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Dedicated to Mrs. W.S.S. van Benthem Jutting

On *Glossodoris quadricolor* (Rüppell & Leuckart, 1828) (Mollusca, Nudibranchia)

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INTRODUCTION

Among a collection of fishes received from a fish dealer, destined for the Aquarium of the Amsterdam Zoo, Mr. Fr. de Graaf found three nudibranchs. He kindly permitted us to study them alive and afterwards to preserve them in the collections of the Zoological Museum. The specimens were collected in the neighbourhood of Djakarta, Indonesia. Colour paintings were made after the living specimens by our painter Mr. Jos Ruting, who also copied in black and white some drawings — published before — for comparison. The Director of the Rijksmuseum van Natuurlijke Historie at Leiden, Prof. Dr. L. D. Brongersma and its Curator for molluscs, Dr. C. O. van Regteren Altena, were so kind to put van Hasselt's original painting of *Doris lineolata* at our disposal. This has not been reproduced in BERGH's paper on van Hasselt's nudibranchs (1887). It seemed important to show its likeness to Bergh's *Chromodoris lineolata* (BERGH, 1905, pl. IV fig. 7) and its differences from Baba's *Glossodoris lineolata* (BABA, 1949, pl. XVI fig. 58) here reproduced in black and white in fig. 6.

DESCRIPTION OF OUR SPECIMENS

The largest specimen, when alive, was about 45 mm long; when preserved only 14 mm long, 2 mm wide, and 2 mm high. The second animal, when alive, was 33 mm long; preserved 15 mm long, 3 mm wide, and 2 mm high. The smallest was alive 22 mm; when preserved 13 mm long, 5 mm broad, and 3 mm high. These measurements show unexpected differences due to the amount of contraction after preservation. Because the animals had to be kept in the aquarium as long as possible, they had to be preserved after they had

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died. The colour pattern is reproduced in our colour plate for the largest specimen. The black and white figures 3 to 5 show the differences in colour pattern in the three specimens. All three animals showed the mantle with a white-orange (sometimes yellow)-white margin and a white (milky white, sometimes slightly bluish) centre with black longitudinal lines. The rhinophores and the branchial plumes are orange to carrot red, even the genital pore has an orange coloured margin. We refer to the colour plate for details.

The number of gill plumes was 14 in the largest animal and 11 in the second in size. They were irregularly provided with simple pinnules, which sometimes become longer and slightly composite at the top. The rhinophores are finely annulated with a smooth sheath and about 18 to 26 rings.

The foot is pointed behind, less wide than the mantle; the front of the foot is double. The sole of the foot has a white colour and an orange border. The head, covered by the mantle, wears two small tentacles. The mantle is broad in front, with a slight restriction in the neck region and broadening again backwards (see figures). We reproduce (figs. 3, 4, and 5) the pattern on the back to show how — apparently — the number of black lines increases as the animal grows larger.

DISCUSSION

For comparison the drawings from BERGH, 1905, pl. IV figs. 4 and 5 of *Chromodoris annae* (alive 55 mm, preserved 33 mm long) and of *Chr. elisabethina* (35 mm) are reproduced here in black and white (our figures 1 and 2); apparently the number of stripes is not directly correlated with the size of the animals. It seems to us that these, most probably, form one series with our animals, as do the animals figured by BERGH, 1877, pl. LI fig. 6 (*Chr. elisabethina*) and fig. 21 (*Chr. annae*). They are not reproduced here. The animal copied in BERGH, 1890, pl. LXXXVI fig. 5 (*Chr. annae*) from Brock's painting seems to belong to the same series, though this painting is not very good.

The series of figures induces us to suppose that all these animals belong to one species, which, as BERGH, 1905 : 144 remarks, is to be identified with *Doris quadricolor* RÜPPELL & LEUCKART, 1828 : 31, pl. IX fig. 2.

BABA, 1949, pl. XVI fig. 58 gives the painting of an animal which he identified with *Glossodoris lineolata* (VAN HASSELT, 1824). The basic colour pattern of the mantle is a number of black longitudinal lines on a white background. This looks more like our *Gl. quadricolor* than like *Gl. lineolata*. Both van Hasselt and Bergh give the mantle of the latter species as yellow with greyish black longitudinal lines. We are glad that we can reproduce here the

Explanation of the colour plate

FIGS. 1—3, *Glossodoris quadricolor* (RÜPPELL & LEUCKART, 1828).

