

Linzer biol. Beitr.	35/1	661-666	30.6.2003
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## A new species of *Nannophya* RAMBUR from Australia (Odonata: Libellulidae)

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**Abstract:** *Nannophya paulsoni* sp. n. (♂ holotype: Yirrkala Mission, Arnhem Land, Northern Territory, Australia) is described after material from the type locality and from Cape York Peninsula, Queensland. The species is illustrated and compared with the described species of *Nannophya* RAMBUR.

**Key words:** *Nannophya*, new species, Australia; *Nannophya pygmaea* RAMBUR, distribution.

### Introduction

*Nannophya pygmaea* RAMBUR was first recorded for Australia by WATSON (1973), apparently on the basis of material from Arnhem Land in Northern Territory. The species continued to be recorded from Northern Territory and Australia by WATSON (1974) and WATSON et al. (1991).

When Dennis Paulson at the WDA Symposium 2003 at Beechworth told me that he had just collected *N. pygmaea* near Bamaga on the Cape York Peninsula we were both happy about this new record and range extension of one of the world's smallest dragonflies. A few weeks later, however, Dennis informed me that his "*N. pygmaea*" from near Bamaga was in fact an undescribed species. Only then I remembered that a few years ago I had found the Arnhem Land series of "*N. pygmaea*" somewhat different from typical *N. pygmaea*. But knowing typical *N. pygmaea* only from photographs I did not follow up. Recent re-examination of the Arnhem Land series, however, showed that it does not belong to *N. pygmaea*. It represents the species collected by Dennis near Bamaga, and it is described as new below (terminology of CHAO 1953).

At the same time it is stressed that *N. pygmaea* has as yet not been collected in Australia and has to be omitted from the available check-lists of Australian dragonflies.

### Description

#### *Nannophya paulsoni* spec. nov. (Figs 1-4, photos)

*Nannophya pygmaea* RAMBUR; WATSON 1973: tbl 1; WATSON 1974: 148; HOUSTON & WATSON 1988: 124; WATSON et al. 1991: 248; WATSON & HOUSTON 1994: 29.

**Material examined:** Holotype ♂, Yirrkala Mission, Northern Territory, Australia, 31.1.-3.2.1968, J.A.L. Watson (ANIC = Australian National Insect Collection, CSIRO, Canberra). Additional material: Paratypes: 12♂♂, 8♀♀, same data as holotype (ANIC, GTAD = Günther Theischinger Collection); 2♂♂, Skull Creek, 5 km S Bamaga on dirt road (10°55'50"S/142°22'58"E), Queensland, Australia, 2.1.2003, D.R. Paulson and N. Smith (DP = Dennis Paulson Collection).

**Name:** Dedication to Dennis R. Paulson (Seattle, USA), world authority on Odonata. English name (by suggestion of D.R. Paulson): Scarlet Pygmyfly.

A very small, slender dragonfly; abdomen rather long, vivid red in male, largely dark brown in female; wings rather short and largely clear, the bases only slightly suffused with yellowish, the tips widely rounded and the hindwing base not expanded.

**Male** (Figs 1-4, photos)

**Dimensions:** Hindwing 11.8-13.3 mm; total length 16.7-18.2 mm; abdomen (including appendages) 10.7-12.3 mm.

**Head:** Labium largely blackish brown, lobes with inner and distal margin and particularly the included corner blackish brown; labrum, clypeus, bases of mandibles and frons largely greenish yellow merging into yellowish brown and pale reddish- to greyish brown on frons and anterior half of labrum; remainder of mandibles, genae, postgenae and antennae black; vertex blackish brown, sometimes apparently brightened up; occiput blackish brown on top, largely yellow behind; eyes (discoloured) largely reddish brown.

**Cervix and prothorax:** Eucervicale brownish black with anterodorsal portion whitish yellow. Pronotum largely brownish black, only anterior rim of anterior lobe and an irregular loop surrounding each of the twin bulges of median lobe dusky to pale yellow; propleura largely blackish brown, only posterior region of epimeron dusky yellow; legs black except for paler trochanter and outer face of coxa.

**Synthorax:** Front, terga and ventral face largely variably dark greyish- to blackish brown; sides brownish yellow to pale greyish brown with blackish brown patch along dorsal approximately 1/3 of each, meso- and metapleural, suture, darker patches of variable size also in ventral region on katepisterna, epimera and metanepisternum; dorsal carina bright yellow. Legs black except for markedly paler trochanters and patch on outer surface of femora.

