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ON THE SYNONYMY OF *SAGITTA DECIPIENS* FOWLER, 1905, AND *SAGITTA NEODECIPIENS* TOKIOKA, 1959, AND THE VALIDITY OF *SAGITTA SIBOGAE* FOWLER, 1906

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ABSTRACT

The inadequacies of the original descriptions of *Sagitta decipiens* Fowler, 1905, and *S. sibogae* Fowler, 1906, have led to confusion concerning these species. *Sagitta neodecipiens* Tokioka, 1959, is a junior synonym of *S. decipiens* Fowler, 1905. *S. sibogae* Fowler, 1906, is the valid name for the species usually incorrectly named *S. decipiens* (non Fowler, 1905) because of the redescription of Ritter-Zahony (1911). *S. philippini* Michael, 1919, is a junior synonym of *S. sibogae*. The two valid species are redescribed from the types, and lectotypes have been designated.

INTRODUCTION

Fowler's original description of *Sagitta decipiens* from the Bay of Biscay was poorly illustrated in that the camera lucida drawing gave only the outline of a specimen without seminal vesicles (Fowler, 1905: pl. 5, fig. 32). Later he described *S. sibogae* (Fowler, 1906)

from the Indonesian area. In his revision of the group, Ritter-Zahony (1911) was misled by the inadequacies of Fowler's descriptions and treated *S. sibogae* as a junior synonym of *S. decipiens*, giving a more detailed illustration of what he named *S. decipiens*, and his view was generally accepted. Tokioka (1959) described a new species from the North Pacific, *S. neodecipiens*, closely related to *S. decipiens*.

Material from the Discovery collections of the Institute of Oceanographic Sciences (Wormley, Great Britain) collected in the Bermuda area comprised both *S. decipiens* (sensu Ritter-Zahony, 1911) and *S. neodecipiens*, which led to a reinvestigation of the type specimens of *S. decipiens* and *S. sibogae*. Unfortunately the type specimens of *S. neodecipiens* are lost but both the drawings (Tokioka, 1959, figs. 17-19) and the description and comments (Tokioka, 1959:

374-378) are very detailed.

MATERIAL

The material examined is preserved in the following museums and institutes: British Museum (Natural History), London (BMNH); United States National Museum, Washington, D.C. (USNM); Institute of Oceanographic Sciences, Wormley, Great Britain (IOS); Zoologisk Museum, Copenhagen (ZMUC); Zoölogisch Museum, Amsterdam (ZMA).

It originates from: the "Research" Expedition (BMNH): 20 specimens alcohol, 2 specimens slides; the Philippine Expedition (USNM): 1 specimen alcohol, + 100 specimens formalin; the Discovery collection, cruise 52, sta. 8281 (IOS): + 600 specimens formalin; The Atlantide Expedition (ZMUC): 22 specimens alcohol; the Siboga Expedition (ZMA): 69 specimens alcohol; and the Siboga Expedition (BMNH): 4 specimens slides.

Sagitta decipiens Fowler, 1905 (figs. 2-4)

Sagitta decipiens Fowler, 1905: 70, pl. 5, figs. 32-35; Lea, 1955: 606, fig. 4; Neto, 1961: 27, figs. 22-24; Alvarino, 1963: 103, figs. 5-6; Vučetič, 1969: 3.
Sagitta neodecipiens Tokioka, 1959: 377, figs. 17-19, fig. 20 (nr. 47-48); Ducret, 1962: 344, figs. 14-16, 18; Tokioka, 1965: 349; Dallot & Ducret, 1968: 433, fig. 4; Ducret, 1968: 125; Furnestin & Codaccioni, 1968: 159; Ibañez, 1969: 102; Dallot, 1970: 551; Ducret, 1973: 578; Nagasawa & Marumo, 1976: 99; Kuroda, 1976: 44. (non Ducret, 1962: fig. 17)

Type material.- Lectotype BMNH 1931.5.27.35, alcohol specimen; paralectotypes, BMNH 1909.12.8.36-47, 18 alcohol specimens; paralectotype, BMNH 1931.5.27.35, alcohol specimen; paralectotypes, BMNH 1931.5.27.2, parts of 2 specimens on slides.

The lectotype has been selected from "Research" sta. 30 g in which 2 specimens were present. These specimens were kept by Fowler until 1931, while the rest of the "Research" samples were given to the British Museum (Natural History) in 1909. The lectotype is 8.4 mm long, the tail 25% of the total length, number of hooks 5-6, anterior teeth 7-8,

posterior teeth 15-17, maturity stage IV, tail cavity empty, ovaries with eggs.

