

Dorid nudibranchs described by J.E. Gray in M.E. Gray, 1842–1857 (Mollusca: Opisthobranchia)

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Abstract – In works completed during the years 1842–1857 J.E. Gray introduced four new generic and five specific names of dorid nudibranchs based on drawings reproduced by his wife M.E. Gray. Some of those names are currently in use, whereas others have not been in use since their introduction.

These names are revisited, along with reproductions of the original drawings by M.E. Gray, and a discussion of the status of the names. Photographs of likely representatives of these species are presented, based on our interpretation of the original description. Where there is some uncertainty, we have offered a discussion as to the most likely possibility of a correct identification. A list of potential changes that would have to be made during revision of the groups herein is included as a guide for succeeding authors.

INTRODUCTION

Maria Emma Smith Gray [1787–1876], conchologist and algologist, was the spouse of naturalist John Edward Gray [1800–1875]. Mrs. Gray greatly assisted her husband in his scientific work especially by her drawings. She also mounted and arranged most of the Cuming collection of shells in the British Museum (now The Natural History Museum, London), but she was mostly interested in the study of sponges and algae.

During the 1840's M.E. Gray had to spend a period of time confined at home due to health problems. During that time, she copied from several works figures of mollusks for the use of her husband. Hoping that other authors could also benefit from this compilation of figures, she decided to publish them in a series of volumes (E.M. Gray, 1842–1857). Although five volumes were published, only four concentrated on the Nudibranchia. In the fourth volume, J.E. Gray wrote an explanation of the plates. In most cases J.E. Gray copied the name of the species and included a reference to the work from which the drawings were copied. However, in some cases the drawings were copied from manuscript works and new names were introduced for the species. In some cases, authors used those new names, whereas others were either overlooked or ignored for unknown reasons by the malacological community.

The objective of the present paper is to bring the researchers' attention to the importance of delving

into the scientific literature to uncover and discuss the original name(s) and all synonymies of a species. We present a particularly troublesome example that demonstrates why such full checks should be performed. In addition, we wish to call the attention of modern nudibranch researchers to the names used by Gray, first as an interesting historical overview of how taxonomic names can come into use or fall into obscurity. Due to the lack of original material from which to compare photographs and live specimens to Gray's drawings, we have illustrated the species most closely resembling those drawings in order to inspire further interest in and debate on the history of nudibranch species names.

SYSTEMATICS

Generic names

Names are printed as in the original description (between quotation marks), and arranged in the original order. A complete reference is provided, including the type species and some remarks on the taxonomy or nomenclature of each genus name.

1. "ACANTHODORIS. Gill not retractile; tentacula retractile." — *Acanthodoris* J.E. Gray in M.E. Gray, 1850: 103.

Type species

Doris pilosa Abilgaard in Müller, 1789, by monotypy.

Remarks

This generic name is currently regarded as valid.

2. "CERATODORIS. Tentacula enlongate, filiform, not retractile." — *Ceratodoris* J.E. Gray in M.E. Gray, 1850: 103.

Type species

Doris eolida Quoy and Gaimard, 1832, by monotypy.

Remarks

J.E. Gray (1842–1857) introduced the genus name *Ceratodoris* in combination with *Doris eolida* Quoy and Gaimard, 1832, which is the type species by monotypy. Quoy and Gaimard (1832: 263–264, pl. 18, figs 11–15) described *Doris eolida* as a small white dorid with reddish spots and large dorsal processes. This description matches the characteristics of *Okenia plana* Baba, 1960, and it is most likely that these two names are synonyms. Therefore *Ceratodoris* is a junior synonym of *Okenia* Menke, 1830. Bergh (1874: 109–112, pl. 3, figs 4–20) introduced the genus *Echinodoris* Bergh, 1874 also based in *Doris eolida* Quoy and Gaimard, 1832. However, Bergh (1874) misidentified the type species of *Echinodoris*, and he actually described a specimen of *Cadlinella ornatissima* Risbec, 1928. Rudman (1995) provided a thorough discussion of the status of *Ceratodoris eolida* and this reference should be consulted for further details. We agree with Rudman (1995) in that the status of *Echinodoris* will remain undetermined until a type species is fixed for this genus name. Possibilities include either that *Echinodoris* is based on the nominal species previously cited as type species or it may be the taxonomic species actually involved in the misidentification (ICZN 1999: Article 70.3).

