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NEW SPECIES OF *CHROMODORIS* AND *NOUMEA*
(NUDIBRANCHIA: CHROMODORIDIDAE) FROM THE WESTERN
INDIAN OCEAN AND SOUTHERN AFRICA

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By

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ABSTRACT: Four new species of *Chromodoris* and one species of *Noumea* are described. *Chromodoris lekker* sp. nov. and *C. pruna* sp. nov., are known from more than one locality in the western Indian Ocean, while *C. kitae* sp. nov. is known only from northwestern Madagascar. *Chromodoris heatherae* sp. nov. and *Noumea protea* sp. nov. are restricted to the temperate waters of South Africa and appear to be more closely related to sister taxa from temperate Australia than to other congeners.

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INTRODUCTION

The chromodorid opisthobranch fauna of the tropical Indo-Pacific has received considerable attention in recent years (Rudman, 1982, 1983, 1984, 1985, 1986a, 1986b, 1986c, 1987, 1988, 1990; Baba, 1988; Bertsch and Gosliner, 1989). During the last decade, more than 70 new species have been described. Despite this resurgence in interest, knowledge of this speciose family remains far from complete. Gosliner (1987) recorded almost 40 species of chromodorids from southern Africa; more than half were considered to be undescribed.

Since my original work on the opisthobranchs of southern Africa, I have made additional field collections from the granitic Seychelles, Aldabra Atoll, and Madagascar. This paper includes several of these new species from southern Africa and other tropical localities in the western Indian Ocean.

Descriptions of four new species of *Chromo-*

doris and one of *Noumea* are contained in this paper. Specimens deposited in the Department of Invertebrate Zoology and Geology of the California Academy of Sciences, San Francisco, are designated by the abbreviation CASIZ. Specimens deposited in the Department of Marine Biology of the South African Museum, Cape Town, are designated by the abbreviation SAM.

SPECIES DESCRIPTIONS

***Chromodoris heatherae* sp. nov.**

(Figs. 1A, 2, 3A)

Chromodoris sp. 1. Gosliner, 1987: 76, Fig. 112.

TYPE MATERIAL.—Holotype: CASIZ 073919, one specimen, Onrus, Walker Bay, Cape Province, intertidal zone, 5 February 1980, T. M. Gosliner. Paratypes: CASIZ 086859, one specimen, Philip's Reef, Algoa Bay, Cape Province, 10 m depth, 21 May 1984, T. M. Gosliner. CASIZ 086869, one specimen, Hottentot's Huisie, Atlantic coast of Cape Peninsula, 15 m depth, January 1981, T. M. Gosliner. CASIZ 073978, one specimen, Philip's Reef, Algoa Bay, 10 m depth, May 1984,

T. M. Gosliner. CASIZ 074653, one specimen. Philip's Reef, Algoa Bay, 10 m depth, 21 May 1984, G. C. Williams. CASIZ 074097, one specimen, The Mill, Bakoven, Atlantic coast of Cape Peninsula, 16 September 1982, T. M. Gosliner. CASIZ 073470, three specimens, one dissected, Philip's Reef, Algoa Bay, 11 m depth, 15 May 1984, T. M. Gosliner. CASIZ 074079, one specimen, Philip's Reef, Algoa Bay, 10 m depth, 21 May 1984, T. M. Gosliner. SAM A 35436, five specimens, Castle Rocks, False Bay, and Cape Hangklip, no date given, T. M. Gosliner. SAM A 35435, one specimen, off Llandudno, Cape Peninsula, 20–23 m depth, 16 March 1989, T. M. Gosliner. SAM A 35442, one dissected specimen, Onrus, Walker Bay, intertidal zone, no date given, T. M. Gosliner. SAM A 35437, one specimen, Sea Forth, False Bay, 9 November 1981, W. R. Liltved. SAM A 35433, Rooi Els, False Bay, 10 m depth, 26 October 1980, T. M. Gosliner. SAM A 35432, two specimens, one dissected, Oudekraal, no depth date or collector given. SAM A 35434, five specimens, one dissected off Llandudno, Atlantic coast of Cape Peninsula, no depth given, 23 December 1979, W. R. Liltved.

ETYMOLOGY.—*Chromodoris heatherae* is named for my daughter, Heather Erica Gosliner, who was born in Cape Town, where this species is common.

DISTRIBUTION.—This species is found around the temperate coast of the Cape Province from the Atlantic coast of the Cape Peninsula to Port Elizabeth.

EXTERNAL MORPHOLOGY.—The living animals (Fig. 1A) are 20–70 mm in length. The body is translucent white with white gills and rhinophores. A band of numerous, crowded, opaque white glands is present along the margin of the notum. In most specimens, a series of irregular blood-red spots is arranged randomly over the surface of the notum. Only a few specimens from Algoa Bay lacked red spots. Some specimens from Algoa Bay had an additional submarginal yellow band along the edge of the notum. The triangular foot extends posteriorly beyond the notum. The foot lacks any red or yellow markings in all specimens examined. On either side of the head is a short, digitiform oral tentacle. There are 12–22 unipinnate gills forming the branchial plume. The perfoliate rhinophores bear 14–20 lamellae.

BUCCAL MASS.—The anterior portion of the buccal mass is elongate and glandular. The glandular portion extends further posteriorly on the ventral surface than it does dorsally. The broad jaws bear dense chitinous rodlets (Fig. 2A), each bearing bifid denticles at their apex. Occasionally, some rodlets may be undivided or trifid. The radular formula is $46 \times 36.1.36$, $55 \times 43.1.43$, $57 \times 44.1.44$, and $68 \times 52.1.52$, in four specimens examined. The rachidian tooth (Fig.

2B) is reduced and devoid of denticles. The innermost lateral tooth (Fig. 2B) bears one to three denticles on the inner side of the triangular primary cusp and two to five denticles on its outer side. The remaining lateral teeth lack denticles on their inner side but have denticles on their outer margin. The lateral teeth from the central portion (Fig. 2C) are arched with an elongate cusp. There are 5–14 denticles on the outer margin of the teeth. The outermost laterals (Fig. 2D) are blunt and elongate with 2–4 denticles.

REPRODUCTIVE SYSTEM.—(Fig. 3A) The ampulla is thin and elongate. It narrows distally and bifurcates into the short oviduct and the vas deferens. The oviduct enters the female gland mass in the region of the albumen gland. The membrane and mucous glands are larger than the albumen gland and are situated peripherally around the gland mass. The mucous gland exits at the nidamental opening. At this opening is a nodular vestibular gland. The highly convoluted proximal portion of the vas deferens is the glandular, prostatic segment. The prostate narrows slightly and again expands into the ejaculatory portion. This coiled section terminates in the unarmed penis, which lacks armature and a distinct papilla. Adjacent to the penis is the straight vaginal duct. Near the middle of the length of the vagina, the uterine duct emerges and joins with the female gland mass. More proximally are the curved, muscular, digitiform receptaculum seminis and the spherical, thin-walled bursa copulatrix.

