard (1908, 1909, 1911) knew *P. gigantea* from the Blue Mountains, Moss Vale and Sydney. Since then records mainly for *P. gigantea,* but also including *P. litorea,* were added mainly by Fraser (1960), Arthington & Watson (1982), Davies (1998), NPWS (1999) Theischinger (1999, 2001b), Trueman (2000) and Baird & Ireland (2006).

P. gigantea is now known from Boonoo Boonoo State Forest in the north to very close to the border of New South Wales and Victoria near Nadgee. Even though all available records are from New South Wales it may well be present in Queensland and in Victoria. Along the coast *P. gigantea* is known to reach as far north as South West Rocks (30.9º S). *P. litorea* was recently recorded from Bonville south of Coffs Harbour approximately (30.4ºS) and is known to occur as far north as Byfield near Yepoon in Queensland. Even though the number of records is still continuously growing, it appears that considerable distances exist even between the known 'neighbour populations'.

Petalura pulcherrima Tillyard, 1913

Petalura pulcherrima (Beautiful Petaltail) (Appendix 1, Photo 12, top) was described by Tillyard (1913) on the basis of six males from Cooktown and one female from Kuranda, Queensland. The typical material of this tropical species is strikingly different in size, head and body pattern, and in absolute and relative size of the male anal appendages, from typical material of the other tropical species *P. ingentissima* which had been described a few years earlier based on material from Herberton and Kuranda (Tillyard 1908). However, over the years more material of tropical *Petalura* was collected from numerous locations between 11ºS and 19º30'S, that is north and south of, and in areas between, the type localities. This material shows significant variability in the characters commonly used to discriminate *P. ingentissima* and *P. pulcherrima* (Fraser 1960, Watson et al. 1991, Theischinger & Hawking 2006), and their identification became problematic. It appears that *P. pulcherrima* will have to be redefined by characters different from those in common use, like size, face and abdominal pattern, shape and relative size of male anal appendages if it is a good species. The question of whether *P. pulcherrima* and *P. ingentissima* exist sympatrically cannot be answered because of justified doubts about the provenance of critical specimens, observed variability even within local populations and some apparent gradual changes from south to north and from high to low and wet to dry habitats. Mostly dated material of *Petalura*

pulcherrima/ingentissima from various collections and museums that may possibly answer some questions, together with material collected more recently, is at present being DNA-analysed in the US; DNA barcoding of all Australian dragonfly species initiated by the Australian Museum (involving L. Christidis, J. Norman and G. Theischinger) has just started.

Conservation status

In spite of or possibly because of its doubtful status and the paucity of records *Petalura pulcherrima* is listed in in the category VU B1+2c in the IUCN *Red List of Threatened Species*.

Brief characteristics and diagnosis

Adult: Length of abdomen 65–80 mm; wingspan 120–130 mm. A very large, rather slim, diurnal, black and yellow dragonfly. Anterior frons largely yellow; postclypeus with distinct yellow spot each side; costae blackish brown, abdominal tergum, 9 largely black; petal-shaped male superior anal appendages of moderate size; inferior appendage brown to black, with postero-dorsal dentation along outer portion of posterior edge.

Larva: Total length 50–55mm. Prementum square; antennae from segment 3–6 almost parallel sided, antennal segment 6 usually more than three times as long as wide and longer than segment 3; male final instar larva with cerci (superior anal appendages of adult) quite small, rather inconspicuous.

History of discovery

The six type males of the type series from Cooktown were collected by Tillyard so there is no doubt about their origin. However, the paratype female was reputedly taken in Kuranda by F.P. Dodd whose locality records are considered not always reliable. There is another specimen, a male from Kuranda, in the collection of the Australian Museum. Unfortunately the collector was also Dodd, and all other available *Petalura* specimens from Kuranda are typical *P. ingentissima.* Only three more individuals matching the description of *P. pulcherrima*, all from Cape York Peninsula, became known in the twentieth century.

