ON FIVE SPECIES OF COMMERCIALLY IMPORTANT GORGONIDS NEW TO INDIAN SEAS

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ABSTRACT

Fve species of commercially important gorgonids in the Indian seas, falling under the genera *Thesia* Duch. and Mich., *Echinomuricea* Verrill, *Echinogorgia* Kolliker and *Heterogorgia* Verrill, are recorded. All the species are described and illustrated.

INTRODUCTION

An unprecedented rise in the export of gorgonids from India in the recent years necessitated a more detailed investigation on this hitherto obscure group from our waters. Accordingly a resource survey was initiated by the Central Marine Fisheries Research Institute, Cochin, in 1980 and the salient findings on the availability, abundance and distribution of different species are being published elsewhere.

While engaged in the study of the various component species from the different centres along the Indian coast, a few species which have hitherto not been recorded from the Indian Ocean seas were collected, and the detailed descriptions of these are presented in this communication.

MATERIAL AND METHODS

The materials were collected mainly from the various centres along the east and west coasts of India where collection of gorgonids is going on in an organised manner. Since the gorgonids from India are being exported under the trade names 'black type', 'red type', 'monkey tail type' and 'flower type', care was taken to sort out the various species falling under each 'type' and to determine their systematic position and abundance at each centre.

Specimens collected by skin divers as also those hauled up in different fishing nets were used in the present study.

The classification adopted here is that of Bayer (1963). The size of spicule is given in mm based on the measurements of 50 spicules at random.

The sketches were done with camera-lucida. The various species recorded herein may be classified as follows:

Order Gorgonacea Lamouroux
Suborder Holaxonia Studer
Family Paramuriceidae Bayer

Genus *Thesia* Duch. and Mich.

1. *Thesia flava* Nutting

Genus *Echinomuricea* Verrill

2. *Echinomuricea indica* Thomson and Simpson

Genus *Echinogorgia* Kolliker

3. *Echinogorgia flora* Nutting
4. *E. complexa* Nutting

Genus *Heterogorgia* Verrill

5. *Heterogorgia flabellum* (Pallas)

SYSTEMATICS

1. *Thesia flava* Nutting (Fig. 1; A, B, C)

Thesia flava Nutting, 1910, p. 52, pl. 8, figs. 1, 1a.

Pseudothesia flava Kukenthal, 1924, p. 228.

Material: Two specimens from the Gulf of Mannar, got entangled in a lobster net at a depth of 2-4 meters (Fig. 1, B and C).

Description: Both these specimens showed the same pattern of growth. The colony divides in one plane, the branching is asymmetrical and fusion of branches very rare. Branches may divide in a vague dichotomous pattern and end in blunt tips. Diameter of branches 1.5-2 mm and of stalk about 4 mm; emerging part of the branch less wide than the apical portion.

Calyces crowded and contiguous; about 0.5 mm high and 1 mm wide. Surface of calyces bristled owing to the presence of spines projecting from the characteristic *Thesia* type of spicules. Polyps fully retractile; operculum and collaret delicate. Conenenchyme packed with irregular plates.

Spicules: 1) The characteristic *Thesia* type of spicule may measure up to 0.56 x 0.033 mm excluding spines (Fig. 1, A. 1). Spines may have an average length of 0.08 mm. Apart from this type, there may be regular spindles (Fig. 1, A. 2) of which some may be slightly bifid at one end. 3) Quadriradiates (Fig. 1, A. 3) and 4) Multiradiates (Fig. 1, A. 4).