3. "ATAGEMA. Gills very small, at the end of a dorsal sac." — *Atagema* J.E. Gray in M.E. Gray, 1850: 104.

Type species

Doris carinata Quoy and Gaimard, 1832, by monotypy.

Remarks

Valdés and Gosliner (2001) examined the single remaining syntype of *Atagema carinata* to confirm its identity and to compare to specimens for their study. These authors provided a diagnosis and discussion on the status and synonymy of *Atagema*, which is currently in use.

4. "CERATOSOMA. Back produced behind." — *Ceratosoma* J.E. Gray in M.E. Gray, 1850: 105.

Type species

Ceratosoma trilobata J.E. Gray, 1850, by monotypy.

Remarks

According to Rudman (1984), J.E. Gray's description is the original introduction of the genus *Ceratosoma*. Most authors attributed this genus to Adams and Reeve, 1850, but J.E. Gray's description appeared several months earlier. As Rudman (1984) pointed out, it is not possible to know the identity of *Ceratosoma trilobata* based on the two drawings published by M.E. Gray, or whether or not they represent the same species. The second drawing appears in volume 4 as "Doris trifida. Gray" which is probably an error for *Doris trilobata*.

Specific names

Names are printed between quotation marks, and arranged in the original order. Then the modern equivalent is provided, including a complete reference, the type locality, and some remarks on the taxonomy or nomenclature and etymology of each species. The original figures of each species are here reproduced and cited in the text.

1. "Glossodoris D'Orbignii, D'Orb. t. 216. f. 2." — *Glossodoris dorbignii* J.E. Gray in M.E. Gray, 1850: 102, pl. 216, fig. 2 (Figure 1A).

Type locality

Unknown.

Remarks

The illustration reproduced by M.E. Gray appears to be copied from a d'Orbigny's unpublished work. The specimen figured has a series of rounded dorsal tubercles interconnected by low ridges (Figure 1A). There are two larger and more elongate tubercles on each rhinophoral sheath and 8 longer branchial leaves and 5 short leaves. Thompson (1984) illustrated the ventral surface of *Doris sticta* (Iredale and O'Donoghue, 1923) and the oral tentacles most nearly match those of Mrs. Gray's drawing showing digitiform tentacles. The difference found between M.E. Gray's drawing and live animals of *Doris sticta* with the shorter 5 anterior branchial leaves of *Glossodoris dorbignii* is probably due to damage of the original specimen.

We also compared M. E. Gray's drawing with *Doris verrucosa* Linnaeus, 1758 because of the shape of the dorsal tubercles in Gray's drawing. However, this species does not have ridges between the dorsal tubercles and the size and placement of the tubercles (Rudman 2004) is not consistent with M. E. Gray's drawings. Her drawings show large tubercles situated on the dorsal median, with only small tubercles along the mantle margin. *Doris verrucosa* has large tubercles scattered over much of the dorsum. The dorsal tubercles of *Glossodoris dorbignii* are not all as mushroom-shaped as in Gray's drawings, but some tubercles do have this shape.

The oral tentacles of *D. verrucosa* are also short whereas in both Gray's drawing and in *Glossodoris dorbignii* they are digitiform and elongate.

Because of the external features listed above, it is clear that *Glossodoris dorbignii* is a member of the genus *Doris* Linnaeus, 1758 and a senior synonym of *Doris sticta* (Iredale and O'Donoghue, 1923). *Doris sticta* was originally introduced as a replacement name for *Doris maculata* Garstang, 1896, type locality Plymouth, England [not *Doris maculata* Montagu, 1804 = *Doto maculata*; type locality Devonshire, England].

In the past fifty years, the following authors have used the specific name *sticta* as the valid name for this member of the genus *Doris*: Pruvot-Fol (1951, 1954), Gantès (1956), Nordsieck (1972), Bouchet and Tardy (1976), Cattaneo-Vietti and Barletta (1984) Thompson and Brown (1984), Perrone (1988), Thompson (1988), Cattaneo-Vietti and Thompson (1989), Cattaneo-Vietti, Chemello, and Giannuzzi (1990), Sabelli *et al.* (1990), Smith and Heppell (1991), Sabelli *et al.* (1992), Valdés (1992), Picton and Morrow (1994), Goto and Poppe (1996), Connor *et al.* (1997a, 1997b), Howson and Picton (1997), García-Gómez (2002), Hiscock *et al.* (2002), Valdés (2002b), Gavaia *et al.* (2003), Parr and Ager (2003), and Calado *et al.* (2005). The name *dorbignii* has not been used as valid since the original description.