**Wings** (Figs 3, 4): Membrane hyaline, bases very slightly suffused with yellowish brown; the suffused areas not discernibly defined but definitely not reaching level of discoidal cell; veins brown to black; pterostigma of forewing markedly shorter than that of hindwing, brown to black; antenodals 5/4; postnodals 4/4; anal field of hindwing small, not expanded, with 4-6 longitudinal veinlets reaching wing margin.

**Abdomen:** Tergum 1 largely brownish red to almost blackish brown; tergum 2 red with blackish brown anterior rim and narrow, blackish brown patch each side along supplementary transverse carina; terga 3-9 red; segment 10 reddish- to blackish brown or black; sterna 1-9 greyish yellow to reddish- and greyish brown; bipartite sternum 11 greyish- to blackish brown. Secondary genitalia (Fig. 1) with lobe approximately parallel sided and longer than hamule; hamule with longer pointed posterior branch and shorter, slightly hooked anterior branch.

**Anal appendages** (Fig. 2): Superiors relatively long and rather strongly curved (as seen in lateral view), basal 1/3 to 1/2 and tips almost black, remainder brownish red. Inferior appendage arched, subtriangular, yellowish brown.

**Female** (photo)

**D i m e n s i o n s :** Hindwing 12.7-13.3 mm; total length 15.5-16.8 mm; abdomen (including appendages) 10.0-10.8 mm.

**H e a d :** Much as in male, but labrum darker.

**C e r v i x a n d p r o t h o r a x :** Much as in male.

**S y n t h o r a x :** Much as in male, but with an ill-defined pale streak each side on front, and sides largely greenish yellow with dark patches in ventral region on episterna, epimera and metanepisternum markedly darker and better defined, and with an additional large black patch along intersegmental suture from metastigma to subalar ridges.

**W i n g s :** Much as in male.

**A b d o m e n :** Terga 1-6 largely reddish- to greyish- and blackish brown, 2-6 with dusky greenish- to greyish yellow basal bar or pair of marks, which variably extend laterally; terga 7-9 and segment 10 almost to completely black; supra-anal plate largely black fading into pale laterally; anal appendages with basal 1/3 black and remainder pale brownish yellow; sterna greyish brown to black. Valves formed by sterna 8 and 9 reaching to middle of segment 10.

### Affinities and discussion

Four of the five species of *Nannophya* RAMBUR occur in Australia. *Nannophya australis* BRAUER, widely distributed in eastern Australia and coexisting there actually or potentially with *N. dalei* (TILLYARD) or *N. paulsoni* is the only species with 2-3 crossveins in the cubital space of the hindwing, whereas the other three Australian species, *N. dalei*, *N. occidentalis* (TILLYARD) and *N. paulsoni*, and the apparently extra-limital *N. pygmaea* RAMBUR have only one. *N. dalei* and *N. occidentalis* are relatively large species with distinct, black abdominal pattern and share a southern distribution, whereas *N. pygmaea* and *N. paulsoni* are very small without distinct black pattern elements on the abdomen and occur primarily in the tropics. From this it appears that *N. paulsoni* is not closely related to any of the other Australian species. With its rather long, slim abdomen and almost clear wings and particularly with its poorly developed anal region of the hindwing, *N. paulsoni* (Figs 1-4, photos) differs also significantly from *N. pygmaea* (Figs 5, 6, photo), a species now known to range from Japan through south-east Asia and Indonesia to New Guinea. Even though it is assumed that significant differences in body/wing proportions, size, shape and venation of anal field of hind wing, and colouration bring about different aerodynamic abilities and behaviour, the lack of marked and consistent differences between *N. pygmaea* and *N. paulsoni* in the structure of secondary genitalia and terminalia suggests that the Australian *N. paulsoni* derived from the wide-spread *N. pygmaea*.

Information about collecting and habitat of *N. paulsoni* is available only from Skull Creek near Bamaga in Queensland. In D. Paulson's diary it reads: 1 hr at midday; clear, hot; narrow stream, 1.8 m wide, 1.5 m deep, mud bottom, through woodland and open with wide pond where road crosses it; white sand soil, many *Nepenthes* (=Pitcherplant); 2 males; mature male perched low at stream edge, immature male in ferns in woods.

### Acknowledgments

I wish to thank Dennis R. Paulson (Seattle, USA) for giving me the opportunity to describe a species he discovered, for information on the variability of *N. pygmaea* and for providing computer scans for this paper. I also wish to acknowledge the managers of the ANIC for giving me access to material in their care.

