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Naso caesius, a New Acanthurid Fish from the Central Pacific[1]

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ABSTRACT: *Naso caesius*, a new unicornfish (Perciformes: Acanthuridae: Nasinae) is described from specimens from the Marshall Islands, Mariana Islands, Hawaiian Islands, and Pitcairn Group. Its occurrence in the Society Islands, New Caledonia, Fiji, and the Coral Sea is confirmed by underwater photographs. It is very similar to and has been confused with *Naso hexacanthus*, differing in having smaller bladelike caudal spines that do not become sharply pointed and antrorse as on large male *N. hexacanthus*, a pale instead of black tongue, entirely pale lower-limb gill rakers (base of rakers blackish in *N. hexacanthus*), and in life color. It is bluish gray overall (not yellowish ventrally as on *N. hexacanthus*) and lacks the black borders on the opercle and preopercle and the white lower lip usually seen on *N. hexacanthus*; one common color phase, which can be rapidly assumed, has vertically elongate spots on the body that vary from paler to darker than the ground color. *Naso thorpei* Smith, known from one 314-mm specimen from Durban, South Africa, is questionably distinct from *N. hexacanthus*. *Naso tapeinosoma* (Bleeker) and *N. vomer* (Klunzinger) are probable junior synonyms of *N. hexacanthus*.

WHILE DIVING IN the deep East Channel of Enewetak Atoll, Marshall Islands, in 1982, the junior author noticed that two different male color patterns were being displayed during courtship in an aggregation of what was thought to be only adult *Naso hexacanthus* (Bleeker), a wide-ranging, zooplankton-feeding acanthurid fish that lacks any rostral prominence on the forehead as seen in adults of most species of the genus (popularly called unicornfishes). She called this to the attention of the senior author who agreed with her observation and noted that two color forms could be detected within the aggregation, apart from courtship, one of which was distinctly yellowish on the ventral part of the body, in contrast to the second, which was bluish gray overall, only paler ventrally. Furthermore, fish in the bluish gray phase often exhibited a pattern of vertically elongate, diffuse blotches on the upper two-thirds of the body that could be either paler or darker than the ground color; also three indistinct darker and lighter stripes on the head were sometimes present. Fish of this phase did not display black borders on the opercular and preopercular margins often seen on *N. hexacanthus*, and the caudal fin was uniform in color, not blue with a broad posterior yellowish brown margin (see Plate I, *C*). We concluded that we were observing two species.

The senior author and Patrick L. Colin speared a total of 14 fish of the bluish gray species and five typical *Naso hexacanthus* at Enewetak so that a direct comparison could be made of the specimens. Papers on the Nasinae by Smith (1955, 1966) were consulted to determine if the bluish gray species could be identified.

Smith (1955) described a new genus, *Atulonotus*, for two species of *Naso*, *N. hexacanthus* and *N. vomer* (Klunzinger), designating the former as the type species. He diagnosed the genus as follows: fairly elongate ovate body; snout and forehead without a horn or marked prominence at any stage, two

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keeled peduncular plates, no caudal filaments, uniserial fine-pointed teeth that are serrate apically on edges, and body somber without bright color. Smith (1966) downgraded *Atulonotus* to subgeneric status, admitting that juveniles of other genera could not be differentiated from the species of *Atulonotus*; he included a new species in the subgenus, *Naso thorpei*, which he described from a single specimen 375 mm in total length, from Durban, Natal. He had no knowledge of its life color. He separated *N. thorpei* and *N. hexacanthus* in the key on body depth, tooth counts, and the color of the tongue (black in adults of *N. hexacanthus*, not darkly pigmented in *N. thorpei*). In the accounts of the two species he also differentiated them on caudal-fin shape, that of adult *N. hexacanthus* being truncate, whereas that of *N. thorpei* was described as "scarcely truncate even as expanded."

Smith (1966) gave the body depth of *N. hexacanthus* as 2.7–3.2 in fork length; however, his illustrated specimen (fig. 9D) has a body depth of 3.3 in the fork length, and adults of this species can have a body depth up to 3.5 in the fork length; therefore this basis for separation is obviously invalid. So is the tooth count difference; Smith wrote for *N. hexacanthus*, "Fewer than 100 teeth in either jaw." Our first count of the upper teeth of an Enewetak specimen of *N. hexacanthus* 548 mm in standard length (SL) is 102. It is clear from a comparison of the caudal-fin shape of *N. hexacanthus* with the unidentified *Naso* that this also offers no promise of separation; those of the same size have the same fin shape. However, our adult specimens of *N. hexacanthus* all have the upper surface of the tongue black, whereas it is pale on the 14 specimens of the other species. We then suspected that our second species of *Naso* was *N. thorpei*, and we searched for some other basis to separate the two in addition to tongue coloration and life color.

