

Glyptophidium effulgens Nielsen and Machida, 1988,
a junior synonym of *Glyptophidium argenteum* Alcock, 1889
(Actinopterygii, Teleostei, Ophidiiformes)

Masanori Nakae* and Keiichi Matsuura**

Collection Center, National Museum of Nature and Science,
3–23–1 Hyakunin-cho, Shinjuku-ku, Tokyo, 169–0073 Japan

*E-mail: nakae@kahaku.go.jp

**E-mail: matsuura@kahaku.go.jp

(Received 30 November 2009; accepted 18 December 2009)

Abstract The type specimens of *Glyptophidium effulgens* Nielsen and Machida, 1988 were compared with specimens of *G. argenteum* Alcock, 1889 and *G. lucidum* Smith and Radcliffe in Radcliffe, 1913, including types of the latter. These comparisons revealed that *G. effulgens* is a junior synonym of *G. argenteum*. One of the paratypes of *G. lucidum* is also identifiable as *G. argenteum*.

Key words: Actinopterygii, Ophidiiformes, Ophidiidae, synonymy, *Glyptophidium effulgens*, *Glyptophidium argenteum*, *Glyptophidium lucidum*.

Introduction

Glyptophidium effulgens was originally described by Nielsen and Machida (1988) on the basis of 3 specimens from off the Philippines. Nielsen and Machida (1988) distinguished it from other congeners by the following combination of characters: pelvic-fin ray 1, precaudal vertebrae 11, median branchial tooth patch 1, orbit diameter 29.0–31.0% of head length, pseudo-branchial filaments 7–8, and a relatively thin sagitta with a distinct depression in the dorsal rim. Since their original description, additional specimens of the species have not been collected.

We have recently had an opportunity to examine the type specimens of *Glyptophidium effulgens* and types of *G. lucidum* in detail, leading us to a conclusion that *G. effulgens* is a junior synonym of *G. argenteum* Alcock, 1889.

Materials and Methods

Counts and measurements follow Hubbs and Lagler (1958) and Nakae and Matsuura (2009). The tail of *Glyptophidium* is fragile and easily

damaged during collecting operations. As a result, many museum specimens lack the caudal tip. In the following pages, the standard length of specimens lacking the caudal tip is shown with “+” after the value presented. Sagittas were observed by computerized tomography (CT) scan (ALOKA LCT-100). Institutional abbreviations follow Leviton et al. (1985). Specimens examined in this study are listed below.

Glyptophidium argenteum (20 specimens): USNM 99158 [201+ mm standard length (SL), holotype of *G. effulgens*], *Albatross* sta. D-5410 (10°28'45"N, 124°05'30"E), 704 m, bottom trawl, 17 Mar. 1909; USNM 272001 (210+ mm SL, paratype of *G. effulgens*), same data as USNM 99158; ZMUC P77783 (228+ mm SL, paratype of *G. effulgens*), same data as USNM 99158; USNM 99057 (205+ to 244 mm SL, 3 specimens), *Albatross* sta. D-5410 (10°28'45"N, 124°05'30"E), 704 m, Agassiz trawl, 18 Mar. 1909; USNM 99160 (179+ to 217+ mm SL, 3), *Albatross* sta. 5405 (10°49'20"N, 124°24'23"E), 479 m, Agassiz trawl, 17 Mar. 1909; USNM 99179 (171 to 229+ mm SL, 3), *Albatross* sta. D-5373 (13°40'N, 121°31'10"E), 618 m, beam

