

**CEPHALOPHOLIS POLYSPILA, A NEW SPECIES OF GROUPE
(PERCIFORMES: SERRANIDAE: EPINEPHELINAE)
FROM SOUTHWESTERN THAILAND AND SUMATRA**

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ABSTRACT

Cephalopholis polyspila is described as a new species of serranid fish of the subfamily Epinephelinae from Sumatra and the Andaman Sea, off southwestern Thailand. It is similar to *C. microprion* (Bleeker), differing in having small blue spots on the head, body, and fins instead of just the head and thorax; in having 16 or 17 (more often 17) instead of 15 or 16 (more often 16) pectoral rays; in having small scales dorsally on the snout extending anterior to the nostrils (not present in *C. microprion*), a more elongate body on average, shorter pectoral fins, and in attaining larger size (188 mm SL, compared to 145 mm SL for *C. microprion*). It has also been confused with the blue-spotted *C. cyanostigma* (Valenciennes), differing in life color, in usually having 15 soft dorsal rays (strongly modal 16 rays in *cyanostigma*), and in its smaller size (*cyanostigma* to at least 234 mm SL).

INTRODUCTION

On 18 April 1997 the first author photographed and then speared a small brown, blue-spotted grouper of the genus *Cephalopholis* in 4 meters at the islet of Pulau Ular off the southwestern coast of Sumatra. Its blue spots were small and numerous on the head, body, and fins, but the fish was clearly not *C. argus* Bloch and Schneider or *C. cyanostigma* (Valenciennes) which are also brown with a profusion of small blue spots. Instead it seemed most like *C. microprion* (Bleeker), a small grouper known from New Caledonia and the Great Barrier Reef to Indonesia and the Philippines, whose blue spots are restricted to the head and thorax. Five days later at the Mentawai Islands off the coast of Sumatra, typical *C. microprion* was observed and collected. An initial comparison of the Sumatra specimen with those of *C. microprion* did not reveal any differences except for the more extensive spotting of the former. The general morphology and the counts of fin rays, scales, and gill rakers seemed the same.

Noting that Lieske and Myers (1994: 24, fig. 10) listed a blue-spotted serranid fish as the Starry Grouper, *Cephalopholis* sp., from the Andaman Sea, a request was made of the second author for specimens he might have in the collection of the Phuket Marine Biological Center. Eleven specimens were sent which had been identified as *C. cyanostigma*. Another specimen of the new species previously misidentified as *C. cyanostigma* is RUSI 27659, 183 mm SL, which is designated as a paratype for the J.L.B. Smith Institute of Ichthyology. Additional material, also as *C. cyanostigma*, was obtained from Richard Winterbottom of the Royal Ontario Museum in Toronto who collected fishes with Randall D. Mooi, Wouter Holleman, and the second author off Phuket in 1993.

Meristic data from these additional specimens revealed a difference in the number of pectoral rays from *Cephalopholis microprion*; the latter has 15 or 16 (more often 16) pectoral rays, whereas the Andaman Sea - Sumatra fish have 16–17 (more often 17; see Table 1). Moreover, it was noted

that the Andaman Sea specimens are larger on the average than the specimens identified as *C. microprion* by Randall and Heemstra (1990), with the exception of a 181-mm fish from Phuket in the collection of the National Science Museum, Tokyo. This specimen was sent on loan by Keiichi Matsuura; it proved to be the same as the other material from the Andaman Sea, and it is included as one of the paratypes of the new species. The numerous specimens of the new species from the Royal Ontario Museum range to 188 mm SL. The largest *C. microprion* examined measures 145 mm SL.

Although *Cephalopholis cyanostigma* is readily distinguished in life color from the new species (*cyanostigma* illustrated by Randall and Heemstra, 1990: pl. 2 C, D; pl. 29 G, H; Kuitert and Debelius, 1994: 91; and Eichler and Myers, 1997: 93), it is very similar in preservative. It has a strong modal count of 16 dorsal soft rays, in contrast to 15 for the new species (Table 1). Also it attains larger size (to 234 mm SL, with unconfirmed reports of greater length).