DISCUSSION.—*Chromodoris heatherae* is similar in color pattern to several species of *Chromodoris* that are found along the temperate coast of Australia (Rudman, 1983). It is most similar to *Chromodoris splendida* (Angas, 1864). However, *C. splendida* has red lines on the gills and rhinophores that are absent in all material of *C. heatherae* examined. *C. hunteri* Rudman, 1985, also from Australia, lacks red on the gills and rhinophores. In *C. hunteri* the yellow border is marginal, while in *C. heatherae* it is submarginal, when present. *Chromodoris hunteri* rarely exceeds 15 mm in length, while the length of *C. heatherae* may exceed 70 mm. Both *C. splendida* and *C. hunteri* have fewer denticles (a maximum of eight) on the lateral teeth than *C. heatherae*, which has 12–14 denticles on the teeth bearing the most denticles. Even in small specimens of *C. heatherae* that are the same size as those of *C. hunteri*, these differences are consistent.

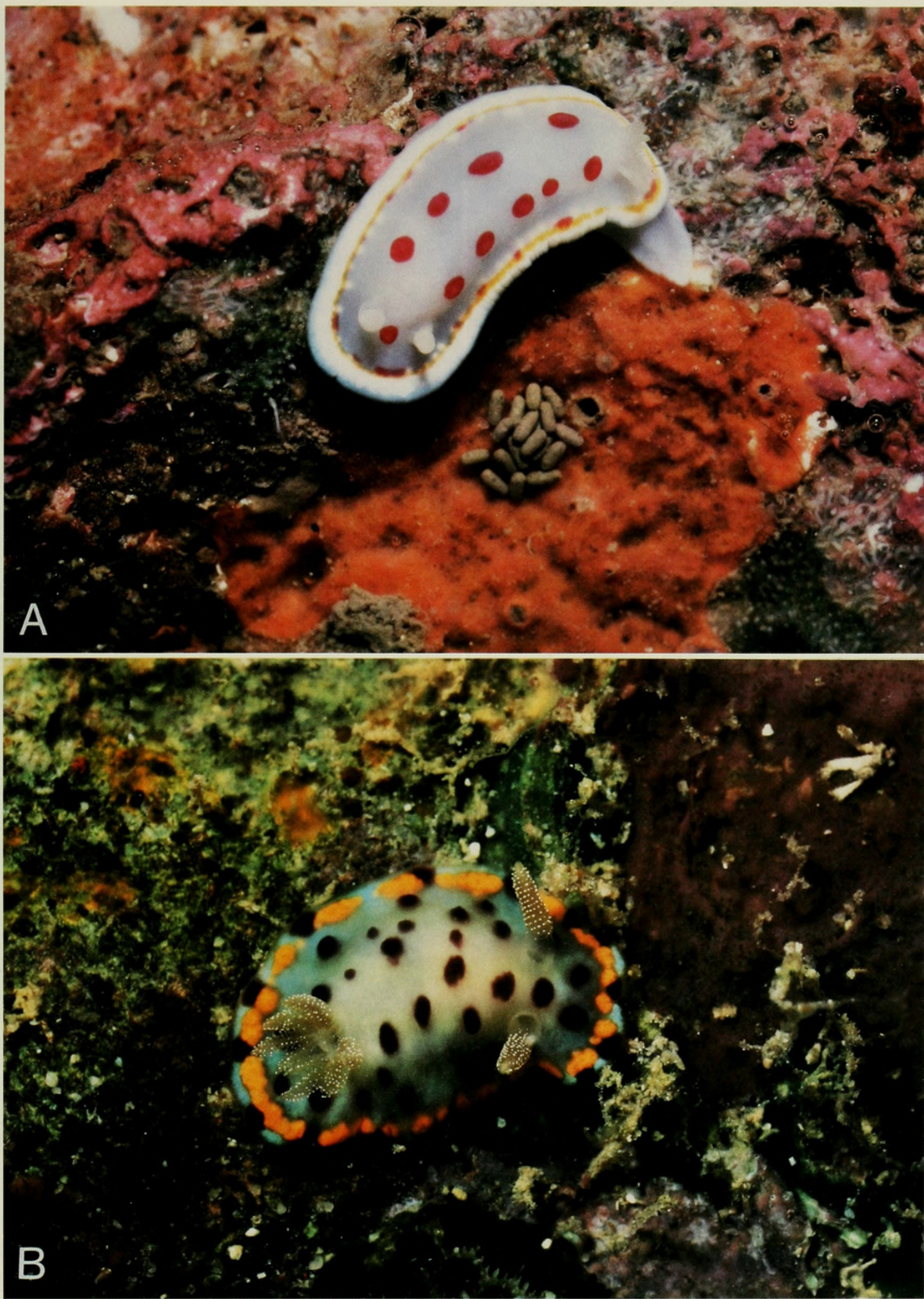


FIGURE 1. Living animals. A. *Chromodoris heatherae* sp. nov., from Algoa Bay, South Africa. B. *Chromodoris kitae* sp. nov., from Nosy Komba, Madagascar.