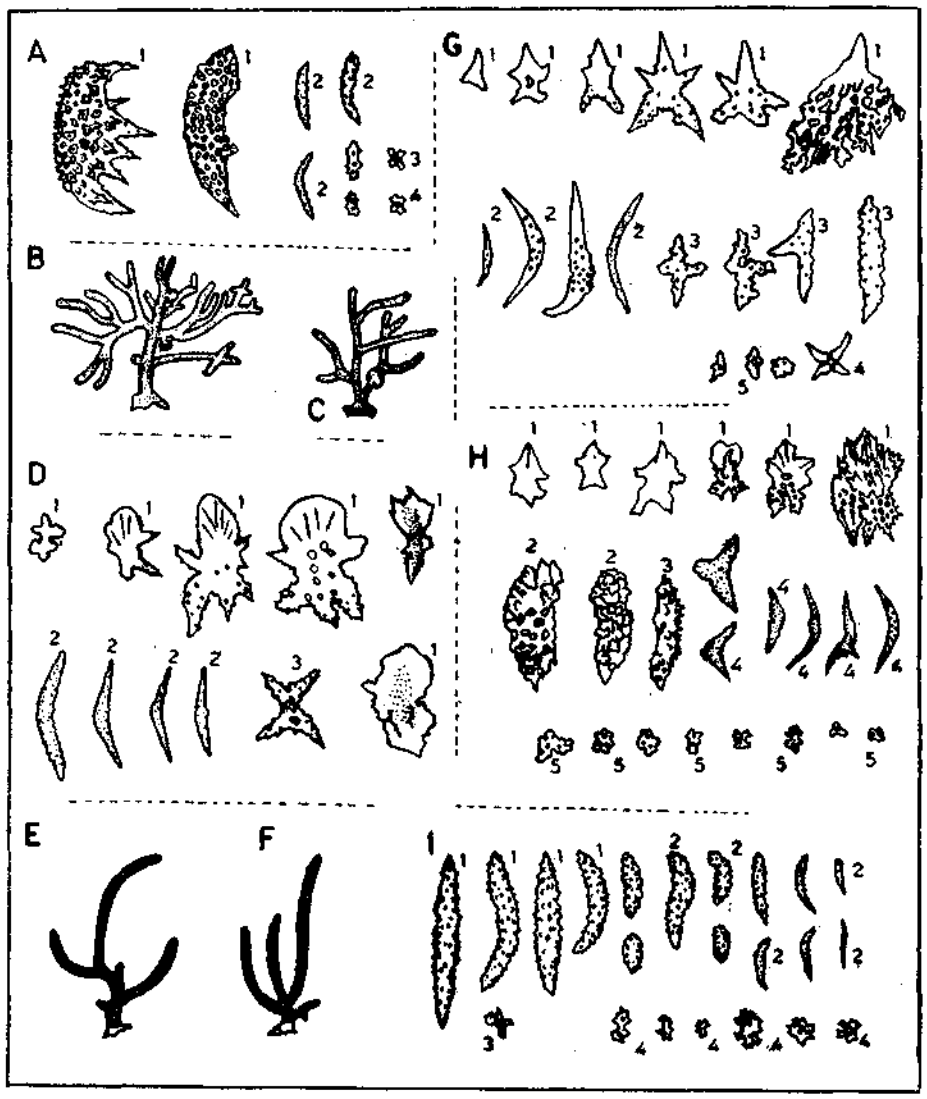

FIG. 1. A *Thesia flava*: Spicules, 1) *Thesia* type of spicule, 2) Regular spindles, 3) Quadriradiate spicule and 4) Multiradiates. B. *Thesia flava*: Entire specimen. C. *Thesia flava*: Entire specimen. D. *Echinogorgia flora*: Spicules, 1) Leaf clubs, different stages of growth, 2) Spindles and 3) Tetract spicules. E. *Echinogorgia flora*: Entire specimen, F. *Echinogorgia flora*: Entire specimen, G. *Echinomuricea indica*: Spicules, 1) Thorn spicules, different stages of growth, 2) Spindles, 3) Triraradates, 4) Tetraradiates and 5) Multiradiates. H. *Echinogorgia complexa*: Spicules, 1) Leaf clubs, different stages, 2) Ordinary clubs, 3) Toothed spindles, 4) Granulated spindles, and 5) Triacts|Tetracts. I. *Heterogorgia flabellum*: Spicules, 1) Large spindles, 2) Bent spindles, 3) Tetraradiates and 4) Multiradiates.