MATERIALS AND METHODS

Type specimens of the new species have been deposited in the Australian Museum, Sydney (AMS); the National Museum of Natural History, London (BMNH); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); National Science Museum, Tokyo (NSMT); Phuket Marine Biological Center, Phuket (PMBC); Royal Ontario Museum, Toronto (ROM); J.L.B. Smith Institute of Ichthyology, Grahamstown (RUSI); and the U.S. National Museum of Natural History, Washington, D.C. (USNM).

Lengths recorded for specimens are standard length (SL), the straight-line distance from the tip of the snout in the median plane to the base of the caudal fin (end of hypural plate). Body depth is the greatest depth; body width is the greatest width just posterior to the head. Head length is measured from the front of the upper lip in the median plane to the most posterior point of the opercular membrane; snout length is taken from the same anterior point to the fleshy edge of the orbit. Orbit

diameter is the greatest fleshy diameter of the orbit; interorbital width is the least bony width. Caudal-peduncle depth is the least depth, and caudal-peduncle length the horizontal distance between verticals at the rear base of the anal fin and the base of the caudal fin; lengths of spines and rays of fins are measured from their extreme bases in a straight line to their tips. Pectoral-fin length is the length of the longest ray; pelvic-fin length is measured from the base of the spine to the tip of the longest ray.

Counts of pectoral rays include the rudimentary uppermost ray. Counts of lateral-line scales are made to the base of the caudal fin. Gill-raker counts include all rudiments; the count of lower-limb rakers contains the raker at the angle.

Meristic and morphometric data given in parentheses refer to paratypes. Table 1 presents dorsal-soft-ray and pectoral-ray counts of the new species, *Cephalopholis cyanostigma*, and *C. microprion*. Table 2 provides measurements of type specimens of the new species as percentages of the standard length. Proportional measurements in the text are rounded to the nearest 0.05.

Cephalopholis polyspila, new species

Figs. 1, 2; Tables 1, 2

Cephalopholis cyanostigma (non Valenciennes) Randall and Heemstra, 1990: 43 (in part) (Phi Phi Don Island); Pokapunt *et al.*, 1993: 100, 114, fig. 6 (Andaman Sea).

Cephalopholis microprion (non Bleeker) Randall and Heemstra, 1990: 54 (in part) (Phuket, SW Thailand).

Cephalopholis sp. Lieske and Myers, 1994: 24, fig. 10 (Andaman Sea).

Holotype: BPBM 37636, female, 126 mm, Indonesia, Sumatra, Pulau Ular (1°7.2'S, 100°21.35'E), S side, reef with ledges and small caves, 4 m, spear, J.E. Randall, 18 Apr. 1997.

Paratypes: NSMT-P 50628, 181 mm, Andaman Sea, SW Thailand, Phuket, Ko Bon, 4 m, spear, K. Matsuura, 4 Nov. 1986; RUSI 27659, 183 mm, Phi Phi Don Island (7°41'N, 98°43'E), S coast, K. Matsuura, 11 Nov. 1986; USNM 353870, 137