Initially we failed to find any meristic or morphometric characters to distinguish *Naso hexacanthus* from the presumed *N. thorpei* (later, with more material available, a modal difference in the count of dorsal and anal soft rays was detected).

We then took muscle and liver tissue samples from five fresh specimens of *N. hexacanthus* and 10 of the *N. "thorpei"* for a preliminary electrophoretic analysis. Seventeen presumed genetic loci were screened, resulting in eight polymorphic loci (5% level) and no fixed differences. Further electrophoretic analysis of the two species with larger sample sizes might, however, result in a separation (see Shaklee et al. 1982 for review).

Because it was believed that the specimens of the bluish gray species would prove to be *Naso thorpei*, we only preserved the head, caudal peduncle, and caudal fin of the larger specimens; however, meristic data and some measurements were taken of these specimens first.

Additional study of the specimens after preservation and of older museum material resulted in the finding of three other color differences. The lower lip of *N. hexacanthus* is distinctly pale (often white in life), while that of the presumed *N. thorpei* is usually colored like that of the adjacent part of the head. The margins of the opercle and preopercle of *N. hexacanthus* are often black or a darker brown than the rest of the head; no such dark borders are apparent on our specimens of *N. "thorpei."* The base of the lower-limb gill rakers of *N. hexacanthus* are blackish, whereas the gill rakers of *N. "thorpei"* are entirely pale.

Also we finally discovered a useful morphometric character. When comparisons are made of the size and shape of the caudal bladelike spines of the two species, those of *N. hexacanthus* are larger at any given size; moreover, the caudal spines of large adult males of *N. hexacanthus* have pointed tips that project anteriorly, whereas those of our large *N. "thorpei"* are not sharply pointed and retrorse (Figure 1).

Smith did not describe or illustrate the caudal spines of his holotype of *N. thorpei*, so we asked Phillip C. Heemstra of the J. L. B. Smith Institute of Ichthyology (RUSI) in Grahamstown, South Africa, to examine this feature of the specimen (RUSI 603, 314 mm SL) for us. He made a sketch that enabled us to realize at a glance that our specimens are not *N. thorpei* but an undescribed species. Heemstra's sketch matches the shape of *N.*

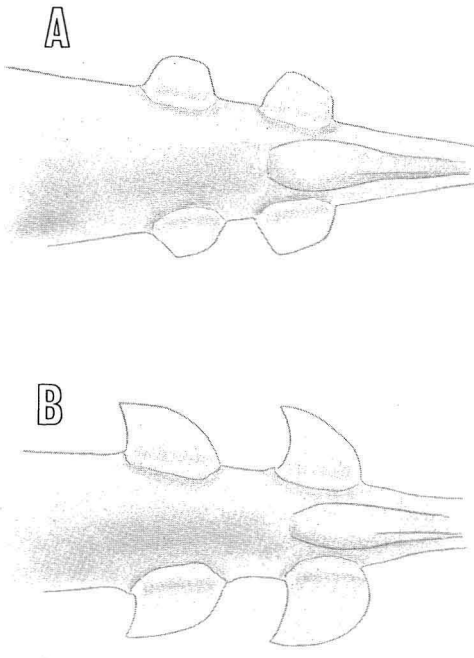


FIGURE 1. Dorsal view of caudal spines: *A*, *Naso caesius*, BPBM 34608, 514 mm SL; *B*, *Naso hexacanthus*, BPBM 34532, 494 mm SL (Miles Ishiki).

hexacanthus of the same size. Furthermore, Smith's counts of 27 soft rays for both the dorsal and anal fins of his type of *N. thorpei* (confirmed by Heemstra) fit *N. hexacanthus* but not the new species (see Table 1). In fact, with only the color of the tongue as a difference, a feature not evident on the young of *N. hexacanthus*, the validity of *N. thorpei* may be questioned. Smith himself apparently had reservations about the species. After his description of *N. thorpei* he wrote, "It is at present maintained as distinct." To our knowledge, no additional specimens of *Naso* in South Africa or elsewhere in the Indian Ocean that could be identified as *N. thorpei* have been obtained. At our request Dr. Heemstra made a direct comparison of the holotype of *N. thorpei* with specimens of *N. hexacanthus* of about the same size and could find no difference except tongue coloration.

