

A nomenclatural review of the genus *Schizophrys* White, 1848 (Decapoda: Brachyura: Majoidea: Majidae)

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Abstract. The nomenclature of the Indo-West Pacific spider crab genus *Schizophrys* White, 1848 (Majidae) is clarified, including the authorship, date of publication, and type species designation. The nomenclature of the genus is reviewed and species with confused taxonomic identities are discussed. The status of one poorly known species supposedly from the Mediterranean Sea, *Schizophrys dichotomus* Desmarest, 1823, is clarified. A type specimen of *Mithrax asper* H. Milne Edwards, 1831, one of the most widely reported *Schizophrys* species, was rediscovered and is herein designated as the lectotype. *Inachus bifidus* Marion de Procé, 1822 is here determined to be a synonym of *Mithrax asper* H. Milne Edwards, 1831, and we invoke Article 23.9.1.1 of the current zoological code to reverse the precedence of the names to conserve *Mithrax asper*, which is in current and prevailing usage.

Key words. Majidae, *Schizophrys*, spider crab, taxonomy, nomenclature, lectotype designation

INTRODUCTION

The spider crab genus *Schizophrys* White, 1848, belongs to the family Majidae Samouelle, 1819. There are currently seven valid species assigned to the genus: *Schizophrys aspera* (H. Milne Edwards, 1834); *S. dichotomus* (Latreille, 1831); *S. dahlak* Griffin & Tranter, 1986; *S. dama* (Herbst, 1804); *S. jeddahensis* Al-Aidaros, Kumar, Al-Haj & Sonnewald, 2017; *S. pakistanensis* Tirmizi & Kazmi, 1995; and *S. rufescens* Griffin & Tranter, 1986 (cf. Ng et al., 2008; Al-Aidaros et al., 2017; this study; Table 1). The type species of the genus has been generally accepted as *S. aspera* through subsequent designation by Miers (1879). Species in this genus are relatively common throughout shallow waters in the Indo-West Pacific region (Griffin & Tranter, 1986). As a result of a wider study on spider crabs, it has become apparent that there is confusion regarding the authorships and dates of publication of the genus and of some of its species, as well as the type species designation for the genus. The taxonomy of several species is also unclear because a number of old synonyms have been ignored when new taxa were described by recent workers. As members of this genus are common in shallow waters and often used or cited in various systematic and ecological studies, this taxonomic uncertainty is not healthy.

As such, it is useful to review the various nomenclatural and taxonomic issues associated with *Schizophrys* and its constituent species.

TAXONOMY

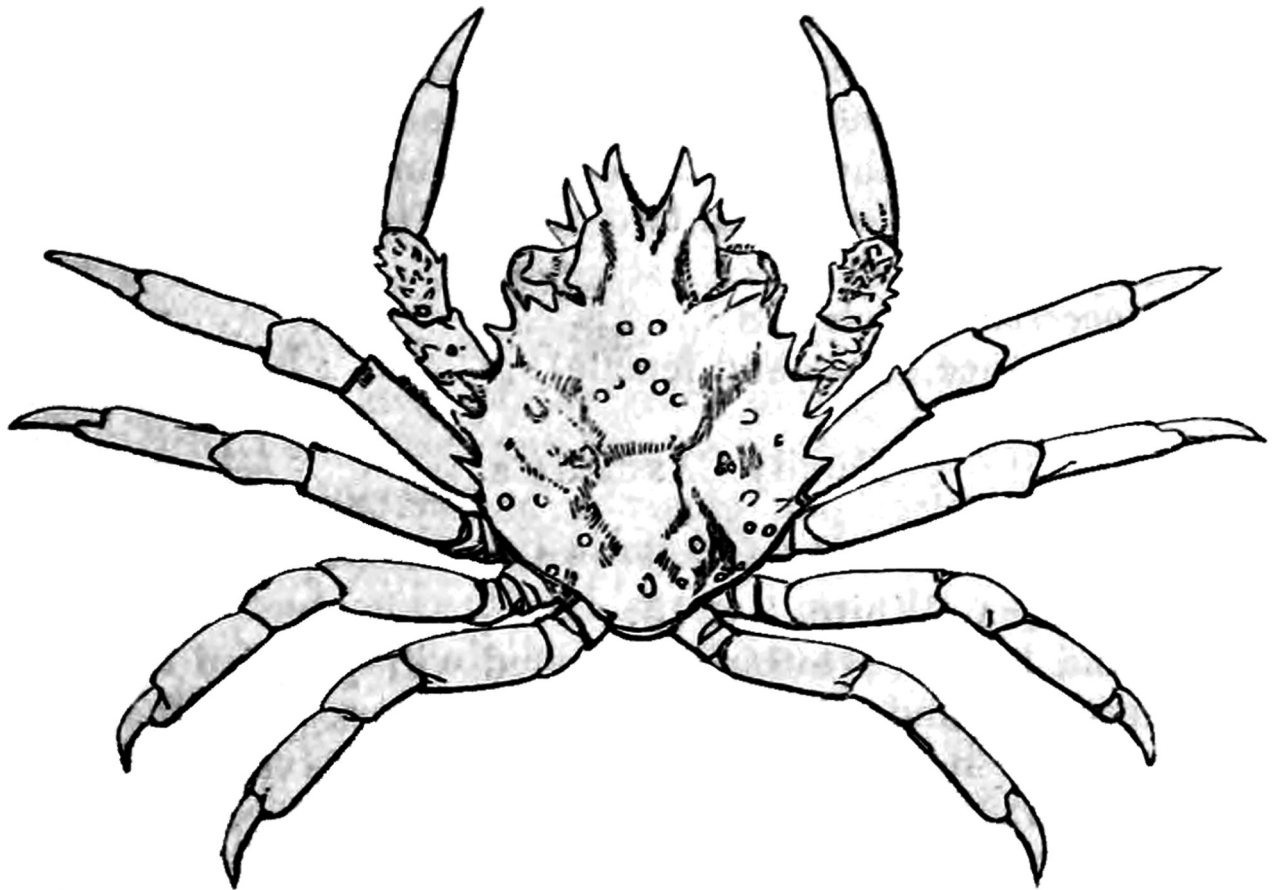
Nomenclature of *Schizophrys* and *Mithrax asper*: authorship, date of publication, and type species designation