The largest specimen from Djakarta. 1, from above; 2, from below; 3, from the side. Painted by Jos Ruting.

FIG. 4, *Glossodoris lineolata* (VAN HASSELT, 1824).

Original painting of the type specimen, made by van Hasselt, now in the library of the Rijksmuseum van Natuurlijke Historie at Leiden. Natural size.



1



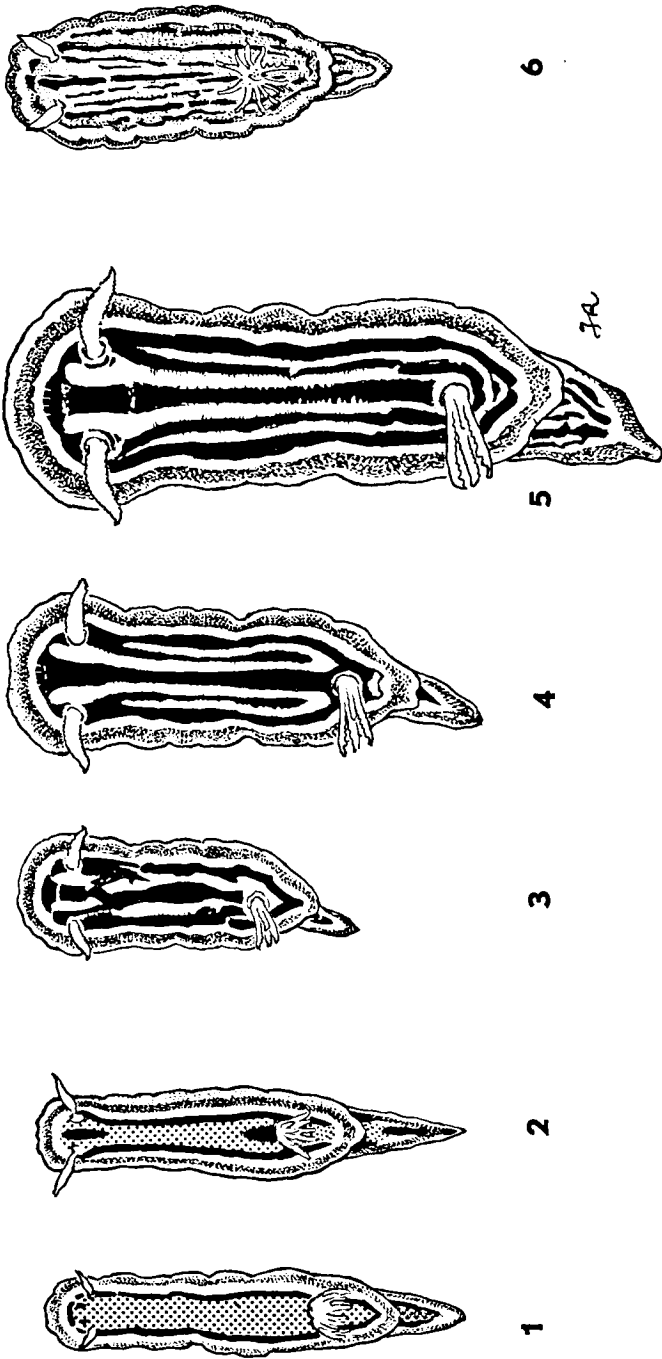
2



3



4



FIGS. 1—6. *Glossodoris quadricolor* (RÜPPEL & LEUCKART, 1828). 1, copy of painting from BERGH'S Siboga Report, 1905, pl. IV fig. 4 (*Chromodoris annae*); 2, copy of painting from the same report, pl. IV fig. 3 (*Chromodoris elisabethina*); 3, drawing of our smallest specimen; 4, drawing of our medium-sized specimen; 5, drawing of our largest specimen; 6, copy of painting in BABA, 1949, pl. XVI fig. 58 (there named *Glossodoris lineolata*) (animal $1\frac{1}{2} \times$ natural size).

original drawing of van Hasselt, which was not reproduced in VAN HASSELT's paper of 1824, nor in BERGH's paper of 1887. Probably he thought it unnecessary to copy the painting which certainly must have been in his hands, as the figure is on the same sheet of paper as the animals BERGH copied in his colour plate of 1887.

So we consider the possibility of *Gl. lineolata* sensu BABA, 1949, being a more striated *Gl. quadricolor* and not a synonym of the *Gl. lineolata* of van Hasselt.