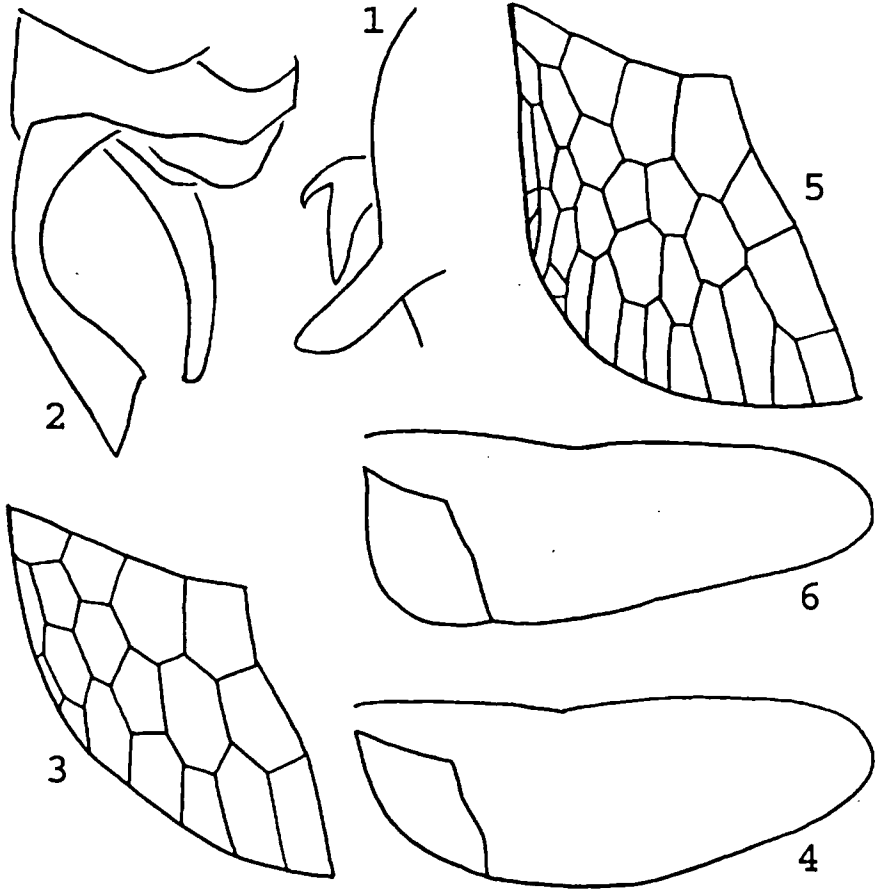
### Zusammenfassung

*Nannophya paulsoni* sp. n. von Australien wird beschrieben und mit den bekannten Arten von *Nannophya* RAMBUR verglichen. Es wird festgestellt, dass *Nannophya pygmaea* RAMBUR nicht zur australischen Libellenfauna gehört.

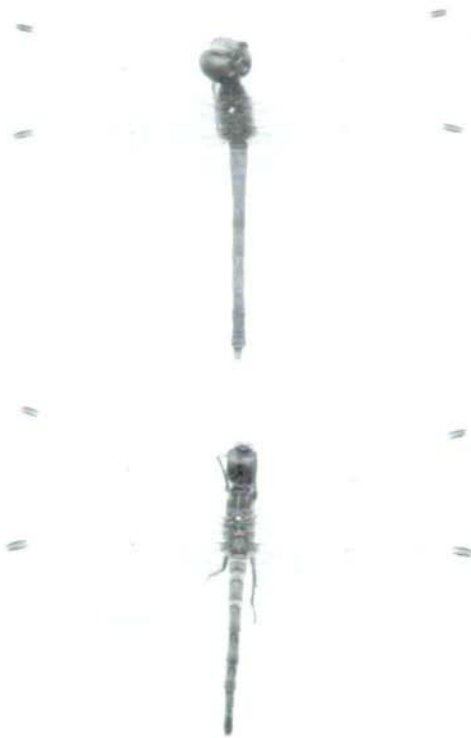
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**Figs 1-4.** *Nannophya paulsoni* sp. n., male: (1) secondary genitalia, lateral; (2) anal appendages, lateral; (3) anal field of hindwing; (4) shape of hindwing with anal field indicated. **Figs 5, 6.** *Nannophya pygmaea* RAMBUR, male: (5) anal field of hindwing; (6) shape of hindwing with anal field indicated.



Photos (by G. Theischinger):  
*Nannophya paulsoni* sp. n., dorsal  
(from NNT): (top) male; (bottom)  
female.



5 km S Bamaga,  
Queensland, Australia  
2 Jan 2003  
D. R. Paulson



Bako National Park,  
Sarawak, Malaysia  
26 Aug 1980  
D. R. Paulson

Photos (by D.R. Paulson): (left) *Nannophya paulsoni* sp. n., male, lateral; (right) *Nannophya pygmaea* RAMBUR, male, lateral.