

Two New Gobiid Fishes of the
Genus *Gobiopsis* and a
Redescription of *Feia nympa* Smith

ERNEST A. LACHNER
and
JAMES F. McKINNEY

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ABSTRACT

Lachner, Ernest A., and James F. McKinney. Two New Gobiid Fishes of the Genus *Gobiopsis* and a Redescription of *Feia nympha* Smith. *Smithsonian Contributions to Zoology*, number 299, 18 pages, 11 figures, 3 tables, 1979.—The genus *Gobiopsis* Steindachner is redefined to embrace two new Indo-Pacific species, *Gobiopsis exigua* and *G. springeri*, and to include the nominal species, *Callogobius atratus* Griffin. Descriptions of the new species are provided and a redescription of *G. atrata* is presented. *Gobiopsis exigua* is known from two widely disjunct regions, the Gilbert and Fiji Islands, Pacific Ocean, and the Comores and Amirantes Islands, western Indian Ocean. *Gobiopsis springeri* is known only by the holotype taken at Ceram, Indonesia, and *G. atrata* is endemic to the New Zealand fauna. The scope of the generic concept is broadened and a revised generic diagnosis is presented. An expanded key includes 13 species allocated to the genus. The monotypic genus, *Feia* Smith, and type-species, *F. nympha* Smith, are redescribed and the superficial relationship of the genus *Feia* to *Gobiopsis* is compared and discussed. The two new species and *G. atrata*, all other species of *Gobiopsis* collectively, and *Feia nympha* are compared in Tables 2 and 3 using 21 meristic, sensory, various morphological, and color characters, and their interrelationships are discussed in the text.

The inclusion of the three species within *Gobiopsis* expands the known range of the genus to include certain tropical insular areas of the Indian and Pacific oceans and the temperate waters of New Zealand.

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Two New Gobiid Fishes of the Genus *Gobiopsis* and a Redescription of *Feia nympha* Smith

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Introduction

In our revision of the genus *Gobiopsis* (Lachner and McKinney, 1978), we treated 10 species that shared important characters such as the broad, depressed head with up-turned snout, prominent barbels on the head in particular areas, an inter-relationship between the cutaneous papillae system and the cephalic sensory pore and canal system, a fleshy midcheek fold, and certain portions of the color pattern such as the dark sickle-shaped pectoral fin mark. We considered that these characters formed the basis for a finite group of gobies. Discovery of additional species variously related to the genus *Gobiopsis* necessitates further consideration of these group characters.

The purpose of this study is to describe two new species of barbeled gobies that are most closely related to *Gobiopsis* and that we provisionally place in this genus, to redescribe the species *Callogobius atratus* Griffin and discuss its placement in the genus *Gobiopsis*, to redescribe the species *Feia nympha* Smith and discuss the possible relationship between the monotypic genus *Feia* and *Gobiopsis*,

and to consider the relationships between the 10 species of *Gobiopsis* sensu stricto of Lachner and McKinney (1978) with species treated herein as *Gobiopsis* sensu lato.

METHODS.—The method of taking counts and mensurations and the terminology used for the cutaneous papillae system, cephalic sensory pore system, and particular barbels on the head are the same as those given by Lachner and McKinney (1978). Abbreviations not included in the above paper follow: PU2 = antepenultimate vertebra; D2 = second dorsal fin; P1 = pectoral fin; A = anal fin; s.s. = sensu stricto; s.l. = sensu lato.

The pterygiophore formula is explained by Birdsong (1975:137). The lateral scale count refers to the number of oblique rows horizontally along the midside of the trunk from the upper edge of the opercle to the end of the hypural arch. Data taken from a holotype is underlined in the descriptive account.

ACKNOWLEDGMENTS.—For loans and exchanges of specimens and for providing various information on certain species, we thank the following individuals: A. B. Stephenson, Auckland Institute and Museum (AIM); J. Moreland, National Museum of New Zealand (NMNZ); W. N. Eschmeyer, T. Iwamoto, and P. Sonoda, California Academy of Sciences, San Francisco (CAS); D. F. Hoesel, H. K.

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Larsen, and J. R. Paxton, Australian Museum, Sydney (AMS); J. E. Böhlke, Academy of Natural Sciences, Philadelphia (ANSP); J. E. Randall and A. Suzumoto, Bernice P. Bishop Museum, Honolulu (BPBM); M. M. Smith, Rhodes University, J. L. B. Smith Institute of Ichthyology, Grahamstown, South Africa (RUSI); R. Winterbottom, (formerly of Rhodes University), Royal Ontario Museum, Toronto.

Detailed drawings of the heads and whole bodies were made by J. R. Schroeder. V. G. Springer, National Museum of Natural History (NMNH), Smithsonian Institution, Washington, D.C., provided information on the habitat and ecology of the new species named in his honor. All specimens listed in the collections of NMNH are listed under the abbreviation USNM (former United States National Museum). We are grateful to Ray S. Birdsong and Leslie W. Knapp for their critical comments and review of this manuscript and for the first paper on *Gobiopsis* by Lachner and McKinney (1978).

The *Gobiopsis* Complex

The inclusion of *Callogobius atratus* and the two new species described below, *G. springeri* and *G. exigua*, in *Gobiopsis* broadens the generic concept from that given by Lachner and McKinney (1978). A revised generic diagnosis of *Gobiopsis* now embracing 13 species follows: first dorsal fin with six spines; teeth in jaws unicuspid; barbels

on head present, well developed or reduced; a horizontal fleshy fold on midcheek, prominent or reduced, bearing a row of coarse papillae or in close proximity to it, or bearing barbel-like structures; cephalic sensory pore system lacking the posterior otic pore; preopercular pores two, one, or none (cephalic pore system entirely absent in three species); cephalic sensory pores mostly conspicuous, round, oval or slitlike; cutaneous papillae system well developed, of moderate to coarse papillae, conspicuous horizontal rows on side of head and chin; inner rays of pelvic fins joined to tips or nearly so, frenum fragile to strongly developed forming a weak to a well-formed disc, the fin rays multibranching, not reaching anal opening; dorsal fins distinctly separate or membrane of first dorsal fin touching base of second dorsal fin; head broad, depressed; snout broad to moderately broad, upturned, the lower jaw protruding; gape moderate to wide; coloration of trunk in most species with saddles, vertical bars, or variously mottled; a dark sickle-shaped band present in some species on pectoral fin, near base, with an anterior wedge or wedges that divide the light basal area; tongue round, truncate, or slightly bilobed; gill opening moderate to wide; interorbital width narrow to broad; neural and haemal spines of PU2 narrow to spatulate; posterior nares near anterior nares or near margin of eyes; vertebrae 10+16 or 10+17; second dorsal fin rays almost always I,10 or I,11; anal fin rays almost always I,9 or I,10.

Expanded Key to the Species of *Gobiopsis*

1. Barbels numerous and well developed on head, including those on cheek tuft and intermandibular area; four prominent horizontal rows of papillae on cheek; anal fin rays almost always I,9 *Gobiopsis sensu stricto*
 Barbels few and not well developed, those on cheek tuft and intermandibular area absent; two or three horizontal rows of papillae on cheek; anal fin rays I,102
2. A single, median chin barbel; fleshy cheek fold well developed; membrane of first dorsal fin reaches base of second dorsal fin; interorbital broad, about equal to diameter of eye; no suborbital row of papillae; second dorsal fin rays I,11 or I,12; a large, distinct, dark sickle-shaped mark on pectoral fin; vertebrae 10+17 (New Zealand) *G. atrata* (Griffin)
 One or two pairs of chin barbels; cheek fold not well developed; first and second dorsal fins distinctly separate; interorbital narrow, about one-half diameter of eye or less; a suborbital row of widely spaced papillae present; second dorsal fin rays almost always I,10; dark mark at base of pectoral fin small, indistinct, not sickle shaped; vertebrae 10+163
3. Sensory pores present; a single pair of chin barbels; no gular barbels; outer preoperculo-mandibular row of papillae ascends on posterior portion of preopercle nearest to its margin; pelvic fins moderate in length, not nearly reaching anal aperture; predorsal area with three, dark, narrow transverse bands (western Pacific and Indian oceans) *G. exigua*, new species

Sensory pores absent; two pairs of chin barbels and two gular barbels present; outer preoperculo-mandibular row of papillae ascends well in advance of preopercular margin; pelvic fins long, nearly reaching anal aperture; predorsal area with two broad, dark transverse bands (Ceram, Indonesia) *G. springeri*, new species

Gobiopsis atrata (Griffin), new combination

FIGURES 1, 2

Callogobius atratus Griffin, 1933:176, pl. 25.