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mm, Krabi Province, Rok Nai Island, S side (7°13'N, 99°4'50'E), 4 m, multiprong spear, U. Satapoomin, 25 Mar. 1992; PMBC 14100, 136 mm, Phangnga Province, Surin Neur Island, S coast (9°24'48"N, 97°52'30"E), 10 m, hand line, U. Satapoomin, 2 May 1993; PMBC 9832, 143 mm, Phuket Island, from fishermen of village at Rawai Beach, W. Pokapunt and P. Sirimontraporn, 9 Oct. 1993; RUSI 59838, 144 mm, same data as preceding; ROM 69424, 15: 65.5–141 mm, Ko Lon, N side (7°47'10"N, 98°23'45"E), 1–9 m, rotenone, R. Winterbottom and party, 10 Nov. 1993; ROM 69425, 15: 82–145 mm, Ko Aeo, NE side (7°45'47"N, 98°20'24"E), 0–6 m, rotenone, R. Winterbottom and party, 10 Nov. 1993; ROM 69426, 3: 100–142 mm, Ko Hi, bay on S coast, middle of bay (7°44'30"N, 98°22'33"E), 6–10 m, rotenone, R. Winterbottom and party, 11 Nov. 1993; ROM 69427, 127 mm, Ko Hi, bay on S coast, middle of bay (7°44'30"N, 98°22'32"E), 6–11 m, rotenone, R. Winterbottom and party, 12 Nov. 1993; ROM 69428, 2: 117–154 mm, Ko Hi, bay on S coast, middle of bay (7°44'31"N, 98°22'32"E), 0–5 m, rotenone, R. Winterbottom and party, 12 Nov. 1993; ROM 69429, 20: 85–183 mm, Phuket Island, W coast at Patong Beach, off sandy beach at N tip of bay (7°55'15"N, 98°16'16"E), 7.5–13 m, rotenone, R. Winterbottom and party, 13 Nov. 1993; AMS I.39056-001, 93.5 mm, BMNH 1999.2.18.1, 90 mm, BPBM 38552, 89 mm, and CAS 205887, 88 mm, same data as preceding; ROM 69430, 14: 49–162 mm, Phuket Island, W side, Kata Bay, 20 m E of islet Ko Pu (7°48'25"N, 98°17'32"E), 3–8 m, rotenone, R. Winterbottom and party, 14 Nov. 1993; ROM 69431, 8: 48–180 mm, Ko Racha Yai, bay on E coast near N tip (7°36'15"N, 98°22'50"E), 3–7.5 m, rotenone, R. Winterbottom and party, 16 Nov. 1993; ROM 69432, 2: 104.5–162 mm, Ko Racha Yai, bay in middle of N coast, E side 250 m from beach and 100 m from E arm of bay (7°36'38"N, 98°22'07"E), 6–10.5 m, rotenone, R. Winterbottom and party, 17 Nov. 1993; ROM 69433, 10: 58.5–172 mm, Ko Rachi Noi, SE end (7°28'15"N, 98°19'35"E), 1.5–9 m, rotenone, R. Winterbottom and party, 18 Nov. 1993; ROM 69434, 6: 44–135 mm, Ko Rachi Yai, SE side (7°35'14"N, 98°22'07"E), 3–6 m, rotenone, R. Winterbottom

and party, 19 Nov. 1993; ROM 69435, 11: 68–158 mm, Ko Mai Thon, NW tip (7°45'40"N, 98°28'45"E), 4.5–8.5 m, rotenone, R. Winterbottom and party, 23 Nov. 1993; ROM 69436, 14: 56–154 mm, 60 m E of previous station, 4.5–7 m, rotenone, R. Winterbottom and party, 23 Nov. 1993; ROM 69437, 3: 134–188 mm, Ko Hi, middle of bay on S coast (7°35'10"N, 98°22'05"E), 15–19 m, rotenone, R. Winterbottom and party, 26 Nov. 1993; ROM 69438-39, 3: 62–137 mm, Similan Island, E coast (8°38'N, 97°39'E), 0–17 m, U. Satapoomin *et al.*, 14 Dec. 1993; PMBC 14099, 107 mm, Satul Province, Kata Island, W coast (6°32'17"N, 99°15'33"E), 3 m, gill net, U. Satapoomin, 13 Dec. 1994; PMBC 11566, 24 mm, Satul Province, Rawi Island, W coast (6°33'35"N, 99°15'46"E), 11 m, tea-seed powder extract, U. Satapoomin, 14 Dec. 1994; BPBM 38553, 173 mm, Phuket Island, NW coast, Naiyang Beach, about 8°6'N, 98°18'E, gill net, from local fisherman, U. Satapoomin, 27 Dec. 1998.

Diagnosis: Dorsal rays IX, 15–16; anal rays III, 8; pectoral rays 16 or 17 (more often 17); lateral-line scales 47–50; longitudinal scale series 91–103; small embedded scales dorsally on snout nearly reaching upper lip; gill rakers 8–9 + 14–16; body depth 2.7–2.95 in SL; pectoral fins 1.55–1.85 in head length; brown, the edges of scales dark brown, with six indistinct dark bars and numerous small black-edged blue spots on head, body, and fins; soft portion of dorsal and anal fins and caudal fin with a pale bluish gray outer margin and a broad dark brown submarginal band free of blue spots. Largest specimen examined, ROM 69437, 188 mm SL, from off Phuket, Thailand.