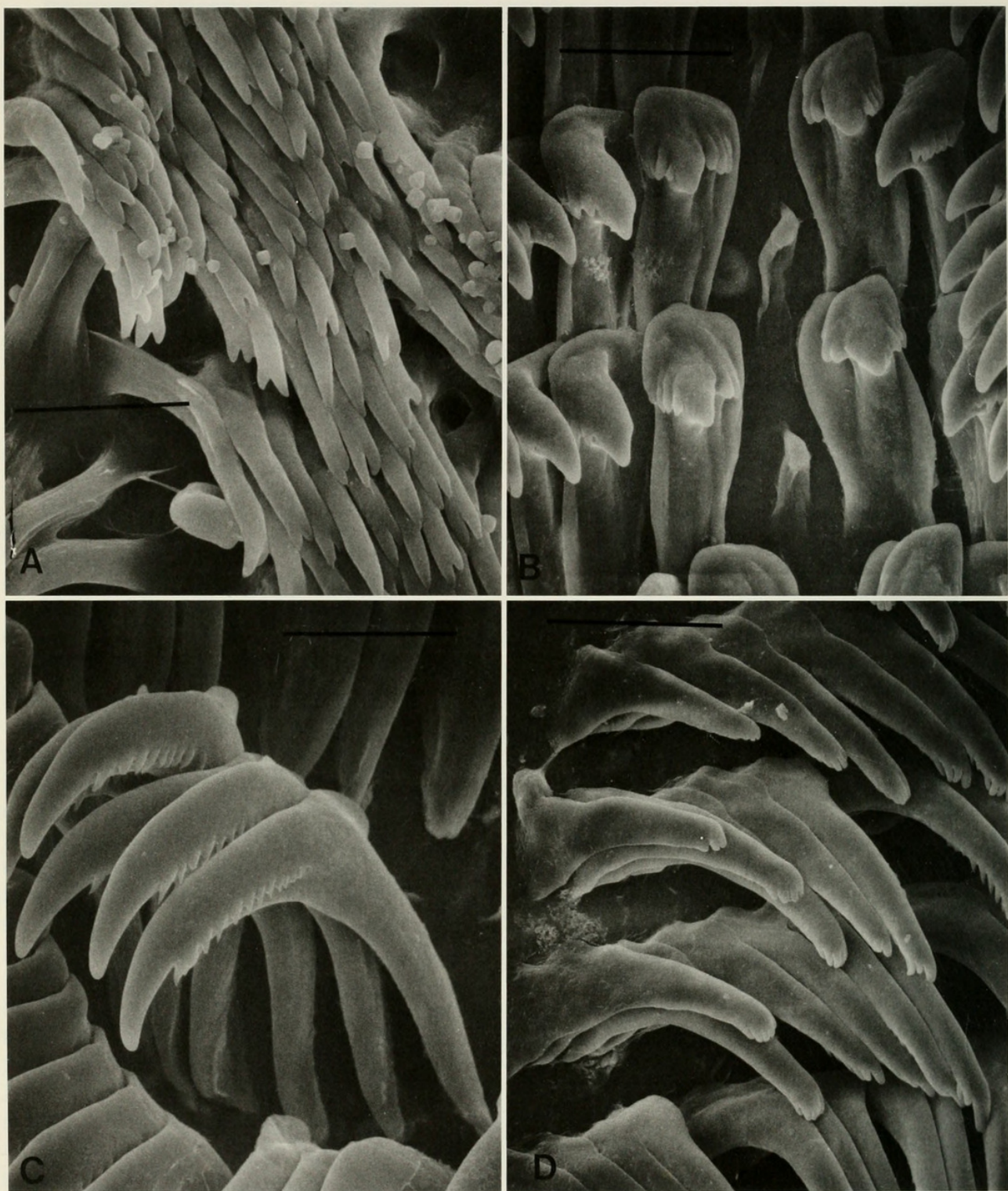


FIGURE 2. *Chromodoris heatherae* sp. nov., scanning electron micrographs. A. Jaw rodlets, scale = 15 μ . B. Rachidian and inner lateral teeth, scale = 30 μ . C. Lateral teeth from central portion of half-row, scale = 25 μ . D. Outer lateral teeth, scale = 43 μ .

***Chromodoris kitae* sp. nov.**
(Figs. 1B, 3C, 4)

TYPE MATERIAL.—Holotype: CASIZ 092488, Nosy Tanikely, Madagascar, 1 m depth, 14 April 1989, T. M. Gosliner. Paratypes: CASIZ 092487, one specimen, dissected, Nosy Komba, Madagascar, 1 m depth, 21 April 1992, T. M. Gos-

liner. CASIZ 092486, two specimens, Nosy Komba, Madagascar, 1 m depth, 12 April 1990, T. M. Gosliner.

ETYMOLOGY.—This species is named for my friend and colleague Katharine (Kit) Stewart, who made it possible for me to make two expeditions

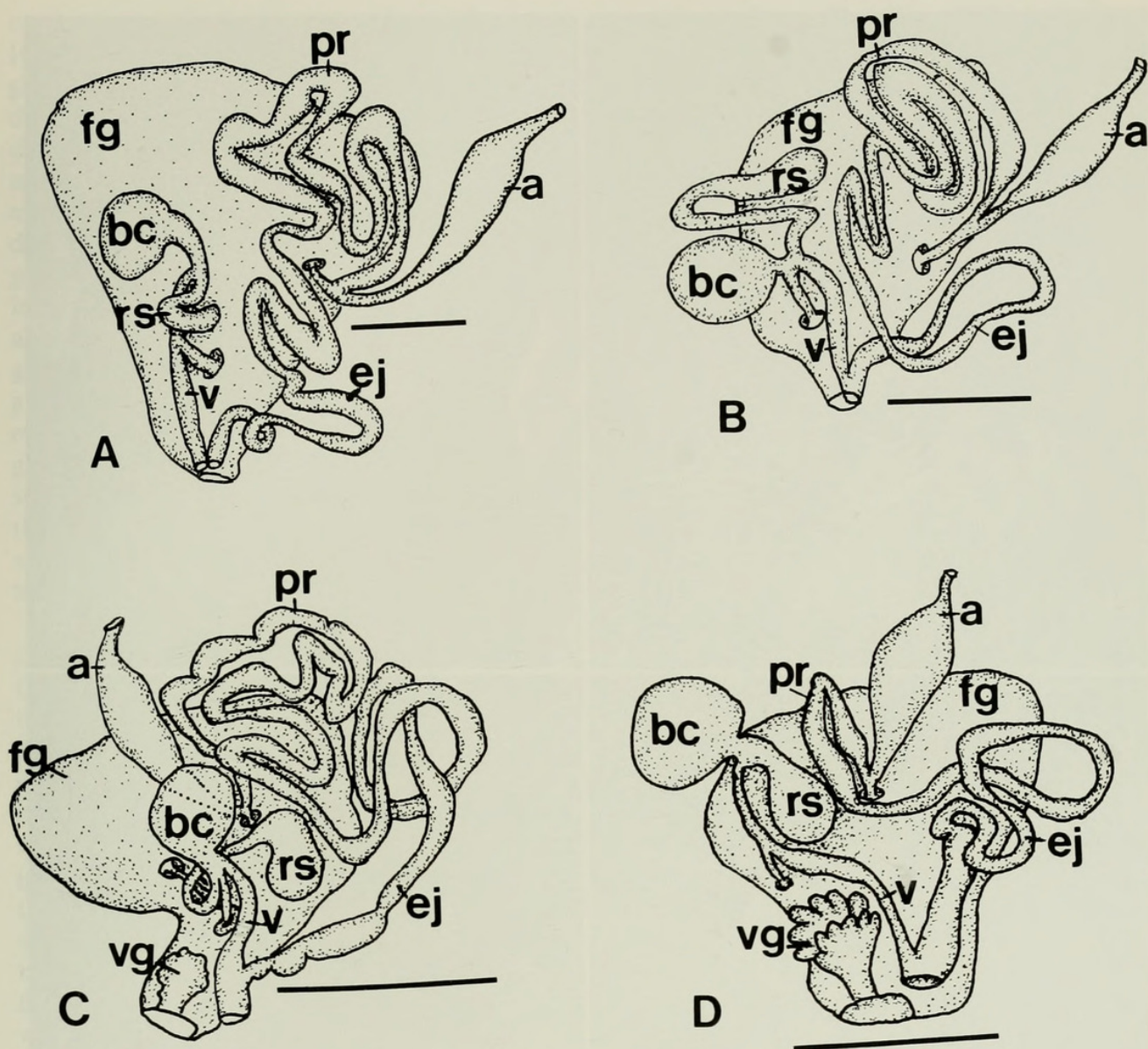


FIGURE 3. Reproductive systems. A. *Chromodoris heatherae* sp. nov., scale = 2 mm. B. *Chromodoris lekker* sp. nov., scale = 1 mm. C. *Chromodoris kitae* sp. nov., scale = 1 mm. D. *Noumea protea* sp. nov., scale = 1 mm, a = ampulla; bc = bursa copulatrix; ej = ejaculatory portion of vas deferens; fg = female gland mass; pr = prostatic portion of vas deferens; rs = receptaculum seminis; v = vagina; vg = vestibular gland.

to survey the opisthobranch fauna of Madagascar.