Colour: Of the two specimens examined one was greenish yellow and the other pink. Spicules assume the general colour of the specimen.

Biological associates: Barnacles often form galls on branches.

Distribution: Known previously from Malay Archipelago and is here reported from the Gulf of Mannar.

Commercial name: "Flower type"

2. *Echinomuricea indica* Thomson and Simpson

(Fig. 1, G; Fig. 2, A)

Echinomuricea indica Thomson and Simpson, 1909, p. 204, pl. 3, figs. 2, 3; pl. 8, fig. 4.

Kukenthal, 1924, p. 188, fig. 17.

Material: Several specimens from export samples. This species is fairly well represented all along the southwest and southeast coasts of India and is exploited in large quantities at Rameswaram and Tuticorin. This species is distributed up to a depth of 25 meters in the Gulf of Mannar, but is common only at depths between 5 and 8 meters (Fig. 2).

Maximum size noted in this case is 80 cm (height) with a spread of about 60 cm or more. Colony divides in one plane and may assume ovate, obovate or even circular shape in advanced stages of growth. Branches arising directly from the stalk lose their identity after a short distance and the branchlets formed often traverse in a radial pattern. These branchlets often anastomose freely in an irregular pattern, resulting in an irregular reticulation with mesh size varying between 1 x 1.5 and 1.5 x 6 cm; meshes often elongated in the axis of growth, and the branchlets forming the sides of mesh may have an average diameter of 2 mm; branchlets often end in blunt tips.

Calyces distributed throughout, hemispherical; height 0.5 mm and diameter 1.5 mm on an average. Anthocodia retractile, calyx margin ornamented with thorn spicules, collaret well defined and robust.

Spicules: 1) Thorn spicules. *Echinomuricea* type, with sharp conical spine bearing 6 or less tuberculated root-like structures arising from the base of the spine (Fig. 1, G. 1). Size, when well developed, 0.39 x 0.39 mm. Other spicules represented are 2) Spindles (Fig. 1, G. 2). 3) Triradiates (Fig. 1, G. 3) Tetraradiates (Fig. 1, G. 4) and 5) Multiradiates (Fig. 1, G. 5).