MATERIAL EXAMINED.—Eight collections, 19 specimens (29.8–73.4 mm SL), all from New Zealand. NORTH ISLAND: AIM Ps 286.1, holotype, male, 50.9 mm SL, Cable Bay, Mangonui; NMNZ 3141 (2 specimens), outer Bay of Islands; USNM 216445 (5), out of NMNZ 3141; USNM 216446 (1), Goat Island, Leigh, formerly NMNZ 5393; NMNZ 5944 (1), Lyall Bay, Wellington; NMNZ 5945 (1), Wellington harbor entrance; NMNZ 3285 (1), Ohiro Bay, Wellington. STEWART ISLAND: NMNZ 5627 (3), Rosa Island, Port Pegasus; NMNZ 5644 (4), upper Port Pegasus.

DIAGNOSIS.—Cephalic sensory pores absent; head barbels reduced to a single, median stump-like protuberance on chin; outer preoperculo-mandibular row of papillae ascends on border of posterior margin of preopercle; postorbital row of papillae short and weakly developed; fleshy cheek fold enlarged; interorbital wide; dark mark at base of pectoral fin large, prominent, sickle shaped; anal rays I,10; vertebrae 10+17.

DESCRIPTION.—Dorsal fin rays VI–I, 11 (18), VI–I, 12(1); anal rays I,10 (19); pectoral rays 19 (18), 20 (13), 21 (1); pelvic rays I,5 (6); segmented caudal rays 17 (19); branched caudal rays 15 (10), 16 (6), 17 (3); lateral scale rows about 55–65 (8); transverse scale rows 23–26 (6); predorsal scales about 25.

Scales cycloid; eccentric, narrow focus; primary radii in anterior field about 6–7 and 1–2 secondary radii; no radii in posterior field.

Gill rakers moderate in length, about 10 on lower limb of first arch, 2 or 3 on upper limb.

Vertebrae 10+17 (17); pterygiophore formula

3 (22110); neural and haemal spines of PU2 compressed and spatulate.

A large species for *Gobiopsis*; body elongate, head depressed, trunk compressed posteriorly; head profile viewed from above moderately acute; snout long, pug nosed, gape oblique, wide; lower jaw protrudes; angle of lower jaw not reaching vertical from anterior margin of eye; interorbital wide, about equal to or greater than eye diameter in larger specimens; eyes situated more dorsolaterally than on *G. springeri* or *G. exigua*; anterior and posterior nares widely separated, the posterior naris close to eye, both at end of tube; tongue broadly rounded or truncate, the tip free; gill opening moderate, similar to *Gobiopsis sensu stricto*, not as wide as on *G. springeri* and *G. exigua*.

Pectoral fin comparatively short, not extending to vertical at anterior margin of anus, posterior margin round or somewhat pointed; pelvic fins form a short oval cup, the inner rays joined, the frenum large and strongly developed; pelvic fin length 63 to 74 percent of distance from pelvic insertion to anal fin origin; first and second dorsal fins about equal in height; membrane of first dorsal fin just reaching origin of second dorsal fin; caudal fin rounded, equal to head length or slightly less.

Scales small, more crowded and smaller anteriorly than posteriorly on trunk; scales absent on cheek, opercle, and area just posterior to eyes; nape and occipital area with small, crowded scales.

Genital papilla of male short, depressed, and tapers slightly at tip; papilla of female short and bulbous and slightly bilobed at tip.

Dentition of upper jaw with an outer row of about 35 caninoid teeth, slightly larger on anterior

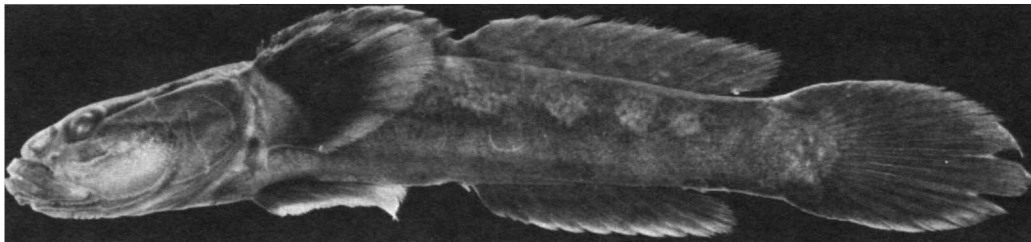


FIGURE 1.—*Gobiopsis atrata*, USNM 216446, male, 48.3 mm SL, New Zealand, Goat Island, Leigh.

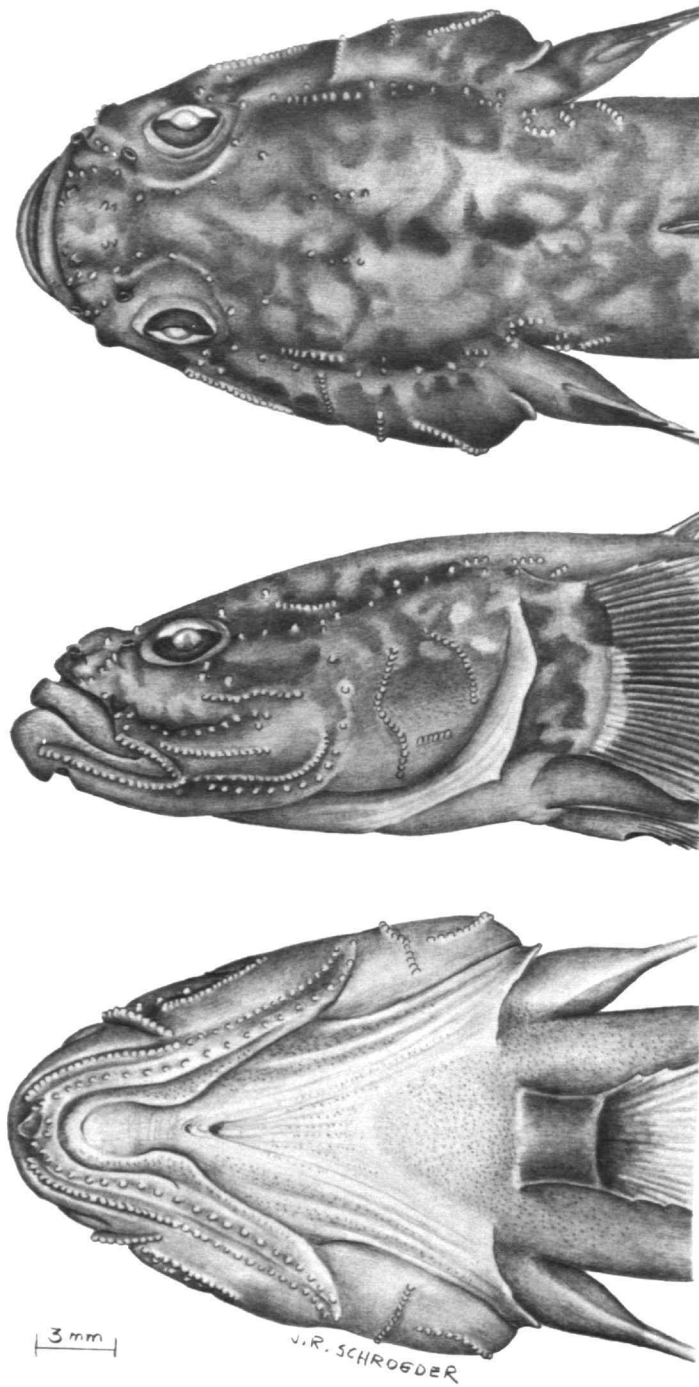


FIGURE 2.—*Gobiopsis atrata*, NMNZ 5644, female, 60.9 mm SL, New Zealand, Stewart Island. (Drawn by J. R. Schroeder.)

part of jaw, equal to or twice as long as width of spaces between them; a patch of 2 rows of small villiform teeth behind outer row; a row of about 6 recurved caninoid teeth medially behind villiform patch. The outer row of teeth on lower jaw same as that of upper jaw; a villiform patch of teeth in about 3 to 4 rows behind outer row; an inner row of about 30 caninoid teeth behind villiform patch, three-fourths as long as those of outer row.