The date of publication of *Schizophrys* was given as “1847” by Ng et al. (2008: 118). The name *Schizophrys* was first used in White (1847: 9) but as a *nomen nudum*, and the two included species-group names were also *nomina nuda*. The first publication to make the genus-group name *Schizophrys* available was actually White (1848: 222) (see Clark & Presswell, 2001: 161). The authorship and date of publication for the widespread species *Mithrax asper* is commonly cited as H. Milne Edwards (1834a: 320) (see Davie, 2002: 311; Ng et al., 2008: 118). The name is, however, available from H. Milne Edwards (1831: [10]). *Mithrax asper* H. Milne Edwards, 1831, was first transferred to *Schizophrys* White, 1848, by Miers (1879: 660), who also designated it as the type species of the genus. While this has been followed by all subsequent workers, his action is invalid. *Mithrax asper* H. Milne Edwards, 1831, cannot be the type species of the genus as the species was not originally included within the genus (Article 67.2 of the International Code of Zoological Nomenclature, hereafter the Code, ICZN 1999: 66, 67). Only two species were originally included in *Schizophrys* by White (1848: 222): *Schizophrys serratus* White, 1848 (from “Isle of France” = Mauritius), and *Schizophrys spiniger* White, 1848 (from the Philippine Islands). *Schizophrys serratus* White, 1848, is herein selected as the type species of the genus as it conforms to the current taxonomic concept of the genus (cf. Griffin & Tranter, 1986: 243–245). Although the status

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A

Schizophrys serratus (twice the natural size).



B

Fig. 1. Species of *Schizophrys* White, 1848. A, *Schizophrys serratus* White, 1848 syntype (from White, 1848: 223, unnumbered fig.), “Isle of France” (= Mauritius); B, *Mithrax asper* H. Milne Edwards, 1831, lectotype (herein designated), female (carapace width $\times$ carapace length: 25.1 $\times$ 29.3 mm) (MNHN-IU-B463), no locality (photographed by N.K. Ng).

of the type specimen of *Schizophrys serratus* White, 1848, is unknown and the figure provided (White, 1848: 223, unnumbered fig., reproduced as Fig. 1A) is a small-sized specimen (probably a juvenile), the figure shows enough characters to leave no doubt about its generic affinities. The second species included by White (1848) in *Schizophrys*, *S. spiniger* White, 1848, is currently considered to be a synonym of *Cyclax spinicinctus* Heller, 1861 (see Griffin & Tranter, 1986: 244, 246; Ng et al., 2008: 116). Forest & Guinot (1961: 16, 17) considered *Schizophrys spiniger* to be a valid species of *Cyclax* Dana, 1851, but regardless of the validity of the species, it is not currently regarded as congeneric with *S. serratus* White, 1848.

Alphonse Milne-Edwards (1872: 234) stated that *S. serratus* is only a more spiny variant of *S. aspera*, and as such, it has generally been considered by subsequent authors to be a junior subjective synonym of *S. aspera* (e.g., Ward, 1942: 74; Griffin & Tranter, 1986: 244; Ng & Davie, 2002: 371; Ng et al., 2008: 118). We follow this classification pending a taxonomic revision of the genus.

All species-group names described in or subsequently transferred to the genus *Schizophrys* White, 1848, as well as their current identities, are listed in Table 1.

***Schizophrys aspera* (H. Milne Edwards, 1831): rediscovery of type material and lectotype designation**

Following Ng et al. (2008), eight species-group names are currently synonymised under *Schizophrys aspera* (H. Milne Edwards, 1831): *Mithrax quadridentatus* MacLeay, 1838; *Maja (Dione) affinis* De Haan, 1839; *Schizophrys serratus* White, 1848; *Mithrax spinifrons* A. Milne-Edwards, 1867; *Mithrax affinis* Brito Capello, 1871; *Mithrax triangularis* Kossmann, 1877; *Mithrax (Schizophrys) triangularis* var. *indica* Richters, 1880; and *Inachus bifidus* Marion de Procé, 1822 (Table 1).