EXTERNAL MORPHOLOGY.—The living animals (Fig. 1B) are 5–18 mm in length. The body is translucent white. Along the margin of the notum and over the surface of the mantle are scattered spots of dark purple. Immediately inside the area of outer purple spots are concentrations of reflective yellow or orange-yellow granules. The gills and rhinophores are gray-brown. There are numerous small opaque white spots arranged in distinct rows along the edges of the rhinophoral lamellae and gill pinnae. The branchial plume consists of eight unipinnate gills.

The perfoliate rhinophores are composed of up to 15 lamellae. The oral tentacles are short and digitiform.

BUCCAL MASS.—The buccal mass is divided evenly into an anterior glandular portion and a posterior muscular one. At the posterior end of the mass is an elongate pair of salivary glands. Within the buccal mass, at the anterior end of the muscular portion of the buccal mass are the jaws. They contain numerous elongate, bifid rodlets (Fig. 4A). The radular formula in one specimen is $45 \times 35.1.35$. The rachidian teeth (Fig. 4B) are small and vestigial, devoid of denticles. The innermost lateral teeth (Fig. 4B) have one

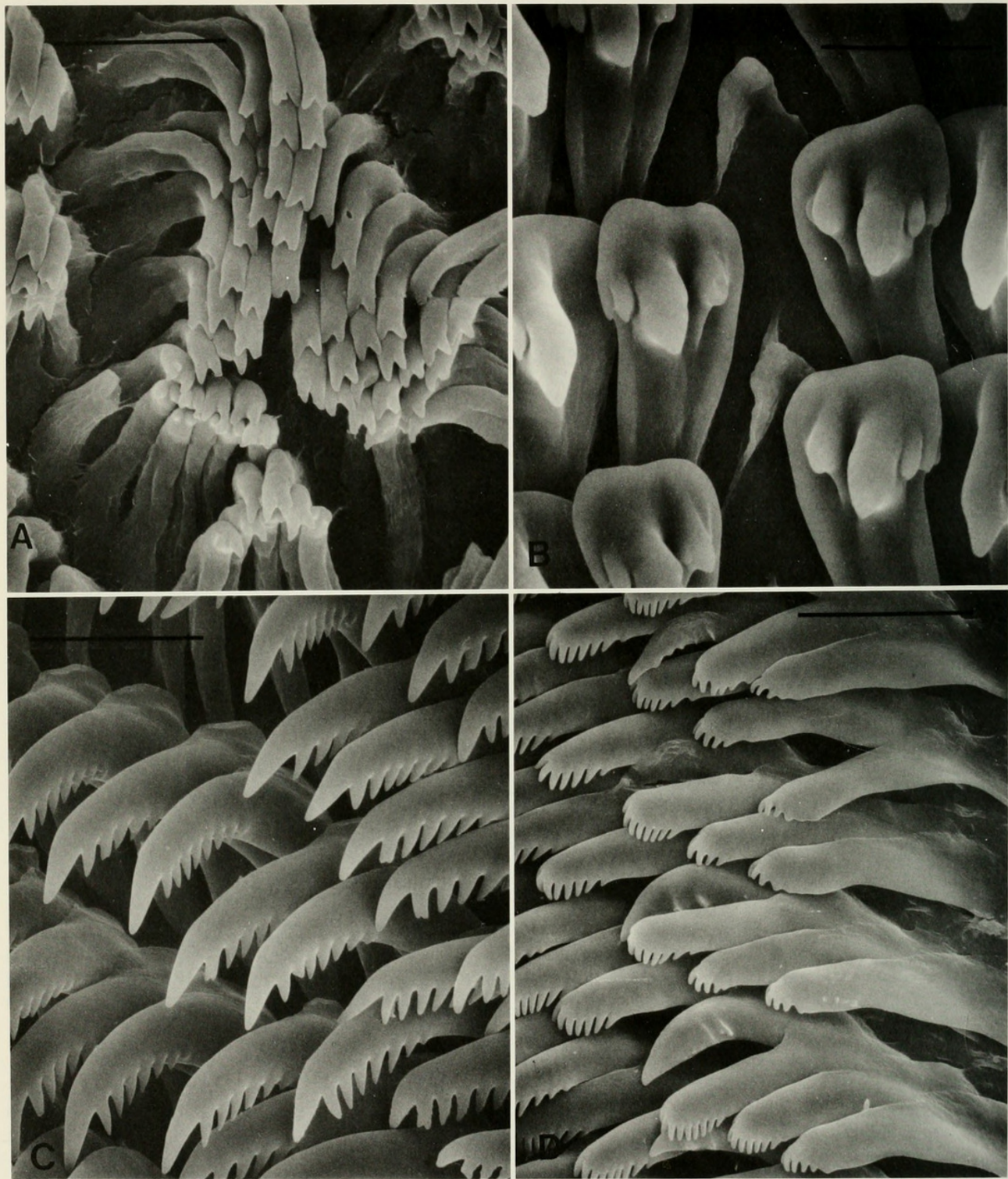


FIGURE 4. *Chromodoris kitae* sp. nov., scanning electron micrographs. A. Jaw rodlets, scale = 15 μ . B. Rachidian and inner lateral teeth, scale = 15 μ . C. Lateral teeth from central portion of half-row, scale = 20 μ . D. Outer lateral teeth, scale = 30 μ .

or two denticles on their inner side of the larger cusp and two to three denticles on the outer side. The remaining outer lateral teeth lack denticles on the inside of the primary cusp and have a series of denticles along the outer edge. The outer laterals from the middle of the radular half-row (Fig. 4C) are elongate with 6–8 denticles along

the margin while the more elongate outermost teeth (Fig. 4D) have three to four denticles, situated at the tip of the teeth.

REPRODUCTIVE SYSTEM.—(Fig. 3C) The ampulla is moderately long and tubular and narrows into a long postampullary duct prior to bifurcating into the oviduct and vas deferens. The

oviduct is relatively thin, curved and elongate. It enters the female gland mass near the albumen gland. The proximal prostatic portion of the vas deferens is tightly coiled, consisting of several distinct loops. The duct narrows slightly into the muscular ejaculatory portion, which terminates at an unarmed penis and shares a short common duct with the vagina prior to the joint exit at the gonopore. The female gland mass consists of a large lobed mucous gland and smaller membrane and albumen glands. Near the exit of the mucous gland is a small, lobed vestibular gland. The vagina is of moderate length. The uterine duct emerges from the common junction of the vagina, the bursa copulatrix and the receptaculum seminis, and enters the female gland mass. The thin-walled, spherical bursa has an extremely short duct while the muscular, pyriform receptaculum has an elongate, curved duct.

