

## New Species of Shallow Water Scorpionfish (Scorpaenidae: *Scorpaena*) from the Central Coast of Western Australia

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A new species of scorpionfish, *Scorpaena gasta*, is described on the basis of five specimens collected from the warm temperate central coast of Western Australia, eastern Indian Ocean, at depths of 3–7 m. *Scorpaena gasta* is most similar to a Western Australian species, *S. sumptuosa*. The two species are distinguished from other Indo-Pacific species of *Scorpaena* by the following combination of characters: lateral surface of maxilla with a distinct longitudinal ridge; relatively thick skin with numerous small sensory pores covering nearly the entire predorsal area to near the first pored lateral-line scale; anteroventral surface of lower jaw with one or two pairs of slender tentacles in ventral view. *Scorpaena gasta* and *S. sumptuosa* are separated by four meristic, several morphometric, and color features. *Scorpaena gasta* is a small species (smallest mature female 67.4 mm SL; largest known specimen 83.6 mm SL), whereas *S. sumptuosa* is a relatively large species, attaining at least 241 mm SL.

THE Indo-Pacific species of *Scorpaena* (Scorpaeniformes: Scorpaenidae) usually inhabit relatively deep benthic habitats of the outer continental shelf and upper slope in warm temperate and tropical seas. A few species occur inshore in temperate regions, but *Scorpaena* is replaced by the closely related genera *Parascorpaena* and *Sebastapistes* in shallow coastal waters of the tropics. During a biogeographic research project to characterize regions within Australian seas (Australia National Fish Bioregionalisation Project), five unidentified scorpaenid specimens were found in the collection of the Western Australian Museum. These specimens were collected at depths of 3–17 m from the warm temperate central coast of Western Australia in the eastern Indian Ocean. Although the specimens were collected from shallow, subtropical habitats, they have the following characters that have been recognized as diagnostic for the Indo-Pacific species of *Scorpaena*: 12 dorsal-fin spines, teeth on the palatines, an occipital pit, the posterior lacrimal spine directed posteroventrally, some pectoral-fin rays branched in adults, and the pored lateral-line scales continuing onto the caudal-fin base (Motomura et al., 2005).

A comparison of the five specimens with all Indo-Pacific nominal species attributable to *Scorpaena* suggested that the former is most similar to *S. sumptuosa* morphologically, with both species sharing several unusual characters for *Scorpaena*. However, the specimens differ from *S. sumptuosa* in several aspects, including several meristics and proportional measurements, coloration, and depth distribution. Thus,

the specimens are described herein in detail as a new species.

### MATERIALS AND METHODS

Counts and measurements follow Motomura (2004a, b) with the following additions. Scales below the lateral line were counted vertically between the first anal-fin spine base and the lateral line. Scales were also counted vertically between the sixth dorsal-fin spine base and the lateral line and between the last dorsal-fin spine base and the lateral line. Predorsal scale rows are defined as the number of rows between the first dorsal-fin spine base and the posterior margin of the occipital pit and only exposed scales were counted. Head width is the straight-line distance between the posterior ends of the pterotic spine bases. Pectoral-fin length was measured from the origin of the uppermost ray to the posterior tip of the longest ray. Maxilla depth is the greatest distance between the dorsal and ventral margins of the maxilla, measured perpendicular to the longitudinal axis of the maxilla. Standard and head lengths are expressed as SL and HL, respectively. Sex and the absence of a swimbladder were confirmed by dissection of the abdomen on the right side.

Terminology of head spines follows Randall and Eschmeyer (2002) with the following additions: the spine occurring at the base of the uppermost preopercular spine is referred to as the supplemental preopercular spine (Eschmeyer, 1965); and the coronal and pretympanic (as an extra spine) spines are figured in Chen