Since becoming aware of the fresh coloration of the new species, the senior author discovered that both of these species of *Naso* are landed in Hawaii from local catches by fishermen. Two specimens of the new species were obtained from a Honolulu fish market. Examination of acanthurid fishes labeled as *Naso hexacanthus* at the Bernice P. Bishop Museum in Honolulu (BPBM) revealed two additional specimens of the new species: one from Oahu and one from Pitcairn Island. Also, a specimen from Bikini Atoll in the Marshall Islands was found at the U.S. National Museum of Natural History, Washington, D.C. (USNM). Paratypes from Enewetak have been deposited at the following institutions: Australian Museum, Sydney (AMS); The Natural History Museum, London (BMNH); and California Academy of Sciences, San Francisco (CAS).

A copy of the manuscript of this paper was given to Robert F. Myers in Guam with a request to be alert for the new species of *Naso* there. He soon obtained a specimen from a local spearfisherman that we have deposited as another paratype at the Bishop Museum; he also provided a color photograph of the specimen.

Lengths of specimens are given as SL, the horizontal distance from the front of the upper lip in the median plane to the caudal-fin base. Body depth is the greatest depth measured vertically from the base of the dorsal fin

TABLE 1

FIN-RAY COUNTS OF *Naso hexacanthus* AND *N. caesius*

	DORSAL RAYS								ANAL SOFT RAYS					PECTORAL RAYS		
SPECIES	V	VI	VII	26	27	28	29	30	27	28	29	30	31	16	17	18
N. hexacanthus	1	19	4	1	10	8	5		1	11	11	1			21	3
N. caesius		16	4		1	10	7	2		1	10	8	1	1	16	3

TABLE 2

PROPORTIONAL MEASUREMENTS OF TYPE SPECIMENS OF *Naso caesius* EXPRESSED AS PERCENTAGES OF THE STANDARD LENGTH

	HOLOTYPE	PARATYPES						
CHARACTER	BPBM 29160	BPBM 34530	BPBM 4337	BPBM 34529	BPBM 34528	BPBM 30610	BPBM 34531	CAS 76030
Standard length (mm)	369	114	178	308	322	356	456	480
Body depth	37.4	44.7	39.9	39.0	36.2	36.7	36.5	36.3
Body width	13.2	13.2	13.3	12.6	12.5	12.1	13.1	12.0
Head length	23.9	26.0	25.8	23.9	23.8	24.3	23.0	22.6
Snout length	14.3	15.2	14.7	14.5	14.6	14.2	13.3	13.6
Orbit diameter	5.0	8.6	7.3	5.6	5.5	5.0	4.8	4.4
Interorbital width	8.3	8.8	8.6	8.0	7.9	8.6	8.0	8.0
Upper jaw length	4.7	5.4	4.9	4.9	4.9	4.8	4.5	4.6
Caudal peduncle depth	3.9	4.9	4.7	4.1	4.0	4.1	3.9	3.7
Caudal peduncle length	13.7	10.2	12.8	13.7	14.2	13.6	12.2	12.3
Predorsal length	26.5	31.4	28.4	27.1	27.8	26.4	25.8	25.9
Preanal length	35.9	39.4	37.6	34.8	34.7	35.0	33.6	33.4
Prepelvic length	27.6	28.8	28.2	27.7	26.9	27.4	26.4	26.5
First dorsal spine	10.9	13.6	10.4	11.7	11.0	8.4	9.4	10.6
Last dorsal spine	8.7	11.0	10.1	9.9	9.1	7.6	7.5	8.9
Longest dorsal ray	11.1	10.5	11.2	11.0	10.1	10.0	10.1	10.8
Last dorsal ray	6.3	6.1	5.7	6.8	6.3	6.2	6.8	6.9
First anal spine	7.4	7.4	broken	7.6	7.2	broken	broken	8.1
Longest anal ray	9.9	9.6	9.9	9.6	9.5	9.2	9.6	9.8
Last anal ray	5.9	5.8	6.7	5.9	6.2	6.0	6.5	6.4
Caudal fin length	14.7	24.8	22.2	19.0	19.1	17.7	15.0	13.2
Caudal concavity	3.2	8.3	9.1	7.9	8.0	7.6	2.7	3.7
Pectoral fin length	15.5	18.3	17.9	15.9	15.5	15.9	15.5	15.4
Pelvic spine length	10.1	13.2	13.2	10.7	9.8	9.6	9.1	9.6
Pelvic fin length	10.9	14.2	14.0	11.9	11.0	10.5	10.2	10.2

to the base of the anal fin; body width is the maximum width just posterior to the gill opening. Head length is measured from the front of the upper lip to the most posterior end of the opercular membrane, and snout length from the same anterior point to the fleshy edge of the orbit. Orbit diameter is the greatest fleshy diameter. 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 caudal-fin base. Caudal concavity is the distance between verticals at the tips of the longest and shortest caudal-fin rays. Gill-raker counts are made on the first gill arch and include rudiments; the upper-limb count is given first; the raker at the angle is included in the lower-limb count.

