

RECORD OF *PHYLLOBRANCHILLUS ORIENTALIS* (KELAART, 1858) (SYN. *BRANCHOPHYLLUM ORIENTALE* VAR. *SAGAMIENSE* BABA, 1955) FROM CAPE SHIONO-MISAKI, KII, MIDDLE JAPAN (OPISTHOBRANCHIA : SACOGLOSSA)¹⁾

KIKUTARÔ BABA²⁾ and IWAÔ HAMATANI³⁾

With Plate IX and 1 Text-figure

The first author defined about fifteen years ago a variety *sagamiense* of *Branchophyllum orientale* (KELAART, 1858) on a single specimen collected from Sagami Bay, Japan (see BABA, 1955, pp. 9, 40), which was distinguished from the type form of the species by having a black spot in the centre of the branchial papillae and a comparatively shorter radular ribbon ($17 \times 0.1.0$). However, Mr. K. S. SUNDARAM of the Central Marine Fisheries Research Institute, Mandapam Camp, Tamilnadu, South India kindly called the first author's attention to the presence of a black spot on each branchial papilla of the specimen of *Phyllobranchillus orientalis* (KELAART, 1858) (the current nomenclature for *Branchophyllum orientale*) recently collected from the sea not very distant from the type locality of the species in India. Moreover, the second author has collected two specimens which are just the same as the variety from Sagami Bay from the region of Cape Shiono-misaki, Kii, about 300 km south west of Sagami Bay and found that the radular formula is almost as large in the dissected one of the two specimens as in the Indian specimens of *P. orientalis* reported by ALDER and HANCOCK in 1864.

Then, the authors have come to the conclusion that there is not, now, any reason for separating the variety *sagamiense* from the type form of the species; the variety should be withdrawn. The present paper is thus to record the occurrence of *P. orientalis* from Cape Shiono-misaki and to show the morphology of the specimens from this locality in detail in order to make the cancellation of the variety *sagamiense* intelligible.

The first author is indebted deeply to Mr. SUNDARAM for his kindness in giving the author the above-mentioned information by a personal communication.

1) Contributions from the Seto Marine Biological Laboratory, No. 553.

2) Shigigaoka 35, Minami-11-jyo, Sango-cho, Ikoma-gun, Nara-ken.

3) Tennoji Senior High School attached to Osaka Kyoiku University, Osaka.

Family Caliphyllidae THIELE, 1931

The family Caliphyllidae consists of 4 genera:

1. *Caliphylla* COSTA, 1867
= *Beccaria* TRINCHESE, 1870
Type: *Caliphylla mediterranea* COSTA, 1867
2. *Phyllobranchillus* PRUVOT-FOL, 1933
= *Branchophyllum* PRUVOT-FOL, 1947
= *Phyllobranchus* ALDER & HANCOCK, 1864
Type: *Proctonotus orientalis* KELAART, 1858
3. *Mourgona* MARCUS & MARCUS, 1970
Type: *Mourgona murca* MARCUS & MARCUS, 1970
4. *Cyerce* BERGH, 1871
= *Lobiancoia* TRINCHESE, 1881
Type: *Cyerce elegans* BERGH, 1871

Polybranchia PEASE, 1860 (type: *P. pellucida* PEASE, 1860) was not adequately characterized for later identification as a senior synonym of *Phyllobranchus* or of *Cyerce* (see SWENNEN, 1961, p. 57; MARCUS, 1965, p. 269; and MARCUS, 1970, p. 31).

Bosellia TRINCHESE, 1891 (type: *B. mimetica* TRINCHESE, 1891) is transferred to the Elysiidae (see MARCUS & MARCUS, 1970, p. 53).

Phyllobranchillus orientalis (KELAART, 1858)

(Japanese name: Kanran-umiushi)

Proctonotus orientalis KELAART, 1858, p. 118.—Ceylon; KELAART, 1859, p. 492.—Ceylon.

Phyllobranchus orientalis: ALDER & HANCOCK, 1864, p. 145, pl. 33, figs. 18–19.—Madras; ELIOT, 1960, pp. 686–688; O'DONOGHUE, 1932, pp. 142–143.—Gulf of Manaar.