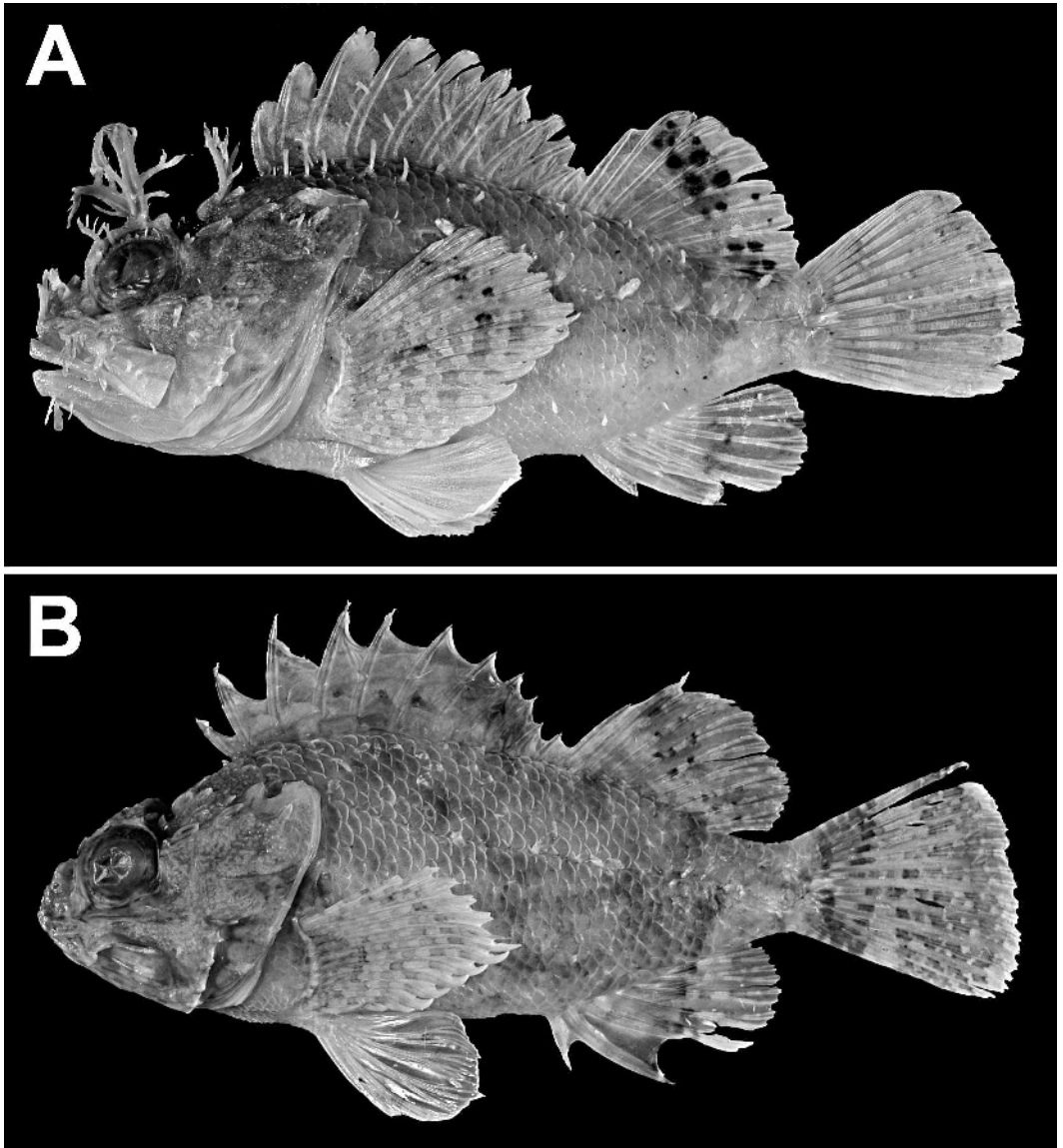


Fig. 1. *Scorpaena gasta*. (A) WAM P. 27960-006, holotype, mature female, 69.4 mm SL, Kalbarri, Western Australia; (B) CSIRO H 6186-01, paratype, male, 63.8 mm SL, Houtman Abrolhos, Western Australia (supraocular tentacle laid down).

(1981:fig. 1) and Motomura et al. (2004:fig. 14b), respectively. Institutional codes follow Leviton et al. (1985).

***Scorpaena gasta*, new species**

Ghostly Scorpionfish  
Figures 1–3

*Holotype*.—WAM P. 27960-006, mature female, 69.4 mm SL, Australia, Western Australia, Kalbarri, off mouth of Murchison River, 27°30'S,

114°25'E, 16–17 m depth, rotenone, 17 April 1983, J. B. Hutchins.

*Paratypes*.—AMS I. 43480-001, mature female, 67.4 mm SL, Australia, Western Australia, Houtman Abrolhos, Beacon Island, 28°29'S, 113°47'E, 3 m depth, rotenone, 9 April 1978, G. R. Allen; CSIRO H 6186-01, male, 63.8 mm SL, same data as AMS I. 43480-001; WAM P. 26069-002, male, 83.6 mm SL, same data as AMS I. 43480-001; WAM P. 32317-005, mature female, 73.7 mm SL, Australia, Western Australia, Shark Bay, 24.93 km

west-northwest of Cape Peron North, 25°22.6–23.0'S, 113°17.5–17.6'E, 11.0–11.5 m depth, 7 Oct. 2002, S. M. Morrison.

*Diagnosis.*—A species of *Scorpaena* with the following combination of characters: pectoral-fin rays 15; longitudinal scale rows 36–40; scales below lateral line 13 or 14; scale rows between last dorsal-fin spine base and lateral line 5; exposed predorsal scale rows 0–2; gill rakers 13; well-exposed scales covering anteroventral surface of body and pectoral-fin base; anterior surface of preocular spine without a median ridge; lateral surface of maxilla with a distinct longitudinal ridge; lateral surface of lacrimal without spines; anterior lacrimal spine simple; extremely deep occipital pit; relatively thick skin with numerous small sensory pores covering predorsal area from posterior edge of occipital pit to first dorsal-fin spine origin (most predorsal scales embedded in skin), and extending to just above or near first pored lateral-line scale; similar skin with pores between opercular spines and covering upper spine; numerous tentacles on head and trunk, supraocular tentacle longest, approximately equal to or 1.5 times orbit diameter; anteroventral surface of lower jaw with one or two pairs of slender tentacles in ventral view; relatively shorter second, third, and fourth dorsal-fin spines (11.4–15.3% of SL [mean 13.3%], 15.8–18.6% [17.4%], 17.9–19.0% [18.4%], respectively), length of third spine less than upper-jaw length; a relatively shallower caudal-peduncle depth (10.5–11.7% of SL [11.2%]); a variable, diagonal cluster of black spots on soft-rayed portion of dorsal fin; spinous portion of dorsal fin uniform yellowish to reddish with narrow, translucent, submarginal stripe.

*Description.*—Proportional measurements of *Scorpaena gasta* are given as percentages of SL and HL in Table 1. Data for the holotype are presented first, followed by paratype data (if different) in parentheses.