Description: Dorsal rays XI, 15 (15–16, rarely 16) anal rays III, 8; all dorsal and anal soft rays branched, the last to base; pectoral rays 16 (16–17; see Table 2), the uppermost unbranched (lowermost ray of smaller paratypes unbranched); pelvic rays I, 5; principal caudal rays 17, the upper and lower unbranched; upper procurrent caudal rays 8, the posterior two segmented; lower procurrent caudal rays 7, the posterior two segmented; lateral-line scales 49 (47–50), plus 3–

Table 1 Counts of dorsal soft rays and pectoral rays of species of *Cephalopholis*.

	Dorsal Soft Rays				Pectoral Rays			
	14	15	16	17	15	16	17	18
<i>C. cyanostigma</i>	2	33	1		10	25	1	
<i>C. microprion</i>	27	1			2	26		
<i>C. polyspila</i>	2	42	6		22	28		

4 pored scales on caudal-fin base; longitudinal scale series 101 (91–103); about 18 scales above lateral line to origin of dorsal fin; about 28 scales below lateral line to origin of anal fin; circumpeduncular scales about 50; gill rakers 8 + 15 (8–9 + 14–16); pseudobranchial filaments 47 (42 in 90-mm

paratype, and 49 in 173-mm paratype); branchiostegal rays 7; vertebrae 10 + 14.

Body depth 2.9 (2.7–2.95) in SL; body compressed, the width 2.05 (1.85–2.2) in depth; head length 2.4 (2.3–2.45) in SL; dorsal profile of head convex - more so on nape than snout, with a slight indentation above posterior edge of orbit; snout length 4.3 (4.05–4.35) in head; orbit diameter 6.2 (4.75–6.25) in head; interorbital width 9.8 (8.2–10.0) in head; caudal-peduncle depth 3.4 (3.1–3.55) in head; caudal-peduncle length 3.0 (2.95–3.25) in head.

Mouth large, the maxilla extending well posterior to a vertical at rear edge of orbit, the upper-jaw length 2.0 (1.95–2.15) in head; mouth slightly oblique, forming an angle of about 20° to

Table 2 Proportional measurements of type specimens of *Cephalopholis polyspila* expressed as percentages of the standard length.

	Holotype	Paratypes							
	BPBM 37636	CAS 205887	AMS I.39056	PMBC 14099	PMBC 14100	USNM 353870	PMBC 9832	RUSI 59838	BPBM 38553
Standard length (mm)	126	88.0	93.5	107	136	137	143	144	173
Greatest body depth	34.4	36.2	34.0	35.6	33.0	37.1	33.7	35.3	35.0
Body width	16.5	17.0	17.7	16.1	17.8	17.7	16.7	17.5	17.9
Head length ¹	42.0	43.2	42.8	42.0	41.2	43.0	41.1	43.2	42.6
Snout length	9.7	10.0	9.8	9.8	10.3	10.2	9.9	10.5	10.5
Orbit diameter	6.8	9.1	8.3	7.8	7.2	7.5	6.7	6.9	6.8
Interorbital width	4.4	4.5	4.3	4.4	4.5	4.8	4.5	4.7	5.2
Caudal-peduncle depth	12.4	13.1	12.9	12.4	12.3	13.2	12.3	12.2	13.8
Caudal-peduncle length	14.1	14.8	13.9	13.4	13.3	13.9	14.0	14.6	14.4
Predorsal length	42.5	44.4	41.2	42.0	41.3	43.1	40.4	41.0	41.6
Preanal length	69.3	69.4	69.7	69.9	71.2	70.2	71.3	69.3	70.8
Prepelvic length	38.7	39.6	39.8	40.1	39.9	39.5	39.7	42.7	41.1
Upper-jaw length	20.9	21.6	21.2	20.6	20.6	20.1	20.9	21.4	21.1
First dorsal spine	6.7	6.8	6.6	6.6	6.3	6.6	6.9	6.9	6.5
Longest dorsal spine	13.7	14.5	13.8	13.8	12.8	14.3	13.4	13.7	13.3
Longest dorsal soft ray	16.6	16.5	16.2	17.3	17.0	17.5	16.9	16.4	16.3
First anal spine	9.5	10.8	10.7	10.0	9.9	9.3	9.7	9.7	9.3
Second anal spine	16.7	19.0	19.1	18.8	16.2	16.0	17.2	17.4	15.9
Third anal spine	15.0	16.8	15.7	15.6	15.2	15.2	15.6	16.4	13.9
Longest anal soft ray	19.3	19.8	19.1	17.3	19.5	18.8	19.4	18.9	18.4
Caudal-fin length	23.0	25.0	23.4	22.9	24.1	22.8	23.1	22.4	22.6
Pectoral-fin length	26.1	27.2	26.5	26.2	26.4	26.5	25.2	23.8	24.8
Pelvic-spine length	11.9	13.2	12.7	12.6	11.9	12.6	12.7	12.0	11.9
Pelvic-fin length	19.8	21.4	19.3	19.7	19.5	21.0	20.7	18.7	18.6