Biological notes

Between 2005 and 2008, in January and February, individuals matching the original description of Tillyard (1913) and the diagnostic characters given above were observed in *Pandanus* swamp near Cooktown (S. Butler & G. Theischinger, unpubl.). Females were observed, apparently ovipositing, along swamp margins early in the day (before 9 a.m.). Males appeared somewhat later, usually when at least a large part of the swamp was sunlit. They mostly settled on dry branches between 1 and 2 m from the ground, probably watching out for arriving or passing females. Copulation was observed late morning and early afternoon again 1 to 2 m from the ground on *Pandanus*. The flight usually is soaring, somehow like a slow arrow. However, when excited, for example after a missed hit, it can be shooting almost threatening, like a fast arrow. Exuviae were found at the confluence of two small creeks with moderate flow and in places with swampy patches along the banks. Adults were present there occasionally.

Archaeophya adamsi Fraser, 1959

Because of its rarity and apparently restricted distribution, little is known of the Australian endemic dragonfly *Archaeophya adamsi* (Horned Urfly, also called Adams Emerald) (Appendix 1, Photos 13 and 14), and only anecdotal observations are available.

When describing *A. adamsi*, and in his book on Australasian dragonflies, Fraser (1959, 1960) classified it as a corduliid. Theischinger and Watson (1978, 1984) and Watson et al. (1991) included it in in the subfamily Gomphomacromiinae of the family Corduliidae, and Theischinger & Hawking (2006) in accordance with Carle (1995) and Bechly (1996) listed it as a gomphomacromiid.

Conservation status

In 1999 *Archaeophya adamsi* was listed as a Vulnerable Species in Part 1 of Schedule 5 of the *NSW Fisheries Management Act 1994*. The decision was based on its restricted distribution, rarity, long life-history and a threat to some populations by urban development. In 2006 *A. adamsi* was omitted from Part 1 of Schedule 5 Vulnerable Species and inserted into Part 1 of Schedule 4 Endangered Species of the *NSW Fisheries Management Act 1994*. This decision was based on the reduction of its distribution by continuing impact in some localities and on the lack of protection of the species even in reserves.

The populations at Somersby Falls and at Hungry Way Creek occur in reserves.

Brief characteristics and diagnostics

Archaeophya adamsi is one of two congeneric species.

Adult: Length of abdomen 40–47 mm; wingspan approximately 70–80 mm. A diurnal, black and yellow dragonfly; the median lobe of the pronotum with a yellow lateral tooth; the metapostepimeron (posterodorsal corner of synthorax) yellow; the abdominal tergum 2 with two yellow spots on supplementary transverse carina.

Larva: Total length 21–24 mm. Frontal plate prominent. Distal dentations of labial palps short, wide and lacking setae. Posterior margin of postmentum (at the base of labium) generally concave, at least in the final instar. Pronotal lobes wing-like. Wing pads parallel. Abdomen short, dorsally and laterally unarmed.

History of discovery

Archaeophya adamsi was described by Fraser (1959) after a single female collected by E. Adams at Edungalba, Queensland, on 28.xii. 1953. In December 1967 the first male of the species was found by G. Theischinger along Berowra Creek at Galston Gorge near Hornsby, New South Wales. Over the following years *A. adamsi* was collected in a few localities, generally north or north-west and close to Sydney (Somersby Falls, Floods Creek, Tunks Creek and Bedford Creek near Hornsby; Hungry Way Creek in Wollemi National Park). However, it was not detected in north-eastern New South Wales, nor was it ever confirmed for Queensland. Material from tropical Queensland, collected as early as 1967 and lodged in the Australian National Insect Collection under *A. adamsi*, was found to be of a different species. It was described as *Archaeophya magnifica* in the same paper as the male of *A. adamsi* (Theischinger & Watson 1978).

Adults of *A. magnifica* and larval exuviae were also found by L Müller and G. Theischinger in November 1976 in tropical Queensland followed by the discovery of the larva of *A. adamsi* at Galston Gorge in December of the same year. The larvae of both *Archaeophya* species

were described by Theischinger & Watson (1984). During two surveys by NSW Fisheries conducted in 2006 and 2007 in order to find larvae of *A. adamsi* in promising river sites, A. Bruce found a single larva at Cedar Creek, Hayes Crossing.