Schizophrys aspera has a large geographic range (Griffin & Tranter, 1986; Apel, 2001; Naderloo & Türkay, 2012), which in addition to the Indo-West Pacific region, also includes the Red Sea (Griffin & Tranter, 1974), Suez Canal (Türkay, 2001; El-Serehy et al., 2012), Iran (Naderloo & Türkay, 2012), Japan (Sakai, 1969, 1976), and America (Rathbun, 1925). The species has also been reported as an invasive species in Hawaii and New Zealand (Coles et al., 1997; Coutts & Dodgshun, 2007). However, the exact type locality for *S. aspera* is not known (Table 1).

Although the type specimen was not clearly indicated by H. Milne Edwards (1831: [10]), it was noted in the description that the specimen was part of “la collection du Muséum”, i.e., the Muséum National d’Histoire Naturelle (MNHN), Paris, France. It was also mentioned by Castro (2011: 53) that there is a possible type specimen in the MNHN. A dried specimen at the MNHN that matches the description by H. Milne Edwards (1831: [10]) very closely, was recently located (MNHN-B463, Fig. 1B). This specimen is herein

designated as the lectotype of the species *Mithrax asper* H. Milne Edwards, 1831 (Fig. 1B).

Status of *Inachus bifidus* Marion de Procé, 1822: reversal of precedence with junior synonym *Mithrax asper* H. Milne Edwards, 1831

Inachus bifidus was described from “baie Manille” (Manila Bay, Philippines) by Marion de Procé (1822: 134). Since it was described, only Ng et al. (2008: 118) treated this name, listing it as a junior synonym of *Schizophrys aspera* (H. Milne Edwards, 1831). The original description given by Marion de Procé (1822: 134) is short and brief. No figures of *Inachus bifidus* are known and the type material of *Inachus bifidus* Marion de Procé (1822) is no longer extant (see Ng et al., 2008: 123). As described by Marion de Procé (1822), the species has 18 protuberances on the carapace, with the two posterior ones adjoining, and is taller than it is wide. In the Philippines, where this species is found, the only majoid species that matches this morphology is *Schizophrys aspera* (H. Milne Edwards, 1831) (see Griffin & Tranter, 1986: 254; Ng et al., 2008: 118). The locality also fits within the known distribution of *Schizophrys aspera* (H. Milne Edwards, 1831) (see Griffin & Tranter, 1986: 246). We are thus confident that *Inachus bifidus* Marion de Procé, 1822, is a synonym of *Schizophrys aspera* (H. Milne Edwards, 1831).

There is, however, a problem with priority. Ng et al. (2008: 123) commented that “[w]ith regards to *Inachus bifidus* Marion de Procé, 1822, also from Manila, his description best fits the common *Schizophrys aspera* (H. Milne Edwards, 1834) and we also synonymise these. The types of both species are no longer extant (see discussion for *Portunus tropicalis* Marion de Procé, 1822)”. Basically, Ng et al. (2008) had invoked Article 23.9.1.1 of the Code (1999) to reverse priority for *Portunus tropicalis* Marion de Procé, 1822, and, by extension, *Inachus bifidus* Marion de Procé, 1822. Their action, however, was invalid because they did not provide the requisite list of works using the junior name.

The present authors agree that while the Principle of Priority (Article 23 of the Code, ICZN, 1999: 24, 25) requires that the oldest available name for the taxon under consideration to be used, replacing the name *Mithrax asper* H. Milne Edwards, 1831, with *Inachus bifidus* Marion de Procé, 1822, will only cause nomenclatural instability as the former is in current and widespread use for a well-known and widely-distributed species of spider crab (see references cited below). We, therefore, formally invoke Article 23.9 of the Code (ICZN, 1999: 27–29) that requires a reversal of precedence of a junior synonym when the senior synonym has not been used as a valid name after 1899 (Article 23.9.1.1) and the junior synonym “has been used for a particular taxon, as its presumed valid name, in at least 25 works, published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years” (Article 23.9.1.2).

Table 1. Species-group names described in, or transferred to, the genus *Schizophrys* White, 1848. The first column gives the name in its original combination and rank. The second column gives the first publication to make the name available and the type locality. The third column gives the current identity of the species-group name while the corresponding row in the fourth column gives the references upon which the identity is made. *Schizophrys serratus* White, 1848, as marked with the “*” is the type species of the genus by designation herein (see discussion in text). Names in **bold** are herein considered to be valid.