Phyllobranchus (australis): RISBEC, 1928, pp. 272–277, pl. 8, fig. 10, pl. D, fig. 4, text-fig. 92.—N. Caledonia.

Phyllobranchillus orientalis: PRUVOT-FOL, 1933, p. 93; RISBEC, 1953, p. 166, figs. 116–118.—N. Caledonia.

Polybranchia orientalis: SATYAMURTI, 1952, p. 228, pl. 25, figs. 2a–2b.—Gulf of Manaar.

Branchophyllum orientale var. *sagamiense* BABA, 1955, pp. 9–10, 40–41, pl. 3, figs. 7–8, text-fig. 8.—Sagami Bay.

Material: Sp. No. 1. Cape Shiono-misaki, Kii, June 14, 1968.

Sp. No. 2. Cape Shiono-misaki, April 7, 1970.

These specimens were obtained by the second author from the surface of the green alga *Caulerpa brachypus* HARVEY growing on the subtidal bed in the said location, and studied by the two authors.

Total length of the animals 14–20 mm. The general body form and colour are approximately as reported previously by BABA, 1955 on a specimen from Sagami Bay. The oral tentacles are small and auriculate. The rhinophores are stouter,

cylindrical and deeply fissured to form two rolled lobes. The branchial papillae, set nearly all around the mantle, are contractile, deciduous, and very sticky to the touch. Each papilla consists of a long stalk and an expanded lamina which is denticulated on the margin. The liver diverticulum is thickly branching within the papilla. There are tiny tubercles irregularly scattered on the back and branchial papillae. The sole is not divided into two halves by a transverse furrow.

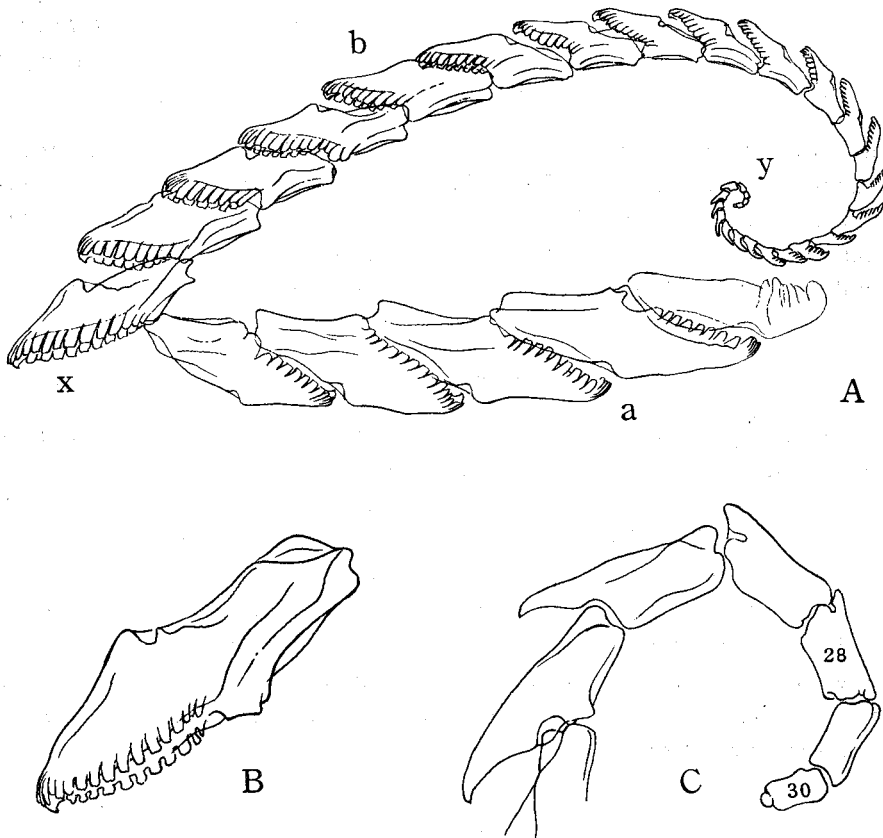


Fig. 1. *Phyllobranchillus orientalis*. Sp. No. 1.