Biological notes

Larvae were collected in streams and small rivers, being found on rocks or in litter along the stream margins and also in riffles. In captivity a healthy larva spent 18 month as a final instar, whereas other larvae kept in similar conditions went through several stages in much shorter time. This indicates a very flexible life-history. A male observed at Berowra Creek completely dominated an open territory with *Austrogomphus ochraceus, Choristhemis flavoterminata, Orthetrum caledonicum* and *Diplacodes haematodes* present.

Austrocordulia leonardi Theischinger, 1973

Because of its rarity and apparently restricted distribution, little is known of the Australian endemic dragonfly *Austrocordulia leonardi* (Sydney Hawk) (Appendix 1, Photos 15 and 16), described by Theischinger (1973) from Woronora River near Heathcote in New South Wales. Only anecdotal observations are available.

When Tillyard (1910) wrote about the larva of what only later turned out to be *Austrocordulia refracta* he referred to it as libellulid larva X. Fraser (1957) classified *A. refracta* as a gomphomacromiine corduliid, so did Theischinger & Watson (1978, 1984) and Watson et al. (1991) for the then-known three species of *Austrocordulia*. Following Bechly(1996) and Carle (1995) Theischinger & Hawking (2006) included *Austrocordulia* together with *Austrophya*, *Lathrocordulia* and *Micromidia* in Austrocorduliidae.

Conservation status

In 2007 *Austrocordulia leonardi* was listed as an Endangered Species in Part 1 of Schedule 4 of the *NSW Fisheries Management Act 1994*. The decision was based on the extremely limited distribution, rarity, recent lack of detection and threats to its survival.
It is included in the category VU B1+2c in the IUCN *Red List of Threatened Species*.

The population at Audley (Kangaroo Creek) occurs in a national park.

Brief characteristics and diagnostics

Austrocordulia leonardi is one of three congeneric species.

Adult: Length of abdomen 35–40 mm; wing span 60–70 mm. A diurnal, black and yellow dragonfly, the synthorax with two lateral yellow stripes, the black male superior anal appendages with a lateral tooth at approximately one-third of their length and the female with the inner lobe of the vulvar scales blunt, subtriangular.

Larva: Total length 21–25 mm. Prementum wide and flat-bottomed. Premental ligula widely rounded. A substantial lateral process on postocular lobe. Abdominal terga uniformly arched; distinct lateral spines on segments 7–9, those on 9 with inner margins almost parallel to body axis.

History of discovery and disappearance

Austrocordulia leonardi was discovered in November 1968 by G. Theischinger and L. Müller along an artificial dam of the Woronora River immediately upstream of the junction of Heathcote Creek at the Heathcote Road bridge. Adults were observed flying along the dam and occasionally settling on bushes; larvae were found coexisting with *Austrocordulia refra*cta under boulders in shallow water and exuviae were collected mainly on banks formed by bedrock. In the year following its discovery *A. leonardi* was also detected (mainly from exuviae) along Kangaroo Creek near Audley. A few years later adults and larva of *A. leonardi* were described and compared with *A. refracta* (Theischinger 1973).

Over the following years, infrequent and irregular visits to both sites were sufficient to confirm the continuing existence there of *A. leonardi.* And then it was found, again coexisting with *A. refracta* (see Theischinger 1997), along the Nepean River immediately upstream and downstream of Maldon Bridge near Wilton. In 1986 the weir damming the Woronora River near Heathcote was taken down because parked cars of sunbathers had caused traffic problems. After this habitat change *A. leonardi* was no longer sighted there, whereas *A. refracta*, the apparently more robust *Austrocordulia* species (see Theischinger 2008), persisted.

Collecting in other localities and in nearby streams, including an official survey of the Cataract River by J.A.L. Watson and G. Theischinger, did not result in establishing more populations of *A. leonardi*.