Taxon name	Original description (type locality)	Current identity	References
<i>Maja (Dione) affinis</i>	De Haan, 1839: 94, pl. G (Japan)	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Dai & Yang, 1991: 152 (list); Yamaguchi & Baba, 1993: 359, 360, fig. 117; Davie, 2002: 311; Ng et al., 2008: 118 (list).
<i>Mithrax affinis</i>	Brito Capello, 1871: 264, pl. 3 fig. 4, 4a (unknown)	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Ng et al., 2008: 118 (list).
<i>Mithrax asper</i>	H. Milne Edwards, 1831: [10] (unknown)	<i>Schizophrys aspera</i> (H. Milne Edwards, 1831)	A. Milne-Edwards, 1872: 231–234, pl. 10 fig. 1, 1a–f; Miers, 1879: 660; Ives, 1891: 215; Alcock, 1895: 243, 244; Alcock & Anderson, 1898: pl. 35, fig. 1, 1a; Bouvier, 1940: 325; Buitendijk, 1949: 67; Sankarankutty, 1962: 159–160, figs. 15–16; Sakai, 1965: 89, pl. 41 fig. 2; Griffin, 1966: 270, 286 (key), 289, pl. xvi; Takeda, 1973: 109; Griffin, 1974: 28; Griffin & Tranter, 1974: 181, 182; Sakai, 1976: 246, pl. 89 fig. 3; Griffin & Tranter, 1986: 245 (key), 245, 246, figs. 88a, 91g, h; Tirmizi & Kazmi, 1995: 135 (list), 139; d’Udekem d’Acoz, 1999: 190; Ng et al., 2008: 118 (list); Al-Aidarros et al., 2017: [1], [4]–[6], fig. 5b, table 1; Naderloo, 2017: 158, figs. 18.4d, 18.8, 18.9.
<i>Inachus bifidus</i>	Marion de Procé, 1822: 134 (Manila Bay, Philippines)	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Ng et al., 2008: 118 (list).
<i>Schizophrys dahlak</i>	Griffin & Tranter, 1986: 245 (key), 246, 247, figs. 88d, 89, 90a, b, d, e, 91c, d (Red Sea)	<i>Schizophrys dahlak</i> Griffin & Tranter, 1986	Griffin & Tranter, 1986: 245 (key), 246, 247, figs. 88d, 89, 90a, b, d, e, 91c, d; Tirmizi & Kazmi, 1995: 135 (list), 139; Ng et al., 2008: 118 (list); Al-Aidarros et al., 2017: [1], [4].
<i>Cancer dama</i>	Herbst, 1804: 5, 6, pl. 59 fig. 5 (Locality uncertain).	<i>Schizophrys dama</i> (Herbst, 1804)	Alcock, 1895: 245; Alcock & Anderson, 1898: pl. 35, fig. 2, 2a; Balss, 1935: 124; Buitendijk, 1949: 67, 68; Yaldwyn, 1964: 362, text-fig.; Griffin, 1966: 270, 286 (key); Griffin & Tranter, 1986: 245 (key), 247, 249, figs. 88b, 91e, f; Tirmizi & Kazmi, 1995: 135 (list), 139–141; Sakai, 1999: 25, 26, pl. 12E; Ng et al., 2008: 118 (list); Al-Aidarros et al., 2017: [1], [3], [4].
<i>Mithrax dichotomus</i>	Desmarest, 1823: 264 (Mediterranean Sea)	<i>Schizophrys dichotomus</i> Desmarest, 1823	Bouvier, 1940: 325, fig. 198, pl. XIII fig. 2; Griffin & Tranter, 1986: 244, 251; d’Udekem d’Acoz, 1999: 190; Ng et al., 2008: 118 (list); Ghory, 2012: 121 (list); Al-Aidarros et al., 2017: [1], [3], [5].
<i>Mithrax (Schizophrys) triangularis var. indica</i>	Richters, 1880: 143, 144, pl. 15 figs. 8–14 (Mauritius)	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Davie, 2002: 311; Ng et al., 2008: 118 (list).
<i>Schizophrys jeddahensis</i>	Al-Aidarros, Kumar, Al-Haj & Sonnewald, 2017: [2]–[3], figs. 1–4, 5a, Table 1.	<i>Schizophrys jeddahensis</i> Al-Aidarros, Kumar, Al-Haj & Sonnewald, 2017	Al-Aidarros et al., 2017: [2]–[3], figs. 1–4, 5a, Table 1.
<i>Schizophrys pakistanensis</i>	Tirmizi & Kazmi, 1995: 136, 137, 139, 140, figs. 1, 2 (Cape Monze, Pakistan)	<i>Schizophrys pakistanensis</i> Tirmizi & Kazmi, 1995	Tirmizi & Kazmi, 1995: 136, 137, 139, 140, figs. 1, 2; Siddiqui et al., 2000: 17–28, figs. 1–8; Ng et al., 2008: 118 (list); Al-Aidarros et al., 2017: [1], [3], [5], [6], table 1; Naderloo, 2017: 159, figs. 18.4e, 18.9, 18.10.

Taxon name	Original description (type locality)	Current identity	References
<i>Mithrax quadridentatus</i>	MacLeay, 1838: 58 ("the Cape" [= Cape Town], South Africa)	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Ng & Ah Yong, 2001: 87, fig. 1f; Davie, 2002: 311; Ng et al., 2008: 118 (list).
<i>Schizophrys rufescens</i>	Griffin & Tranter, 1986: 245 (key), 249–251, figs. 88c, 90c, f, g, 91a, b (Whittlebee Point, South Australia)	<i>Schizophrys rufescens</i> Griffin & Tranter, 1986	Griffin & Tranter, 1986: 245 (key), 249–251, figs. 88c, 90c, f, g, 91a, b; Tirmizi & Kazmi, 1995: 135 (list), 139; Ng et al., 2008: 118 (list); Al-Aidarros et al., 2017: [1], [3], [5].
<i>Schizophrys serratus</i> *	White, 1848: 223, text-fig. ("Isle of France" [= Mauritius])	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	White, 1848: 223, text-fig.; Griffin & Tranter, 1986: 144 (list); Davie 2002: 311; Ng et al., 2008: 118 (list).
<i>Mithrax spinifrons</i>	A. Milne-Edwards, 1867: 263 ("l'île des Navigateurs" [=Samoa])	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Davie, 2002: 312; Ng et al., 2008: 118 (list).
<i>Mithrax triangularis</i>	Kossmann, 1877: 13–15 (Red Sea)	<i>Schizophrys aspera</i> H. Milne Edwards, 1831	Davie, 2002: 311; Ng et al., 2008: 118 (list).