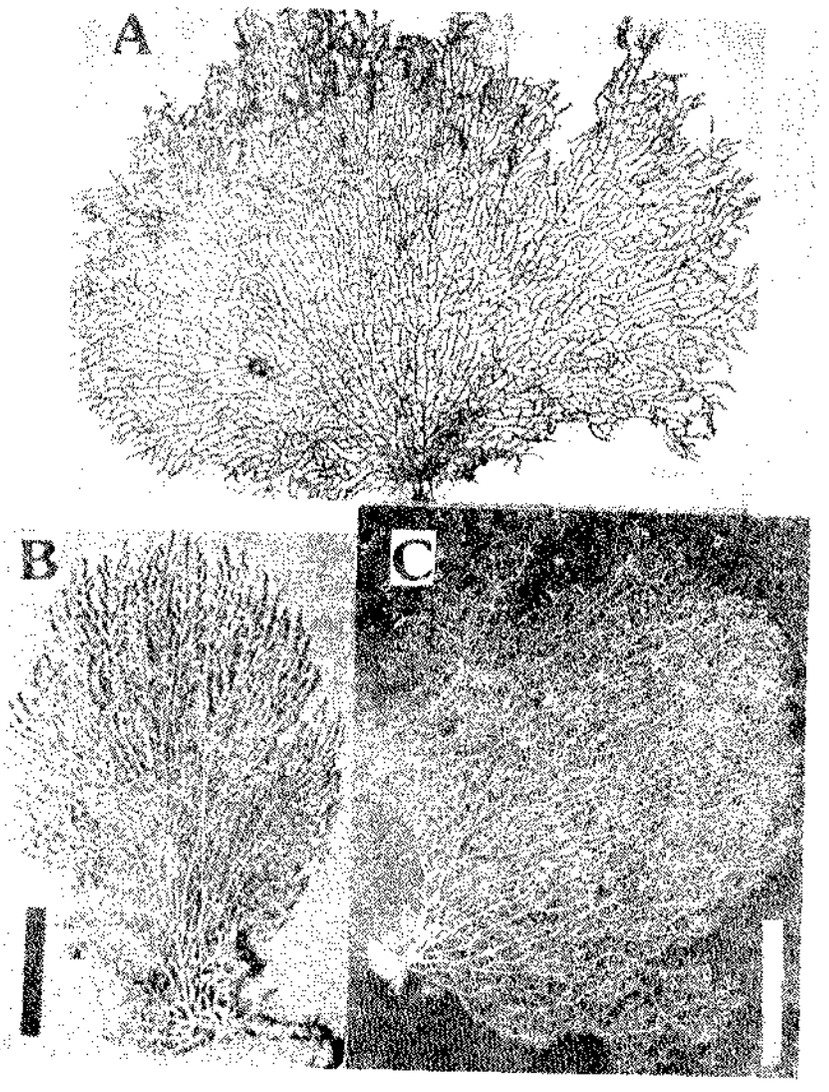

FIG. 2. A. *Echinomuricea radica*. B. *Echinogorgia complexa* (Inset scale 5 cm). C. *Heterogorgia babellum* (Inset scale 20 cm).

Colour: Coenenchyme brown; axis dark brown and spicules colourless.

Distribution: The original description of the species was based on a collection from a depth of 24 meters off Arakan coast. The species is here reported from the Indian seas.

Commercial name: "Black type"

3. *Echinogorgia flora* Nutting
(Fig. 1: D, E, F)

Echinogorgia flora Nutting, 1910, p. 66, pl. 11, figs. 2, 2a; pl. 21, fig. 10. Kukenthal, 1924, p. 200, fig. 123.

Material: Two specimens collected by skin diving off Mulloor (south of Vizhinjam) from mussel beds (Figs. 1, E. F).

Description: Colony bushy and branches in one plane, division often in an irregularly dichotomous pattern; one branch (normally that which is directed to the peripheral part of the specimen) often curves out just after its point of origin and then grows while the other takes a straight course. The tips of branches often show a tendency to curve towards the midlongitudinal line of the colony. Branches circular in cross section with a diameter varying between 2 and 3 mm; tips blunt. Stalk and branches have more or less the same diameter.

Calyces distributed all over, contiguous and flush with the surface. Polyps retractile, surface and calyces well armoured with 'leaf clubs'.

Spicules: 1) "Leaf clubs". *Echinogorgia* type. These spicules differ from the same seen in all the other species of *Echinogorgia* in that there is only one leaf as against several noted in all the others. The leaf like expansion, in the present case, is oval, orbicular and transparent and in some cases the expansion may bear tubercles or striations ornamenting it (Fig. 1, D. 1). The basal part may have 1-4 lateral tuberculated structures as in all *Echinogorgia* type of spicules. Size up to 0.42 mm. 2) Spindles. Angulated or not, size up to 0.25 mm (Fig. 1, D. 2). 3) Tetracts. Very rare (Fig. 1, D. 3).

Colour: In living condition the colony was light yellow, but after preservation in formalin the colour turned to pale white. The axis is dark brown in older parts while pale brown in the terminal parts. Spicules are colourless.

Biological associates: *Pteria* sp. found attached to a specimen examined.

Distribution: This species was originally recorded from the littoral zone of New Guinea and is here recorded from the southwest coast of India (south of Vizhinjam) from mussel beds at a depth of 4 meters.

Commercial name: "Flower type".