From about 2000 the Maldon Bridge site was found to suffer from insufficient flushing of water, a situation certainly not helped by the increasing number of nearby dams above river level, and during several visits *A. leonardi* was no longer detected.

In 2006 and 2007 surveys by NSW Fisheries conducted in order to find larvae of the species in promising river sites were unsuccessful. So was a visit by G. Theischinger to the Karuah River dam site where a tiny larva, apparently of *A. leonardi*, had been found during a survey by the NSW Department of Land and Water Conservation.

However, in the last few years several visits by G. & C. Theischinger and U., I. and A. Jones confirmed at least the continuing existence of *A. leonardi* in Kangaroo Creek at Audley, a locality situated in Royal National Park and thus under protection.

Biological notes

Flight activity in bright sunshine and body coloration of *A. leonardi* clearly indicate that it is definitely a diurnal species even though it was frequently encountered resting in the shade. Mature males were observed flying, mostly with the very long abdomen distinctly curved. A pair in copula was collected late one morning as was a pair in copula consisting of a male *A. leonardi* and a female of the crepuscular *A. refracta* (Theischinger 1997). Attempts to rear *A. leonardi* gave an indication that its life cycle would be longer than one year.

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Appendix 1 – Photos

Photo 1: *Hemiphlebia mirabilis*, female

Photo 2: *Hemiphlebia mirabilis*, female

Photo 3: *Acanthaeschna victoria*, male

Photo 4: *Acanthaeschna victoria*, male

Photo 5: *Acanthaeschna victoria*, female

Photo 6: *Acanthaeschna victoria*, final instar larva

Photo 7: *Petalura gigantea*, male (from near Nadgee)

Photo 8: *Petalura gigantea*, male (from Penrose NP)

Photo 9: *Petalura gigantea*, male (from Penrose NP)

Photo 10: *Petalura litorea*, male (from Stradbroke Island)