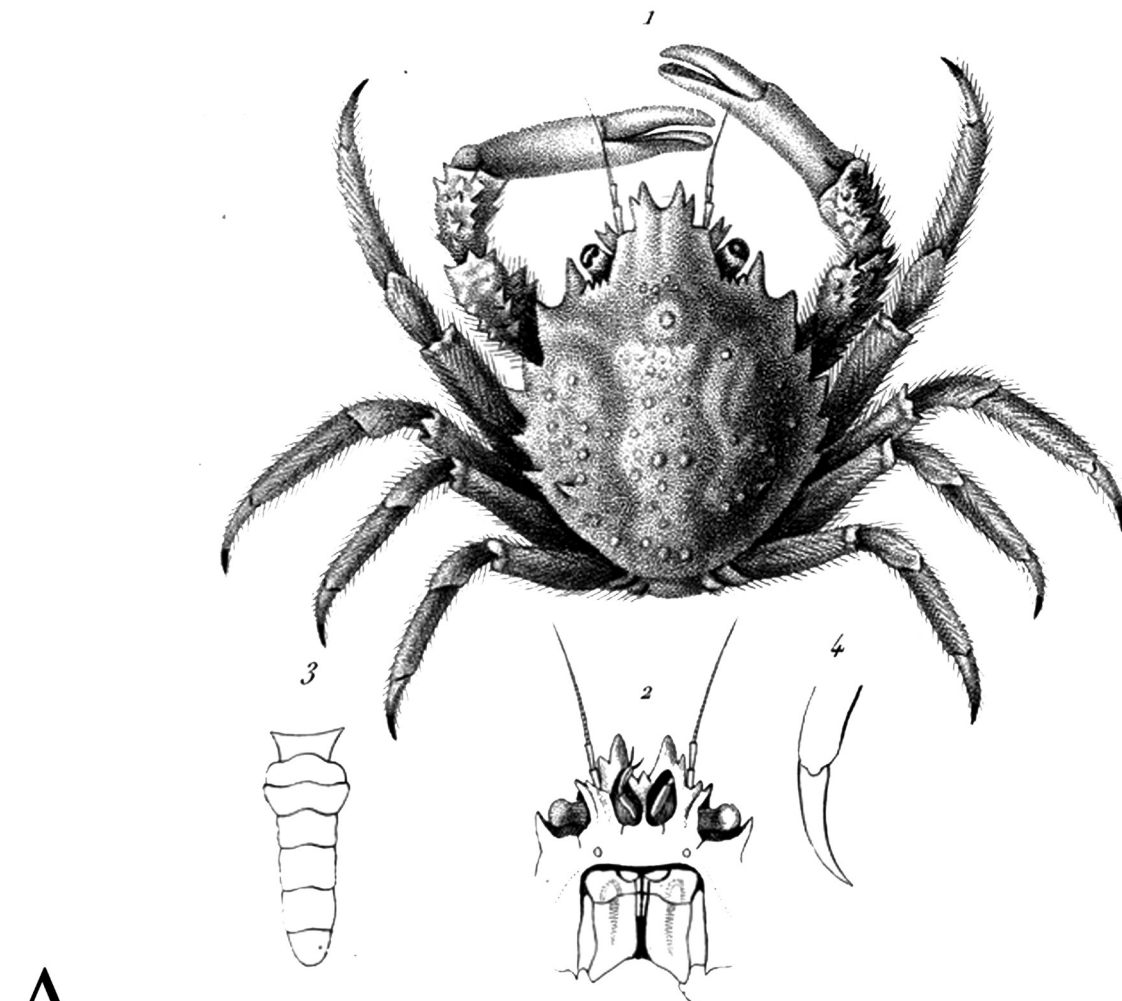
Since 1899, the species-group name *Inachus bifidus* Marion de Procé, 1822, has not been used as a valid name for the taxon it denotes, which fulfils Article 23.9.1.1 of the Code. In the past 44 years, 30 publications by 45 different authors have used the name *Mithrax asper* H. Milne Edwards, 1831, as the valid name for the taxon it denotes (viz., Takeda, 1973: 109; Griffin, 1974: 28; Griffin & Tranter, 1974: 181, 182; Lundoer, 1974: 5 (list); Sakai, 1976: 246, pl. 89 fig. 3; Serène et al., 1976: 16 (list); Griffin & Tranter, 1986: 245 (key), 245, 246, figs. 88a, 91g, h; Berry & Morgan, 1986: 60 (list); Dai & Yang, 1991: 152, 153, pl. 18 fig. 5, fig. 77 (5); Yamaguchi & Baba, 1993: 359; Morgan & Berry, 1993: 49 (list); Tirmizi & Kazmi, 1995: 135 (list), 139; Poupin, 1996: 27; d'Udekem d'Acoz, 1999: 190; Jones & Berry, 2000: 62 (table); Morgan, 2000: 117 (list), 120 (table); Siddiqui et al., 2000: 17, 28; Türkay, 2001: 285 (list); Ng & Ah Yong, 2001: 87; Ng & Davie, 2002: 371 (list); Ghory & Siddiqui, 2007: 49 (list), 53 (table), 61 (list), figs. 3A–C, 8B, 16; Ng et al., 2008: 118 (list); Yeo et al., 2009: 181, 182 (table); Gokul & Venkataraman, 2010: 71, pl. 3 fig. t; Castro, 2011: 53, 54; El-Serehy et al., 2012: 3667–3671; Ghory, 2012: 121–124; Naderloo & Türkay, 2012: 36 (list); Tudge et al., 2014: 3, 5, 7, 9, 11, 13, figs. 2D, E, 3, 4; El-Serehy et al., 2015: 789–793). As such, all the requirements for Article 23.9.1.2 of the Code (ICZN, 1999: 28) are fulfilled.