Type locality.- H.M.S. "Research" station 30g, 47° 14' N, 07° 58' W, 19.VII.1900, 0-100 fathoms.

Description.- Body slender, with a small head. Eye pigment elongated T-shaped as shown in fig. 2. Tail segment forms 25.0% to 31.7% of total length. Maximum body length at maturity 13.5 mm. Anterior fins long and narrow, with a small rayless part at the anterior end, beginning at the hinder end of the ventral ganglion. Posterior fins equally situated on trunk and tail with a small rayless zone at the anterior end. No collarette. Gut-diverticula prominent. Ovaries short, when mature extending about as far as the posterior end of the anterior fins. Ova rather big. Seminal vesicles long and narrow with a glandular part at the anterior end, situated at approximately equal distance from posterior fins and tail fin. Number of hooks: 6 (sometimes 5 in old, and 7 in young specimens). The anterior teeth are small, triangular in shape and they form imbricate rows, numbering from 4 to 10. The posterior teeth are long and narrow, numbering from 6 to 18.

Remarks.- Fowler's original drawing of this species is reproduced in fig. 1a. The lectotype, and one of the paralectotypes with seminal vesicles are illustrated in figs. 3 and 4 respectively. When these are compared with the original figure of *S. neodecipiens*, reproduced in fig. 1c, there can be little doubt that they are identical. Hence *S. neodecipiens* Tokioka, 1959, becomes a junior synonym of *S. decipiens* Fowler, 1905.

Sagitta sibogae Fowler, 1906 (figs. 5-6)

Sagitta sibogae Fowler, 1906: 21, pl. II, figs. 66-72.
Sagitta decipiens; Ritter-Zahony, 1911: 27, figs. 30-31; Michael, 1919: 254, pl. 35, fig. 8; Burfield & Harvey, 1926: 94, fig. 4; Russell, 1939: 3, fig. 9; Tokioka, 1939: 132, fig. 9-2; 1940: 5; Schilp, 1941: 37; Thomson, 1947: 20;

Tokioka, 1950: 127; 1952: 309; 1954: 359; 1955: 219; 1957: 137; Fagetti, 1958: 58, fig. 12; Sund, 1959: 273, fig. 3; Tokioka, 1959: fig. 20 (nr. 49-50); Legaré & Zoppi, 1961: 160, figs. 4-6; Ducret, 1962: 344; Tokioka, 1962: 9; 1965: 349; Furnestin, 1966: 126; Alvaríño, 1967: 61, figs. 38-39; Dallot & Ducret, 1968: 433, fig. 3; Ducret, 1968: 125, fig. 26; Furnestin & Codaccioni, 1968: 160; Alvaríño, 1969: 24, figs. 87-88; Ibañez, 1969: 102; Silas & Srinivasan, 1970: 179, fig 1-c; Dallot, 1970: 551; Ducret, 1973: 578; Nagasawa & Marumo, 1976: 99; Kuroda, 1976: 44. (non Fowler, 1905).

Sagitta philippini Michael, 1919: 240, pl. 34, figs. 1-4;

? *Sagitta neodecipiens*; Ducret, 1962: fig. 17. (non Tokioka, 1959).

Type material.- Lectotype, ZMA 525-c, alcohol specimen; paralectotypes, ZMA 525 a-b, 39 alcohol specimens; paralectotypes, ZMA 526, 25 alcohol specimens; paralectotypes, ZMA 527, 2 alcohol specimens; paralectotypes, ZMA 528, 2 alcohol specimens; paralectotype, BMNH 1931.5.27.1.4N, 1 specimen on slide; paralectotypes, BMNH 1931.5.27.1.1N-3N, parts of 3 specimens on slides.

The lectotype has been selected from Siboga-Expedition sta. 141 in which 40 specimens were found. These specimens and the other paralectotypes are syntypes as no indication of a specimen as holotype could be found. The lectotype is 16.1 mm long, the tail 18.6% of the total length, number of hooks 5-6, anterior teeth 11-11, posterior teeth 20-21, maturity stage IV, tail cavity nearly empty, seminal vesicles present, long ovaries with eggs.

Type locality.- Siboga Expedition station 141, 01° 0.4' S, 127° 3' E, 5.VIII.1899, 0-1500 m.