Barbels absent except for a single median, squarish, short mental protuberance.

The cutaneous papillae system (Figure 2) is well developed and the general pattern resembles that of *G. aporia* but differs mainly as follows: the sub-orbital row is absent; the nasal row consists of coarse, widely spaced papillae and is confluent behind the eye with the lateral cephalic row, which also has coarse, widely spaced papillae (the secondary lateral cephalic row has close-set papillae like those of *G. aporia*); a short vertical row of 2 or a group of 3 papillae present below eye, above cheek fold; postorbital row reduced to 1 or 2 papillae; occipital series reduced to 2 paired groups having 1 and about 3 papillae each; snout with a regular row of coarse papillae parallel to nasal row but laterad to nares rather than numerous scattered papillae; an anterior and posterior pair of coarse papillae on snout in area that bears posterior internasal barbels on *G. aporia*; the fleshy cheek fold is well developed and has a row of large, coarse papillae beneath it, but there is no row of papillae mounted on its edge; a row of papillae is present above posterior margin of fold and extends on cheek to posterior preopercle (equals first cheek row?); third cheek row absent or reduced to a single papilla; fourth cheek row shorter and positioned closer to cheek fold than in *G. aporia*. Trunk and caudal series as described by Lachner and McKinney (1978).

COLOR IN PRESERVATION.—A darkly colored species, highly mottled in larger specimens. Head behind eyes and nape with strong, blackish, irregular mottling over brownish black background, mottling reduced or lacking in smaller specimens; side of head with dark streak from eye to upper edge of opercle; cheek with a strong oblique dark mark from eye to lower opercle; 2 dark irregular blotches or barlike marks below eye; upper opercle with dark mottling, snout and chin with faint dark mottling. Trunk dorsolaterally with 6 light roundish spots,

larger than orbit, separated from each other by brownish background and obliterated or nearly so by black, irregular mottling in larger specimens; spots create a wavy brownish midlateral stripe mostly in smaller specimens, obliterated by black mottling or patches in larger specimens. Six or 7 dark, irregular blotches along dorsal midline pass through dorsal fins and over caudal peduncle in larger specimens, faintly present or absent in most of smaller specimens. Breast, belly, and lower caudal peduncle dark brown to blackish in larger specimens, a more uniform and lighter brown in smaller specimens. Fleshy base of pectoral fin mottled with black in larger specimens, mottling reduced in smaller specimens; proximal portion of pectoral fin light, followed by a large, black, sickle-shaped mark, uniform in smaller specimens but in larger specimens forms a black wedge on upper portion of fin, which divides or nearly so the light pectoral base; sickle-shaped mark extends outward on rays, becoming faint distally and terminating at outer fifth of ray, remainder of pectoral fin clear. Pelvic fin with basal portion, including all of frenum, blackish, becoming gradually lighter distally, more pigment on interradiation membrane than on rays, outer fifth of fin clear or light brown. First and second dorsal fins of larger specimens blackish with heavier black mottling or irregularly arranged black spots; smaller specimens with dark brown basal spot anteriorly on first dorsal fin and about 5 similar spots along second dorsal fin base, remainder of fins light brown. Anal fin dark brown to black proximally, light brown to clear distally. Caudal fin uniformly dark brown, somewhat lighter at its extremity.

GEOGRAPHIC DISTRIBUTION.—*Gobiopsis atrata*, apparently a New Zealand endemic, is represented in our material from the northeast coast of North Island, the vicinity of Wellington, and Stewart Island at the southern extremity of South Island.

REMARKS.—Griffin (1933:176, pl. 25) illustrated enlarged scales along the midbody and mentioned a lateral line. We find no differentiated scales on the holotype and other material studied.

Gobiopsis exigua, new species

FIGURES 3, 4

HOLOTYPE.—AMS I.18052-004, female, 41.5 mm SL, from Gilbert Islands, Abiang Atoll, Leeward

Reef crest, $\frac{1}{2}$ mi N of southern end of atoll, D. F. Hoese Sta 73-51, 11 Nov 1973.

PARATYPES.—AMS I.18052-005, female, 34.8 mm SL, taken with holotype; USNM 216209, male, 33.4 mm SL, female, 37.0 mm SL, taken with holotype; BPBM 11373, gravid female, 40.2 mm SL, Fiji Islands, Viti Levu, Rat-Tail Pass, collected by J. E. Randall, 7 Aug 1971; BPBM 20320, female, 32.3 mm SL, Fiji Islands, outside Mbengga barrier reef, near E end of Frigate Passage, J. E. Randall Sta 25, 11 Mar 1973; ANSP 134776, female, 25.6 mm SL, Amirantes Islands, Remire Reef, NE of Eagle Island, J. E. Böhlke Sta F-82, 4 Mar 1964; CAS 33610, female, 32.6 mm SL, Grand Comore Island, N of Hotel Itsandra, in front of "Coelacanth Grotto," 50 m from shore, J. E. McCosker Sta 75-17, 19 Feb 1975.

DIAGNOSIS.—Cephalic sensory pores present, anterior interorbital pore (AITO) present, IT pore absent; head barbels reduced in number and size, one on each side of chin, a pair on snout; outer preoperculo-mandibular row of papillae ascends on posterior portion of preopercle; postorbital row of papillae long; fleshy cheek fold reduced; interorbital narrow; dark mark at base of pectoral fin small, indistinct; anal rays I,10.

DESCRIPTION.—Dorsal fin rays VI-I,10 (7), VI-I,11 (1); anal rays I,10 (8); pectoral rays 18(1), 19(9), 20(6); pelvic rays I,5 (5); segmented caudal rays 17 (8); branched caudal rays 15 (4), 16 (3), 17 (1); lateral scale rows 30-37 (8); transverse scale rows 13-17 (8); predorsal scales 11-17 (7).

Scales cycloid, eccentric, narrow focus, primary radii in anterior fields 4-5, secondary radii 1-2, no radii in posterior field.

Gill rakers of first gill arch short, stout, about 10 on lower limb, 3 on upper limb.

Vertebrae 10+16 (8); pterygiophore formula 3 (22110); neural and haemal spines of PU2 narrow and spinelike.

Measurements of features of the head and trunk

for the holotype and a male and female paratype are given in Table 1.

Physiognomy of the head and trunk similar to that of *G. springeri*.

Tongue slightly bilobed, the tip free; pectoral fin pointed, the posterior margin typically reaching vertical through anterior margin of anal aperture; pelvic fin moderate in length, 67-75 percent of distance from pelvic fin insertion to anal fin origin; pelvic frenum fairly well developed, inner pelvic rays connected nearly to tips by membrane; first dorsal fin slightly higher than second dorsal; first dorsal fin distinctly free from second dorsal fin; caudal fin rounded or slightly pointed, longer than deep, shorter than head length.

Scales somewhat crowded anteriorly on trunk, absent on cheek and opercle, present on breast, nape, and anteriorly nearly to eyes.

Genital papilla of male short, round, and tapers to point; papilla in female short, bulbous.

Teeth of upper jaw consisting of an outer row of enlarged caninoids, longer than the spaces between them, numbering about 25-30 across jaw; moderate to broad patch of villiform teeth behind outer row; inner row behind villiform patch consists of slightly posteriorly recurved caninoids, smaller than those of outer row, about 20 across jaw. Teeth of lower jaw composed of outer row of enlarged caninoids, longer than spaces between them, numbering about 7-10, extending only across anterior half of jaw; moderate villiform patch extending over entire jaw posterior to outer row; near inner border of villiform patch is a row of small caninoids, slightly recurved posteriorly, less than one-half length of those in outer row and numbering about 16-20 across jaw. No vomerine or palatine teeth.