Dorsal fin with 12 spines and nine soft rays; all soft rays branched; length of first spine 1.7 (1.4–1.7; mean 1.6) in second spine; fourth spine longest (third spine subequal in one paratype), its length slightly less than upper-jaw length; fourth to eleventh spines progressively shorter; length of eleventh spine 2.2 (1.8–2.3; mean 2.0) in last spine; membrane of spinous portion of dorsal fin moderately notched; second soft ray longest, its length slightly greater than that of longest dorsal-fin spine; posterior branch of last soft ray joined by membrane to caudal peduncle for approximately one-ninth (nearly half in two paratypes) its length. Anal fin with three spines

and five soft rays; all soft rays branched; first spine 2.1 (2.0–2.3; mean 2.1) in second spine, 1.7 (1.5–2.0; mean 1.8) in third spine; first soft ray longest; posterior branch of last soft ray joined by membrane to caudal peduncle for less than one-tenth its length. Pectoral fin with 15 rays on each side of body, an uppermost ray and nine (ten in three paratypes) lower rays unbranched, remaining five (four in four paratypes) rays branched; seventh ray longest, its length less than head length; lower unbranched rays somewhat thickened; posterior margin of fin rounded. Pelvic fin with one spine and five soft rays, all soft rays branched; second soft ray longest, its length slightly greater than upper-jaw length; last soft ray joined by membrane to abdomen for approximately half (less than half in one paratype) its length. Caudal fin with 15 segmented rays, 11 rays branched, remaining rays unbranched; seven (or six) dorsal series of procurrent rays, seven (or six) ventral series; posterior margin of fin slightly rounded. Caudal-peduncle depth 1.5 (1.7–1.9; mean 1.7) in caudal-peduncle length.

Longitudinal scale rows 36 (37–40). Pored lateral-line scales 23. Scales below lateral line 13 (14 in one paratype). Scale rows between base of sixth dorsal-fin spine and lateral line five. Scale rows between base of last dorsal-fin spine and lateral line five. Predorsal scale rows 0 (one in two paratypes; two in two paratypes). Gill rakers on upper limb four, lower limb nine, including one (two in four paratypes) rakers on hypobranchial; total gill rakers 13. Gill rakers relatively short and spinous, but length of longest raker on first gill arch slightly greater than (or approximately equal to) that of gill filaments around angle of gill arch; fourth gill slit closed by membrane. Branchiostegal rays seven. Swimbladder absent.

Body moderately compressed anteriorly, progressively more compressed posteriorly. Nape and anterior body arched. Body depth relatively shallow, less than head length. Numerous small papillae on upper half of head, including upper outer margin of eye membrane, interorbital space and occipital pit. An extremely long, fleshy, slender tentacle (= supraocular tentacle), with several long, distinct branches along its margin, on posterior end of supraocular spine base; length of supraocular tentacle more than 1.5 times orbit diameter (length somewhat variable; shortest tentacle among paratypes subequal to orbit diameter; tentacles of most paratypes much greater than orbit diameter); supraocular tentacle extending beyond second dorsal-fin spine base when laid back (extending slightly beyond posterior edge of occipital pit in paratype with

TABLE 1. MORPHOMETRIC CHARACTERS OF *Scorpaena gasta* AND *S. sumptuosa*, EXPRESSED AS PERCENTAGES OF STANDARD AND HEAD LENGTHS. Means in parentheses include primary type data.