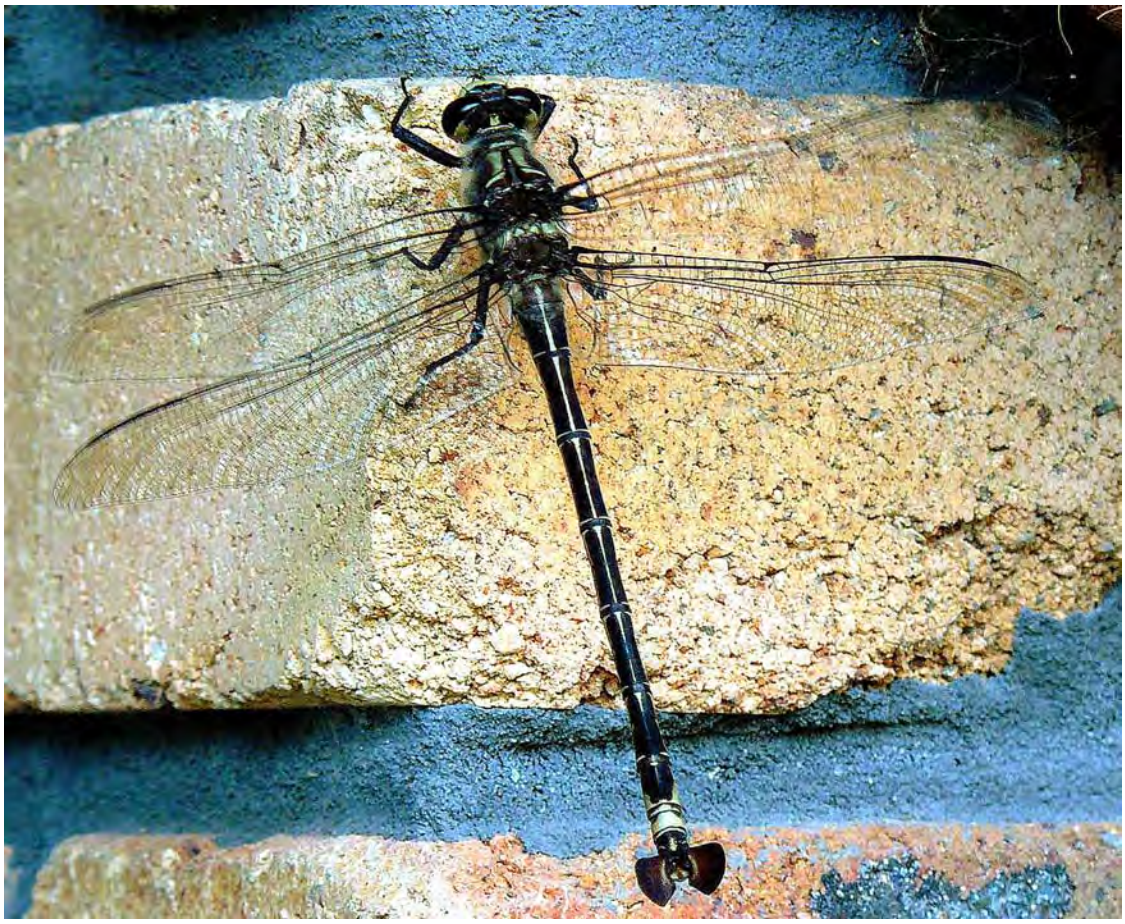

Photo 11: *Petalura litorea*, male (from Bonville, south of Coffs Harbour)

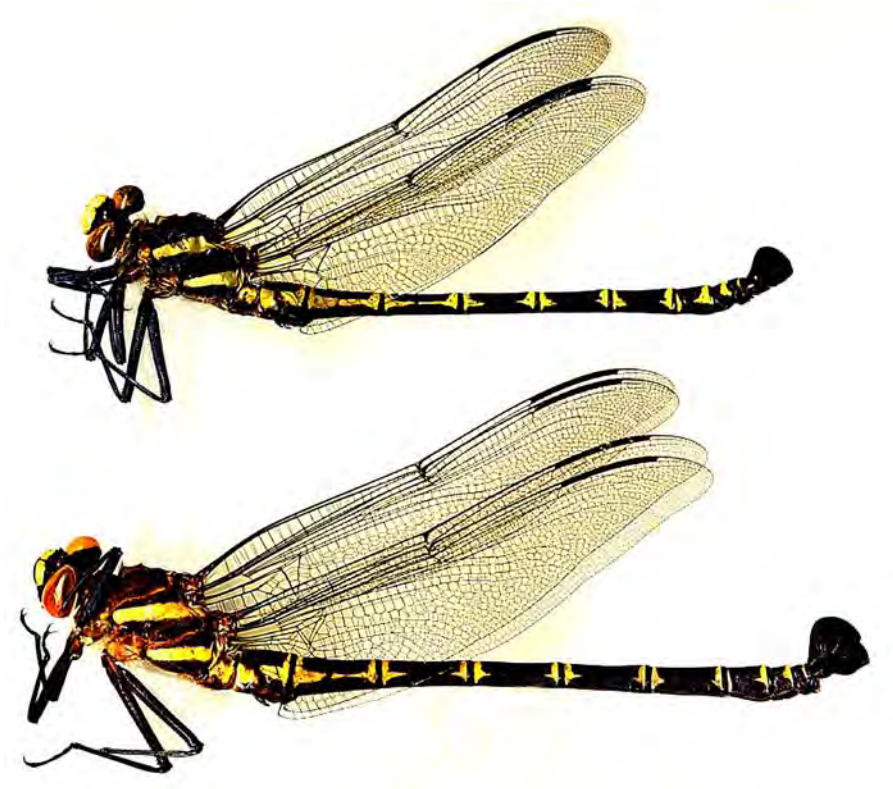

Photo 12: *Petalura pulcherrima*, male (from near Cooktown), and *P. ingentissima*, male (from Paluma)

Photo 13: *Archaeophya adamsi*, female

Photo 14: *Archaeophya adamsi,* final instar larval exuvia

Photo 15: *Austrocordulia leonardi*, male

Photo 16: *Austrocordulia leonardi*, final instar larval exuvia

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