DISCUSSION.—Rudman (1983) reviewed species of chromodorids with large, purple spots. *Chromodoris kitae* is most similar in appearance to *C. bimaensis* Bergh, 1905. In *C. bimaensis*, the largest purple markings form rings rather than spots. In *C. kitae*, the yellow submarginal pigment is interrupted with areas of translucent white, while in *C. bimaensis* the yellow line is interrupted only by purple spots. The yellow of *C. kitae* is composed of reflective granules, while the pigment of *C. bimaensis* does not appear to be reflective. The rhinophores and gills of the four specimens of *C. kitae* are all ornamented with opaque white spots, that are absent in specimens of *C. bimaensis*. *Chromodoris bimaensis* has purple spots on the edge of the foot, which are absent in *C. kitae*. The radular morphology of the two species is similar. However, the outermost lateral teeth of *C. kitae* are elongate and denticulate, while those of *C. bimaensis* are short, curved, and lack denticles. The reproductive system of *C. bimaensis* has not been described. Although the two species have a similar color pattern, the differences noted above appear to be consistent. *Chromodoris kitae* is thus far known only from northern Madagascar, while *C. bimaensis* has been found from Indonesia, New Caledonia, and Fiji, all in the Western Pacific. These differences strongly suggest that they represent distinct species.

Chromodoris kitae is also similar to western Indian Ocean and Red Sea specimens of *C. aspersa* (Gould, 1852) (Rudman, 1983). However, *C. aspersa* lacks purple spots outside of the or-

ange marginal ring. The gills and rhinophores of *C. aspersa* are orange rather than gray-brown and lack opaque white spots.

***Chromodoris lekker* sp. nov.**

(Figs. 3B, 5A, 6)

Chromodoris sp. 4, Gosliner, 1987: 77, Fig. 115.

TYPE MATERIAL.—Holotype, CASIZ 073265, Nosy Tanike-ly, Madagascar, 1 m depth, 11 April 1990, T. M. Gosliner. Paratypes, CASIZ 074127, one specimen, dissected, 1 km N of Mahé Beach Hotel, Mahé Island, Republic of the Seychelles, 1 m depth, 30 April 1984, T. M. Gosliner. CASIZ 073291, one specimen, 1 km N of main pass in barrier reef off Mora Mora Resort, 20 km N of Tulear, Madagascar, 20 m depth, 28 March 1990, T. M. Gosliner. CASIZ 073554, one specimen, fringing reef, Mangalimasa, S of Hotel Soanambo, Ile Sainte Marie, Madagascar, 1 m depth, 6 April, 1990, T. M. Gosliner. CASIZ 073540, five specimens, south end of cove at La Crique Hotel, Ile Sainte Marie, Madagascar, 1 m depth, 8 April 1990, T. M. Gosliner. CASIZ 073556, two specimens, off Ambatarao Village, NW end of Ile Sainte Marie, Madagascar, 1 m depth, 7 April 1990, T. M. Gosliner. SAM A 35466, one specimen, dissected, Adlam's Point, Sodwana Bay National Park, Natal, South Africa, date depth and collector not known.

ETYMOLOGY.—The epithet "lekker" comes from the South African slang meaning nice or sweet, referring to the attractiveness of this species. This name has not been latinized to preserve the vernacular meaning of the word in South Africa.

DISTRIBUTION.—This species is widespread in the western Indian Ocean and has been recorded from Natal, South Africa, both coasts of Madagascar, the granitic Seychelles, and Reunion Island (Dr. Maurice Jay, photo and personal communication).

EXTERNAL MORPHOLOGY.—The living animals (Fig. 5A) are 10–22 mm in length. The body is translucent white. Around the margin of the notum is an interrupted line of opaque white. Immediately centrad to the opaque white line is a wider submarginal band of burnt orange, which may be entire or interrupted. In the specimen from South Africa, a line of small dark purple to black spots is present on the orange band. These spots were absent in all other material examined. Centrad to the orange band is a wide band of light purple. Within this band is a series of 16–30 large, dark purple to black spots forming a ring. In the central portion of the notum are some irregular, opaque white areas that bear small, scattered opaque white tubercles. The rhinophores and gills are translucent white with a covering of opaque white. The branchial plume

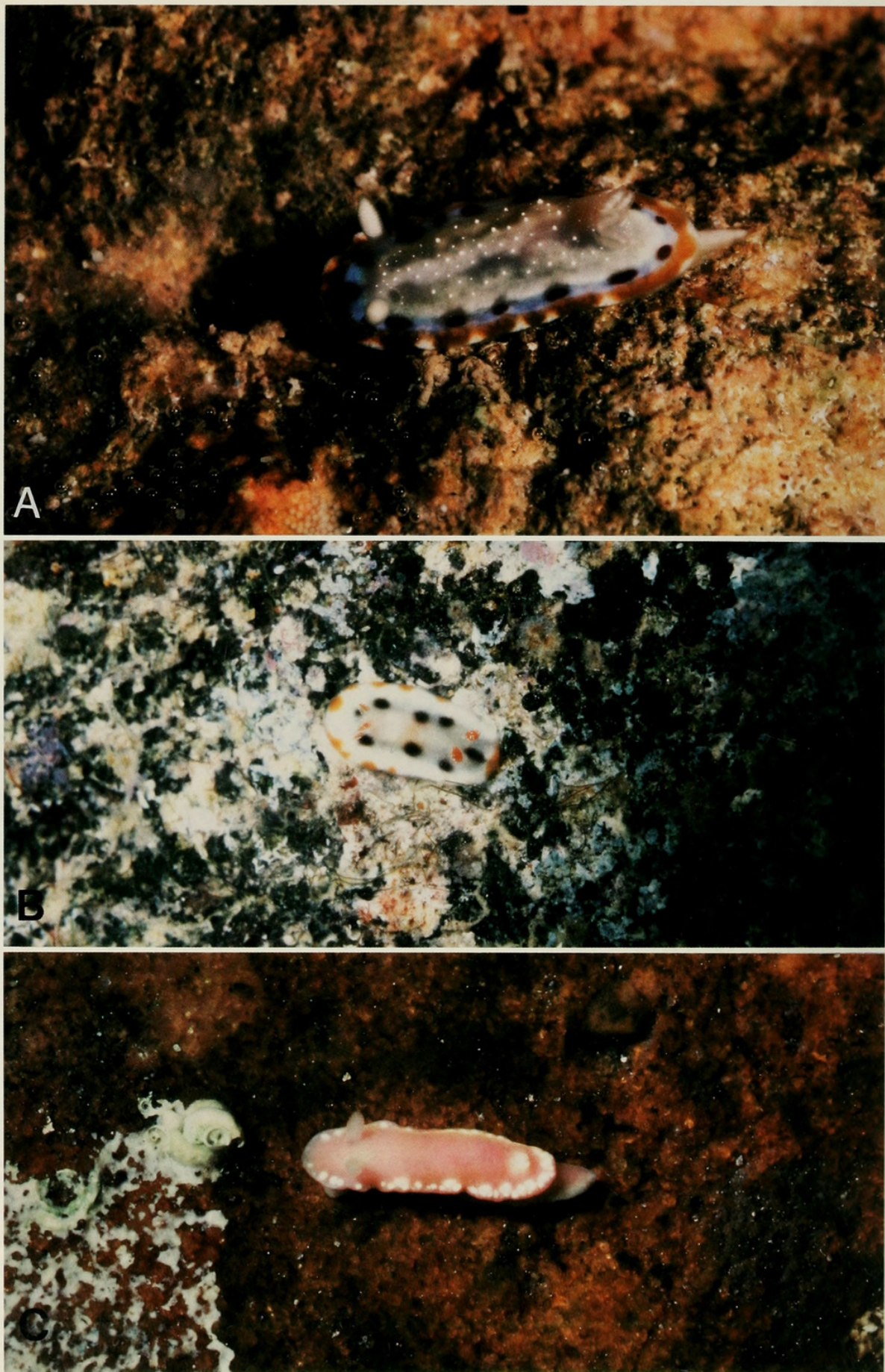


FIGURE 5. Living animals. A. *Chromodoris lekker* sp. nov., from Ile Ste. Marie, Madagascar. B. *Chromodoris pruna* sp. nov., from Nosy Tanikely, Madagascar. C. *Noumea protea* sp. nov., from Hottentot's Huisie, Oudekraal, Cape Town, South Africa.