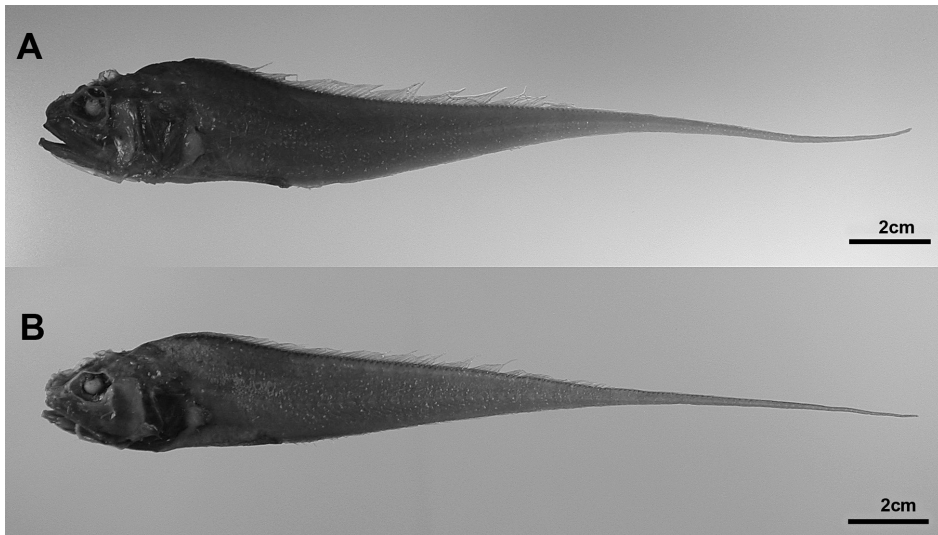


Fig. 1. Holotype of *Glyptophidium effulgens*, USNM 99158, 201 mm+SL (A) and specimen of *G. argenteum*, USNM 99057-3407, 208 mm SL (B).

trawl, 2 Mar. 1909; ZMUC P77772–P77777 (134+ to 234+ mm SL, 6), *Galathea* sta. 436 (10°12'N, 124°14'E), 710 m, sledge trawl, 9 Aug. 1951; NSMT-P 78388 (93.4+ mm SL), off Heda, Suruga Bay, Shizuoka Prefecture, Honshu, Japan, 300–400 m, bottom trawl, 1 Apr. 1986; USNM 99913 [194 mm SL, paratype of *G. lucidum* (see “Results and Discussion” below)], *Albatross* sta. 5624 (0°12'15"N, 127°29'30"E), 527 m, trawl, 29 Nov. 1909.

Glyptophidium lucidum (21): USNM 74144 (211+ mm SL, holotype), *Albatross* sta. 5625 (0°07'N, 127°28'E), 421 m, beam trawl, 29 Nov. 1909; USNM 99107 (149+ to 182+ mm SL, 7, paratypes), *Albatross* sta. D-5626 (0°07'30"N, 127°29'E), 485 m, trawl, 29 Nov. 1909; ZMUC P77548 (157+ mm SL, paratype), *Albatross* sta. D-5626 (0°07'30"N, 127°29'E), 485 m, trawl, 29 Nov. 1909; USNM 99272 (91.1+ to 195 mm SL, 11), *Albatross* sta. 5625 (0°07'N, 127°28'E), 421 m, beam trawl, 29 Nov. 1909; NSMT-P 48338 (149+ mm SL), South Senoumi Bank (34°45'37"N, 138°29'32"E–34°45'58"N, 138°28'23"E), Suruga Bay, Shizuoka Prefecture, Honshu, Japan, 240–410 m, bottom trawl, 4 Oct. 1995.

Results and Discussion

In their review of *Glyptophidium*, Nielsen and Machida (1988) recognized 7 species including their new species *G. effulgens* from the Philippines. They stated that *G. effulgens* (Fig 1A) is distinguishable from the closely related species, *G. argenteum* (Fig. 1B) and *G. lucidum* in having the following characters: orbit diameter 29.0–31.0% of head length, pseudobranchial filaments 7–8, and a relatively thin sagitta with a distinct depression in the dorsal rim. However, our examination of the type specimens of *G. effulgens* revealed that it is indistinguishable from *G. argenteum* as values for almost all meristic and morphometric characters (including orbit diameter) overlap (Fig. 2, Table 1); both have gill rakers on the anterior gill arch that are long and thin with several knobs on the inner surface (Fig. 3); the shape of the dorsal rim of the sagitta and its thickness (26.5–28.0% of sagitta width in *G. effulgens* vs. 26.5–36.2% in *G. argenteum*) are variable and thus not useful for separating the two species (Fig. 4; see also figures of Nakae and Matsuura, 2009). In addition, the distribution of *G. effulgens* completely overlaps that of *G. ar-*