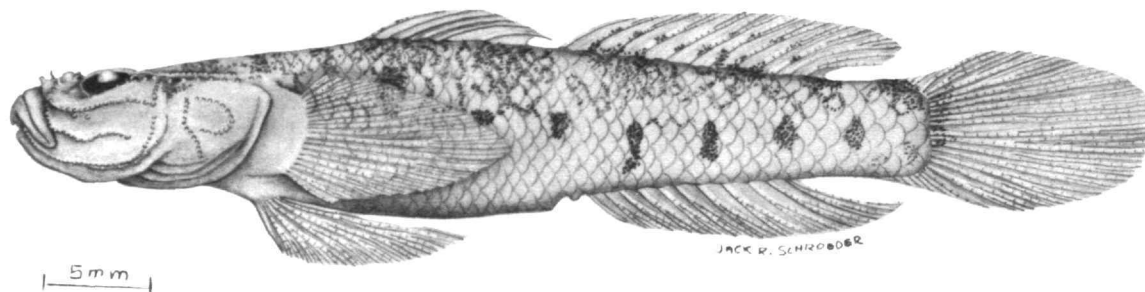


FIGURE 3.—*Gobiopsis exigua*, AMS I.18052-004, holotype, female, 41.5 mm SL, Gilbert Islands, Abiang Atoll. (Drawn by J. R. Schroeder.)

The following sensory pores present on all specimens: NA, AITO, PITO, SOT, and AOT. The pores are moderate in size and round, lacking flaps, not at end of tubes and none margined by dense, dark pigment.

Barbels on chin short, stumplike, 1 on each side; 2 simple anterior internasal barbels; barbels of cheek tuft reduced to 3 enlarged papillae-like structures.

The cutaneous papillae system (Figure 4) is conspicuous and resembles rather closely that of *G. springeri* but differs as follows: papillae on inner

preoperculo-mandibular row not as elongate; the vertical portion of outer preoperculo-mandibular row located more posteriorly; nasal row reduced to a few papillae on snout.

Cheek fold as in *G. springeri*.

COLOR IN PRESERVATION.—Top of head and pre-dorsal area of body with 3 brown transverse bands, the anterior one widest and separated from eyes, extending laterally onto upper preopercle and opercle; the second band extends laterally to margin of upper opercle; the third band extends laterally to level of upper pectoral fin insertion

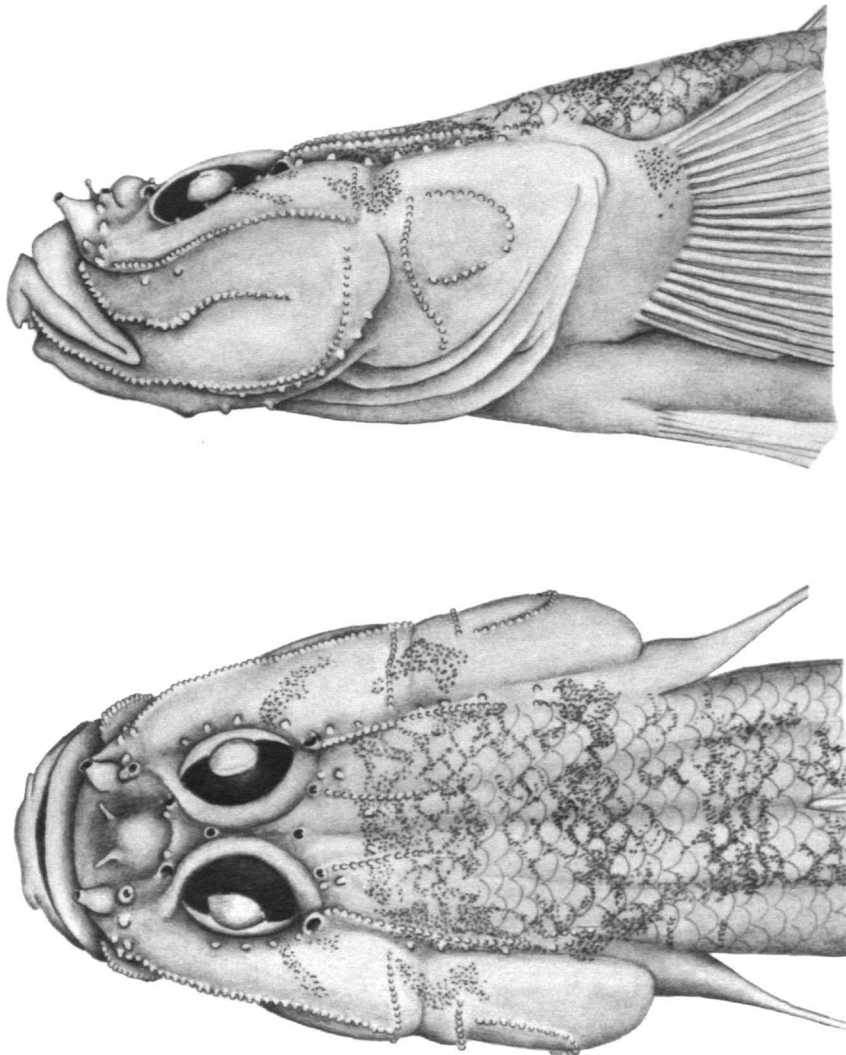


FIGURE 4.—*Gobiopsis exigua*, AMS I.18052-004, holotype. (Drawn by J. R. Schroeder.)

and also passes posteriorly, joining dorsolaterally with the anterior saddle of the first dorsal fin. First dorsal saddle passes through spines 1-4, extends ventrally on body and coalesces with a brown, vertically oblong lateral spot beneath pectoral fin. Second dorsal saddle passes through end of first dorsal fin; third dorsal saddle passes through rays 1-4 of second dorsal fin; fourth saddle passes through rays 6-8 of second dorsal fin; fifth saddle, smaller than others, passes over caudal peduncle at end of second dorsal fin; sixth saddle, about equal in size to fifth saddle, passes over end of peduncle at origin of dorsal procurrent caudal rays. Saddles 2-6 do not join lateral spots on body on Pacific specimens but do so on Indian Ocean specimens. Posterior to spot beneath pectoral fin are 7 brown spots, mostly deeper than wide, on middle or ventrolateral region of trunk, the anterior ones larger and more intense than those on peduncle. Area between saddles and spots weakly mottled.

Midsnout area before eyes, area above rictus and midcheek with scattered brown pigment. An oblique, faint brown bar from eye downward and posteriorly to midpreopercle. Lower head, belly, and lower peduncle uniformly light.

First and second dorsal fin elements most heavily pigmented basally where saddles occur; some fine spots, linearly arranged in 2 rows, mainly on second dorsal fin, on proximal half of rays. A weakly pigmented brown bar basally on caudal fin rays; scattered brown pigment farther out on fin rays on Indian Ocean material. Upper base of pectoral fin with a diffuse spot or blotch of scattered chromatophores, mostly on rays. Remainder of fins clear.

GEOGRAPHIC DISTRIBUTION.—Known from four localities in two widely disjunct regions, the Gil-

bert and Fiji Islands, Pacific Ocean, and the Comores and Amirantes Islands, western Indian Ocean.

ECOLOGY.—Specimens were captured from surface waters to depths of 22 m. A specimen from Fiji was taken near a vertical reef front over a bottom of rubble and coarse sand.

ETYMOLOGY.—The specific name is from the Latin *exiguus*, meaning "little," "short," or "scanty," and refers to the short, poorly developed head barbels.

REMARKS.—No differentiation was observed between the small samples from the Indian and Pacific oceans other than the differences in the color pattern on the trunk discussed above. Our material is too limited to judge the systematic significance of this color variation.