	<i>Scorpaena gasta</i>		<i>Scorpaena sumptuosa</i>		
	Holotype	Paratypes	Dried syntype	Dried syntype	Non-types
	WAM P. 27960-006	<i>n</i> = 4	MNHN A. 4409	MNHN B. 2570	<i>n</i> = 6
Standard length (mm)	69.4	63.8–83.6	241.2	229.1	72.2–228.6
% of standard length					
Body depth	40.8	35.4–38.9 (37.9)	37.9	43.2	38.3–46.5 (41.0)
Body width	22.6	21.5–22.1 (22.0)	—	—	20.0–22.0 (21.0)
Head length	46.3	42.1–45.6 (44.0)	40.7	41.5	41.5–45.5 (42.2)
Snout length	12.2	9.9–10.9 (10.9)	8.8	10.0	10.2–11.2 (10.2)
Orbit diameter	12.4	11.4–12.9 (12.3)	9.5	10.0	10.6–13.0 (10.8)
Interorbital width <sup>a</sup>	5.0	4.4–5.6 (5.1)	—	—	5.4–7.1 (6.1)
Interorbital width <sup>b</sup>	4.8	3.7–4.9 (4.5)	—	—	5.0–5.4 (5.3)
Head width	14.8	14.4–15.4 (15.0)	—	—	14.1–15.8 (14.7)
Upper-jaw length	22.8	21.7–22.7 (22.4)	23.0	22.7	22.0–23.1 (22.7)
Maxilla depth	6.9	6.4–7.0 (6.8)	6.8	6.7	6.1–6.7 (6.5)
Postorbital length	24.5	22.4–23.7 (23.2)	22.8	21.7	21.1–23.6 (22.3)
Between tips of opercular spines	8.4	8.0–8.9 (8.3)	9.0	7.6	8.8–9.6 (8.9)
Predorsal-fin length	35.2	31.6–36.4 (34.2)	28.2	32.0	31.9–34.8 (32.0)
Preanal-fin length	71.9	68.2–72.7 (70.9)	72.0	74.2	71.9–74.2 (72.9)
Prepelvic-fin length	42.8	37.7–41.2 (40.2)	43.7	46.4	39.7–44.5 (43.3)
1 <sup>st</sup> dorsal-fin spine length	8.6	6.6–10.7 (8.4)	8.7	10.9	9.6–10.7 (10.1)
2 <sup>nd</sup> dorsal-fin spine length	14.3	11.4–15.3 (13.3)	20.1	22.5	16.8–23.7 (20.2)
3 <sup>rd</sup> dorsal-fin spine length	18.6	15.8–18.5 (17.4)	23.8	27.5	22.0–29.6 (26.1)
4 <sup>th</sup> dorsal-fin spine length	19.0	17.9–18.5 (18.4)	—	—	22.1–25.9 (23.6)
5 <sup>th</sup> dorsal-fin spine length	18.3	15.7–17.7 (17.3)	—	—	18.2–21.5 (19.7)
6 <sup>th</sup> dorsal-fin spine length	17.4	15.1–16.2 (16.1)	—	—	16.9–20.5 (18.3)
7 <sup>th</sup> dorsal-fin spine length	15.9	14.4–15.3 (15.0)	—	—	14.1–18.7 (15.8)
8 <sup>th</sup> dorsal-fin spine length	13.7	12.4–13.1 (12.9)	—	—	12.2–16.5 (14.0)
9 <sup>th</sup> dorsal-fin spine length	11.4	9.9–11.1 (10.8)	—	—	10.5–13.7 (12.1)
10 <sup>th</sup> dorsal-fin spine length	6.8	6.6–7.9 (7.2)	—	—	6.8–10.7 (8.1)
11 <sup>th</sup> dorsal-fin spine length	6.1	5.6–7.1 (6.2)	3.5	5.2	4.0–6.1 (4.7)
12 <sup>th</sup> dorsal-fin spine length	13.3	11.6–13.0 (12.6)	10.7	12.1	12.4–16.3 (13.0)
Longest dorsal-fin ray length <sup>e</sup>	20.0	18.9–20.5 (19.8)	—	20.4	19.9–23.5 (21.1)
1 <sup>st</sup> anal-fin spine length	8.9	8.0–9.4 (8.6)	6.2	8.2	7.6–10.4 (8.1)
2 <sup>nd</sup> anal-fin spine length	18.6	15.8–19.1 (18.1)	14.2	15.2	14.7–21.1 (16.2)
3 <sup>rd</sup> anal-fin spine length	15.3	14.0–16.8 (15.2)	—	12.3	13.1–17.7 (14.4)
Longest anal-fin ray length <sup>d</sup>	21.6	20.6–23.0 (21.6)	19.9	21.7	21.6–22.2 (21.5)
Pectoral-fin ray length <sup>c</sup>	32.4	29.1–33.5 (31.6)	—	27.6	30.3–32.5 (30.6)
Pelvic-fin spine length	14.8	14.5–16.5 (15.5)	13.3	15.0	13.6–19.3 (15.3)
Longest pelvic-fin ray length (2 <sup>nd</sup> )	24.2	22.4–26.2 (24.0)	23.3	24.8	23.6–26.6 (24.7)
Caudal-fin length	29.7	28.8–31.2 (29.7)	28.7	31.3	29.7–31.3 (29.9)
Caudal-peduncle length	17.0	18.5–21.3 (19.2)	19.0	—	18.2–19.2 (18.7)
Caudal-peduncle depth	11.7	10.5–11.6 (11.2)	14.3	12.8	11.5–13.1 (12.8)
% of head length					
Snout length	26.5	23.4–25.6 (24.7)	21.6	24.1	22.6–26.6 (24.2)
Orbit diameter	26.8	27.0–29.1 (27.9)	23.2	24.0	25.1–28.7 (25.5)
Interorbital width <sup>a</sup>	10.9	10.5–12.8 (11.6)	—	—	11.9–16.8 (14.4)
Interorbital width <sup>b</sup>	10.3	8.8–11.5 (10.3)	—	—	11.6–13.1 (12.4)
Head width	32.1	33.0–36.4 (34.2)	—	—	33.6–34.9 (34.3)
Upper-jaw length	49.2	47.6–53.9 (51.0)	56.5	54.7	51.1–54.5 (53.8)
Maxilla depth	15.0	14.0–16.4 (15.5)	16.8	16.2	13.8–16.1 (15.5)
Postorbital length	53.0	52.0–53.4 (52.7)	56.2	52.4	50.8–55.8 (52.9)
Between tips of opercular spines	18.1	17.6–21.0 (18.8)	22.0	18.3	20.9–22.4 (20.9)

<sup>a</sup> at vertical midline of eye<sup>b</sup> at posterior end of preocular spine base<sup>c</sup> 2<sup>nd</sup> or 3<sup>rd</sup> ray is the longest in *S. gasta* and 1<sup>st</sup> or 2<sup>nd</sup> in *S. sumptuosa*<sup>d</sup> 1<sup>st</sup> or 2<sup>nd</sup> ray is the longest in *S. gasta* and 2<sup>nd</sup> in *S. sumptuosa*<sup>e</sup> 7<sup>th</sup> ray is the longest in *S. gasta* and 7<sup>th</sup> or 8<sup>th</sup> in *S. sumptuosa*.

shortest tentacle). A slender tentacle (= preocular tentacle), with several distinct branches along its margin (no branches in one paratype), on posterior end of preocular-spine base; length of preocular tentacle approximately equal to (or slightly less than) pupil diameter. Several distinct, short tentacles on upper outer margin of eye membrane. A short, broad tentacle, with several short branches along its distal margin, on posterior edge of low membranous tube associated with anterior nostril; tentacle slightly shorter than preocular tentacle and extending beyond posterior margin of posterior nostril when laid back. Five (four) distinct slender tentacles on anterior margin of lower snout in anterior view; two of them occurring near anterior end of forward ridge of lacrimal, remaining three (two) tentacles on anteroventral margin of ascending process of premaxilla in anterior view; longest tentacle subequal to length of preocular tentacle. Three (two in most paratypes) distinct, slender tentacles along posterior margin of anterior lacrimal spine, length of longest tentacle greater than that of nasal spine. A long, fleshy, slender tentacle, with several rounded branches along its margin, on posterior lacrimal spine; length of tentacle much greater than that of preocular tentacle; posterior lacrimal spine tentacle linked posteriorly to head by skin. Two (1–3) short, slender tentacles on central cheek. Three (1–3) short, slender tentacles on posterior maxilla. Two pairs of distinct slender tentacles on underside of lower jaw in ventral view; first pair between a sensory pore on side of symphyseal knob and first pore on dentary, second pair between first and second pores on dentary (second pair of tentacles absent in two paratypes). Three (two) rounded, thin skin flaps occurring near tips of third to fifth (fourth and fifth) preopercular spines; tiny tentacles along preopercular margin (absent in most paratypes); a small flap on posterior base of supplemental preopercular spine; lengths of flaps less than that of anterior lacrimal spine tentacles. Several tiny tentacles (very few in most paratypes) scattered over postorbit and upper opercle. A long, slender distinct tentacle (= parietal tentacle), with distinct branches along its margin, on posterior end of parietal spine base; its length less than that of supraocular tentacle, but greater than other tentacles on head and body; parietal tentacle extending beyond second dorsal-fin spine origin when laid back (extending beyond first dorsal-fin spine origin in most paratypes; not reaching first dorsal-fin spine origin in one paratype). No tentacles on lips, mid-interorbital space, and occipital pit. Numerous tentacles and skin flaps on lateral surface of entire trunk,