- A. Entire radular row ($\times 35$). a. ascending series, b. descending series, x. effective tooth, y. spiral end.
 B. Effective tooth, enlarged ($\times 75$).
 C. Spiral end of the descending series, enlarged ($\times 450$).

The general integument of the body is translucent, grayish yellow, and with chocolate mottlings scattered over the back, sides and sole. The liver diverticula within the branchial papillae are tinted yellowish green. The fan-like expansion of each branchial papilla is marked at the centre with a deep chocolate or almost blackish spot which was found also by Mr. SUNDARAM on his specimen of *P. orientalis* from the Gulf of Manaar. The pericardial region is opaque white. Additional

opaque white spots may be seen on the back, rhinophores and branchial expansions.

The radula of the Sp. No. 1 consists of about 5 teeth in the ascending series and 30 ones in the descending spiral series. The length of the radular ribbon is thus as long as that shown by ALDER and HANCOCK (1864) in their Indian specimens of *P. orientalis*. The protruded penis in the Sp. No. 1 is elongated and conical. It is devoid of an apical stylet. There occurs, however, a longitudinal series of about 25 spiny warts on the lower two thirds of the length of the penis. In each of genera, *Caliphylla* and *Mourgona*, there is a stylet on the top of the penis. *Phyllobranchillus viridis* (DESHAYES, 1857) from the West Indies differs from *P. orientalis* in having rows of spiny warts on the upper half of the long curved penis (see MARCUS, 1970, p. 32).

Additional note: A single specimen of *Phyllobranchillus orientalis* was collected from the Palau Islands (Station M. 48) by Dr. Sadayoshi MIYAKE of the Agricultural Department, Kyushu University on July 19, 1939 and sent to the first author for identification (this was lost later by accident). The contracted animal was 15 mm long. The radula consisted of 9 teeth in the ascending series and 40 ones in the descending series.

Summary

1. There is not any essential difference between *Branchophyllum orientale* var. *sagamiense* BABA, 1955 and *Phyllobranchillus orientalis* (KELAART, 1858); the two are ascertained to agree with each other in the body form, the colouration with black spots on the branchial papillae, and the constitution of the radular ribbon.

2. *Phyllobranchus prasinus* BERGH, 1871, *P. rubicundus* BERGH, 1871 and *Lobifera papillosa* PEASE, 1866 may be cited as additional synonyms of *Phyllobranchillus orientalis*.

3. *Phyllobranchillus orientalis* (KELAART, 1858) is widely distributed in the Indian and the southern Pacific Oceans, and ranges northwards to Shiono-misaki, Kii and Sagami Bay of Japan, constituting a member of the vagile epifauna on the colony of *Caulerpa brachypus* HARVEY.