Gobiopsis springeri, new species

FIGURES 5, 6

HOLOTYPE.—USNM 210011, female, 25.5 mm SL, Indonesia, Ceram, just offshore and west of Tandjung Namatatuni, V. G. Springer Sta 73-15, taken 19 January 1973.

DIAGNOSIS.—Cephalic sensory pores absent; head barbels reduced in number and size, 2 on each side of chin, 1 on each side of anterior gular region, and remnants on snout; outer preoperculo-mandibular series of papillae ascends vertically well in advance of preopercular margin; postorbital row of papillae long; fleshy cheek fold degenerate; interorbital narrow; dark mark at base of pectoral fin an indistinct blotch, not sickle shaped; anal rays I,10.

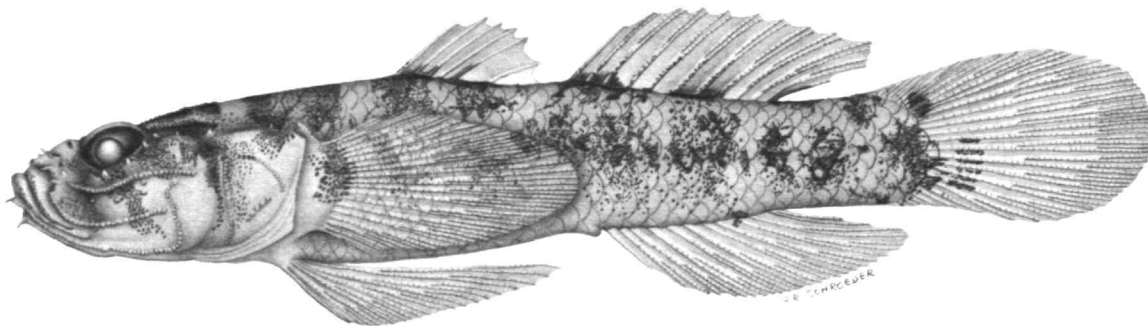


FIGURE 5.—*Gobiopsis springeri*, USNM 210011, holotype, female, 25.5 mm SL, Indonesia, Ceram.
(Drawn by J. R. Schroeder.)

DESCRIPTION.—Dorsal fin rays VI–I,10; anal rays I,10; pectoral rays 19–19; pelvic rays I,5; segmented caudal rays 17; branched caudal rays 16; lateral scale rows about 31; transverse scale rows 12; predorsal scales inconspicuous, deeply embedded.

Scales cycloid, delicate; eccentric focal area small, primary radii in anterior field 6 to 9, absent in posterior field.

Gill rakers of first gill arch short, stout, about 12–13 on lower limb; 2 very small rakers on upper limb.

Vertebrae 10+16; pterygiophore formula 3 (22110); neural and haemal spines of PU2 narrow and spinelike.

Measurements of features of the head and trunk are given in Table 1.

A moderately elongate species, trunk depressed anteriorly, compressed posteriorly; head depressed, anterior profile viewed from above moderately

acute; snout pug nosed, lower jaw protrudes anteriorly; gape oblique, wide; end of lower jaw reaches vertical from anterior margin of eye; interorbital width less than one-half diameter of eye; eyes situated dorsally; anterior and posterior nares close together, the anterior nares at end of long tube, the posterior nares on short tube; tongue slightly bilobed, the tip free; gill opening wide, extending well forward and below lower base of pectoral fin.

Pectoral fin long and pointed, the posterior margin reaching vertical from origin of second dorsal fin; pelvic fins long, nearly reaching anal opening, the inner rays apparently joined by a fragile membrane, frenum poorly developed; first dorsal fin nearly as high as second dorsal; membrane of first dorsal weak and probably not reaching second dorsal origin; caudal fin rounded, longer than deep, shorter than head length.

TABLE 1.—Morphometric proportions of *Gobiopsis springeri* and *G. exigua* (expressed in thousandths of the standard length)

Character	<u>springeri</u>	<u>exigua</u>	<u>exigua</u>	<u>exigua</u>
	holotype	holotype	paratype	paratype
Standard length (SL, mm)	25.5	41.5	33.4	34.8
Sex	female	female	male	female
Head length	325	308	299	316
Snout length	78	72	75	72
Postorbital length	180	183	174	175
Greatest diameter of orbit	78	58	63	60
Bony interorbital width	24	17	15	17
Pectoral fin length	259	270	287	276
Pelvic fin length	259	234	240	244
Caudal fin length	294	263	290	267
Predorsal length	424	386	383	382
Greatest depth of body	184	181	147	167
Least depth of peduncle	122	106	111	103
Postanal fin length	365	349	398	394
Lower jaw length	125	106	99	103
Pelvic fin insertion to anal fin origin	353	359	317	339

Scales more crowded and smaller anteriorly than posteriorly on trunk; scales absent on cheek, opercle, and anterior portion of nape.

Genital papilla of female short and bulbous.

Teeth of upper jaw composed of an outer row of about 14 widely spaced caninoid teeth; a patch of 3 to 4 rows of villiform teeth behind outer row, followed by a row of about 9 posteriorly recurved caninoid teeth, larger medially than laterally but smaller than those of outer row. Lower jaw with an outer row of 6 widely spaced caninoid teeth that is margined behind by a villiform patch similar to that of upper jaw, and an inner row of 13 to 14 caninoid teeth, recurved posteriorly and somewhat smaller than teeth in outer row.

We find no evidence of cephalic sensory pores.

Barbels consist of a small pair on each side of chin, 2 small anterior gular barbels, and 2 short anterior internasal barbels. Barbels of cheek tuft reduced to 1 or 2 papillae-like structures on each side.

The cutaneous papillae system (Figure 6) is conspicuous as in other *Gobiopsis* but differs from the system described by Lachner and McKinney (1978) as follows: the inner preoperculo-mandibular row contains coarse and elongate papillae; the outer preoperculo-mandibular row ascends vertically well in advance of the preopercular margin; nasal and suborbital rows confluent around eye as in *G. aporia* but consist of few, coarse, widely spaced papillae; postorbital rows long; the lateral cephalic row bears coarse, widely spaced papillae similar to those encircling eye; fold on cheek reduced, not prominent, but bears a row of close-set, small papillae that corresponds to first cheek row (Lachner and McKinney, 1978); second cheek row greatly

reduced to about three coarse papillae; third cheek row absent or only 1 papilla in area; fourth cheek row normally developed; trunk papillae series present and resembles those described for *Gobiopsis sensu stricto*.

COLOR IN PRESERVATION.—Head with 2 dark brown, more or less oblique bars below eye; chin and snout light brown; a broad brown transverse band immediately behind eyes, extending on each side to upper preopercle and lower opercle; a second broad transverse band on nape, extending on each side to upper opercle and upper pectoral fin insertion. Trunk from dorsal fin origin to end of peduncle with 6 diffuse saddles or saddle-like spots along dorsal midline; saddles or spots black where they traverse dorsal fins. Two trunk saddles that pass through base of first dorsal fin extend ventrally to midlateral area, where they join to form a large, wide irregular spot; saddles that pass through second dorsal and one on peduncle not connected to 5 midlateral, irregular blotches beneath them. A brown spot, mostly on upper pectoral fin base and proximally on rays, deeper than wide; some weak pigmentation extending slightly farther out on fin, remainder of fin clear. Dorsal fins mostly clear, spines slightly pigmented and blackish at base, where saddles occur. Caudal fin with brown oblique mark at midbase, extending to lower procurvent rays; brown oval spot basally on upper procurvent rays to base of fourth segmented ray; proximal half of primary rays with scattered brown chromatophores, more so on lower half of fin; remainder of fin clear. Pelvic and anal fins clear.

GEOGRAPHIC DISTRIBUTION.—Known only from the type-locality.