According to the ICZN (1999, Article 23.9.2), a junior synonym takes precedence over a senior synonym that has not been used since 1899, if the junior synonym has been used in at least 25 publications, published by at least 10 authors in the immediately preceding 50 years. These conditions are met with the above referenced citations. Therefore the name *Doris sticta* is considered valid (*nomen protectum*) and *Glossodoris dorbignii* is considered invalid (*nomen oblitum*).

Etymology

This species (*Glossodoris dorbignii*) was named after Alcide Charles Victor Marie Dessalines d'Orbigny [1802–1857], prominent French naturalist. Between 1815 and 1820 he and his family lived at Esnandes, a coastal village 13 km north of La Rochelle, where his father Charles encouraged d'Orbigny's interest in marine life. During that time he collected various specimens of opisthobranchs now deposited at the Museum National d'Histoire Naturelle, Paris, France. It is likely that d'Orbigny encountered specimens of *Doris sticta*, which is relatively common in northern France. In 1826, at the age of 24, d'Orbigny was selected to sail for South America on a seven-year research expedition organized by the Museum National d'Histoire Naturelle. He amassed an enormous collection of natural history specimens. After returning to France, invertebrate fossils became d'Orbigny's

main focus of interest, especially the taxonomy and stratigraphical distribution of species from the Jurassic and Cretaceous. D'Orbigny made major contributions to many scientific disciplines, including zoology, paleontology, geology, archeology, and anthropology.

2. "Actinodoris Tilesii, Tilesius, t. 230. f. 4." — *Actinodoris tilesii* J.E. Gray in M.E. Gray, 1850: 102, pl. 230, fig. 4 (Figure 1B).

Type locality

Japan.

Remarks

The specimen figured by M.E. Gray (Figure 1B) has a dark background color with a paler line around the mantle and foot margins. There are probably 6 tripinnate branchial leaves, although this is not clear from the drawing. The rhinophores are perfoliate, elongate and dark with a paler apex.

Actinodoris tilesii is most likely a junior synonym of *Dendrodoris fumata* (Rüppell and Leuckart, 1830). Brodie *et al.* (1997) revised the systematics of *D. fumata* and *Dendrodoris nigra* (Stimpson, 1855), concluding that these two species show a remarkable external variability. (See also Brodie and Calado 2006). The drawing of *A. tilesii* however clearly matches the black form of *D. fumata*, which is characterized by having a black dorsum with no white spots and a marginal thin red line around the mantle (Figure 1B). Some dark specimens of *D. nigra* have a similar coloration, but the red line is submarginal and there are white spots on the dorsum (Brodie *et al.* 1997).

M.E. Gray did not indicate the locality in which *A. tilesii* was collected, but according to Krusenstern (1810–14) the specimen was collected in Japan.

Etymology

This species was named after Wilhelm Gottlieb Tilesius von Tilenau (1769–1857), who accompanied the Krusenstern expedition during the first Russian circumnavigation, from 1803 to 1806. After the Russian painter, Kurjlandzow, left the expedition in Kamchatka in 1804, Tilesius became responsible for recording interesting observations relating to the geography and natural history of the places they visited. He contributed many detailed designs for the illustrations in the Atlas that accompanied the three volumes of Krusenstern's account of the voyage.

3. "Actinodoris Krusensternii, Tilesius, t. 230. f. 5." — *Actinodoris krusensternii* J.E. Gray in M.E. Gray, 1850: 102, pl. 230, fig. 5 (Figure 1C).

Type locality

Japan.