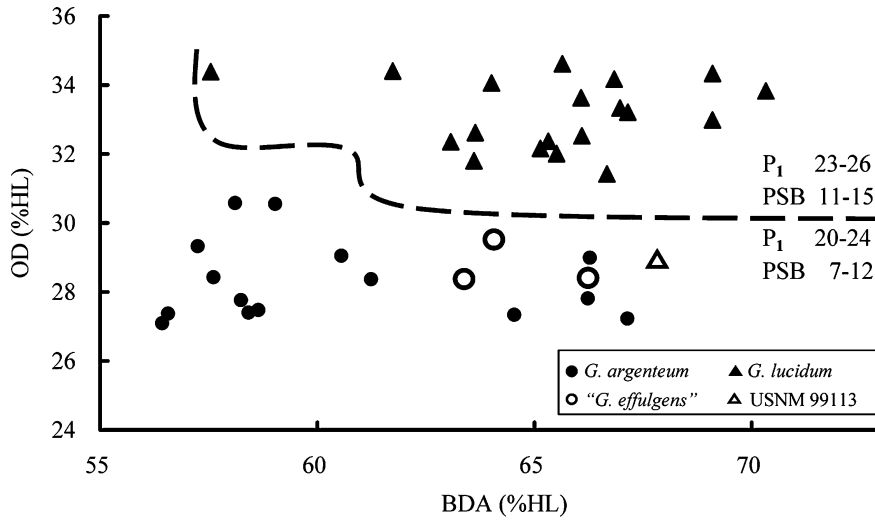


Fig. 2. Comparisons of orbit diameter versus body depth at anal-fin origin in specimens of *Glyptothidium argenteum*, *G. effulgens*, *G. lucidum* and a paratype of *G. lucidum* USNM 99113. Three damaged specimens examined (1 *argenteum*, 2 *lucidum*) are excluded. Abbreviations: BDA, body depth at anal-fin origin; HL, head length; OD, orbit diameter; P₁, pectoral-fin ray; PSB, pseudobranchial filaments.

Table 1. Meristic and morphometric characters of 3 species of *Glyptothidium* (*argenteum* species-group) fishes. Data from Nielsen and Machida (1988) in parentheses.

Species	<i>G. argenteum</i>		<i>G. effulgens</i>		<i>G. lucidum</i>
	17 specimens from USNM and ZMUC	USNM 99158 Holotype	USNM 272001 Paratype	ZMUC P77783 Paratype	
Specimens					21 specimens from USNM and ZMUC
Standard length (mm)	93.4*–244* (127–287)	201* (202)	210* (212*)	228 (228)	91.1*–211* (115–196)
Dorsal-fin rays	143–155 (140–158)	144* (141)	107* (107*)	142 (141)	133–140 (133–146)
Anal-fin rays	118–130 (114–133)	122* (124)	89* (89*)	117 (125)	110–122 (109–122)
Pectoral-fin rays	20–24 (20–24)	21 (21)	22 (22)	22 (22)	23–26 (23–26)
Pelvic-fin rays	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
Caudal-fin rays	6–7 (6–7)	– (–)	– (–)	– (–)	7–8 (7–8)
Gill rakers on anterior arch:					
dorsal small+long+ventral small	1–4+17–21+4–7	1+18+6	2+18+6	3+19+6	1–4+17–20+5–7
Total gill rakers on anterior arch	(0–5+17–23+3–8)	(1+19+5)	(2+19+6)	(3+19+6)	(0–3+14–20+4–9)
Median basibranchial tooth patch	24–28 (23–31)	25 (25)	26 (27)	28 (28)	24–28 (23–27)
Precaudal vertebrae	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
Caudal vertebrae	11 (11–12)	11 (11)	11 (11)	11 (11)	11 (11)
Dorsal-fin origin above vertebra number	78–82 (74–85)	74 (74)	51* (51*)	74 (73)	72–73 (70–81)
Anal-fin origin below dorsal ray number	3–4 (2–4)	3 (3)	3 (3)	3 (3)	3–4 (3–4)
Anal-fin origin below vertebra number	19–21 (18–23)	21 (20)	19 (20)	19 (21)	19–23 (20–24)
Pseudobranchial filaments	13–15 (13–16)	14 (14)	13 (13)	13 (14)	13–15 (12–15)
In % of head length					
Orbit diameter	7–12 (7–12)	7 (7)	9 (8)	9 (8)	12–15 (11–15)
Body depth at dorsal-fin origin	27.1–30.6 (21.5–28.5)	28.5 (29.5)	28.5 (29)	29.3 (31)	31.4–34.6 (31.5–40.5)
Body depth at anal-fin origin	66.4–85.4 (66–91)	76.3 (80)	76.8 (78)	76.2 (81)	71.9–81.3 (75–88)
In % of preanal length	56.4–67.1 (52–69)	62.8 (63)	65.4 (64)	63.2 (65)	57.5–70.3 (61–77)
Head length	60–68.3 (55–74)	63.6 (–)	65.9 (–)	64.8 (–)	56.7–66.1 (53–66)
Condition of gill rakers	long and thin	long and thin	long and thin	long and thin	short and robust