especially dorsoanterior area of trunk; length of longest tentacle approximately equal to orbit diameter (approximately equal to or slightly less than pupil diameter); several pored lateral-line scales associated with tentacles or skin flaps. Tiny tentacles on lateral surface of dorsal-fin spines; few tiny tentacles on lateral surface of pectoral-fin rays; no tentacles on pelvic- and anal-fin spines, and soft rays and membranes of all fins. Pectoral-fin axil without skin flaps.

Well-exposed cycloid scales covering an area surrounded by opercular margin and tips of upper and lower opercular spines, other parts of head not covered with exposed scales. Well-exposed ctenoid scales (some scales nearly cycloid) on lateral surface of trunk, scales becoming cycloid on abdomen. Body scales not extending onto rays or membranes of fins, except basal caudal fin. Well-exposed cycloid scales covering pectoral-fin base and ventral surface of body, including between pelvic fins. Lateral line not strongly sloping downward, nearly straight above pectoral fin. Numerous small sensory pores on upper half of head from upper half of cheek to dorsal surface of head, but not extending onto opercular margin and distal portion of area between upper and lower opercular spines; relatively thick skin with numerous small sensory pores covering predorsal area from first dorsal-fin spine origin to posterior edge of occipital pit; skin extending to just above first pored lateral-line scale (or above supraclithral spine base); relatively thick skin with numerous small sensory pores covering entire area surrounded by upper and lower opercular spines. Underside of dentary with three well-developed sensory pores on each side, first pore below tip of anterior lacrimal spine, second pore below and between tips of anterior and posterior lacrimal spines, third pore located on posterior margin of dentary. A large pore behind symphyseal knob of lower jaw in ventral view (a pair of small pores in three paratypes). An indistinct pore (sometimes covered by lower-jaw lip) on each side of symphyseal knob in ventral view.

Mouth large, slightly oblique, forming an angle of about 25° (20–25°) to horizontal axis of head and body. Posterior margin of maxilla just reaching (or extending slightly beyond) a vertical through posterior margin of orbit. A distinct longitudinal ridge on lateral surface of lower maxilla. Lower jaw with a symphyseal knob. Width of symphyseal gap separating premaxillary teeth bands slightly narrower than width of each band. Upper jaw with a band of short, incurved, conical teeth, tips of teeth pointed. About nine tooth rows at front of upper jaw, tooth band narrowing posteriorly. Tooth band of upper jaw

wider than that of lower jaw. Lower jaw with a band of short, recurved, conical teeth, tips of teeth not strongly pointed; lengths of most teeth less than those of upper jaw. About four (4–7) rows of small teeth at front of vomer, becoming two (2–4) rows posteriorly, forming a V-shaped patch on vomer. Width of vomer plate greater than length of palatine plate. About three (3–4) tooth rows on palatine. Underside of lower jaw without ridges.

Dorsal profile of snout steep, forming an angle of about  $55^\circ$  ( $50\text{--}60^\circ$ ) to horizontal axis of head and body. Nasal spine simple, sharp, directed dorsally, flattened anteriorly and posteriorly, its length greater than anterior nostril diameter. Ascending process of premaxilla not intruding into interorbital space, its posterior margin extending beyond level with anterior margin of posterior nostril in dorsal view, but not extending beyond posterior margin of posterior nostril. Median interorbital ridge present, but indistinct, covered by skin. Interorbital ridges weakly developed anteriorly and well developed posteriorly, separated by a relatively shallow channel, beginning posterior to nasal spines and then conjoined to each other at level of posterior end of postocular spine base, forming a distinct broad ridge to anterior angular edge of occipital pit; diverging anteriorly and posteriorly in dorsal view, distance between ridges narrowest at a vertical midline through eye. Interorbital space moderately deep, about one-fourth of orbit extending above dorsal profile of head. Preocular spine simple, directed dorsoposteriorly; tip of spine extending beyond level with upper margin of pupil in lateral view; flattened anteriorly and posteriorly; anterior surface of spine without a median vertical ridge. Supraocular spine simple, its tip just reaching a vertical through posterior margin of pupil in lateral view; its length approximately equal to that of postocular spines. Postocular spine simple, not strongly canted laterally; base wider than tympanic spine base, not joined to interorbital ridge or tympanic spine base. Tympanic spine simple, strongly pointed, directed dorsally, with narrow base; base not joining to interorbital ridge or parietal spine base. Interorbital, coronal, and pretympanic spines absent. A distinct transverse ridge, formed from interorbital ridges, anterior to occipital pit, slightly curved posteromedially in dorsal view. Occipital pit remarkably deep, center of pit slightly convex. A distinct transverse ridge in rear of occipital pit between bases of parietal spines. Occipital pit surrounded laterally only by tympanic spines and anterior half of parietal spine bases; no ridges in lateral sides of pit anterior to tympanic spines and between tym-

