

## Short Communication

### On the correct name for *Hemigrapsus edwardsii* (Hilgendorf, 1882) (Brachyura: Varunidae) from New Zealand

C. L. McLAY† and C. D. SCHUBART‡

†Department of Zoology, University of Canterbury, PB 4800  
Christchurch, New Zealand; e-mail: c.mclay@zool.canterbury.ac.nz

‡Biologie I, Universitat Regensburg, D-93040 Regensburg, Germany;  
e-mail: cd\_schubart@yahoo.com

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The specific name for the New Zealand crab long known as *Hemigrapsus edwardsii* (Hilgendorf, 1882) has been uncertain because of problems with generic definitions. Resolving this question required examination of the relationships between *Brachynotus* de Haan, 1835, *Heterograpsus* Lucas 1849 and *Hemigrapsus* Dana, 1851. The genus *Heterograpsus* is an objective junior synonym of *Brachynotus* since they both have the same type species, *Gonoplax sexdentatus* Risso, 1827. Comparison of *Brachynotus* and *Hemigrapsus* shows that the New Zealand species belongs in *Hemigrapsus* and should be known as *H. sexdentatus* (H. Milne Edwards, 1837).

KEYWORDS: *Hemigrapsus sexdentatus*, *Brachynotus*, *Cyclograpsus*, taxonomy, Crustacea, Decapoda.

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#### Introduction and taxonomic history

Henri Milne Edwards (1837: 79) described *Cyclograpsus sexdentatus* as ‘Cyclograpse a six dents’ based on material from the collections of the Paris Museum originating from New Zealand. Dr Jacques Forest from the Paris Museum kindly located the potential types and provided the following information: ‘They are, under the name *Heterograpsus sexdentatus*, without mention “type”, two dry specimens seen by H. Milne Edwards: 1. A male of 34.5 × 29.0 mm “MM. Quoy et Gaimard—Nlle. Zélande”, MNHN B 3509; 2. A female 33 × 28 mm “Mr. Arnoux—Nlle. Zélande”, MNHN B 3510. Both specimens match roughly the size mentioned by H.M.E., “15 lignes” = 33.75 mm (he writes “longueur”, but it is more probably the “largeur” = width). We can assume that the first specimen has been collected by the “Astrolabe” and that it is the one mentioned in the description. Consequently, I am inclined to consider that it is the presumed holotype of *sexdentatus*. Concerning the

second specimen, its status is doubtful: we have no information on the possible collector, M. Arnoux'. It is most likely that the above specimens were either collected from the Bay of Islands (North Island) in March to April 1824, by Dumont D'Urville, on the 'Coquille', or from near French Pass/D'Urville Island, Tasman Bay (South Island) in January to March 1827, by Jacquinot or D'Urville, on the 'Astrolabe'. Thus either of these places could be the type locality of *Cyclograpsus sexdentatus*.

Dana (1852: 331) transferred *Cyclograpsus sexdentatus* to *Hemigrapsus* Dana, 1851 because the species does not have a third maxilliped merus 'crossed by an oblique piliferous crest'. H. Milne Edwards (1853) synonymized *Hemigrapsus* under *Heterograpsus* Lucas, 1849 and used *Heterograpsus sexdentatus* for his New Zealand species, while renaming *Heterograpsus sexdentatus* Lucas, 1849 to *Heterograpsus lucasi*. H. Milne Edwards (1853: 192) listed Lucas' genus and species under the tribu Grapsinae, not realising the identity with *Brachynotus sexdentatus* (Risso, 1827), which he lists and figures under the tribu Ocypodinae (see H. Milne Edwards, 1852: 161). *Brachynotus sexdentatus* is an eastern Atlantic and Mediterranean species (Udekem d'Acoz, 1999). H. Milne Edwards' (1853) terminology was adopted by Heller (1863), Miers (1876) and Kingsley (1880). Hilgendorf (1882) was the first to realise that *Heterograpsus lucasi* H. Milne Edwards, 1853 is identical with *Brachynotus sexdentatus* (Risso, 1827). When synonymizing these genera, priority was given to the older generic name *Brachynotus* de Haan, 1835, making *Heterograpsus* Lucas, 1849 a junior objective synonym. This action required that the New Zealand *Heterograpsus sexdentatus* (H. Milne Edwards, 1837) be placed into *Brachynotus*. However, *Gonoplax sexdentatus* Risso, 1827 was already included in *Brachynotus* by de Haan (1835). Hilgendorf (1882) therefore introduced the name of *Brachynotus edwardsii* for *Cyclograpsus sexdentatus* H. Milne Edwards, 1837 from New Zealand. Within less than 50 years, there had been four different names for this crab from New Zealand: *Cyclograpsus sexdentatus* H. Milne Edwards, 1837, *Hemigrapsus sexdentatus* (H. Milne Edwards, 1837), *Heterograpsus sexdentatus* (H. Milne Edwards, 1837) and *Brachynotus edwardsii* Hilgendorf, 1882.