Description.- Body slender with a broader head than *S. decipiens*. Eye pigment large, elongated T-shaped as shown in fig. 5. Tail segment from 18% to 28% of total length. Maximum length at maturity about 20 mm. Anterior fins long and narrow *) beginning at the hinder end of the

*) The type specimens are preserved in alcohol, which made fin shapes difficult to see, so the description of the fins is also based on formalin 4% preserved specimens from the Bermuda area.

ventral ganglion with a small rayless part at the anterior end. Posterior fins equally situated on trunk and tail, broader than the anterior fins, also with a small rayless zone at the anterior end. No collarette. Gut-diverticula prominent. Ovaries long and slender, extending about as far as the ventral ganglion in mature specimens. Seminal vesicles situated near the tail fin, at a large distance from the posterior fins, with a prominent glandular knob at the anterior part. Number of hooks usually 6. The anterior teeth are short, triangular in shape and they form imbricate rows, numbering from 6 to 13. The posterior teeth are long and narrow, numbering from 9 to 23.

Remarks.- Fowler's (1906) rather poor figure of this species is reproduced in fig. 1b. The more widely known figure of Ritter-Zahony (1911) is shown here in fig. 1d but because that author referred this figure to *S. decipiens* Fowler (1905) the identity of *S. sibogae* has been confused and this name has become lost in synonymy. The lectotype of *S. sibogae* is shown in fig. 6 and the true identity of *S. decipiens* (sensu Ritter-Zahony, 1911) with *S. sibogae* Fowler, 1906, can be confirmed by comparing fig. 1d with fig. 6. It is also apparent that *S. philippini* of Michael (1919) described from a single specimen (USNM 17801) is also identical with *S. sibogae* (cf. figs. 6 and 7). The specimens Michael (1919) mentioned as *S. decipiens* are also *S. sibogae*. Finally it may be mentioned that the *S. neodecipiens* pictured by Ducret (1967, fig. 17) shows in fact the typical seminal vesicles of *S. sibogae* and probably belongs to this latter species.

DISTRIBUTION

The distribution and geographic variation of the closely related species *S. decipiens* and *S. sibogae* will be dealt with in a separate paper. From investigations in the Bermuda area (IOS material) there are indications that *S. decipiens* is a deep-mesopelagic species while *S. sibogae* is a shallow-mesopelagic species. This distribution somewhat resembles the ones found for *S. planctonis* f. *planctonis* and *S. planctonis* f. *zetesios* (Pierrot-Bults, 1975), but *S. decipiens*

does not occur in higher latitudes as does *zetesios*, nor is there evidence for a different bathymetric distribution of *S. decipiens* at different latitudes.

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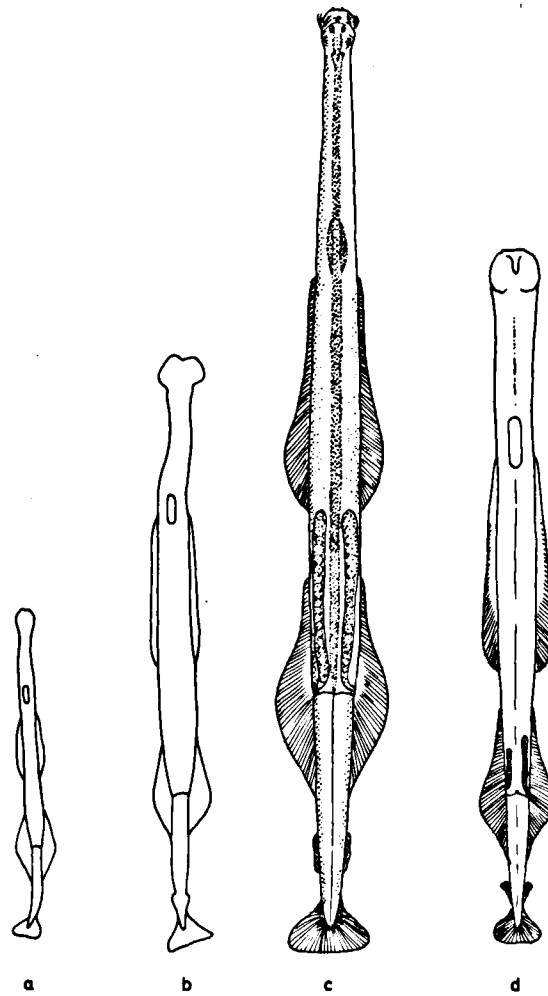


Fig. 1. Copies of the original drawings of: a, *Sagitta decipiens* Fowler, 1905; b, *S. sibogae* Fowler, 1906; c, *S. neodecipiens* Tokioka, 1959; d, *S. decipiens* (non Fowler) Ritter-Zahony, 1911.