As both requirements of Article 23.9.1 are met and in accordance with Article 23.9.2, the name *Mithrax asper* H. Milne Edwards, 1831 (herein declared a *nomen protectum*) is considered a valid name and takes precedence over the subjective synonym *Inachus bifidus* Marion de Procé, 1822 (herein declared a *nomen oblitum*). *Mithrax asper* H. Milne Edwards, 1831, remains the valid name for the taxon under consideration in the combination *Schizophrys aspera* (H. Milne Edwards, 1831).

***Mithrax dichotomus*: authorship, date of publication and possible identity**

The taxon known as *Mithrax dichotomus* has had a confused authorship and date of publication. Ng et al. (2008: 118) attributed the authorship and date of publication of *Mithrax dichotomus* to "Latreille, 1831". However, this name was actually not used in any publications by Latreille in 1831. Griffin & Tranter (1986: 244, 251) gave the author of this species as H. Milne Edwards, but cited "1934" as the year of publication. Prior to these two works, Heller (1863: 38) attributed authorship of this name to "Desmarest", but with no date of publication indicated. Bouvier (1940: 325) attributed the species to Heller, and transferred it to *Schizophrys* White, 1848. Bouvier (1940: 325) also mentioned that various authors attributed the species to H. Milne Edwards who figured the species and that Heller (1863: 38, pl. 1 fig. 25) was the only author to give a detailed description and to figure the cheliped of the specimen.

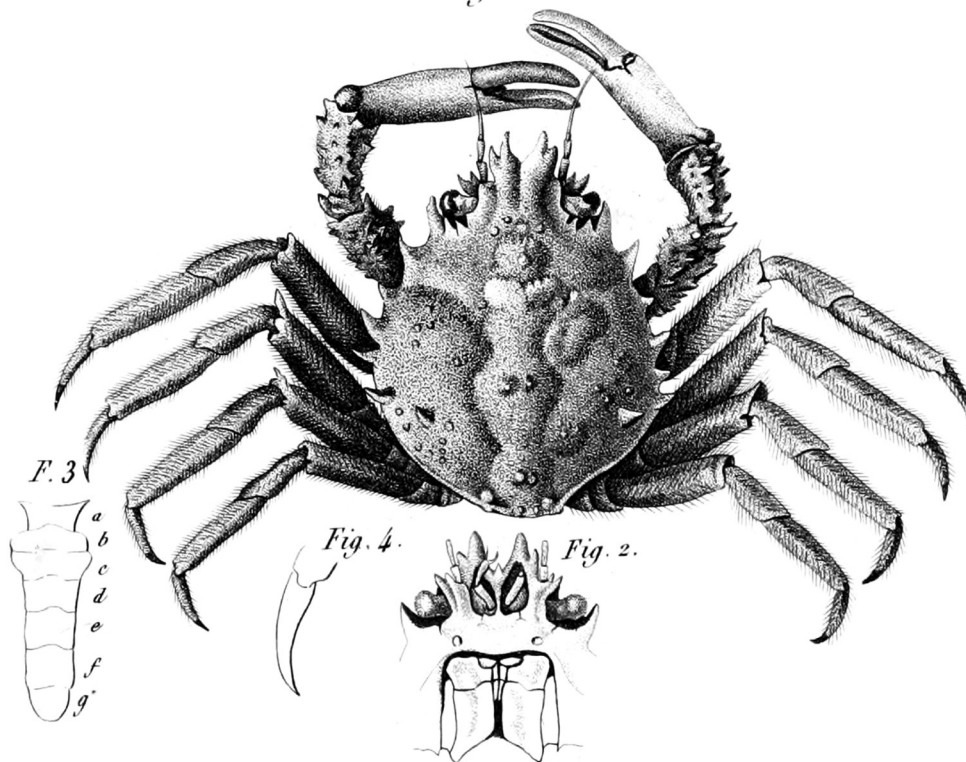
Mithrax dichotomus was indeed treated by H. Milne Edwards (1831: [9], pl. 1; reproduced as Fig. 2A) but with authorship attributed to "Latreille" and the sentence "*M. Dichotomus*. Desmarest *op. cit.* p. 150". The species was again discussed and figured in H. Milne Edwards (1834a: 319; 1834b: pl. 15 figs. 1–4; reproduced as Fig. 2B). De Haan (1837: 94, pl. 22 fig. 4) figured a specimen, which was identified as *Mithrax dichotomus*, but which he subsequently recognised as a new species, *Maja (Dione) affinis* (De Haan, 1839: 94, pl. G) (see Holthuis, 1953: 37, 39). This species was considered to be a junior synonym of *Schizophrys aspera* (H. Milne Edwards, 1831) by Yamaguchi & Baba (1993: 359, fig. 117). Figures of the type material of *Maja (Dione) affinis* provided by Yamaguchi & Baba (1993) show that the species is morphologically similar to *Schizophrys aspera* (H. Milne Edwards, 1831). Bouvier (1940: 325, fig. 198, pl. 13 fig. 2) was doubtful of the locality information that



A

Mithrax dichotomus . Latr . .