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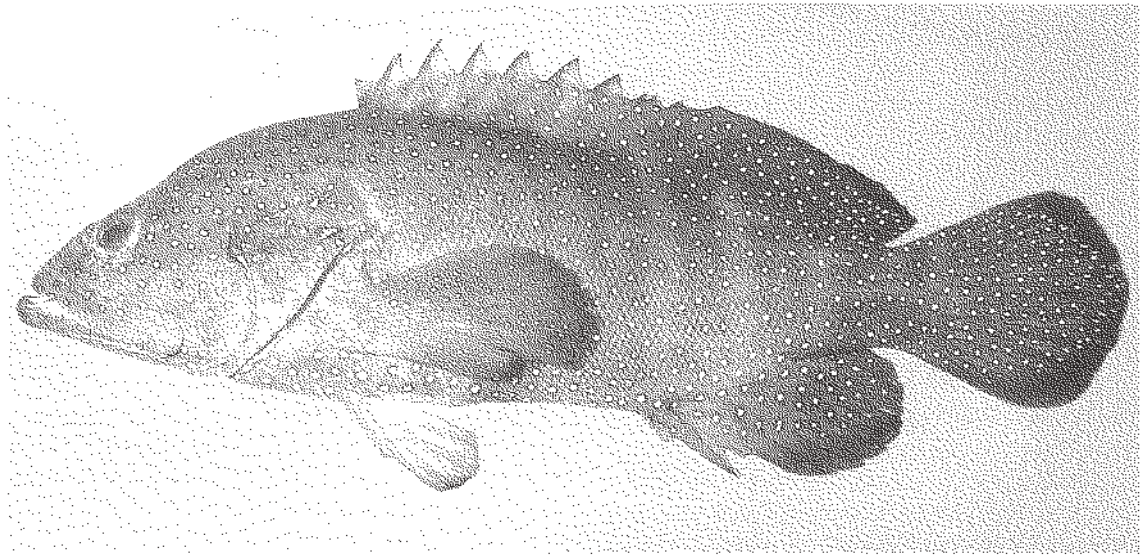


Figure 1 Holotype of *Cephalopholis polyspila*, BPBM 37636, 126 mm SL, Pulau Ular, Sumatra.