The number of black lines in *Gl. quadricolor* shows a considerable variety. The basic colours are black and bluish white, whereas in *Gl. lineolata* the basic colours are black and yellow and the animal is very finely striated. The latter species has been figured by BERGH, 1874, pl. XXXIII fig. 4 and BERGH, 1905, pl. IV fig. 7. Both species have a wide distribution in the Indo Pacific Ocean. Whether *Chr. hiliaris* BERGH, 1890: 935 is related to *Gl. lineolata* must remain undecided.

The synonymy as we see it is given in the following survey (compare also PRUVOT-FOL, 1951).

SURVEY OF THE PUBLISHED TAXA

A. *Glossodoris quadricolor* (RÜPPELL & LEUCKART, 1828) presents at the moment 4 main types of variation, all having a mantle with black lines on a white (sometimes bluish) background.

1. Black lines absent or vestigial:

Chromodoris annae nomen nudum, BERGH, 1875: 73.

Chromodoris annae BERGH, 1876, pl. LI figs. 21—23; 1877: 473.

Chromodoris annae, BERGH, 1890: 931, pl. LXXXVI fig. 5, pl. LXXXIX figs 12—14.

Chromodoris elisabethina var. *annae*, BERGH, 1905: 144, pl. IV fig. 3, pl. XVI fig. 6.

2. A few (1—5) black lines:

Doris quadricolor RÜPPELL & LEUCKART, 1828: 31, pl. IX fig. 2.

Actinodoris sponsa EHRENBERG, 1831 (unpaged); BERGH, 1877a: 54.

Doris magnifica QUOY & GAIMARD, 1832: 270, pl. XX figs. 1—4.

Chromodoris elisabethina nomen nudum, BERGH, 1875: 73.

Chromodoris elisabethina BERGH, 1876, pl. LI figs. 6—15; 1877b: 466.

Chromodoris elisabethina, BERGH, 1890: 929, pl. LXXXIX figs. 15—17.

Chromodoris quadricolor, BERGH, 1905: 143 (*Chromodoris elisabethina*, pl. II fig 7).

Chromodoris quadricolor, BERGH, 1905 (Semper): 68.

Chromodoris quadricolor, HAAS, 1920: 139 (only localities).

Glossodoris westraliensis, O'DONOGHUE, 1924: 554, pl. XXVII figs. 8—9, pl. XXX figs. 51—53.

Glossodoris quadricolor, PRUVOT-FOL, 1933: 123 (only a locality).

Glossodoris quadricolor, WHITE, 1951: 245—246.

Glossodoris quadricolor, RISBEC, 1956: 9 (only a new locality).

Chromodoris quadricolor, MARCUS, 1959: 899—901.

?*Chromodoris quadricolor*, RISBEC, 1928: 131, fig. 32, pl. VI fig. 5.

3. Several lines:

- Chromodoris quadricolor*, ELIOT, 1910: 429.
Glossodoris lineolata, BABA, 1949: 140, pl. XVI fig. 58.
? *Chromodoris albolineata* BERGH, 1879: 5.

4. Mantle predominantly black:

- Chromodoris elizabethina* var. *africana* ELIOT, 1904: 392, pl. XXIV fig. 4.

B. *Glossodoris lineolata* (VAN HASSELT, 1824) has a finely striated mantle, with many black lines on a yellow background.

- Doris lineolata* VAN HASSELT, 1824: 22 (238); BERGH, 1887: 308.
Chromodoris lineolata, BERGH, 1874, pl. XXXIII fig. 4.
Chromodoris striatella BERGH, 1877b: 474, pl. LI figs. 24—25.
Chromodoris funerea COLLINGWOOD, 1881: 131, pl. IX figs. 30—33.
Chromodoris striatella, BERGH, 1884: 73, pl. III figs. 26—29, pl. IV figs. 1—4.
Chromodoris lineolata, BERGH, 1890: 933.
Chromodoris lineolata, ELIOT, 1907: 86.
Chromodoris lineolata, BOETTGER, 1918: 128 (only a new locality).
? *Chromodoris hilaris* BERGH, 1890: 935, pl. LXXXVI fig. 4.
? *Chromodoris clavata* RISBEC, 1928: 151, fig. 42, pl. VII fig. 2.
? *Glossodoris (Chromodoris) lineolata*, RISBEC, 1953: 70, fig. 33.

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