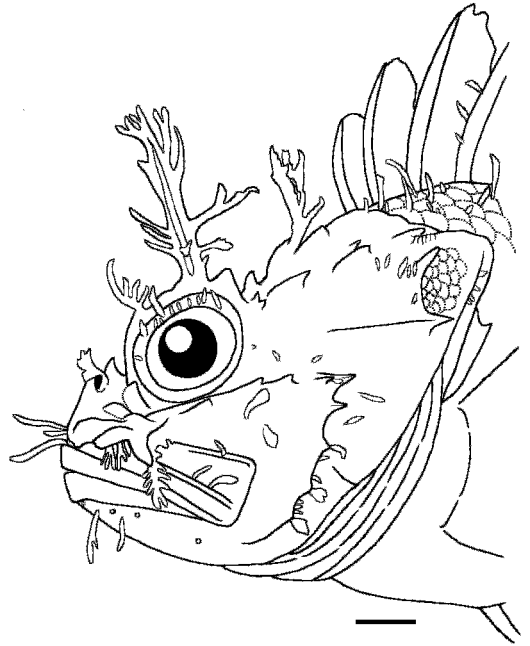


Fig. 2. Lateral view of head of *Scorpaena gasta*, WAM P. 27960-006, holotype, 69.4 mm SL. Scales on the pectoral-fin base and chest region and numerous small papillae and sensory pores on head are not illustrated. Scale bar = 5 mm.

panic and parietal spines in dorsal view. Parietal spine simple, its base curving strongly into occipital pit. Nuchal spine simple, small, indistinct; nuchal and parietal spines joined at base (nuchal spine located below posterior of parietal spine in largest paratype). Sphenotic with two small spines. Postorbital with a small spine (spine absent in two paratypes), its length less than those of sphenotic spines. Pterotic spine simple, located below parietal spine. No distinct ridge in an area surrounded by parietal, nuchal, pterotic, and lower posttemporal spines. Upper posttemporal spine simple, pointed, small, directed dorsoposteriorly, its length much less than that of lower posttemporal spine. Lower posttemporal spine simple, its base length less than that of pterotic spine. Supracleithral spine simple, flattened, not strongly pointed. Cleithral spine flattened, pointed with a low median ridge.

Lateral surface of lacrimal with six radiating elements (Fig. 2); a posteriorly directed furrow, medially concave; two ventrally directed ridges forming anterior and posterior lacrimal spines; other ridges weak, with a low median ridge, embedded in skin anteriorly, not forming a spine; lateral surface of lacrimal with a distinct ridge centrally, but lacking spines. Anterior lacrimal spine simple, directed forward, its tip reaching

dorsal margin of upper lip. Posterior lacrimal spine simple, directed ventroposteriorly, its tip reaching upper lip; longer than anterior lacrimal spine. Suborbital ridge with three spines, first spine below posterior margin of pupil, second spine extending beyond orbit, third spine at end of suborbital ridge. Space between ventral margin of eye and suborbital ridge remarkably narrow. Suborbital pit absent. Preopercle with five spines; uppermost spine largest with a supplemental preopercular spine on its base; first and second spines with narrow base and a low median ridge; third to fifth spines with broad base, lacking a median ridge. Preopercle, between uppermost preopercular spine and upper end of preopercle, without serrae or spines. Upper opercular spine simple without a median ridge; thick skin covering entire spine, except its tip. Lower opercular spine simple with a distinct median ridge, not covered by thick skin. Space between upper and lower opercular spines without ridges or scales, covered with thick skin. Posterior tip of upper opercular spine not reaching opercular margin; posterior tip of lower opercular spine just reaching opercular margin.

Origin of first dorsal-fin spine above lower posttemporal spine. Posterior margin of opercular membrane reaching a vertical through fourth dorsal-fin spine base. Posterior tip of pectoral fin not reaching a vertical through first anal-fin spine base. Origin of pelvic-fin spine slightly posterior to origin of pectoral fin. Posterior tip of depressed pelvic fin not reaching first anal-fin spine base. Origin of first anal-fin spine slightly posterior to origin of last dorsal-fin spine.

*Coloration when fresh.*—Based on color photographs of four female specimens (WAM P. 27960-006, holotype; WAM P. 27953-012, two non-type specimens; and WAM P. 27967-009, one non-type specimen). Body strongly variegated, mainly reddish brown or yellowish brown, suffused with irregular brownish, yellowish brown, and whitish blotches. Membrane of spinous portion of dorsal fin pale red or yellow with one or two uncolored (transparent), narrow, submarginal stripes; stripe thickness narrower than pupil diameter, across distal half of membrane. Membrane of soft-rayed portion of dorsal fin pale red or yellow basally and distally, middle of fin translucent with a variable diagonal band of medium black spots. Pectoral fin similar to side of body. Pelvic fin pale red or yellow basally and translucent distally. Anal fin pale red, with small white spots basally and whitish distally. Caudal fin rays weakly variegated, translucent distally; fin membranes transparent.

*Coloration in preservative.*—Head and trunk yellowish brown, mottled with poorly defined gray blotches dorsally; no blotches on lower one-third of head and abdomen. A pale black blotch on distal margin of membrane between seventh and tenth or eleventh dorsal-fin spines in males; membrane translucent without black spots and blotches in females. An indistinct band, formed by many medium black spots, across middle of membrane of soft-rayed portion of dorsal fin, remainder of membrane translucent. Pectoral and caudal fins yellowish-brown, mottled with poorly-defined grayish or blackish blotches. Pelvic fin uniformly translucent to white without melanin pigments. Anal-fin membrane translucent with an indistinct irregular band across the middle of membrane. Inside mouth uniformly whitish.