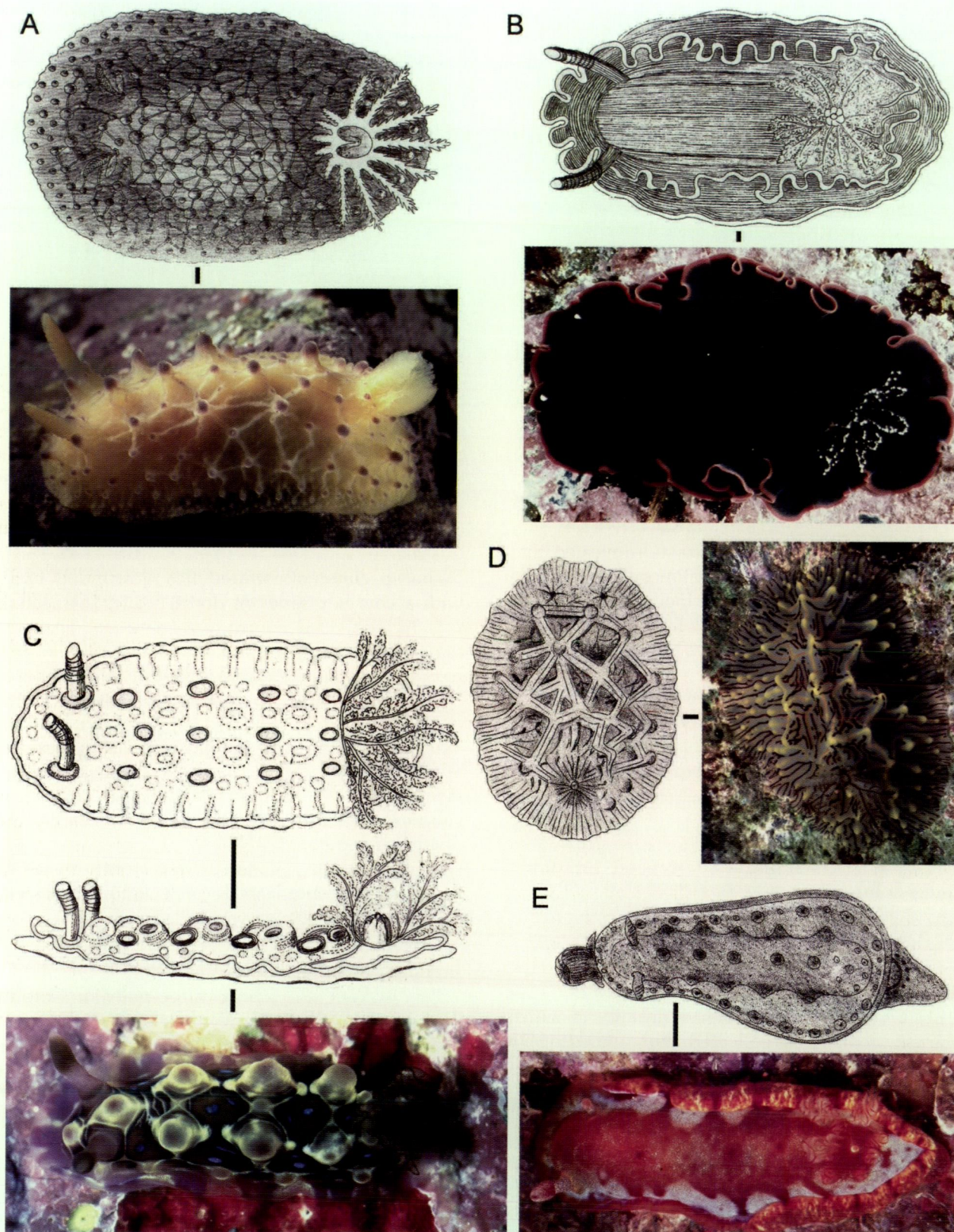


Figure 1 Figures reproduced by M.E. Gray and color photographs of the living animals. A, *Glossodoris dorbignii* J.E. Gray in M.E. Gray, 1850 and *Doris sticta* (Iredale and O'Donoghue, 1923) from Guernsey, Great Britain, photo and copyright Richard Lord. B, *Actinodoris tilesii* J.E. Gray in M.E. Gray, 1850 and *Dendrodoris fumata* (Rüppell and Leuckart, 1830) from Puerto Peñasco, Mexico, photo and copyright LACM archives. C, *Actinodoris krusensternii* J.E. Gray in M.E. Gray, 1850 and *Dendrodoris denisoni* (Angas, 1864) from Papua New Guinea, photo and copyright Terrence M. Gosliner. D, *Doris incei* J.E. Gray in M.E. Gray, 1850 and *Halgerda willeyi* Eliot, 1903 from Papua New Guinea, photo and copyright Terrence M. Gosliner. E, *Hexabranchus adamsii* J.E. Gray in M.E. Gray, 1850 and *Hexabranchus sanguineus* (Rüppell and Leuckart, 1830) from the Philippines, photo and copyright Ángel Valdés.