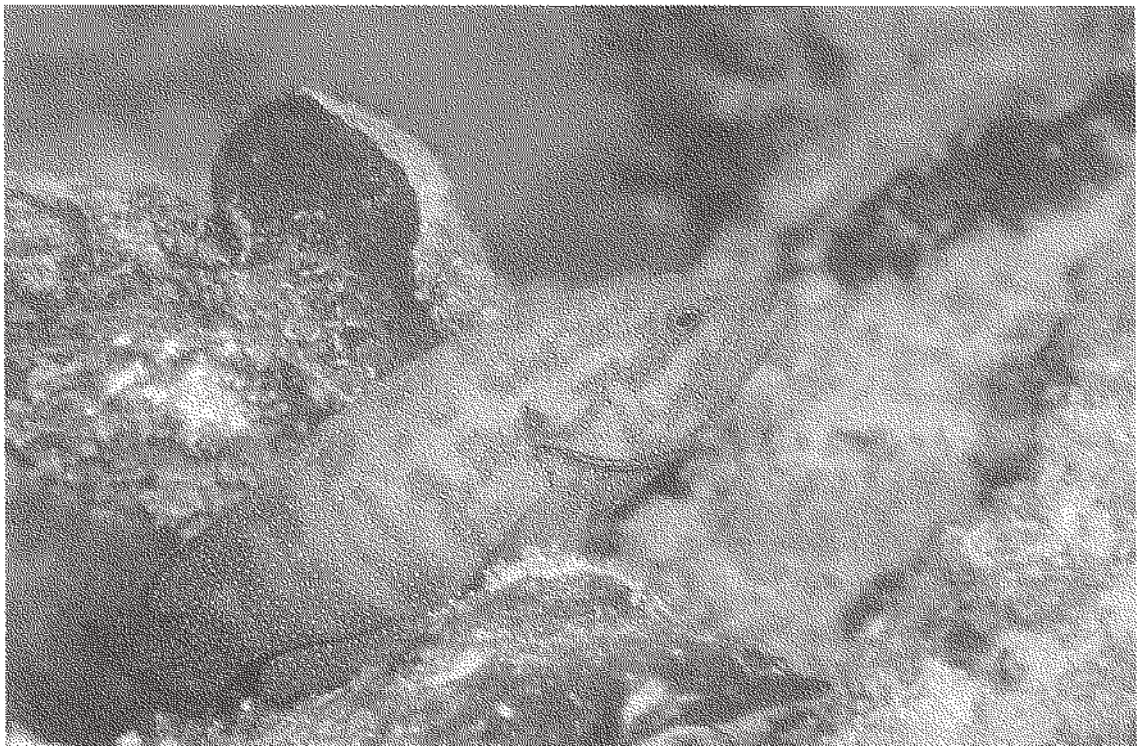


Figure 2 Underwater photograph of holotype of *Cephalopholis polyspila*.

horizontal axis of head and body, the lower jaw strongly projecting; depth of maxilla (including supramaxilla) about equal to orbit diameter; ascending process of premaxilla extending to above anterior edge of orbit; a pair of stout incurved canine teeth anteriorly in jaws, the lower pair medial to upper pair; upper canines of holotype about one-fifth orbit diameter; front of upper jaw with about six rows of slender inwardly depressible teeth, progressively longer posteriorly, the longest about twice as long as anterior canines; side of upper jaw with about 28 fixed incurved conical teeth and an inner band of villiform teeth; front of lower jaw similar to upper; side of lower jaw with an outer row of fixed conical teeth that curve inwardly and posteriorly, and a continuation of the band of slender depressible teeth from front of jaw, narrowing to a single row posteriorly; a V-shaped band of very small teeth on vomer in two to three irregular rows, and a narrow band of very small teeth on palatines in two to three irregular rows. Tongue slender with numerous small papillae on upper surface. Longest gill raker at angle longer than longest gill filament on first arch, 2.5 in orbit diameter.

Anterior nostril a flaring translucent membranous tube, higher posteriorly, in front of center of eye by a distance equal to 3.3 in orbit diameter; posterior nostril larger, round with a slight rim, dorsoposterior to anterior nostril, the internarial distance equal to diameter of anterior nostril.

Opercle with three prominent flat sharp spines, the central one slightly posterior and closer to lower than upper spine; posterior edge of preopercle finely serrate, the rounded corner and posterior margin fleshy; margin of subopercle and interopercle smooth or finely serrate; dorsal edge of opercular membrane broadly rounded.

Lateral line slightly arched over pectoral region, then paralleling contour of back to straight peduncular portion; scales on body ctenoid, becoming cycloid anterodorsally before sixth dorsal spine, and on thorax and prepectoral region; no auxiliary scales on body, but present on cycloid scales of opercle; scales on cheek small, becoming embedded anteriorly; no scales on side of snout; embedded scales dorsally on snout extending

forward nearly to edge of upper lip; no scales on maxilla (except small scales embedded dorsally on maxilla of larger paratypes); small scales on median fins, progressively smaller and more embedded distally, reaching nearly to fin margins; small scales on lateral surface of pectoral fins and medial surface of pelvic fins extending about two-thirds distance to posterior margin.