Towards the end of the 19th century and following Hilgendorf's (1882) clarifications, everyone seemed to agree on the taxonomy. In his Challenger Report, Miers (1886) cites *Brachynotus edwardsii*. Ortmann (1894) refers to *Brachynotus sanguineus*, *B. penicillatus*, *B. nudus*, *B. longitarsis* and *B. spinosus*. Alcock (1900) also uses *Brachynotus* and lists *Hemigrapsus* and *Heterograpsus* as junior synonyms and Holmes (1900) leaves under *Brachynotus* the two American species of *Hemigrapsus*, *H. nudus* and *H. oregonensis*. For some reason, Rathbun (1900) reintroduced the genus *Hemigrapsus* and Rathbun (1918) defined *H. crassimanus* Dana, 1851 as its type, without further explanation. Only later did Rathbun (1931: 87–88) comment on the underlying taxonomic problem: 'The genus *Brachynotus* de Haan, genotype *B. lucasi* (Milne Edwards) is, I think, distinct from typical *Hemigrapsus* Dana (genotype, *H. crassimanus* Dana). It differs in its greater width of carapace and orbits, which are not nearly filled by the eyes; the narrow and distinctly bilobed front, the margin of which is not produced well beyond the antennular cavities, but is identical with the upper margin of these cavities; in addition there is close to and above the lobes a second marginal line parallel to the true margin but not continued to the orbital angle, giving the front a double edge; the suborbital or stridulating ridge of the male is formed chiefly by two long smooth tubercles, and inwardly a smooth ridge, no granules; the outer maxillipeds have the merus broader behind

than in *Hemigrapsus*, and the ischium narrowing more rapidly toward the proximal end'. Apparently, Rathbun was not aware of Hilgendorf's study of 1882, since she uses *B. lucasi* as the type of the genus *Brachynotus* and discusses the possible synonymies in a footnote. In any case, her clear separation of *Brachynotus* and *Hemigrapsus* by morphological characters justified the distinction of the two genera and revalidated *Hemigrapsus*. Chilton and Bennett (1929) used *Hemigrapsus sexdentatus* (H. Milne Edwards, 1837) and *H. crenulatus* (H. Milne Edwards, 1837) in their revision of the New Zealand Brachyura. Richardson (1949b) and Bennett (1964) also kept *Brachynotus* and *Hemigrapsus* separate.