Proportional measurements in the text of the description below are rounded to the nearest 0.05. Data in parentheses refer to paratypes. Table 1 compares the fin-ray counts of the new species with *N. hexacanthus*. Table 2 gives 25 measurements of the holotype and seven paratypes as percentages of the standard length.

Naso caesius Randall & Bell, n. sp.

Plate I, *A*, *B*; Figures 1*A*, 2

Naso hexacanthus (non Bleeker), Schultz & Woods in Schultz and collaborators, 1953: 644.

Naso hexacanthus (non Bleeker), Bagnis et al., 1972: figs. of pp. 84–86.

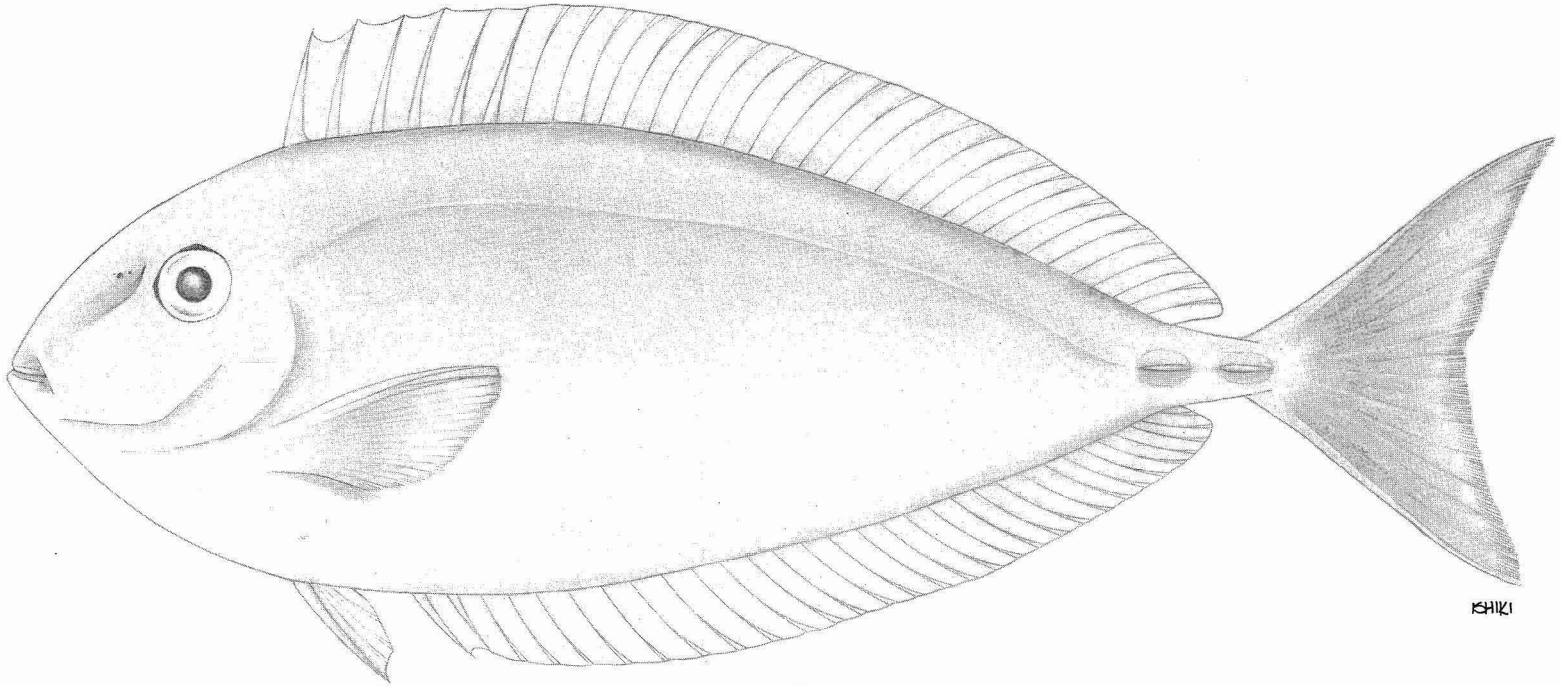
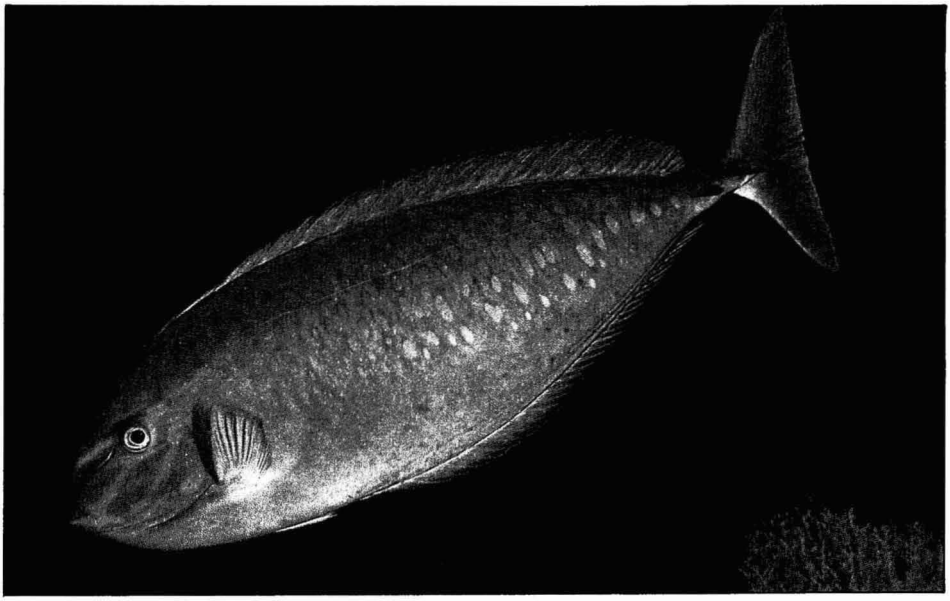
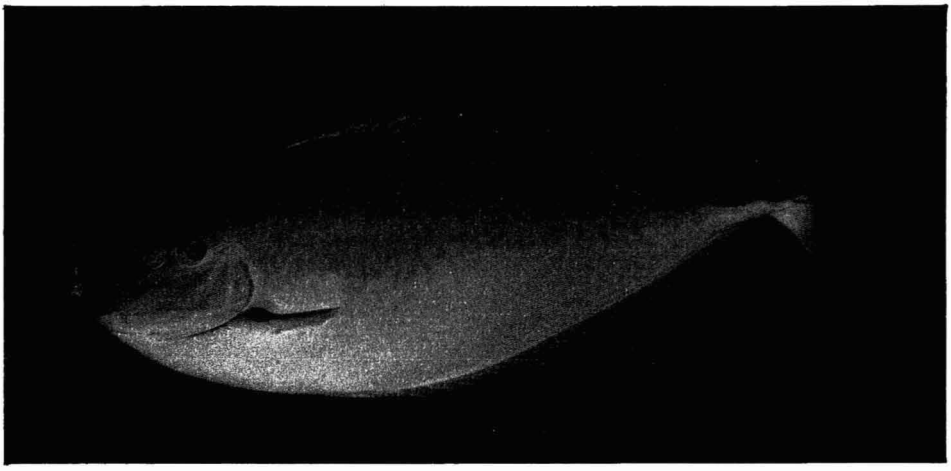


FIGURE 2. Holotype of *Naso caesius*, BPBM 29160, 369 mm SL, Enewetak, Marshall Islands (Miles Ishiki).



A. Underwater photograph of *Naso caesius,* about 550 mm total length, night, Enewetak, Marshall Islands (J. Randall).



B. Underwater photograph of *Naso caesius,* about 450 mm total length, Osprey Reef, Coral Sea (J. Randall).

C. Underwater photograph of *Naso hexacanthus,* about 600 mm total length, night, Enewetak, Marshall Islands (J. Randall)

Naso hexacanthus (non Bleeker), Fourmanoir & Laboute, 1976:212, left-hand fig.

Naso thorpei (non Smith), Randall et al., 1990:431, lower fig.

HOLOTYPE: BPBM 29160, female, 369 mm, Marshall Islands, Enewetak Atoll, north side of East Channel (main pass of the atoll) at wreck of concrete ship, 3–5 m, spear, J. E. Randall, 10 October 1982.