FIGURE 6. *Chromodoris lekker* sp. nov., scanning electron micrographs. A. Jaw rodlets, scale = 15 μ . B. Rachidian and inner lateral teeth, scale = 20 μ . C. Lateral teeth from central portion of half-row, scale = 30 μ . D. Lateral teeth from central portion of half-row, scale = 20 μ . E. Outer lateral teeth, scale = 50 μ .

is composed of 6–7 unipinnate gills. The perforiate rhinophores have about 14 lamellae. On either side of the head are digitiform oral tentacles.

BUCCAL MASS.—The buccal mass is large and elongate. The anterior half is glandular. The pos-

terior half is highly muscularized. Within the mass at the anterior end of the muscular portion of the buccal mass are the jaws, which contain numerous bifid rodlets (Fig. 6A). The radular formula is $35 \times 35.1.35$ and $49 \times 33.1.33$ in two specimens examined. The rachidian teeth (Fig.

6B) are reduced and lack a distinct cusp or denticles. The innermost laterals (Fig. 6B) have one or two small denticles on the inside of the triangular cusp and three to four denticles on the outer side. The outer laterals (Figs. 6C, D) increase in length towards the outer margin. They lack denticles on the inner side and possess six to eight denticles along the outer edge. The outermost teeth (Fig. 6E) are elongate with the denticles concentrated near the end rather than being evenly spread along the length of the tooth.

REPRODUCTIVE SYSTEM.—(Fig. 3B) The ampulla is long and tubular and narrows into a short postampullary duct prior to bifurcating into the oviduct and vas deferens. The oviduct is relatively thin and long and enters the female gland mass near the albumen gland. The proximal portion of the vas deferens is tightly coiled, consisting of several distinct loops. The duct narrows slightly into the muscular ejaculatory portion, which terminates at an unarmed penis and shares a short common duct with the vagina prior to the joint exit at the gonopore. The female gland mass consists of a large lobed mucous gland and smaller membrane and albumen glands. The vagina is of moderate length. The uterine duct emerges from the common junction of the vagina, the bursa copulatrix and the receptaculum seminis, and enters the female gland mass near the albumen gland. The thin-walled, spherical bursa has an extremely short duct while the muscular, pyriform receptaculum has an elongate, curved duct.

DISCUSSION.—*Chromodoris lekker* is most similar in its coloration to *C. decora* (Pease, 1860), which is widespread in the Indo-Pacific tropics from numerous localities from Christmas Island in the Indian Ocean to Hawaii (Rudman, 1986b). Though the two species have similar color patterns (Kay and Young, 1969; Bertsch and Johnson, 1981; Rudman, 1986b), there are consistent differences. *Chromodoris lekker* has a largely complete, opaque white marginal band, while *C. decora* has a few opaque white spots on the orange ring. *Chromodoris lekker* has a purple ring inside the orange one that is absent in *C. decora*. In *C. decora*, there is a thin, opaque white band and several lines that are absent in *C. lekker*, which does have scattered, opaque white tubercles.

The radular morphology of the two species is very similar. All of the records for the two species indicate similarity in distribution, dentition, and

number of radular teeth. One exception is that Kay and Young stated that a rachidian row of teeth is absent in *C. decora*. Specimens of *C. decora* from Hawaii (CASIZ 071564) and Papua New Guinea (CASIZ 086403) examined in this study did indeed have vestigial rows of rachidian teeth. All specimens of *C. decora* examined have a larger maximum number of denticles on their radular teeth (9–15) than do those of *C. lekker* (7–8), though there is considerable overlap in denticle number. The reproductive systems of the two species are also similar in their morphology. Both species have an unusually long duct of the receptaculum seminis, though this is not evident in the specimen described by Kay and Young (1969) from Hawaii. A long duct was present in both specimens of *C. lekker* and in specimens of *C. decora* examined here.

Despite the similarity of *Chromodoris lekker* and *C. decora* in their coloration, radular anatomy, and reproductive morphology, the consistent differences described above suggest that the two species are distinct. *Chromodoris lekker* appears to be restricted to the western Indian Ocean, while *C. decora* is known from the eastern Indian Ocean, throughout the western Pacific, and eastwards to Hawaii.

Chromodoris pruna

(Figs. 5B, 7)

Chromodoris sp. 8, Gosliner, 1987:79, Fig. 119.

TYPE MATERIAL.—Holotype, CASIZ 092490, Nosy Tanikeily, Madagascar, 1 m depth, 14 April 1989, T. M. Gosliner. Paratype, SAM A dissected, Park Rynie, Natal, South Africa, intertidal zone, 26 April 1982, T. M. Gosliner.

ETYMOLOGY.—The name “pruna” comes from the rosaceous genus *Prunus*, referring to the plum-colored spots on the notum.

DISTRIBUTION.—This species has been recorded from tropical southern Africa and Madagascar.

EXTERNAL MORPHOLOGY.—The living animals examined (Fig. 5B) were 4 and 6 mm in length. As indicated in the description of the reproductive system, these were immature individuals. The body is opaque white with a narrow, translucent white margin. Irregular orange patches are present around the margin. A large patch of orange is present at the antero-medial end of the animal. Irregular, dark plum spots are scattered over the notum. These spots are irregular in shape and have a diffuse poorly defined out-