*Distribution.*—Known only from the central coast of Western Australia where it ranges from Point Quobba south to Jurien Bay in depths of 3–17 m (based on type specimens and photographs of non-type specimens registered at Western Australian Museum collection; see Material Examined).

*Remarks.*—Dissections of the abdomen on the right side of all type specimens of *S. gasta* showed that three specimens, including the holotype, had expanded gonads with relatively large-sized ova, indicating that it is a small species (the smallest mature female was 67.4 mm SL). The remaining two specimens, including the largest specimen (83.6 mm SL), were males and had a pale black blotch on the distal margin of the membrane between the seventh and tenth or eleventh dorsal-fin spines (this blotch was absent in the three females; Fig. 1A–B).

The eastern Atlantic species of *Scorpaena* have one large sensory pore or a pair of small pores just behind the symphyseal knob in ventral view. This condition (presence of one or two pores) has been recognized as a character for distinguishing Atlantic species (e.g., Eschmeyer, 1969), indicating that the number of pores is invariant within a species. However, two specimens (67.4 mm and 69.4 mm SL females) of *S. gasta* have a single large pore just behind the symphyseal knob, whereas the remaining three specimens (63.8 mm and 83.6 mm males and 73.7 mm female) have a pair of small pores. The variation of number of the pores in *S. gasta* represents individual variation rather than growth-related changes or sexual differences.

The maxilla of *S. gasta* has a distinct longitudinal ridge laterally (Fig. 2). Of all Indo-Pacific nominal species currently regarded as *Scorpaena*,

only two nominal species, *S. gibbifrons* Fowler, 1938 and *S. sumptuosa* Castelnau, 1875, have this character. *Scorpaena gibbifrons*, originally described on the basis of a single specimen (USNM 98900, 68.6 mm SL) from the Philippines, is currently recognized as a valid species of *Scorpaena* (see Poss, 1999), although it has been known only from the holotype since its original description. However, examination of the holotype of *S. gibbifrons* revealed it to have the following characters: well-exposed ctenoid scales covering the posterior half of the lateral surface of the head, including the cheek and opercle, the entire occiput, the pectoral-fin base and the ventral surface of the body (vs. scales absent from cheek, lower opercle, and occiput, and cycloid scales covering pectoral-fin base and ventral surface of body in *S. gasta*); the occiput nearly flat, and slightly convex centrally (vs. occipital pit remarkably deep); and a minute slit behind the last gill arch (vs. slit absent). These characters of the holotype are consistent with diagnostic characters of the genus *Neomerinthe*, defined by Chen (1981). Accordingly, *S. gibbifrons* should be allocated to *Neomerinthe*.

Taxonomic characters of *S. sumptuosa* are poorly known, although it appears to be relatively common along the central and southwestern coast of Western Australia. It has been regarded as a valid species with no synonyms (e.g., Coleman, 1980; Poss, 1994; Eschmeyer, 1998). The characters of two dried syntypes of *S. sumptuosa* (MNHN A. 4409, 241.2 mm SL and MNHN B. 2570, 229.1 mm SL; examined here) were consistent with more recent material of *S. sumptuosa* collected from the general region of the type locality (i.e., central western and southwestern Australia). Our examination of specimens of *S. gasta* and *S. sumptuosa* (eight specimens, including the syntypes, 72.2–241.2 mm SL) showed them to share the following unusual characters for *Scorpaena*, in addition to the maxillary ridge: extremely deep occipital pit (much deeper than other Indo-Pacific congeners); relatively thick skin with numerous small sensory pores covering nearly the entire predorsal area to near the first pored lateral-line scale (the skin absent in most congeners); the thick skin with sensory pores covering the entire area between the upper and lower opercular spines (thin skin without sensory pores usually covering between the spines; thick skin with sensory pores sometimes extending only onto the upper half of the area); and anteroventral surface of lower jaw with one or two pairs of slender tentacles in ventral view (Fig. 2; tentacles absent in all Indo-Pacific congeners, except *S. scorfa* with numerous tentacles

on the underside of the lower jaw; Eschmeyer, 1969; Motomura et al., 2005). *Scorpaena gasta* and *S. sumptuosa* appear to be closely related because, in addition to these characters, they share similarities of the head spines and ridges.

In meristic characters, however, *S. gasta* can be distinguished from *S. sumptuosa* by 15 pectoral-fin rays (vs. 16 in the latter), 36–40 longitudinal scale rows (vs. 43–46), five scale rows between the last dorsal-fin spine base and the lateral line (vs. seven or eight), and 13 or 14 scale rows below the lateral line (18, based on one specimen; scales could not be counted in other seven specimens examined during this study owing to poor condition).

In morphometric characters, there are also several differences between them (Table 1). The anterior dorsal-fin spines of *S. gasta* are significantly shorter than those of *S. sumptuosa*; second spine 11.4–15.3% of SL (mean 13.3%) in *S. gasta* vs. 16.8–23.7% (20.2%) in *S. sumptuosa*; third spine 15.8–18.6% (17.4%) vs. 22.0–29.6% (26.1%); fourth spine 17.9–19.0% (18.4%) vs. 22.1–25.9 (23.6%); and the third dorsal-fin spine length being less than the upper-jaw length in *S. gasta* (vs. greater than upper-jaw length in *S. sumptuosa*). The caudal-peduncle depth of *S. gasta* (10.5–11.7% of SL, mean 11.2%) is also less than that of *S. sumptuosa* (11.5–14.3%, mean 12.8%). Other minor morphometric differences between them are shown in Table 1. Proportions vary ontogenetically, and these apparent differences might disappear when specimens of *S. sumptuosa* that are of comparable size to *S. gasta* are examined. Smaller specimens of *S. sumptuosa* are required to be analyzed for growth-related proportion changes of the species.