ECOLOGY.—Taken from the sharp slope of a

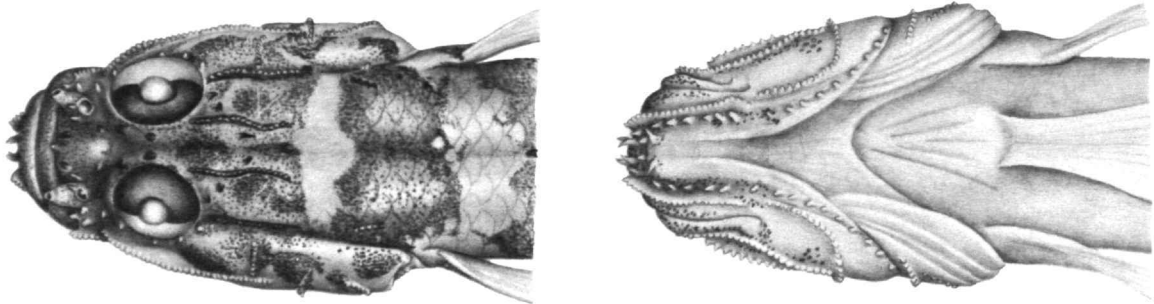


FIGURE 6.—*Gobiopsis springeri*, USNM 210011, holotype. (Drawn by J. R. Schroeder.)

coral reef at a depth of about 15 m.

ETYMOLOGY.—Named for Victor G. Springer, curator of fishes, NMNH, collector of the single specimen.

REMARKS.—The holotype was taken during an intensive collecting period in early 1973. The general area was recollected in early 1974. Large collections of gobioid fishes captured elsewhere in the Indo-Pacific region were examined in several institutions for additional specimens of this species without success. It is either a very rare form or it occupies a relatively inaccessible area.

Feia nympha Smith

FIGURES 7, 8

Feia nympha Smith, 1959:206, fig. 24.

MATERIAL EXAMINED.—Five collections totaling 7 specimens, 12.7–20.2 mm SL. RUSI 256, holotype, female, 20.2 mm SL, Pinda, Mozambique; ANSP 134777 (3 specimens), Seychelles Islands, off NW tip of Anonyme Island, J. E. Böhlke Sta F-44; USNM 216426 (1), Indonesia, Banda Islands, Naira Island, V. G. Springer Sta 74-7; AMS I.19607-001 (1), North Queensland, Great Barrier Reef, Lizard Island, D. F. Hoese Sta 75-28; AMS I.19111-001 (1), Great Barrier Reef, One Tree Island, D. F. Hoese Sta 72-68.

DIAGNOSIS.—Differs from all *Gobiopsis* in lacking head barbels and a fleshy cheek fold, having 2 short rows of papillae on chin that form a V-shaped pattern, the presence of finger-like papillae on mid-trunk in regular vertical rows, anterior body scaleless, body saddles or transverse bars narrow and not well developed, dorsal fin rays VI–I,9, anal rays I,8, and pectoral rays 14 to 15.

Differs from various species of *Gobiopsis* as follows: cephalic sensory pores absent; outer preoperculo-mandibular row of papillae ascends vertically well in advance of posterior margin of preopercle; postorbital row reduced to 1 or 2

papillae; dark mark at base of pectoral fin small, obscure; interorbital wide, about equal to diameter of eye; enlarged, prominent caninoid teeth laterally in both jaws.

DESCRIPTION.—Dorsal fin rays VI–I,9 (7); anal rays I,8 (6), I,9 (1); pectoral rays 14 (5), 15 (7); pelvic rays I,5 (7); segmented caudal rays 17 (7); branched caudal rays 15 (7); lateral scale rows about 14–22 (4); transverse scale rows about 9–11 (3, counted upward and forward from midbase of anal fin); predorsal scales absent.

Scales cycloid, small, and delicate; focus somewhat eccentric, narrow; primary radii in anterior field about 11 or 12 with no secondary radii, no radii in posterior field.

Gill rakers on lower limb of first gill arch about 7, relatively long and slender, those at angle of arch longest; on upper limb 2 very short stubby rakers.

Vertebrae 10+16 (7); pterygiophore formula 3 (22110); neural and haemal spines of PU2 slightly compressed and spatulate.

A small species; body moderately elongate, head depressed, its anterior profile, when viewed from above, only slightly pointed; trunk compressed posteriorly; lower jaw protrudes anteriorly and extends posteriorly to vertical from anterior margin of eye or nearly so; snout short, pug nosed; interorbital wide, almost equal to eye diameter; eyes situated dorsally on head; anterior and posterior nares situated close together, anterior nares at end of prominent tube, margin of posterior nares a short ring; tongue broadly rounded or truncate, the tip free. Gill opening restricted, extending ventrally to slightly below and anterior of lower pectoral fin insertion.

Pectoral fin with posterior margin pointed, reaching back to vertical from middle of anal opening; pelvic fin relatively long, reaching almost to anterior margin of anal opening, the inner rays joined

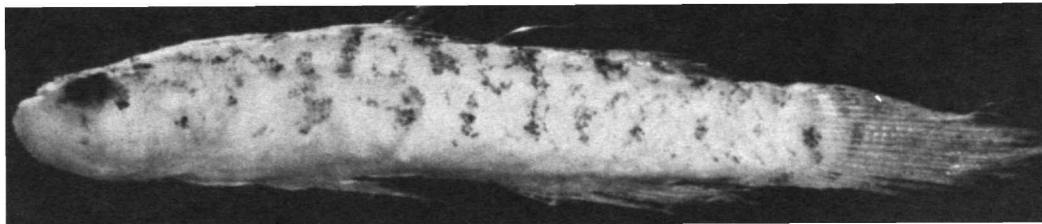


FIGURE 7.—*Feia nympha*, USNM 216426, male, 13.2 mm SL, Indonesia, Naira Island, Banda Islands.

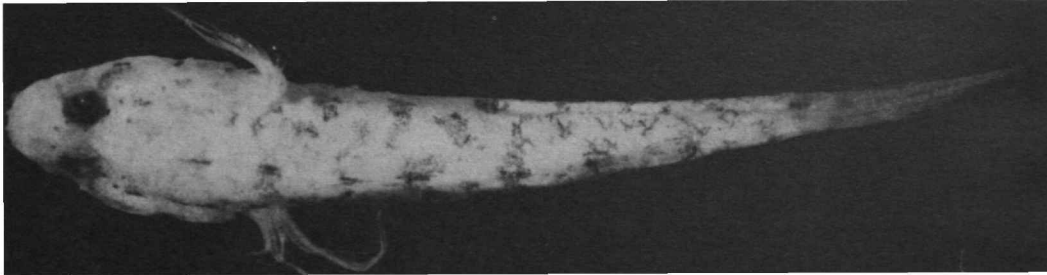


FIGURE 8.—*Feia nympa*, same specimen as Figure 7.

for most of their length, the frenum weakly to moderately developed; first and second dorsal fins equal in height, separated from each other by space equal to length of sixth spine of first dorsal fin; caudal fin rounded, slightly longer than head length.

Scales small and delicate, larger posteriorly on trunk, extending anteriorly on midbody only to below level of origin of second dorsal fin or less; scales absent from body beneath first dorsal fin, cheek, opercle, nape, breast, and belly.

Genital papilla of male short, depressed, tapers to a narrow tip; papilla of female short and bulbous, slightly bilobed at tip.

Dentition of upper jaw consists of an outer row of about 18 caninoid teeth, the lateralmost 3 or 4 teeth on each side about twice as large as others and recurved posteriorly; a villiform patch of 2 rows behind outer row; and an inner row of about 5 median teeth, equal in size to median teeth of outer row. Lower jaw teeth are composed of an outer row of about 9 caninoid teeth, situated in median third of jaw, followed by a villiform patch of about 2 rows of teeth, 1 or 2 enlarged, fanglike teeth situated lateral to villiform patch on each side, and a few smaller caninoids laterad to the fanglike canines.

Cephalic sensory pores absent; barbels absent but cutaneous papillae on cheek, snout, and chin elongate, sometimes flaplike and darkly pigmented.