PARATYPES: BPBM 4337, 178 mm, Hawaiian Islands, Oahu, Honolulu market, J. W. Thompson (no date of collection, but between 1901 and 1925); USNM 140088, 345 mm, Marshall Islands, Bikini Atoll, lagoon, coral head, 9–13.5 m, spear, V. E. Brock, K. O. Emory, and T. Kohler, 13 July 1946; CAS 76030, 480 mm, same collection data as holotype; BPBM 34531, 456 mm, Enewetak Atoll, pinnacle reef in lagoon near East Channel, 13 m, spear, J. E. Randall and P. L. Colin, 22 August 1983; BPBM 34528, 322 mm, Enewetak, lagoon, Medren pinnacle reef, 12 m, spear, J. E. Randall, 25 August 1983; AMS I.31491-001, 321 mm, same data as preceding; BPBM 34529, 308 mm, Medren reef, 10–15 m, spear, J. E. Randall and P. L. Colin, 26 August 1983; BPBM 34530,114 mm, and BMNH 1991.5.20.1, 309 mm, same data as preceding; BPBM 30610, 2:356–402 mm, Hawaiian Islands, Oahu, Honolulu, Tamashiro fish market, J. E. Randall, 5 September 1984; BPBM 37456, 348 mm, Mariana Islands, Guam, W side of Ritidian Point, reef in 27–36 m, speared at night, obtained from a commercial spearfisherman by Robert F. Myers, 5 June 1991.

ADDITIONAL MATERIAL EXAMINED (heads, caudal peduncles, and caudal fins only): BPBM 16813, 407 mm, Pitcairn Island, reef off Bounty Bay, 27.5 m, spear, J. E. Randall, 8 January 1971; BPBM 34607, 537 mm, same data as holotype; BPBM 34608, 4:457–553 mm, Enewetak, lagoon reefs, 10–15 m, spear, J. E. Randall and P. L. Colin, 22–26 August 1983.

DIAGNOSIS: Dorsal fin rays VI or VII (usually VI), 27–30; anal fin rays II, 28–31; pectoral-fin rays 16–18; body depth 2.5–2.8 in SL (juveniles deeper-bodied); forehead without any rostral prominence; side of caudal peduncle with two bony plates, each with a rounded bladelike spine (not pointed and retrorse, even in large males); caudal fin emarginate in young, becoming truncate on large adults; bluish gray in life without dark borders on edges of opercle and preopercle; caudal fin uniformly bluish without a broad posterior brown margin; lower lip not whitish, tongue not black; gill rakers pale.

DESCRIPTION: Dorsal-fin rays VI, 28 (VI or VII, usually VI, 27–30); anal-fin rays II, 30 (28–31); pectoral-fin rays 17 (16–18), the upper two rays unbranched; pelvic-fin rays I, 3; branched caudal-fin rays 14; gill rakers 5 + 11 (3–5 + 8–11) (seven specimens).

Two elliptical bony plates on each side of caudal peduncle, each with a keel-like spine projecting laterally in adults, more in males than females (length of spine perpendicular to plate 7 mm in the 369-mm female holotype, 9.9 mm in a 553-mm female, and 13.6 mm in a 519-mm male; spine not formed on 114-mm juvenile, 1.1 mm on 178-mm juvenile, 1.5 mm on 235-mm specimen, and 4 mm on 308-mm specimen); shape of peduncular spines semicircular to subquadrangular when viewed from above (not sharply pointed with the tip projecting forward as in *N. hexacanthus*; see Figure 1).

Body moderately elongate, the depth 2.7 (2.5–2.8; 2.2 in 114-mm juvenile) in SL; body compressed, the width 2.8 (2.8–3.1; 3.4 in 114-mm juvenile) in depth; head length 4.2 (3.9–4.45) in SL (relatively shorter, in general, in larger fish); dorsal profile of head smoothly convex without any bony or fleshy protuberance; ventral profile of head slightly less convex than dorsal; snout length 1.65 (1.6–1.8) in head; orbit diameter 4.8 (3.0 in 114-mm juvenile to 5.45 in 553-mm fish) in head; interobital arched well above eyes, not evenly convex (a slight rounded ridge middorsally), the width 3.0 (2.8–3.05) in head; caudal peduncle slender, the least depth at dorsal and ventral precaudal depression 6.15 (4.9–6.1) in head.

Mouth terminal or with lower jaw slightly projecting, small, the upper jaw length 5.1 (4.8–4.25) in head; gape nearly horizontal; teeth uniserial, slender, and lanceolate, the number increasing with age (45 upper and 40

lower teeth in 114-mm specimen and 94 upper and 88 lower teeth in 537-mm specimen); edges of distal converging part of teeth finely denticulate. Lips narrow. Tongue broadly rounded.