Remarks

The figures by M.E. Gray depict an oval to elongate dorid, covered with rounded tubercles having what appear to be a central depression (Figure 1C). There are a series of oval markings on the dorsum; some of the markings are dark rings whereas others appear to be light rings and spots. The mantle margin is surrounded by a light line with radial inward ramifications that appear to fade out after running a short distance. There is an undetermined number of tripinnate branchial leaves and the rhinophores are elongate and perfoliate. Examination of the original drawings published by Krusenstern (1810–14: pl. 61, figs. 1–4) show no additional details, with the exception of figure 2, which is a drawing of the ventral side of the body with the mouth area visible as a pore with no oral tentacles.

According to the external features and color pattern, *Actinodoris krusensternii* is most likely a senior synonym of *Dendrodoris denisoni* (Angas, 1864). Examination of photographs from living specimens of *D. denisoni* (Figure 1C) revealed that this species has a similar general morphology to the drawings of *A. krusensternii*, including a similar arrangement of the dorsal tubercles. Additionally, the tubercles of some specimens of *D. denisoni* have darker apices, giving them the appearance of being concave. The other markings and rings depicted by Tilesius (in Krusenstern) and M.E. Gray are most likely an attempt to reproduce the complex color pattern of *D. denisoni*. The presence of a reduced mouth area with no oral tentacles confirms that this is a species of *Dendrodoris*.

We realize that there are other names given to specimens of *Dendrodoris denisoni* such as *D. clavalata* (Alder and Hancock, 1864). However, as discussed by Brodie (2002), a complete revision of the clade *Dendrodoris* is needed at which time a thorough investigation should be undertaken on the synonyms of this species.

M.E. Gray did not indicate the locality in which *A. krusensternii* was collected, but according to Krusenstern (1810–14) the specimen was collected in Japan.

Etymology

This species was named after Adam Johann Ritter von Krusenstern also known as Ivan Fedorovich Kruzenshtern [1770–1846], and Krusenstern (depending on the translation). He was a Russian navigator who circumnavigated the globe from 1803 to 1806 on the ships *Nadezhda* and *Neva*. Although the voyage was undertaken to stimulate the fur trade of the Pacific coast, to examine California for a possible colony, and to revive trade with China and Japan, its most important contribution was to investigate the hydrography of the North Pacific coast of America. His scientific work won him a

honorary membership in the Russian Academy of Sciences. Krusenstern was director of the Royal Naval Academy and was promoted to the rank of admiral. He wrote an account of his voyage (Kruzenshtern, 1810–1814).

4. "*Doris incii*, Alder, MSS. t. 226. f. 1." — *Doris incii* J.E. Gray in M.E. Gray, 1850: pl. 226, fig. 1 (Figure 1D).

Type locality

Torres Straits, New Guinea.

Remarks

M.E. Gray's illustration reproduces a manuscript drawing by "Mr. Alder" of a specimen collected from Torres Straits, New Guinea. The authorship of the drawing is unknown because the identity of "Mr. Alder" could not be verified. As far as we know Joshua Alder [1792–1867] never traveled to New Guinea and no other naturalist or ship surgeon with this name served in survey ships in this region.

The specimen illustrated has a rounded body with a complex series of dorsal ridges connecting rounded tubercles (Figure 1D). There are numerous darker radial lines around the mantle margin and some on the center of the ridges. The rhinophores and gill appear to be retracted but the gill is multi-leaved. The characteristics of this animal most closely match the description or illustration of *Halgerda willeyi* by these authors: Eliot (1904), Burn (1975), Rudman (1978), Willan and Coleman (1984), Coleman (1989), Yonow (1990), Yonow and Hayward (1991), Debelius (1996), Willan (1998), Gosliner, Behrens and Williams (1996), Marshall and Willan (1999), Fahey and Gosliner (1999), Ono (1999), Carlson and Hoff (2000), Fahey and Gosliner (2000) Fahey and Gosliner (2001a), Fahey and Gosliner (2001b), Coleman (2001), Keiu (2000), Fahey and Gosliner (2003), Fahey and Healy (2003), Fahey 2003a), (Fahey 2003b), Ferrari and Ferrari (2003), Nakano (2004) and Ono (2004).

We also compared Gray's drawing to another externally similar species *Halgerda elegans* Bergh, 1905. However, that species has a very sparsely pinnate gill unlike the gill depicted by Gray. Also *H. elegans* does not have prominent dorsal tubercles at the juncture of each ridge.

According to the ICZN (1999, Article 23.9.2), a junior synonym takes precedence over a senior synonym that has not been used since 1899, if the junior synonym has been used in at least 25 publications, published by at least 10 authors in the immediately preceding 50 years. These conditions are met with the above referenced citations. Therefore the name *Halgerda willeyi* is considered valid (*nomen protectum*) while *Doris incii* is considered invalid (*nomen oblitum*).