Fig. 1.



B

Fig. 2. *Schizophrys dichotomus* (Desmarest, 1823). A, *Mithrax dichotomus* Desmarest, 1823: from H. Milne Edwards (1831: [9], pl. 1); B, *Mithrax dichotomus* Desmarest, 1823, from H. Milne Edwards (1834: 319, pl. 15, figs. 1–4).

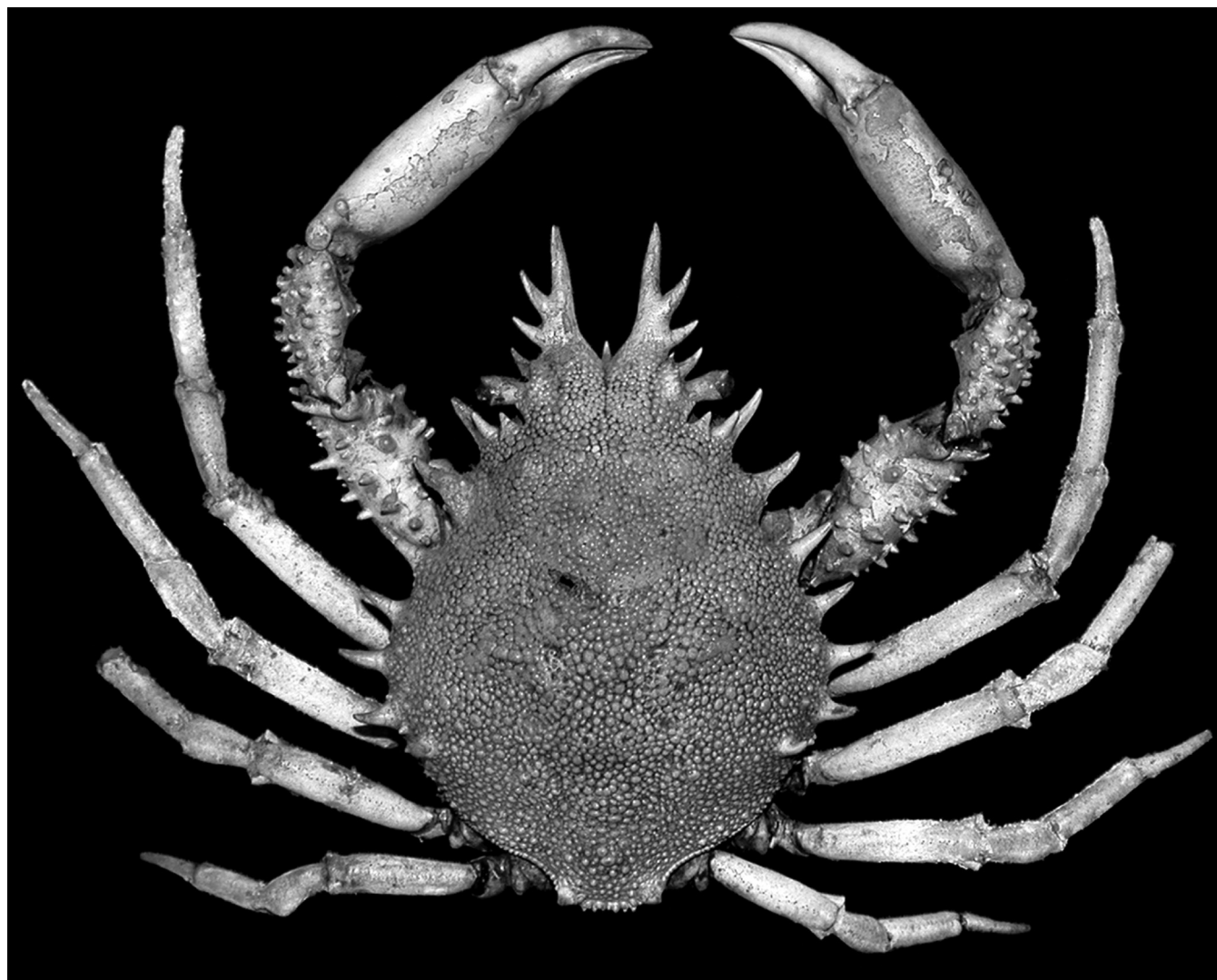


Fig. 3. *Schizophrys dama* (Herbst, 1804), syntype of *Cancer dama* Herbst, 1804, male (carapace width $\times$ carapace length: 49.8 $\times$ 61.5 mm) (ZMB HERBST 2038), locality uncertain (photographed by P.K.L. Ng).