*Caudal tip lacking.

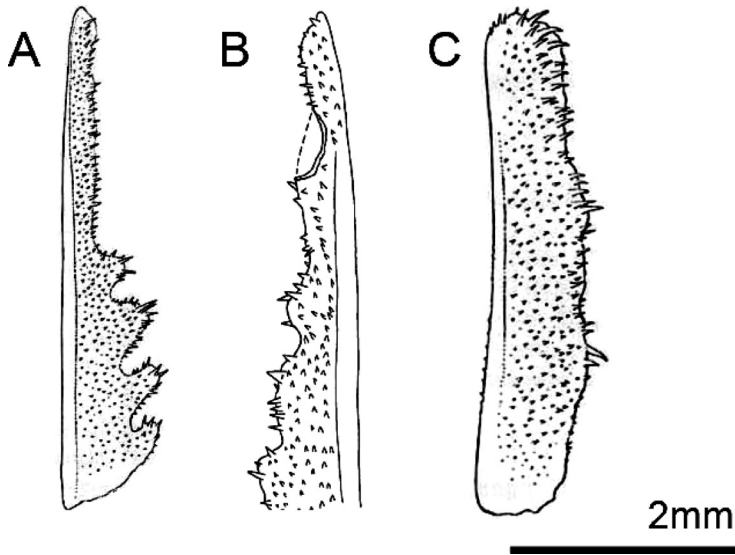


Fig. 3. Gill raker on angle between epi- and ceratobranchial on left first gill arch in three nominal *Glyptophidium* species. A, *G. argenteum*, ZMUC-P 77772, 228 mm SL; B, holotype of *G. effulgens*, USNM 99158, 201+ mm SL; C, *G. lucidum*, USNM 99109, 212+ mm SL. [Figures of *G. argenteum* and *lucidum* slightly modified from Nielsen and Machida (1988).]