A deep oblique groove on snout from in front of middle of eye nearly half distance to front of mouth; nostrils very small, just above deep groove and directly anterior to middle of eye by a distance about one-third to one-half orbit diameter; anterior nostril with a low membranous rim and a slender posterior flap that reaches half distance to posterior nostril; posterior nostril varying from round to elliptical in shape.

Scales very small, close-set (the margins not apparent to the naked eye), each with an elevated dense patch of spinules that are directed posteriorly on body (thus the texture is smooth when stroked posteriorly, but finely abrasive in the forward direction); body and head completely scaled except for lips, opercular membrane, and a narrow zone around anterior nostril; membranes of fins scaleless; spines, and to a lesser extent soft rays, scaled along sides (pelvic and first dorsal and anal spines scaled anteriorly as well). Lateral line on upper side of body approximately following contour of back; a curious series of about 20 vertical slitlike pores in a row a few mm above and parallel to lateral line, these slits not evenly spaced.

Origin of dorsal fin slightly anterior to a vertical at upper end of gill opening; dorsal and anal spines slender but transversally broad basally, especially the first in each fin; first dorsal spine usually longest (the second subequal), 2.75 (1.9–2.9) in head (spines and rays of all fins relatively shorter, in general, with growth); remaining dorsal spines progressively shorter, the last 2.75 (2.35–3.05) in head; first dorsal soft ray slightly longer than last spine; successive rays progressively slightly longer to about fourteenth ray; this ray to about the twentieth subequal, 2.15 (2.15–2.5) in head; last dorsal ray shortest, 3.8 (3.3–4.4) in head; origin of anal fin below base of fourth dorsal spine; anal spines subequal, the first 3.25 (2.8–3.5) in head; relative lengths of anal soft rays similar to those of dorsal fin, the longest 2.4 (2.3–2.7) in head; caudal-fin length 6.8 (4.05–7.6 in SL), the fin about three times higher than its length posterior to end of hypural plate; caudal fin emarginate in young (about 3 in head length), becoming truncate in large adults (caudal concavity of holotype 7.45 in head); pectoral fins short, the third to fifth rays longest, 1.55 (1.4–1.55) in head; pelvic fins short, the first soft ray longest, 2.2 (1.8–2.3) in head. Anus above middle of appressed pelvic fins.

Color in alcohol light gray-brown, paler ventrally, with no obvious dark or light markings on head or body; subadults with four diagonal dark bands on anterior membranes of dorsal and anal fins, becoming horizontal on membranes posteriorly in fins; dark bands in fins of adults faint or absent; caudal fin uniform brown; pectoral fins brown, the membranes pale distally; pelvic fins brown, the membranes darker than rays.

Color in life bluish gray, paler ventrally (nearly white on some individuals); able to alter quickly to a pattern of vertically elongate blotches on about upper two-thirds of body, which may be either darker or paler than the ground color (many blotches approximately elliptical, some irregular, and some interconnected); three pale bands may be present on head, one horizontal at level of upper edge of eye, and two diagonal on cheek; caudal fin more blue than body, without any distinct posterior border of different color; pectoral rays somewhat yellowish. An occasional color phase, also rapidly attained, is overall dark gray-brown.

The color of the body of a 114-mm juvenile was noted as bluish with dark-edged whitish spots.

The following color note was made of a 548-mm male speared at Enewetak that exhibited two color patterns as it was dying: (1) blue with dark gray spots on upper half of body, which were not interconnected, and (2) irregular, interconnected, dark bluish bars alternating with pale blue bars of about equal size; head with three diagonal bands of each color.

REMARKS: This species of *Naso* is named *caesius* from the Latin for bluish gray in reference to its most common ground color.

Naso caesius is represented by specimens from the Marshall Islands, Hawaiian Islands, Mariana Islands, and Pitcairn Group. It is also present in the Society Islands, as may be seen by the color figures in Bagnis et al. (1972:84–86), and New Caledonia, by the figure in Fourmanoir and Laboute (1976: 212). The color illustration identified as *Naso thorpei* in Randall et al. (1990:431) is also *N. caesius* (reproduced herein as Plate I, *B*). This photograph was taken at Osprey Reef in the Coral Sea. In addition, the species was observed and photographed by the senior author off Mbengga in the Fiji Islands. In the course of his doctoral research on acanthurids, Kendall Clements observed two individuals of a species of *Naso* of similar form to *N. hexacanthus* but of different color at the island of Niutao, Tuvalu (formerly Ellice Islands). Typical *N. hexacanthus* were schooling nearby. He made detailed color notes of the two fish. After reading the present account, he concluded he had seen *Naso caesius*. He has not observed it on the Great Barrier Reef where he conducted most of his fieldwork.