In addition to the above meristic and morphometric differences, *S. gasta* differs from *S. sumptuosa* in having numerous distinct tentacles over the entire head and trunk (vs. a few distinct tentacles on the head and trunk in the latter). Furthermore, *S. gasta* differs from *S. sumptuosa* in fresh coloration. The membrane of the spinous portion of the dorsal fin in *S. gasta* is reddish or yellowish with one or two narrow transparent stripes. These stripes are narrower than the pupil diameter and are located across the distal half of the membrane (Fig. 3), whereas in *S. sumptuosa* the fin membrane is variable (reddish or whitish) without distinct stripes (see underwater photographs reported by Coleman, 1980:101; Poss, 1994:fig. 440). Moreover, as mentioned above, *S. gasta* is a small species (the smallest mature female was 67.4 mm SL, and the largest known specimen was 83.6 mm SL), whereas *S. sumptuosa* is a relatively large species (attaining at least 241 mm SL, see Material Examined).

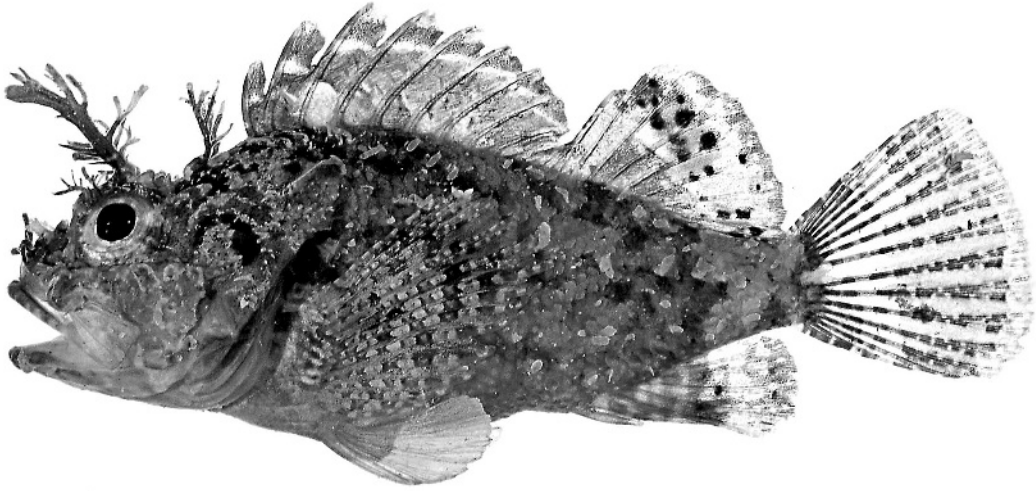


Fig. 3. Photograph of *Scorpaena gasta* (WAM P. 27960-006, holotype, 69.4 mm SL) when fresh, showing two narrow transparent stripes across the distal half of the membrane of the spinous portion of the dorsal fin. Photo by J. B. Hutchins.

Collection data for *S. gasta* indicated that the type specimens were taken from depths of 3–17 m (non-type specimens from 4–14 m), whereas most specimens of *S. sumptuosa* were collected from depths of 40–50 m. This suggests that *S. gasta* and *S. sumptuosa* are bathymetrically segregated, although geographic distributional ranges of both species completely overlap in the central coast of Western Australia (*S. sumptuosa* is known from Point Quobba to the eastern extent of the Great Australian Bight; Poss, 1994).

*Etymology*.—Derived from the Anglo-Saxon *gast* meaning ‘spirit’ or ‘apparition’ in reference to the somewhat ghostly appearance of this species when preserved in alcohol.

#### MATERIAL EXAMINED

*Neomerinthe gibbifrons*: USNM 98900, holotype of *Scorpaena gibbifrons*, 68.6 mm SL, Philippines, vicinity of Surigao Strait (given as Sungao Strait by Fowler, 1938), off Cabugan Grande Island, 10°27'30"N, 125°18'E, RV ALBATROSS, ca. 123 m depth (67 fathoms), 30 July 1909. *Scorpaena sumptuosa*: CAS 204410, 105.1 mm SL, Australia, Western Australia, off Geraldton, 1976; CAS 219504, 141.7 mm SL, Australia, Western Australia, Shark Bay, Aug. 1965, W. Poole; CSIRO C 501, 150.8 mm SL, Australia, Western Australia, off Abrolhos Island, 28°33'S, 113°59'E, CSIRO on FRV WARREEN, 29 Aug. 1948; CSIRO C 2583, 72.2 mm SL, Australia, Western Australia, Shark Bay, off Carnavon, CSIRO on LANCELIN, 27 Aug.

1953; CSIRO T 553, 192.3 mm SL, Australia, Western Australia, northeast of Cape Naturaliste, 33°01'S, 115°10–15'E, 47 m depth, 24 Feb. 1981, S. Collins on HAI KUNG; MNHN A. 710, 228.6 mm SL, Australia (precise locality unknown), F. L. Castelnau; MNHN A. 4409, dried syntype, 241.2 mm SL, Australia, Western Australia, Fremantle, 32°07'S, 115°43'E, 1875, F. L. Castelnau; MNHN B. 2570, dried syntype, 229.1 mm SL, same data as MNHN A. 4409. The following specimens were also identified as *S. gasta* from color photographs taken by J. B. Hutchins, although the specimens were not available for examination: WAM P. 27953-012, 2, Western Australia, Jurien Bay, 10–14 m depth, 11 April 1983; WAM P. 27967-009, Western Australia, Point Quobba, 4–5 m depth, 25 April 1983.

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