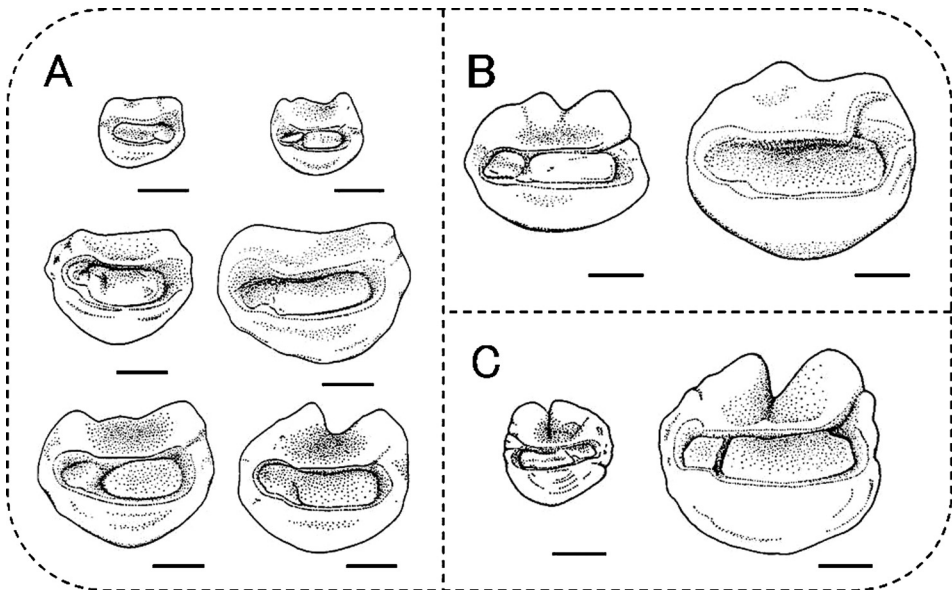


Fig. 4. Medial view of sagitta of *Glyptophidium argenteum* (A), *effulgens* (B), and *lucidum* (C). Bar 2mm. [Figures modified from Nielsen and Machida (1988).]

genteum (see Nielsen and Machida, 1988).

Although, Nielsen and Machida (1988) stated that the holotype of *G. argenteum* Alcock, 1899

is in a very poor condition and only 19 of 118 specimens examined by them have a complete tail, their description showed no doubts about its

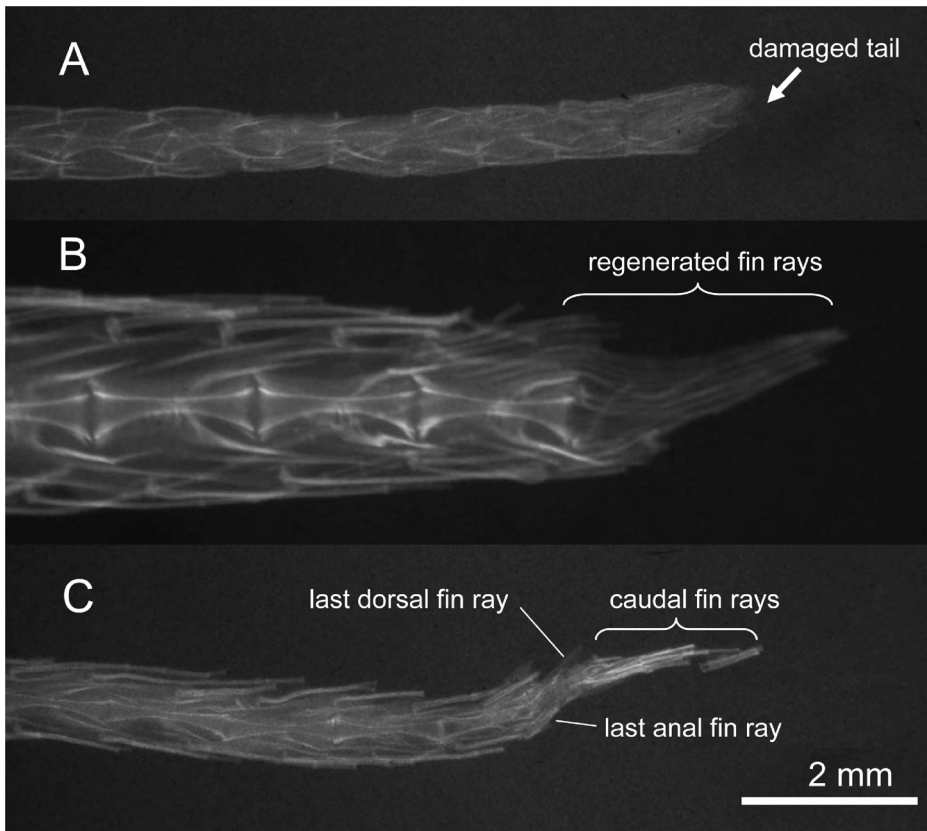


Fig. 5. X-ray photographs of caudal tip of the type specimens of *Glyptophidium effulgens*. A, USNM 99158 (holotype); B, USNM 272001 (paratype); C, ZMUC P77783 (paratype).

taxonomic status.