The taxonomic problem concerning the use of four different genera for *Cyclograpsus sexdentatus* H. Milne Edwards, 1837 is simplified by the fact that *Heterograpsus* Lucas, 1849 is an objective junior synonym of *Brachynotus* de Haan, 1835 (see Hilgendorf, 1882). This is because both genera share the same type species by monotypy, *Goneplax sexdentatus* Risso, 1827. Thus the only remaining problem is whether the New Zealand species belongs to *Brachynotus* de Haan, 1835 or to *Hemigrapsus* Dana, 1851. If it belongs to *Brachynotus* then the specific name '*edwardsii*' Hilgendorf, 1882 must be used, but if it belongs to *Hemigrapsus*, then the original name of '*sexdentatus*' H. Milne Edwards, 1837 becomes valid. Despite this 'either/or' of only possible taxonomic combinations, the name *Hemigrapsus edwardsii* (Hilgendorf, 1882) has been used by most authors, following Richardson's (1949b: 130) statement: 'Dr. (Isabella) Gordon (who) has kindly re-examined for me (British Museum) material of the genera *Brachynotus* and *Hemigrapsus*, supports Rathbun in maintaining the distinctness of the genera, and has demonstrated to me that our *Hemigrapsus sexdentatus* (p. 34) cannot by priority retain its specific name and must now be known as *H. edwardsii* as proposed by Hilgendorf.' This conclusion seems strange because the advice from Isabella Gordon, that the two genera are distinct, should have resulted in the species name *sexdentatus* being retained. In the most recent review of the New Zealand Brachyura, McLay (1988) used *Hemigrapsus edwardsi* (Hilgendorf, 1882). The modified spelling of the specific name followed that used by Dell (1963). The major review by Bennett (1964) used *Hemigrapsus sexdentatus* (H. Milne Edwards, 1837) but it should be pointed out that Bennett's manuscript was the result of work done at various times between 1927 and 1936, and not published until 1964. Only very recently (Cuesta *et al.*, 2001), the name *Hemigrapsus sexdentatus* (H. Milne Edwards, 1837) was re-introduced into the scientific literature.

#### **Comparison of *Brachynotus* and *Hemigrapsus***

Morphological differences between adult *Hemigrapsus* and *Brachynotus* (based on the types *H. crassimanus* and *B. sexdentatus* (as *B. lucasi*)) have been outlined by Rathbun (1931) (see Introduction). Examination of the New Zealand material showed that *H. sexdentatus* and *H. crenulatus* share the morphological characters defined as typical for *Hemigrapsus* by Rathbun (1931).

The genus *Brachynotus* de Haan, 1835 is nowadays restricted to the Atlantic Ocean. Currently, there are four valid species, namely *B. atlanticus* Forest, 1957, *B. foresti* Zariquiey Alvarez, 1968, *B. gemmellari* (Rizza, 1839) and *B. sexdentatus* (type species) (Risso, 1827). Cuesta *et al.* (2000) and Schubart *et al.* (2001) point out that *B. gemmellari* might be the same species as *B. sexdentatus*, representing an eco-phenotypic variation. However, additional results will be needed to confirm this

possible synonymy. Ingle (1980: 124) gives the following definition of *Brachynotus* de Haan, 1835: 'Carapace broader than long, convex longitudinally or somewhat flattened; lateral margins relatively straight. Carpus of third maxilliped articulating at middle of dorsal margin of merus; a very narrow rhomboid-shaped gap between inner margins of third pair of maxillipeds. Chelipeds relatively smooth or carinate'.