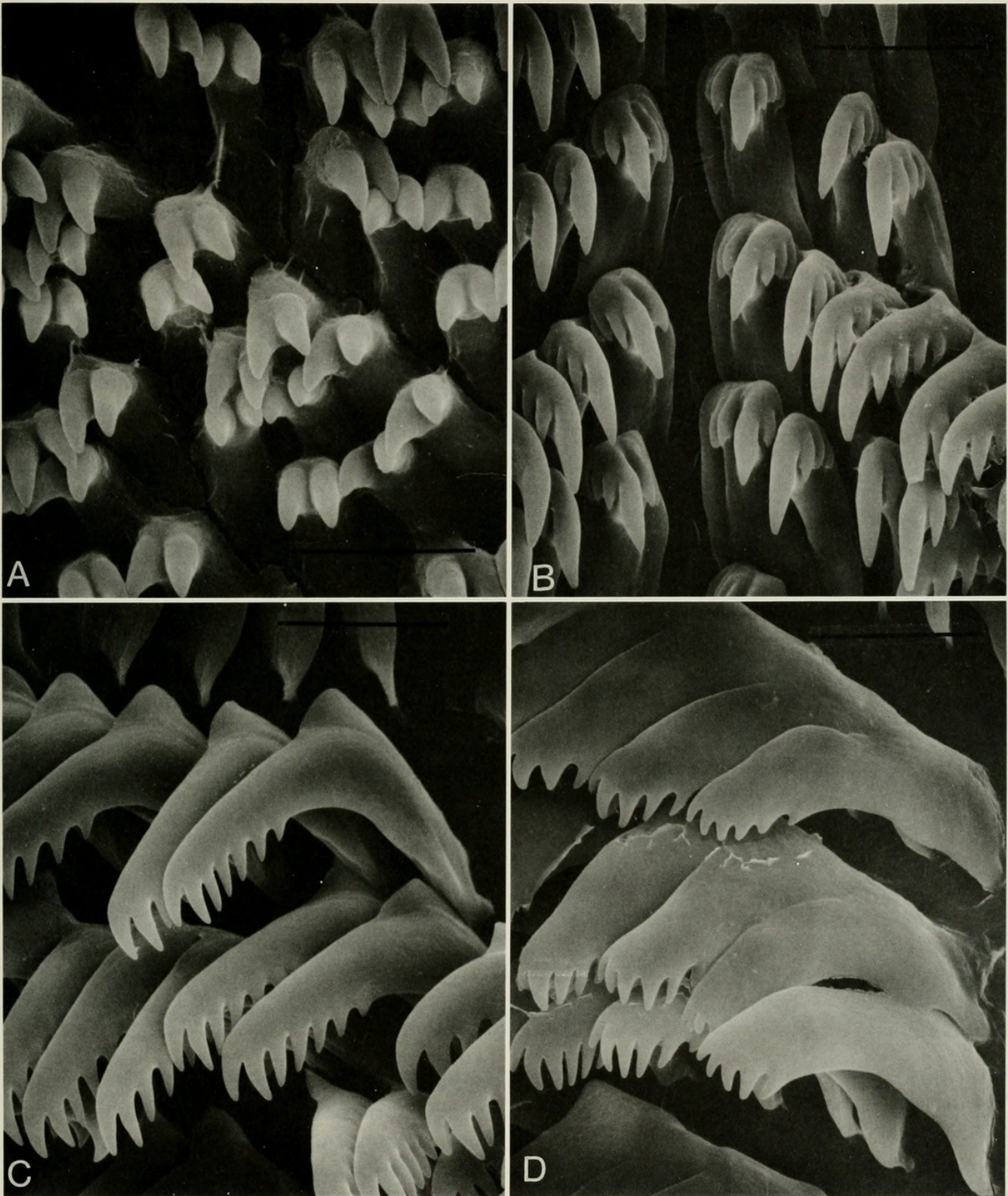


FIGURE 7. *Chromodoris pruna* sp. nov., scanning electron micrographs. A. Jaw rodlets, scale = 7.5 μ . B. Rachidian and inner lateral teeth, scale = 15 μ . C. Lateral teeth from central portion of half-row, scale = 15 μ . D. Outer lateral teeth, scale = 15 μ .

line. The rhinophores are opaque white basally, while most of the clavus is orange. The gills are translucent white and are largely covered with orange pigment. The surface of the orange gills and rhinophores is ornamented by minute, opaque white spots. The branchial plume is com-

posed of six simply pinnate gills. The perfoliate rhinophores have eight lamellae. The oral tentacles are short and digitiform.

BUCCAL MASS.—The anterior half of the buccal mass is glandular, while the posterior portion is highly muscular. Inside the buccal mass, at the

level of the junction of the muscular and glandular portions of the mass, are the jaws. They consist of numerous rows of short, bifid rodlets (Fig. 7A). The radular formula of the paratype specimen examined (A 35477) is $38 \times 26.0.26$. A rachidian row is absent. The inner lateral teeth (Fig. 7B) bear two denticles on the inside of the triangular cusp and three to four on the outside. The remaining laterals bear denticles only on the outside face of the teeth. In the middle of the half row, the teeth (Fig. 7C) are curved with an elongate cusp with 3–6 denticles. The outermost teeth (Fig. 7D) are more elongate, with four to five denticles situated at the end of the teeth.

REPRODUCTIVE SYSTEM.—The reproductive system was entirely immature in the larger of the two specimens.

DISCUSSION.—This species can be compared to other taxa with dark purple spots reviewed by Rudman (1983). It is most similar in color to *C. aspersa* (Gould, 1852). That species has a complete marginal orange line rather than interrupted patches. Also, there are more purple spots than in *C. pruna*, and they are lighter in color. The orange gills of *C. aspersa* are paler than those of *C. pruna* and lack opaque white spots. In *C. aspersa* a vestige of the rachidian plate is present, while in *C. pruna*, the rachidians are absent.

Despite the fact that the two specimens were immature, *Chromodoris pruna* is the only known species of *Chromodoris* with orange rhinophores and gills ornamented with opaque white spots. The color pattern is sufficiently different from other purple-spotted species that differences in coloration could not simply be attributed to the immature state of specimens of *C. pruna* examined here.

Noumea protea sp. nov.

(Figs. 3D, 5C, 8)

Chromodoris sp. 2, Gosliner, 1987: 77, Fig. 113.

TYPE MATERIAL.—Holotype, SAM A35431, Oudekraal, Atlantic coast of Cape Peninsula, 15 km S of Cape Town, 10 m depth, 18 October 1980, T. M. Gosliner. Paratypes, SAM A 35430, three specimens same locality and date as holotype. CASIZ 092489, one specimen, dissected, same locality and date as holotype.

ETYMOLOGY.—The name “protea” comes from the genus of flowering plants *Protea*. The color of the present species is the same as the floral bracts of the king protea, *Protea cynaroides*.

EXTERNAL MORPHOLOGY.—The living ani-

mals (Fig. 5C) are 10–13 mm in length. The animals are uniformly rose-pink in color with a series of opaque white mantle glands along the margin of the notum. The gills and rhinophores are also uniformly pink. The branchial plume consists of seven unipinnate lamellae. The perfoliate rhinophores contain seven lamellae. The oral tentacles are short and digitiform.

BUCCAL MASS.—The jaws consists of numerous irregular, multifid rodlets (Fig. 8A). The radular formula in one specimen is $22 \times 11.1.0.1.11$ (CASIZ 092489). A rachidian row of teeth is entirely absent. The inner lateral teeth (Fig. 8B) are much broader than the succeeding inner laterals. The inner laterals bear one to two denticles on the inner side of the elongate primary cusp and two to four denticles on the outer side. The succeeding laterals (Fig. 8C) all lack denticles on the inner side of the cusp and have 0–2 denticles on the outer side. The teeth are more elongate near the outer margin and lack denticles.