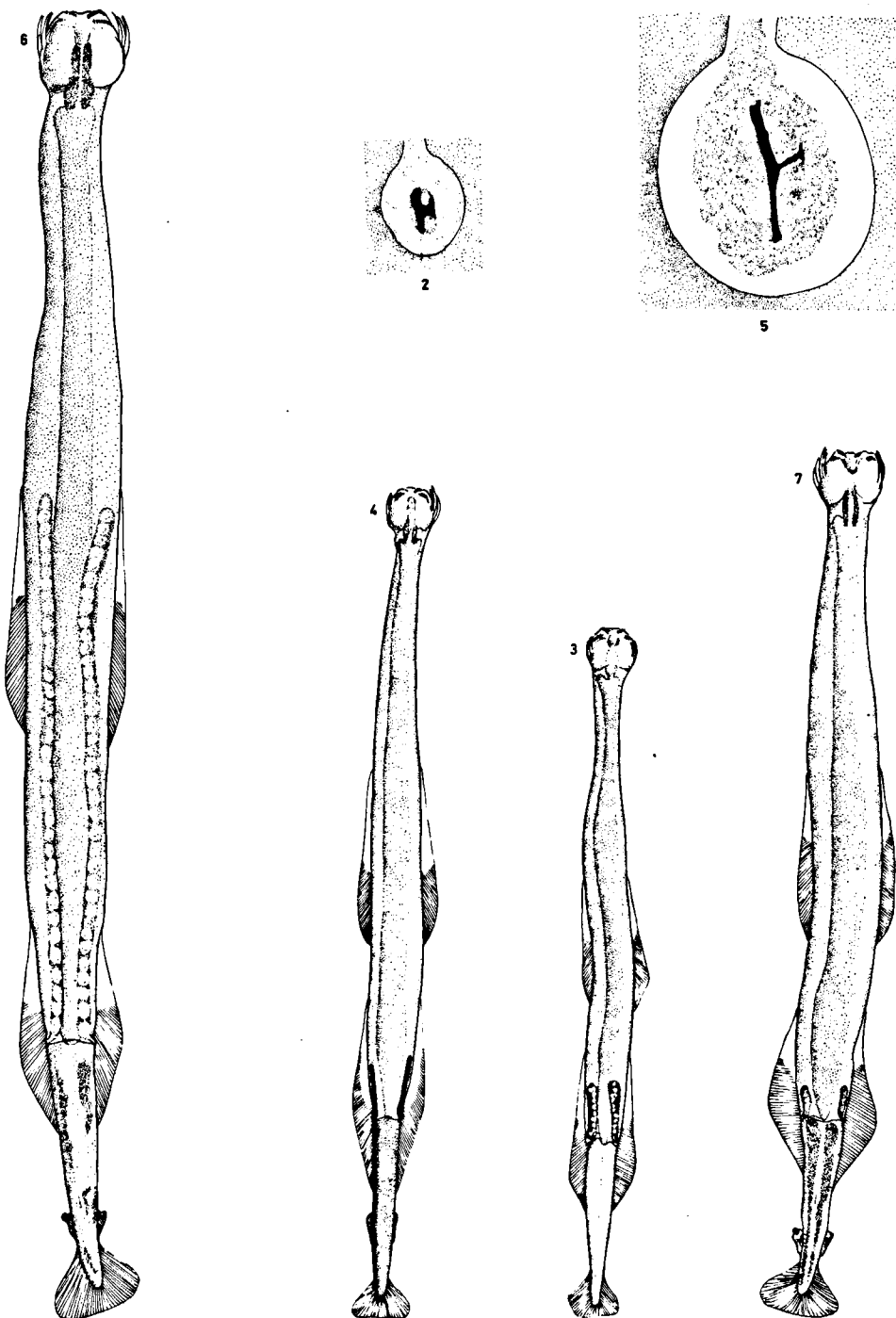


Fig. 2. The eye of the lectotype of *S. decipiens*.- Fig. 3. The lectotype of *S. decipiens*.-
 Fig. 4. One of the paralectotypes of *S. decipiens* with seminal vesicles (same magnification as
 fig. 3).- Fig. 5. The eye of the lectotype of *S. sibogae* (same magnification as fig. 2).-
 Fig. 6. The lectotype of *S. sibogae* (same magnification as fig. 3).- Fig. 7. The type specimen
 of *S. philippini* Michael, 1919 (same magnification as fig. 3).