The genus *Hemigrapsus* Dana, 1851 is only found in the Indo-Pacific Oceans, with the exception of recent introductions of two species into the Atlantic Ocean (Breton *et al.*, 2002). Dana (1851: 348) defined *Hemigrapsus* as follows: 'Carapace nearly smooth, not marked by transverse lines, front nearly straight, sides arcuate. Third maxillipeds separated by a large rhomboidal space, third joint orbiculo-cordate. Antennules transverse. Process outside the antennae transverse, triangular, set closely against first joint of antennae'. Rathbun (1918: 264), who revalidated *Hemigrapsus*, gave a more detailed definition of the genus: 'Carapace broader than long, quadrate with anterolateral margins rounded and dentate; depressed; an oblique ridge runs inward and backward from the posterolateral margin. Front less than half width of carapace. Orbits of moderate size. Antennules folding obliquely. Tooth at inner angle of orbit well developed. Antenna filling the orbital hiatus; flagellum entering the orbit. The suborbital crest forms a tuberculated or striated stridulating ridge which scrapes against the distal end of the arm. Epistome well developed. Buccal cavity quadrate with the anterior corners rounded. Outer maxillipeds moderately gaping; merus broader but very little shorter than the ischium, and as broad as, or broader than long; its inner and outer margins convex, anterior margin excavate, with the palpus inserted toward its outer angle. Chelipeds equal or sub-equal, stout. Palms often with a patch of hair inside. Fingers hollowed out beneath in a shallow groove. Legs of moderate length, and almost unarmed. The abdomen of the male does not cover the sternum at its base.' Currently there are 11 species in the genus *Hemigrapsus* Dana, 1851, namely *H. crassimanus* Dana, 1852 (type species), *H. crenulatus* (H. Milne Edwards, 1837), *H. gibbus* (Jacquinot, in Hombron and Jacquinot, 1843), *H. longitarsis* (Miers, 1879), *H. nudus* (Dana, 1851), *H. oregonensis* (Dana, 1851), *H. pallipes* (H. Milne Edwards, 1837), *H. pencillatus* (de Haan, 1835), *H. sexdentatus* (H. Milne Edwards, 1837), *H. sinensis* Rathbun, 1931 and *H. spinosus* (H. Milne Edwards, 1853). This genus is morphologically quite variable and will need to be revised.

Comparison of larval morphological characters by Cuesta *et al.* (2000) revealed that zoea larvae of the two Atlantic genera *Brachynotus* and *Cyrtograpsus* Dana are distinct from all other Varunidae, including *Hemigrapsus*: 'These two genera [*Brachynotus* and *Cyrtograpsus*] can be distinguished from the rest of Varunidae by the morphology of the telson, which only acquires one pair of serrulate setae on the posterior margin in the course of the development. In contrast, the rest of the Varunidae acquire two or three pairs of serrulate setae' (Cuesta *et al.*, 2000: 218). Re-description of the larvae of the two species of *Hemigrapsus* from New Zealand confirmed these morphological differences (Cuesta *et al.*, 2001).

The conclusion of the present study is that the New Zealand species originally described by H. Milne Edwards (1837) as *Cyclograpsus sexdentatus* and *C. crenulatus* should currently be placed within the genus *Hemigrapsus* Dana, 1851, which is distinct from *Brachynotus* de Haan, 1835. The correct name for *Cyclograpsus sexdentatus* H. Milne Edwards, 1837 is therefore *Hemigrapsus sexdentatus* (H. Milne Edwards, 1837).

VARUNIDAE H. Milne Edwards, 1853  
*Hemigrapsus* Dana, 1851  
*Hemigrapsus sexdentatus* (H. Milne Edwards, 1837)  
(figure 1)

**Synonymy**

*Cyclograpsus sexdentatus* H. Milne Edwards, 1837: 79; White, 1843: 266.

*Hemigrapsus sexdentatus*: Dana, 1852: 348, pl. 22, figure 2; Filhol, 1885: 388; Chilton and Bennett, 1929: 764; Graham, 1939: 429; Powell, 1947: 40, figure 193; Richardson, 1949a: 34, figure 15; Trevarthen and Kulka, 1950: 54; Wood, 1963: 9; Bennett, 1964: 82, figures 94, 137, 138; Cuesta *et al.*, 2001: 903, figure 3.

*Heterograpsus sexdentatus*: H. Milne Edwards, 1853: 192; Miers, 1876: 37; Kingsley, 1880: 207; Lenz, 1901: 472; Hutton, 1904: 249; Thomson, 1905: 546; 1913: 237; Thomson and Anderton, 1921: 100, two figures; Oliver, 1923: 542; Knox and Kilner, 1973: 353.

*Brachynotus edwardsii* Hilgendorf 1882: 70; Miers 1886: 264.