REPRODUCTIVE SYSTEM.—(Fig. 3D) The ampulla is short and wide and narrows into a thin postampullary duct. The postampullary duct narrows distally and bifurcates into the short oviduct and the vas deferens. The oviduct enters the female gland mass in the region of the albumen gland. The membrane and mucous glands are larger than the albumen gland and are situated peripherally around the gland mass. The mucous gland exits at the nidamental opening. At this opening, is a large vestibular gland, consisting of numerous discrete lobes. The short, curved, proximal portion of the vas deferens is the glandular, prostatic segment. The prostate narrows slightly into the muscular ejaculatory portion. This coiled section terminates in the unarmed penis, which lacks a distinct papilla. Adjacent to the penis is the slightly curved vaginal duct. Near the middle of the length of the vagina, the uterine duct emerges and joins with the female gland mass. More proximally are the curved, muscular, club-shaped receptaculum seminis and the spherical, thin-walled bursa copulatrix, which have a common junction with the proximal end of the vagina.

DISCUSSION.—*Noumea protea* is similar in appearance to *Noumea haliclona* (Burn, 1957) from southern and temperate eastern Australia. *Noumea haliclona* varies in color (Rudman, 1983) from white to pink to yellow. Deep-pink specimens resemble material of *N. protea*, except that additional spots of red and a submarginal band

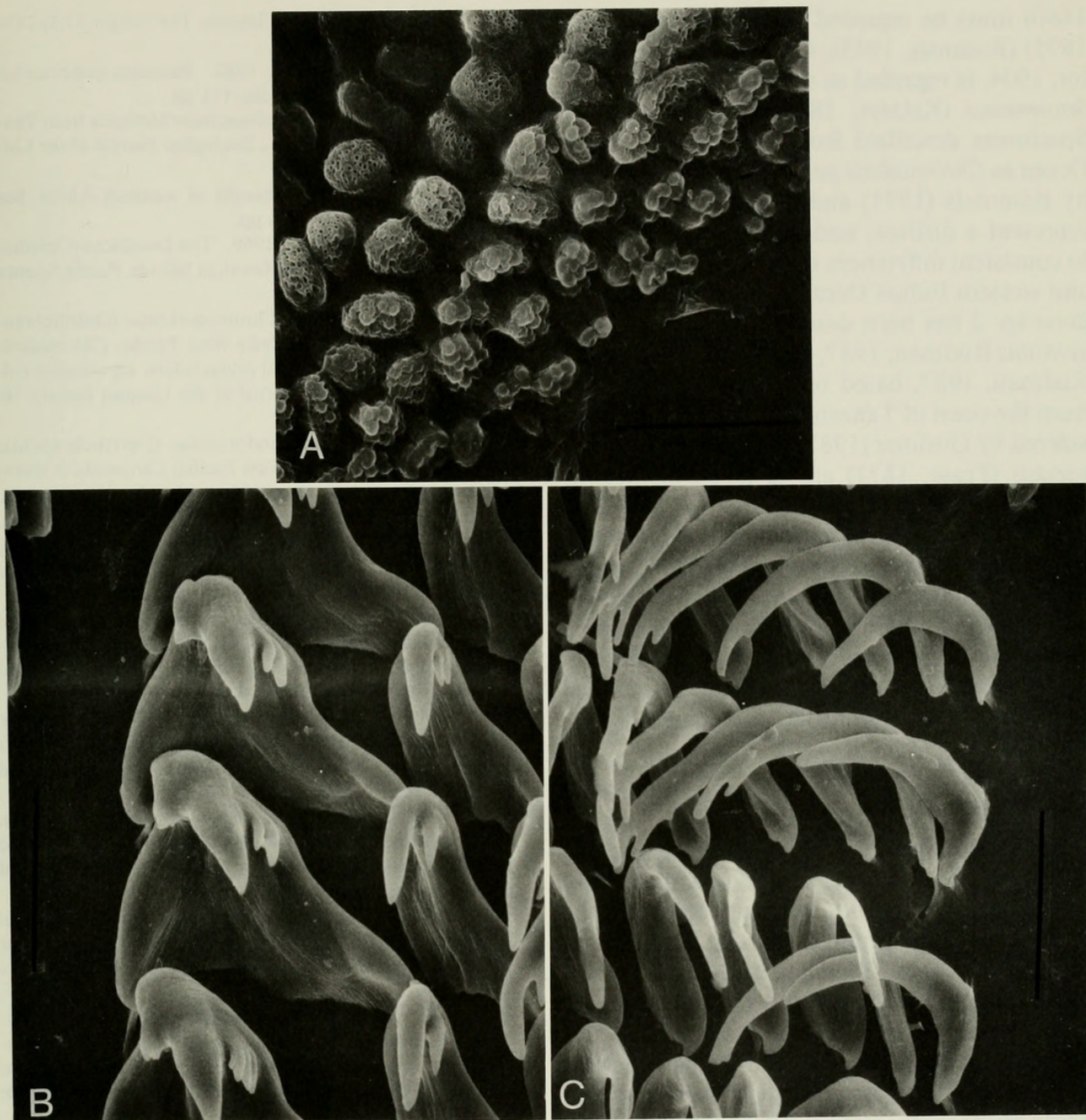


FIGURE 8. *Noumea protea* sp. nov., scanning electron micrographs. A. Jaw rodlets, scale = 15 μ . B. Inner lateral teeth, scale = 25 μ . C. Outer lateral teeth, scale = 25 μ .

are present in the former. Both species are among the few members of the genus described as having a well-developed vestibular gland consisting of numerous lobes (Rudman, 1984). The two differ in the arrangement of the radular teeth. In *N. protea* there are 11 outer lateral teeth per half row, while in mature specimens of *N. haliclona* there are 17–20 teeth per half row. The second lateral teeth of *N. haliclona* have six denticles while those of *N. protea* have only one or two denticles. The remaining outer lateral teeth of *N.*

haliclona have more denticles than the corresponding teeth of *N. protea*.

NOMENCLATURAL CHANGES IN SOUTHERN AFRICAN CHROMODORIDS

Since Gosliner (1987) recorded 39 species of chromodorid nudibranchs from southern Africa, several systematic changes have taken place that affect the identifications in that work. The species identified as *Chromodoris marginata* (Pease,

1860) must be regarded as *C. verrieri* (Crosse, 1875) (Rudman, 1985). *Chromodoris vicina* Eliot, 1904, is regarded as a junior synonym of *C. tennentana* (Kelaart, 1859) (Rudman, 1987). Specimens described from the western Indian Ocean as *Chromodoris geometrica* (Risbec, 1929) by Edmunds (1971) and Gosliner (1987) may represent a distinct, undescribed species owing to consistent differences in color between Pacific and western Indian Ocean specimens. *Chromodoris* sp. 3 has been described as *Chromodoris geminus* Rudman, 1987, and *C. sp. 7* as *C. alius* Rudman, 1987, based on specimens described from the coast of Tanzania. The specimens considered by Gosliner (1987) to represent *Noumea varians* (Pease, 1871) are in fact *Durvilledoris pusilla* (Bergh, 1874). *Glossodoris* sp. 2 of Gosliner (1987) is *G. cincta* (Bergh, 1888), and *G. sp. 3* is *G. hikuensis* (Pruvot-Fol, 1954), based on re-examination of material and comparison with the recent review of *Glossodoris* (Rudman, 1986a). Several species of *Cadlina*, *Hypselodoris*, *Ceratosoma* and *Glossodoris* remain undescribed and will be treated in forthcoming papers.

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