REFERENCES

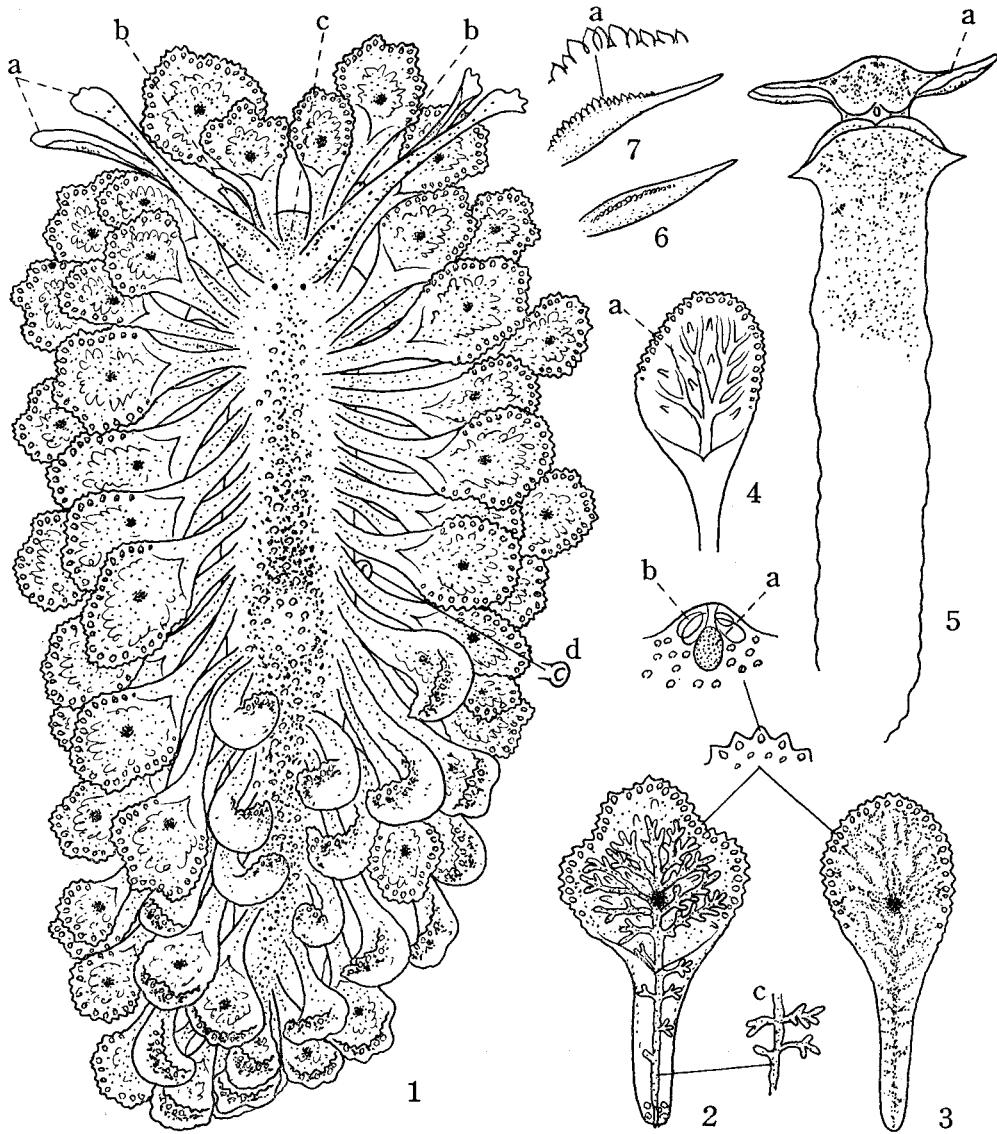
- ALDER, J. & HANCOCK, A. 1864. Notice of a collection of nudibranchiate Mollusca made in India by Walter ELLIOT, Esq., with descriptions of several new genera and species. Trans. Linn. Soc. London, vol. 5.
- BABA, K. 1955. Opisthobranchia of Sagami Bay Supplement, collected by his Majesty the Emperor of Japan. Iwanami Shoten, Tokyo.
- BERGH, R. 1871. Malacologische Untersuchungen, Heft 2. (p. 52, *Phyllobranchus prasinus*; p. 87, *P. rubicundus*) (not seen)
- 1905. Die Opisthobranchiata der Siboga-Expedition. Monograph 50. (p. 77, *Phyllobranchus rubicundus*; p. 78, *P. prasinus*)
- BURN, R. 1957. On some Opisthobranchia from Victoria. Journ. malac. Soc. Australia, vol. 1, no. 1. (p. 14, *Cyerce nigra pallens*)
- 1960. New names for two Victorian opisthobranch molluscs. Journ. malac. Soc. Australia, vol. 1, no. 4. (p. 70, *Branchophyllum pallens*)