Etymology

This species was probably named after John Matthew Robert Ince [1808–1850] of the Royal Navy. (See Gray's text: "Doridae. Mr. Alder's MS drawing. From Torres Straits, Capt. Ince, R.N."). He served as lieutenant aboard the HMS Fly from 1841–1846, during the survey and mapping expeditions to the Torres Straits, along with naturalist Joseph Beete Jukes [1811–1869].

5. "Hexabranhus Adamsii, Adams, MSS. t. 219. f. 1." — *Hexabranhus adamsii* J.E. Gray in M.E. Gray, 1850: pl. 219, fig. 1 (Figure 1E).

Type locality

Borneo.

Remarks

The specimen figured by M.E. Gray has characteristics of *Hexabranhus sanguineus* (Rüppell and Leuckart, 1830). The 5 branchial leaves are contracted but visible near the posterior end of the dorsum (Figure 1D). The buccal mass is partially evaginated so that the mouth area and oral tentacles are visible emerging from the anterior end of the notum. The oral tentacles do not show the characteristic lobules present in species of *Hexabranhus*, but this is probably due to the angle in which they were drawn. The dorsal pattern of colors is very similar to the specimen of *H. sanguineus* also illustrated in Figure 1D.

There is no doubt that *H. adamsii* is a junior synonym of *H. sanguineus*, a fact that has been previously documented in the literature (Valdés 2002a). The drawing was copied from a manuscript picture by Arthur Adams.

Etymology

This species was named after Arthur Adams [1820–1878], who was the ship's surgeon on the H.M.S. Samarang expedition to East and South East Asia from 1843–1846, commanded by Captain Edward Belcher [1799–1877]. During the expedition Adams made numerous observations on living mollusks, sketching many of them in living state.

DISCUSSION

This discussion of nudibranch names introduced by J.E. Gray in M.E. Gray (1842–1850) has limited impact in current taxonomy of dorid nudibranchs. New provisions in the latest version of the International Code of Zoological Nomenclature (ICZN 1999: Article 23.9.1) allow the replacement of senior synonyms by junior synonyms if certain conditions are met. We have noted the names *Doris sticta* and *Halgerda willeyi*, both which would meet the conditions of Article 23.9.1.

The objective of this paper is to bring the researchers' attention to the importance of delving into the scientific literature to uncover and discuss the original name(s) and synonymies of a species. We have presented two particularly troublesome examples that demonstrate why such full checks should be undertaken. We are not proposing any changes in classification, because this subject is more appropriately addressed during revisionary work on each particular group. However, a list of potential changes that would have to be made is included in the summary below, of name statuses as a guide for other authors. Revisions of these groups and subsequent discussion of species names are encouraged and anticipated.

Summary of genus name statuses

- *Acanthodoris* J.E. Gray in M.E. Gray, 1850: 103, valid.
- *Ceratodoris* J.E. Gray in M.E. Gray, 1850: 103, junior synonym of *Okenia* Menke, 1830.
- *Ceratosoma* J.E. Gray in M.E. Gray, 1850: 103, valid.
- *Atagema* J.E. Gray in M.E. Gray, 1850: 104, valid.

Summary of species name statuses

- *Glossodoris dorbignii* J.E. Gray in M.E. Gray, 1850: 102, pl. 216, fig. 2, (*nomen oblitum*) *Doris sticta* (Iredale and O'Donoghue, 1923) (*nomen protectum*).
- *Actinodoris tilesii* J.E. Gray in M.E. Gray, 1850: 102, pl. 230, fig. 4, junior synonym of *Dendrodoris fumata* (Rüppell and Leuckart, 1830).
- *Actinodoris krusensternii* J.E. Gray in M.E. Gray, 1850: 102, pl. 230, fig. 5, senior synonym of *Dendrodoris denisoni* (Angas, 1864).
- *Doris incei* J.E. Gray in M.E. Gray, 1850: pl. 226, fig. 1 (*nomen oblitum*).
- *Halgerda willeyi* Eliot, 1903 (*nomen protectum*).
- *Hexabranhus adamsii* J.E. Gray in M.E. Gray, 1850: pl. 219, fig. 1, junior synonym of *Hexabranhus sanguineus* (Rüppell and Leuckart, 1830).

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