The cutaneous papillae system of *Feia* (Figure 11) differs from that found in *Gobiopsis* by having (1) 2 short, median rows on chin that converge to form a V-shaped pattern on gular area, absent on *Gobiopsis*; and (2) a regular horizontal series of up to 10 groups of flaplike papillae mid-laterally on trunk, each group composed of 1–3

vertically arranged papillae covering an area equal to one scale depth or less (difficult to observe, apparently eroded in some specimens), whereas *Gobiopsis* has vertical, staggered rows of simple, small papillae on trunk, extending over several vertical scale rows, sometime reaching belly.

Other rows of papillae are located in areas similar to those described by Lachner and McKinney (1978), but the following differences are observed: suborbital row absent; nasal row consists of only about 5–6 coarse papillae; lateral cephalic row reduced to 2 or 3 widely spaced papillae; secondary lateral cephalic row with 2 segments of 3–4 papillae each; postorbital row reduced to 1 or 2 papillae; occipital series reduced to a single row of about 1–3 papillae; outer preoperculo-mandibular row as in *G. springeri* but does not ascend as high on cheek; first cheek row of moderate length, commencing at vertical from anterior margin of pupil; second and third cheek rows absent or reduced to 2 or 3 randomly arranged papillae; fourth cheek row as in *Gobiopsis* but somewhat shorter; opercular series with a long anterior vertical row and remnants of other 2 rows. Additionally, there are 2 short, vertical to oblique rows of about 2 papillae each below eye, and also 1 papilla on each side of snout anteriorly and 2 on each side posteriorly, where the internasal barbels were found on *Gobiopsis sensu stricto*.

COLOR IN PRESERVATION.—Head dorsally and snout with scattered brown chromatophores, usually more heavily concentrated on the cutaneous papillae; oblique brown bar from eye ventrally and posteriorly to midcheek; 3 more or less elongate, brownish spots behind eye in area of lateral cephalic papillae row extending to upper pectoral fin base; narrow brownish spot along midline in

occipital area; opercle with small scattered brown spots; chin and lower head pale. Trunk with about 7 brownish, narrow, transverse marks over mid-dorsal area, 2 or 3 of these extending laterally to about midbody, others limited to dorsolateral area, some irregular in shape; a series of about 7 brown spots along midbody, sometimes deeper than wide, extending from area beneath pectoral fin to caudal fin base, highly irregular and broken up in some specimens resulting in a mottled pattern; two small, blackish, subcutaneous spots on ventral midline of caudal peduncle; belly and remainder of lower peduncle pale. Flethy pectoral fin base mostly pale with limited brown pigment on lower portion; a small diffuse brownish spot basally on upper pectoral fin rays; remainder of fin clear. First dorsal fin with 2 proximal brown spots; second dorsal fin with 3 or 4 similar spots, where bars traverse fins; fine dark spots on middle and outer portions of first and second dorsal fin elements, arranged more or less in 2 or 3 horizontal rows. Pelvic and anal fins pale. Caudal fin with brownish irregular bar at base that extends into the procurrent rays; a narrow clear area posterior to bar with the uppermost and

lowermost rays darkly pigmented; rays of remainder of fin with brownish spots in an irregular pattern, the spots more heavily concentrated immediately posterior to clear area.

GEOGRAPHIC DISTRIBUTION.—*Feia nympha* is known from Mozambique, the Seychelles Islands, the Banda Islands of Indonesia, and One Tree Island and Lizard Island of the Great Barrier Reef. Tentatively recorded from Rapa Island (see "Remarks").

ECOLOGY.—Specimens have been collected in depths up to 16 m. The specimen from the Banda Islands was taken over a bottom of frondlike coral.

REMARKS.—Two specimens from Rapa Island, Austral Islands, South Pacific Ocean, BPBM 17255 (female, 16.4 mm SL) and BPBM 17300 (female, 15.5 mm SL), are tentatively identified as *Feia nympha*. They differ from the typical form in having a dorsal fin ray count of VI-I,8 and in aspects of the color pattern. The specimen, BPBM 17300, generally conforms with the typical pattern but the overall pigmentation is more dense and BPBM 17255 (Figures 9, 10), also heavily pigmented, has a dark, broad, lateral trunk stripe, more so below the

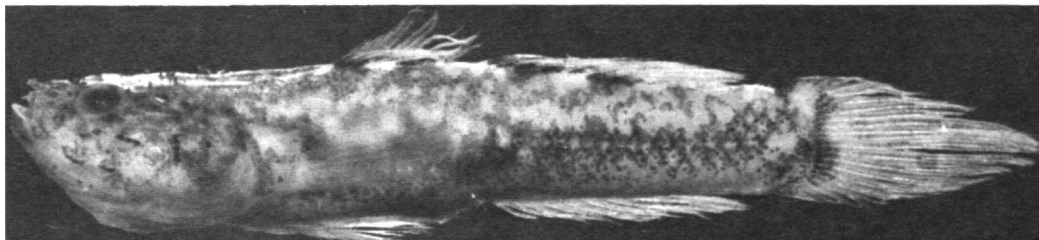
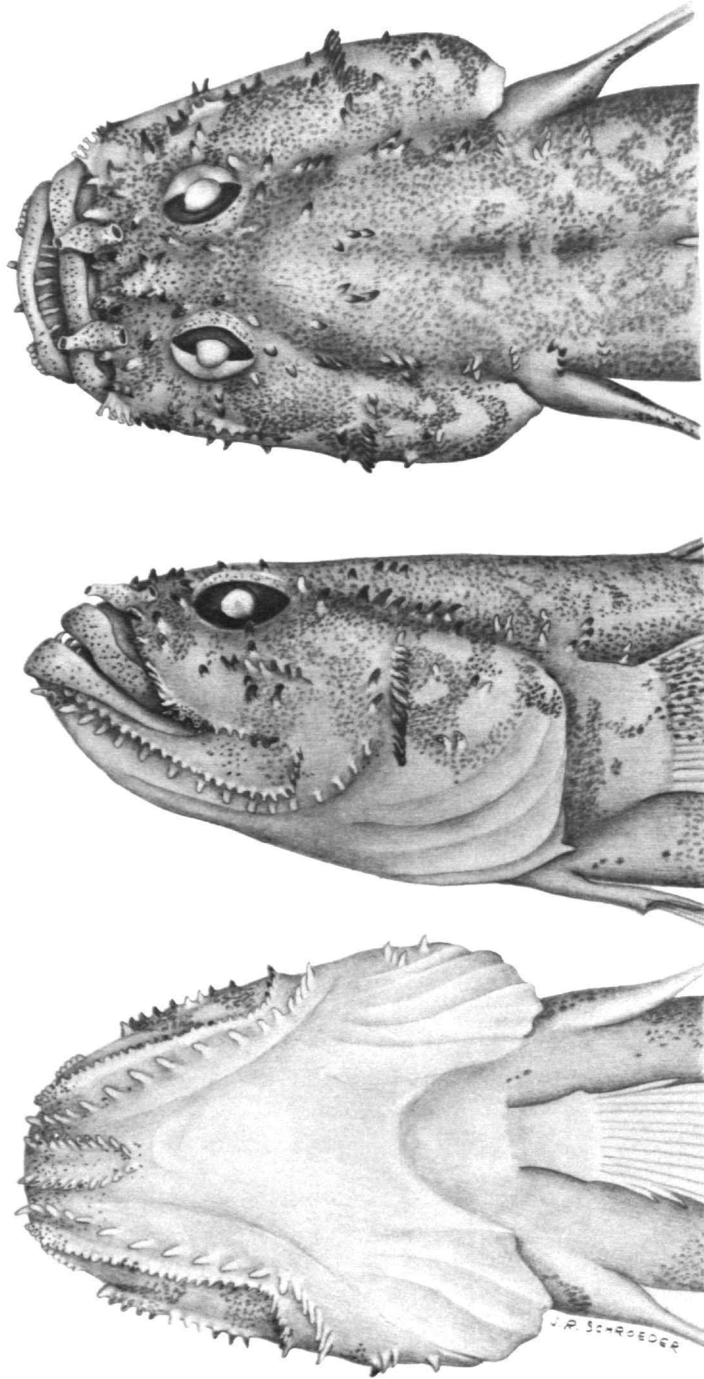


FIGURE 9.—*Feia* cf. *F. nympha*, BPBM 17255, female, 16.4 mm SL, Rapa, Hiri Bay.