was given by H. Milne Edwards for *Mithrax dichotomus*, and mentioned that it is likely the species were imported from the Indian Ocean, or from the Balearic Islands in the western Mediterranean. Although the figure of *Mithrax dichotomus* by Bouvier (1940: pl. 13 fig. 2) states that it is the “photo du type provenant des Baléares”, we are not (and can never be) sure if this is one of the actual types as no specific locality was originally given for *Mithrax dichotomus* by Desmarest (1823: 264). It is possible that the specimen figured by Bouvier (1940: 325, fig. 198, pl. 13 fig. 2) was the specimen examined and figured by H. Milne Edwards (1834a: 319; 1834b: pl. 15 figs. 1–4) leading Bouvier (1940: pl. 13, fig. 2, caption) to incorrectly conclude that this was the “type”. The earliest (and first available) use of the name *Mithrax dichotomus* is in fact by Desmarest (1823: 264), who diagnosed *Mithrax dichotomus* as follows:

“*Mithrax dichotome*; *Mithrax dichotomus*, Latr.; *Maia condyliata*, Risso? Tête ovale oblongue, granuleux, sans épines en dessus à cinq ou six dents latérales, et terminé en avant par deux épines qui sont elles-mêmes divisées chacune en deux pointes. De la Méditerranée.”

It is clear that Desmarest (1823: 264) considered Latreille to be the author of the species. Ng et al. (2008: 20) discussed the confusion in authorship that resulted from the use of many manuscript or label names in the Paris Muséum (now MNHN) where Latreille worked, and the case of *Mithrax dichotomus* is no different. As the use of *Mithrax dichotomus* by Desmarest (1823: 264) is the earliest, and his diagnosis that accompanied the name makes it available, the correct author and date citation of the name must be *Mithrax dichotomus* Desmarest, 1823.

The type locality for *Mithrax dichotomus* has been reported to be the Mediterranean Sea (Desmarest, 1823: 264). As discussed earlier, it is possible that this record was based on the specimen reportedly from the Balearic Islands (see Bouvier, 1940: 325, pl. 13 fig. 2). Very little is known about this species with few published records of this species. The species was never found again from the same area or anywhere else after it was described (d’Udekem d’Acoz, 1999: 190).

An additional nomenclatural issue connected to *Mithrax dichotomus* needs to be discussed. Desmarest (1858: 14)

designated *Mithrax dichotomus* as the type species of *Mithrax* Latreille, 1816. Ng et al. (2008: 123) mentioned that “E. Desmarest (1858: 14) lists ‘*Mithrax dicotomus* Latr.’ as the type, but to our knowledge this name has never been published, and so must be regarded as a *nomen nudum*”. Although *Mithrax dichotomus* is an available name (as discussed above), the designation of *Mithrax dichotomus* as the type of *Mithrax* Latreille, 1816, is also invalid because this species was not an originally included species in *Mithrax* Latreille, 1816 (see Ng & Low, 2010: 38; Windsor & Felder, 2014: 162; 2017: 232).

Mithrax dichotomus has been recognised as a species of *Schizophrys* since Bouvier (1940: 325, fig. 198, pl. 13 fig. 2). Within the genus, there is no known record of any species of *Schizophrys* from the Mediterranean Sea, with the exception of *S. dichotomus*. Even Bouvier (1940: 325) had his doubts about the origins of the specimen, commenting “[I]es exemplaires qui le représentent et qui sont conservés au Muséum proviennent-ils bien des Baléares où jamais l’espèce n’a été retrouvée depuis? cela paraît pour le moins douteux.” (see also d’Udekem d’Acoz, 1999: 190). *Schizophrys dichotomus* has never been recorded again since the original description.

Based on the description by Desmarest (1823: 264), it is likely that there may have been more than one type specimen. The repository for the type material of this species is likely the Muséum national d’Histoire naturelle, Paris, France (MNHN), but we have not been able to find the specimen within the museum despite several attempts; it is very likely no longer extant. We have also not been able to find the specimen from the Balearic Islands figured by Bouvier (1940), which may be a type. As all the type material cannot be located, the exact taxonomic identity of this species cannot be determined. It will almost certainly require an appropriate neotype selection to fix this name, but this should only be done as part of a full revision of the genus. For the moment, we follow Ng et al. (2008: 118) in regarding *Mithrax dichotomus* Desmarest, 1823, as a valid species of *Schizophrys*.

Future work

Within the genus *Schizophrys* White, 1848, two main groups are recognised based on the number of accessory spines found on the pseudorostral spines (Griffin & Tranter, 1986: 245). The “*Schizophrys dama*-group” is comprised of a single species with two accessory spines on the pseudorostral spine (Fig. 3), while members of the “*Schizophrys aspera*-group” include the remaining species have only one accessory spine on the pseudorostral spine (Fig. 1). This is a major problem especially with members of the “*Schizophrys aspera*-group” – with recent workers describing new species in this group (e.g., Griffin & Tranter, 1986; Al-Aidaros et al., 2017), but did not treat or resolve the identities of the many junior subjective synonyms in *S. aspera* s. str. Some of these new taxa could probably be synonyms of the eight junior synonyms now listed under this species (see Table 1). A complete revision of *Schizophrys* White, 1848, with due

consideration and/or examination of all the type material of all the species in this genus (Table 1) is urgently needed to clean up the taxonomy of this genus. During this time, a neotype designation for the poorly known *Schizophrys dichotomus* (Desmarest, 1823), should also be done to stabilise the taxonomy of the various species.

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