Nielsen and Machida (1988) stated that the type specimens of *G. effulgens* are good in condition except for the broken pelvic-fin rays and the missing caudal tip of 1 paratype (USNM 272001). However our examination of the type specimens of *G. effulgens* revealed that the holotype (USNM 99158) also lacks the caudal tip. We were able to determine from X-ray photographs of the holotype (Fig. 5) that the posterior ends of the dorsal and anal-fins are missing, and making it impossible accurately to count dorsal and anal-fin rays. Several of Nielsen and Machida's (1988) fin ray and other meristic counts for the holotype and intact paratype (ZMUC P77783) differ from ours: dorsal-fin rays of Nielsen and Machida 141 in both the holotype and paratype vs. 142–144, anal-fin rays of

Nielsen and Machida 124–125 vs. 117–122, caudal vertebrae of Nielsen and Machida 73–74 vs. 74 in both the holotype and paratype, total gill rakers of Nielsen and Machida 25–28 vs. 25–27 and pseudobranchial filaments of Nielsen and Machida 7–8 vs. 7–9 by us. As our values for all of these characters were based on X-rays, we are confident in their accuracy.

One paratypes of *G. lucidum*, USNM 99113, has 24 pectoral-fin rays, 8 pseudobranchial filaments, relatively long and thin rakers on the anterior gill arch, and orbit diameter 28.9% of head length (Fig. 2) clearly identifying it as *G. argenteum*.

Nielsen and Machida (1988) counted 24 gill rakers on the anterior arch in the holotype of *G. lucidum* while Smith and Radcliffe (1913) stated 25 in their original description. Our examination

of the holotype supports Smith and Radcliffe (1913). On the other hand, Smith and Radcliffe (1913) counted about 10 pseudobranchial filaments in the holotype, but Nielsen and Machida (1988) found 15, which we confirmed.

Acknowledgments

We express our sincere thanks to Jeffrey T. Williams (USNM), Jørgen G. Nielsen and Tammes Menne (ZMUC) for the loan of specimens, Sandra J. Raredon (USNM) for taking digital X-ray images of the type specimens of *G. efulgens*, and Kyoko Iwami (NSMT) for her CT scan operation. We thank Martin F. Gomon (Museum Victoria) for critically reading the manuscript and offered helpful comments, and Yoshihiko Machida (Kochi University) and Gento Shinohara (NSMT) for their useful comments. This study was partially supported by Grant in Aids for Scientific Research (A) by the Japan Society for the Promotion of Science, Japan (19208019).

References

- Alcock, A. 1889. Natural history notes from H. M. Indian Marine Survey Steamer "Investigator," Commander Alfred Carpenter, R. N., D. S. O., commanding. No. 13. On the bathybial fishes of the Bay of Bengal and neighbouring waters, obtained during the seasons 1885-1889. *Annals and Magazine of Natural History, Series 6*, 4: 376-399.
- Hubbs, C. L. and K. F. Lagler 1958. Fishes of the Great Lakes Region. *Bulletin of the Cranbrook Institute of Science*, 26: i-xi+1-186.
- Leviton, A. E., R. H. Gibbs Jr., E. Heal and C. E. Dawson 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, 1985: 802-832.
- Nakae, M. and K. Matsuura 2009. First Records of two ophidiid fishes, *Glyptophidium argenteum* and *G. lucidum*, from Japan (Actinopterygii, Teleostei, Ophidiiformes). *Bulletin of the National Museum of Nature and Science, Series A*, 35: 243-248.
- Nielsen, J. G. and Y. Machida 1988. Revision of the Indo-West Pacific bathyal fish genus *Glyptophidium* (Ophidiiformes, Ophidiidae). *Japanese Journal of Ichthyology*, 35: 289-319.
- Radcliffe, L. 1913. Description of seven new genera and thirty-one new species of fishes of the families Brotulidae and Carapidae from the Philippine Islands and the Dutch East Indies. *Proceedings of the United States National Museum*, 44: 135-176, pls. 7-17.