FIGURE 10.—*Feia* cf. *F. nympha*, same specimen as Figure 9.



11.—*Feia* cf. *F. nympa*, BPBM 17255. (Drawn by J. R. Schroeder.)

midline, beginning at about the level of the anal fin origin and extending to the caudal fin base. The trunk, dorsolaterally, is mottled with brown pigment and the transverse middorsal marks are dark brown. Both specimens have more brown pigment on the fleshy pectoral fin base than on the typical form, especially on BPBM 17255. Based on the limited material, we are unable to determine if the Rapa Island specimens represent a species distinct from *F. nympa*.

Relationships

The 10 species of *Gobiopsis* treated by Lachner and McKinney (1978) form a close-knit group, sharing many features involving barbels, cutaneous papillae, cephalic sensory pores, certain meristic structures, body shape, and basic coloration. The

three species herein relegated to *Gobiopsis* share many of these generic characteristics. *Gobiopsis atrata*, *G. exigua*, and *G. springeri* differ from *Gobiopsis sensu stricto* in having fewer and smaller barbels, papillae on the cheek reduced from four rows to two or three, suborbital rows of papillae widely spaced or absent, and an anal fin ray count of 1,10.

Gobiopsis atrata shares more characters with *Gobiopsis sensu stricto* than do *G. exigua* and *G. springeri*, such as a prominent midcheek fold; a short row of postorbital papillae; the outer row of preoperculo-mandibular papillae ascends on margin of preopercle; the second cheek row of papillae prominent; the neural and haemal spines of the PU2 spatulate; interorbital broad; gill opening moderate; posterior nares close to eyes and on long tubes; tongue round to truncate; and a dark, prom-

TABLE 2.—Comparison of sensory structures among species of *Gobiopsis* and *Feia*

Structures	<i>Gobiopsis sensu lato</i>			<i>Gobiopsis sensu stricto</i>	<i>Feia nympa</i>
	<i>springeri</i>	<i>exigua</i>	<i>atrata</i>		
Sensory pores	Absent	Present, AITO pore unique	Absent	Present in 9 species, absent in 1	Absent
Barbels	Present, reduced	Present, reduced	Present, reduced	Present, prominent	Absent
Cutaneous papillae Outer preoperculo-mandibular row	Ascends on midpreopercle	Ascends near preopercular margin	Ascends on preopercular margin	Ascends on preopercular margin	Ascends on midpreopercle
Length, inner preoperculo-mandibular papillae	Elongate, barbel-like	Short	Short	Short	Elongate, barbel-like
Length, postorbital row	Long	Long	Very short	Short	Very short
Suborbital row	Present	Present	Absent	Present	Absent
Cheek rows	Second and third reduced	Second and third reduced	Third reduced	Four rows well developed	Second or third reduced or absent
Vertical trunk rows	Simple papillae; long rows scattered on trunk	Simple papillae; long rows scattered on trunk	Simple papillae; long rows scattered on trunk	Simple papillae; long rows scattered on trunk	Flaplike papillae; short rows regularly arranged on midside
Barbels on midchin	Two pairs, short Gular present	One pair, short Gular barbels absent	Single median, stumpy Gular barbels absent	Two pairs Gular barbels present	Absent Two short rows of papillae present
Fleshy cheek fold	Reduced	Reduced	Prominent	Prominent	Absent

inent, sickle-shaped pectoral mark. Characters unique to *G. atrata* are vertebrae 10+17; membrane of first dorsal fin weakly connected to spine of second dorsal fin; suborbital row of papillae absent; and a single, median, stumplike chin barbel. The higher fin ray and vertebrae counts for *G. atrata* may be a result of life in the colder waters of New Zealand.

Gobiopsis exigua and *G. springeri* are comparatively closely related and together they differ from all other *Gobiopsis* as follows: midcheek fold not well developed; postorbital row of papillae obviously longer; vertical portion of outer preoperculo-mandibular row of papillae located anterior to preopercular margin; interorbital narrow, more so than *G. angustifrons*; anterior and posterior nares close together, the posterior tube short; gill opening wide; the neural and haemal spines of the PU2 narrow; tongue slightly bilobed; and the dark mark on the pectoral fin base is indistinct and not sickle shaped.

Feia nympha shares the following characters with *G. exigua* and *G. springeri*: anterior and posterior nares close together, the posterior nares on a short tube; dark mark on pectoral fin base indistinct, not sickle shaped; vertical portion of outer preoperculo-mandibular row of papillae ascends anterior to preopercular margin; and the second and third rows of papillae on cheek reduced or absent. *Feia nympha* differs from all *Gobiopsis* in lacking a cheek fold, possessing a V-shaped gular row of papillae, in having flaplike, elongate cutaneous papillae on the head and trunk, and in having low meristic values for the dorsal, anal, and pectoral fins (Table 3). We do not consider the elongate structures on the head

of *Feia* to be barbels. These structures appear to have neuromasts at the tip, and they are arranged in rows and located in positions where we find rows of simple papillae in *Gobiopsis* and other gobies. Thus we have considered these structures as modified and specialized papillae and that they are not homologous to the barbels of *Gobiopsis*. We recognize the need for histological study. Although *Feia* superficially resembles *Gobiopsis* and shares certain important characters, we are not certain that a true relationship exists between these two genera. The presence of these elaborate sensory structures on the heads of these two genera may merely reflect similar adaptations to environmental conditions.

Zoogeography

The 10 species of the *Gobiopsis* sensu stricto group inhabit the continental and large island areas of the Indian and western Pacific oceans but are not known from many of the small insular areas of these oceans. Some of the species are commonly encountered in estuaries.

Gobiopsis exigua apparently avoids the continental areas. This species was taken in the Amirantes and Comoro Islands, Indian Ocean, and the Fiji and Gilbert Islands of Oceania. *Gobiopsis springeri* is known only from one specimen from Ceram, Indonesia. *Gobiopsis atrata* is endemic to the temperate waters of New Zealand.

Feia nympha was described from a single specimen captured at Pinda, Mozambique. We report an extensive distribution for this species in the Indian and western Pacific oceans, inhabiting continental areas as well as small islands.

TABLE 3.—Differences among species of *Gobiopsis* and *Feia* involving nonsensory characters (meristic data for *Gobiopsis* s. s. embraces modal counts for each species)

Character	<i>Gobiopsis</i> s. l.			<i>Gobiopsis</i>	<i>Feia</i>
	<i>springeri</i>	<i>exigua</i>	<i>atrata</i>	s. s.	<i>nympha</i>
Meristics					
Second dorsal fin	I, 10	I, 10(7) I, 11(1)	I, 11(18) I, 12(1)	I, 10 I, 11 for one species	I, 8-1, 9
Anal fin	I, 10	I, 10	I, 10	I, 9	I, 8-1, 9
Pectoral fin	19	18-20	19-21	17-23	14-15
Vertebrae	10+16	10+16	10+17	10+16	10+16
Neural and haemal spines of PU2	Narrow	Narrow	Spatulate	Spatulate	Somewhat spatulate
Interorbital width	Narrow	Narrow	Broad	Moderate to broad	Broad
Gill opening	Wide	Wide	Moderate	Moderate	Moderate
Location of posterior nares	Near anterior nares; on tube shorter than tube of anterior nares	Near anterior nares; on tube shorter than tube of anterior nares	Near margin of eye; on tube about as long as that of anterior nares	Near margin of eye; on tube about as long as that of anterior nares	Near anterior nares; on tube shorter than tube of anterior nares
Tongue shape	Slightly bilobed	Slightly bilobed	Round to truncate	Round to truncate	Round to truncate
Dorsal fins	Separate	Separate	Weakly joined	Separate	Separate
Pectoral fin mark	Small indistinct, not sickle shaped	Small indistinct, not sickle shaped	Large distinct, sickle shaped	Large distinct, sickle shaped	Small indistinct, not sickle shaped

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