- DESHAYES, M. G. P. 1857. Note sur differents mollusques de la Guadeloupe, envoyés par M. SCHRAMM. Journ. Conchyliol., vol. 6.
- ELIOT, C. 1904. On some nudibranchs from East Africa and Zanzibar. 6. Proc. Zool. Soc. London, 1904, vol. 2. (p. 292, *Phyllobranchus prasinus*)
- 1906. On the nudibranchs of southern India and Ceylon, with special reference to the drawings by KELAART and the collections belonging to ALDER & HANCOCK preserved in the HANCOCK Museum at Newcastle-on-Type. Proc. Zool. Soc. London, 1906, vol. 2.
- FRANC, A. 1968. Sous-classe des opisthobranches. In: Traité de Zoologie. Anatomie, systématique, biologie. Publié sous la direction de Pierre-P. GRASSÉ. Tom. 5, fasc. 3. (p. 846, *Polybranchiidae*)
- KELAART, E. F. 1858. Descriptions of new and little-known species of Ceylon nudibranchiate molluscs and zoophytes. Journ. Asiatic Soc., Colombo, vol. 3, pt. 1. (not seen)
- 1859. Descriptions of new and little-known species of Ceylonese nudibranchiate mollusks. Ann. Mag. Nat. Hist., ser. 3, vol. 3.
- MARCUS, Er. 1965. Some Opisthobranchia from Micronesia. Malacologia, vol. 3, no. 2. (p. 269, *Phyllobranchillus prasinus*)
- MARCUS, Er. & MARCUS, Ev. 1970. Opisthobranchs from Curaçao and faunistically related regions. Studies on the fauna of Curaçao and other Caribbean islands. Vol. 33.
- O'DONOGHUE, C. H. 1929. Report on the Opisthobranchiata. Results of the Cambridge expedition to the Suez Canal, 1924. Trans. Zool. Soc. London, vol. 22, pt. 6. (p. 737, *Polybranchiidae*)
- 1932. Notes on Nudibranchiata from southern India. Proc. malac. Soc. London, vol. 20, pt. 3.
- 1933. KELAART's work on the Nudibranchiata of Ceylon. Proc. malac. Soc. London, vol. 20, pt. 4.
- PEASE, W. H. 1860. Descriptions of new species of Mollusca from the Sandwich Islands. Proc. Zool. Soc. London.
- 1866. Remarks on Nudibranchiata inhabiting the Pacific islands, with descriptions of two new genera. Amer. Journ. Conch., vol. 2, no. 3.
- 1871. Descriptions of nudibranchiate Mollusca, inhabiting Polynesia. Amer. Journ. Conch., vol. 6, pt. 4. (p. 300, *Polybranchia*)
- PRUVOT-FOL, A. 1933. Mission Robert Ph. DOLLFUS en Égypte. Opisthobranchiata. Mém. l'Inst. d'Égypte, tom. 21.
- 1947. Les Opisthobranches de W. Harper PEASE. Révision. Journ. Conchyliol., vol. 87, no. 3.
- 1954. Faune de France. 58. Mollusques opisthobranches. Paul Lechevalier, Paris. (p. 175, *Polybranchiidae*)
- RISBEC, J. 1928. Contribution a l'étude des nudibranches Néo-Calédoniens. Faune Colon. Franç., tom. 2.
- 1953. Mollusques nudibranches de la Nouvelle-Calédonie. Faune de l'Union Franç., vol. 15.
- RUSSELL, H. D. 1966. KELAART's Ceylon opisthobranch species. Nautilus, vol. 79, no. 4.
- SATYAMURTI, S. T. 1952. The Mollusca of Krusadai Island (in the Gulf of Manaar). Bull. Madras Gov. Mus., n.s., Nat. Hist. Section, vol. 1, no. 2, pt. 6.
- SWENNEN, C. 1961. On a collection of Opisthobranchiata from Turkey. Zool. Mededel., vol. 38, no. 3. (p. 57, *Polybranchia*)
- THIELE, J. 1931. Handbuch der systematischen Weichtierkunde. Teil II. Gustav Fischer, Jena.

EXPLANATION OF PLATE IX

Phyllobranchillus orientalis (KELAART, 1858). Figs. 1-5 for Sp. No. 2; Figs. 6-7 for Sp. No. 1.

- Fig. 1. Crawling animal from above. Length (Ac) 20 mm. a, rhinophore, b, oral tentacle, c, head, d, anal papilla.
- Fig. 2. Branchial papilla, the upper surface. a, principal gland cell, b, accessory gland cells, c, liver diverticulum.
- Fig. 3. Branchial papilla, the lower surface.
- Fig. 4. Branchial papilla showing radiating ridges (a) on the upper surface.
- Fig. 5. Head and foot form below. a, oral tentacle.
- Fig. 6. Protruded penis in a fresh state, from above.
- Fig. 7. The same in a preserved state, from the side. a, a row of spiny warts.



K. BABA and I. HAMATANI: *Record of Phyllobranchillus orientalis*