*Hemigrapsus edwardsii* : Richardson, 1949b: 130; Batham, 1956: 458; Knox, 1969: 547; 1975: 384; 1983: 66; Baker, 1971: 297; Knox and Bolton, 1978: 74; Roper *et al.*, 1983: 270; Gunson, 1983: 55, one colour figure; Denny and Schiel, 2001: 927.

*Hemigrapsus edwardsi*: Batham, 1958: 652; Dell, 1963: 53, one figure; 1968: 227; Wear, 1965: 16, text figure 6G; Morton and Miller, 1968: 89, pl. 23, 1; Leslie, 1968: 90, figure 82; Wood, 1968: 93; Williams, 1969: 215; Wear, 1970: 14, figures 27–33; Hicks, 1973: 1; Morton, 1973: 118; Miller and Batt, 1973: 73, figure 89; Kitching and Lockwood, 1974: 131; Bedford and Leader, 1977: 341; 1978: 147; Marsden and Fenwick, 1978: 11; Marsden, 1981: 24; Westerkov and Probert,



FIG. 1. *Hemigrapsus sexdentatus* (H. Milne Edwards, 1837) dorsal view of male, 30.5 × 25.9 mm, Kaikoura Peninsula, 18 April 2002, CLM Collection.

1981: 128; Jones 1983: 92; Naylor and Williams, 1984: 81; Pellegrino, 1984: 251; Wear and Fielder, 1985: 68, figures 177, 178; Powell, 1987: 36, figure 193; McLay, 1988: 280, figure 62; Feldmann and McLay, 1993: 447; McLay and McQueen, 1995: 49; Gill, 1998: 41, figure 193; Poinar and Brockerhoff, 2001: 149.

Not *Heterograpsus sexdentatus* Lucas, 1849: 19, pl. 2, figure 4 (= *Brachynotus sexdentatus* (Risso, 1827)).

Not *Heterograpsus sexdentatus* Haswell, 1882: 100 (error, should be *Paragrapsus laevis* (Dana, 1852)).

Not *Hemigrapsus sexdentatus* Knox, 1969: 547 (= *Hemigrapsus crenulatus* H. Milne Edwards, 1837).

*Hemigrapsus sexdentatus* is distinctive because of its dark purple colour and it is commonly known as the 'purple rock crab'. Immature crabs have quite variable coloration with various degrees of pale mottling of the purple ground colour. Its congener, *Hemigrapsus crenulatus* (H. Milne Edwards, 1837), has a dark green colour and is much more setose, especially on the pereopods.

### Discussion

According to the personal communication by Jacques Forest (see Introduction), it is not completely clear which one of the two specimens seen by H. Milne Edwards was selected as the holotype, or if both specimens are syntypes. For taxonomic clarity, the male MNHN B 3509 is selected as the lectotype of *Cyclograpsus sexdentatus* H. Milne Edwards, 1837 but, as explained above, the exact type locality within New Zealand must remain uncertain.

Haswell (1882) listed *Heterograpsus sexdentatus* as part of the New South Wales and Victoria, Australian fauna, but Chilton and Bennett (1929: 765) show that the specimens in the Australian Museum were wrongly identified and should have been *Chasmagnathus laevis* Dana 1852 (= *Paragrapsus laevis*).

The suggestion by Bennett (1964) that the record of *Chasmagnathus subquadratus* in Otago Harbour by Thomson (1913: 238) was an error for *H. sexdentatus* is unlikely because the habitat mentioned makes it more likely that the species in question was in fact *Helice crassa* Dana, 1851. Thomson did not curate any voucher specimens. Miers (1876: 42) first listed *C. subquadratus* from New Zealand.

### Distribution

*Hemigrapsus sexdentatus* occurs on both the mainland North and South Islands and Stewart Island, but it is not known from the Chatham Islands or any other southern offshore islands. Endemic to New Zealand, *H. sexdentatus* is one of the most common intertidal crabs on rocky, stony shores usually found sheltering under stones. This herbivorous species occurs from around 100 cm above to 100 cm below mean sea level (McLay and McQueen, 1995).

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