Origin of dorsal fin over tip of middle opercular spine and fifth lateral-line scale, the predorsal length 2.35 (2.25–2.5) in SL; spines of dorsal fin slender; first dorsal spine 6.3 (5.95–6.55) in head; longest dorsal spine (eighth on holotype) 3.05 (3.0–3.2) in head; longest dorsal soft ray (eighth on holotype) 2.5 (2.4–2.65) in head; posterior ends of dorsal and anal fins reaching to or slightly posterior to base of caudal fin; origin of anal fin below base of first to second dorsal soft rays, the preanal length 1.45 (1.4–1.45) in SL; first anal spine 4.4 (4.0–4.6) in head; second anal spine 2.5 (2.25–2.7) in head; longest anal soft ray (fourth on holotype) 2.2 (2.1–2.4) in head; caudal fin rounded, 1.85 (1.7–1.95) in head; pectoral fins rounded, the middle rays longest, 1.6 (1.55–1.85) in head; origin of pelvic fins below upper base of pectoral fins, the prepelvic length 2.6 (2.35–2.55) in SL; pelvic fins not reaching anus, the second soft ray longest, 2.1 (2.0–2.3) in head.

Color of holotype in alcohol: brown, paler on abdomen, thorax, and ventrally on head, the edges of scales distinctly darker than centers, with six faint dark bars on body, the first two barely perceptible; numerous small brown spots on head and body (though faint in middle and posterior part of body), those on thorax and abdomen larger and with pale centers (a few spots on head also with pale centers); opercular membrane a little darker than rest of head; median fins darker than body (except outer incised part of spinous dorsal that is translucent brown), all with faint dark brown spots (most evident on anal fin where many have pale centers); paired fins light brown with dark brown spots, the pelvics with a dark brown leading edge.

Some paratypes do not show any small dark spots on the fins or on the body except on the thorax and abdomen. The 24-mm paratype of PMBC 11566 is light brown, shading to pale

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yellowish on posterior half of body; fins pale; no trace of dark spots. The 44- and 45-mm paratypes of ROM 69435 are fully dark-spotted.

Color of holotype in life: brown, becoming lighter reddish brown on abdomen, thorax, and lower part of head, with numerous small black-edged blue spots on head, body, and fins; margin of soft portions of dorsal and anal fins and posterior margin of caudal fin (except small middle part) pale bluish gray with a broad dark brown submarginal band free of blue spots; pectoral fins reddish brown, the black-edged blue spots progressively smaller posteriorly; pelvic fins with brownish red rays and clear membranes with a few dark-edged pale blue spots, the leading edge and tip dark brown.

Figure 2 of the holotype shows the disruptive pattern of dark bars and bands that this fish (and other species of the genus) may assume when at rest.

Remarks: This species of *Cephalopholis* is named *polyspila* from the Greek, in reference to the numerous small blue spots on head, body, and fins.

Specimens of this grouper have been collected in the Andaman Sea off the southwest coast of Thailand and off the southwestern coast of Sumatra near Padang from the depth range of 3 to about 13 m.

Randall and Satapoomin (1999) have discussed endemism of fishes of the Andaman Sea and gave examples of other species that range from the Andaman Sea to the southwestern coast of Sumatra or Java.

As mentioned, *Cephalopholis polyspila* has been misidentified as *C. microprion* and as *C. cyanostigma*. It differs from *microprion* in having small blue spots on the body and fins, 16 or 17 instead of 15–16 pectoral rays, slightly higher count of scales in longitudinal series (91–103 compared to 84–98 for *microprion*), small scales dorsally on snout extending nearly to upper lip (scales not anterior to nostrils on *microprion*), a more elongate body on the average (depth 2.7–2.95 in SL, compared to 2.5–2.8 for *microprion*), and shorter pectoral fin (1.55–1.85 in SL, compared to 1.4–1.55 in *microprion*).

Cephalopholis cyanostigma differs in life color from *C. polyspila* in having pale spots superimposed on the brown-barred, blue-spotted pattern of its body, usually more reddish to orangish brown ground color, orange-yellow outer part of the pectoral fins, prominent black spot on the opercular membrane, and in the bright yellow median and pelvic fins of subadults. It also differs in having modally 16 instead of 15 dorsal soft rays, and in attaining larger size (to at least 234 mm SL).

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