4. *Echinogorgia complexa* Nutting
(Fig. 1, H; Fig. 2, B)

Echinogorgia complexa Nutting, 1910 p. 67, pl 11, figs. 1, 1a; pl. 21, Fig. 11. Kukenthal, 1924, p. 200.

Material: Several specimens from export samples. This species is rather widespread in the southeast and southwest coasts of India (Fig. 2,).

Description: Colony flabellate and reticulate, often forming circular to oval expansions. Stalk, which is rather robust, is continued further as main branches and may be traceable in the lower 1/3rd of the colony. Radial branchlets are given off from these branches and these, after their emergence, curve out and then take a parallel course. These radials, as they go, produce lateral branchlets possessing blunt tips. As the growth proceeds these branchlets come into contact with their counterparts originating from the opposite side and fuse forming a compact scalariform reticulation. Meshes thus formed may have a size of about 5 x 10 mm, their long axis being in the direction of growth. Some branches of the last order which could not establish contact with their counterparts, may project into the mesh ornamenting it. Branchlets may have a uniform diameter of 2 mm.

Calyces are distributed uniformly and are contiguous, diameter up to 1 mm and height 0.5 mm. Polyps contractile completely, but collaret rests above the calyx margin. Calyx wall and the general surface ornamented with "leaf clubs".

Spicules: 1) "Leaf clubs" (Fig. 1, H. 1) With several leaf-like expansions from one side and with root-like tuberculated structures from the other. Size, 0.34 x 0.21 mm when well developed. 2) Ordinary clubs. Size, 0.33 x 0.126 mm (Fig. 1, H. 2). 3) Toothed spindles. Size up to 0.94 x 0.07 mm (Fig. 1, H. 3). 4) Granulated spindles (Fig. 1, H. 4). 5) Triacts | Tetracts (Fig. 1, H. 5).

Colour: Colony brown, axis dark brown and spicules colourless.

Distribution: This species was originally recorded from New Guinea from a depth of 73 meters and is here recorded from the southeast and southwest coasts of India.

Commercial name: "Black type".

5. *Heterogorgia flabellum* (Pallas)

(Fig. 1, 1; Fig. 2, C)

Heterogorgia reticulata Nutting, 1910, p. 93, pl. 17, figs. 2, 2a; pl. 22, fig. 17.
Heterogorgia flabellum Kukenthal, 1924, p. 434 (synonymy).

Material: Several specimens from both southwest and southwest coasts of India. Specimens may grow to a height of 100 cm with a lateral spread of about 80 cm or more.

Description: Colony flabellate and reticulate. Stalk divides into main branches which may be traceable up to the middle of the colony and then divide into smaller branchlets. These branches, as they go, divide and redivide forming the

main expanse of the colony, ultimately resulting in either a circular or an oval growthform. The stalk may be roughly circular or rectangular in cross section, but the main branches are distinctly flattened with their larger side at right angle to the plane of the colony. The branches may anastomose in a scalariform pattern forming irregular meshes of 1-3 cm. The ultimate branchlets originating from the periphery of meshes may curve out and grow at right angle to the plane of the colony.

Calyces low, aperture widely open when dry, height 0.5 mm and diameter about 1 mm; evenly distributed over the surface with a tendency to get overcrowded at the growing tips. Polyps completely retractile.

Spicules: 1) Large spindles. Size up to 1.5 x 0.22 mm (Fig. 1, I. 1). 2) Bent spicules of operculum (Fig. 1, I. 2). 3) Tetraradiate spicules (Fig. 1, I. 3) and 4) Multiradiates (Fig. 1, I. 4).

Colour: Colony dull brown to white in dry condition, axis dark brown and spicules colourless.

Distribution: This species was originally reported from Malaysia and northwest Australia and is here recorded from the Indian seas. This species constitutes a major item among the gorgonids which are now exported from India.

Commercial name: "Black type".

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