In recent years the senior author has dived extensively in Indonesia (six dive trips of 2 weeks or more in the period 1983–1990), Papua New Guinea, and the Maldive Islands, often on steep outer reef escarpments where numerous *Naso hexacanthus* are usually seen. He has been constantly alert for *N. caesius* but has never observed it in these areas.

Smith (1966) stated that the juvenile fish from Mauritius that Baissac (1957) identified as *Atulonotus vomer* (Klunzinger) may be identical with his *Naso thorpei*; he added, "the specimen cannot be traced." We believe Baissac's fish was *N. hexacanthus* because the data given by him, including the color, "Ocré, plus pâle sur le ventre. Lèvre supérieure noire," seem diagnostic for this species. Baissac's mention of small round black spots on the top of the head and on the body of adults is suggestive of *N. lopezi* Herre.

Smith (1966) listed *Naseus unicolor* Liénard, 1839 from Mauritius as "not determinable." Liénard's description (repeated by Smith) is brief, and no type specimen is extant. The color given by Liénard, blackish blue dorsally, with fins nearly black, does not suggest any known species of *Naso*. We agree with Smith that *unicolor* should be regarded as a *nomen dubium*.

Smith (1966) recognized five species of *Naso* in his subgenus *Atulonotus*: *hexacanthus*, *lopezi*, *tapeinosoma*, *thorpei*, and *vomer*. Smith correctly listed *Callicanthus metoposophron* Jenkins and *Naso genimarginatus* Herre as synonyms of *N. hexacanthus*. *Naso lopezi* Herre (1927) is a valid species characterized by an elongate body (depth 3.3–3.7 in SL), dorsal rays V, 28–31, and small dark gray spots on the upper half of the body and the caudal fin. Of *Naso tapeinosoma* (Bleeker), Smith wrote, "certainly known and described from only two rather small specimens from the East Indies." We regard *N. tapeinosoma* as the young of *Naso hexacanthus*.

Smith (1966) aptly pointed out the problem of determining what fish Klunzinger (1871) had when he described *Naseus vomer* without an illustration from one specimen 540 mm in total length taken at Kosier (Qusier), Egypt, in the Red Sea. Smith determined that the specimen was destroyed by the bombing of Berlin in World War II. Klunzinger (1884: 87, pl. 13, fig. 2) reported a second Red Sea specimen of what he regarded as *N. vomer*; as noted by Smith, this fish is clearly *Naso hexacanthus*. The color description given in the original description of *N. vomer* by Klunzinger, with mention of the belly being gray-yellow and the edge of the opercle and preopercle blackish, is strongly suggestive of *N. hexacanthus*, but the depth of 4 given by Klunzinger seems too little for *N. hexacanthus*. Therefore, three possibilities exist for *vomer*: Klunzinger had a specimen of *N. hexacanthus* but made an error in recording the body depth; his *N. vomer* was an aberrant *N. hexacanthus*; or there is a slender species of *Naso* in the Red Sea with a color pattern like that of *N. hexacanthus* that awaits the collection of additional material for confirmation. Of the three possibilities, we favor the first because the second Red Sea specimen that Klunzinger (1884) himself identified as *vomer* is *N. hexacanthus*, and because *N. hexacanthus* is common enough to be expected in the listing of species of *Naso* (as *Naseus*) from the Red Sea by Klunzinger (1871).

MATERIAL OF *Naso hexacanthus* EXAMINED: Hawaiian Islands, Oahu, BPBM 4340, 6:138–228 mm; BPBM 8519, 214 mm. Hawaii, BPBM 8481, 300 mm; BPBM 10019, 264 mm. Marquesas Islands, Nuku Hiva, BPBM 11079, 549 mm. Society Islands, Tahiti, BPBM 8996, 235 mm; Indonesia, Lombok, BPBM 30142, 251 mm. Philippines, Ragay Gulf, Galvaney Island, USNM 122189, 444 mm. Marshall Islands, Enewetak Atoll, BPBM 29159, 548 mm (only head, caudal peduncle, and fin retained); BPBM 34532, 4:278–533 mm (only head, caudal peduncle, and fin of two largest saved). In addition, data taken from six specimens from Oahu that were not preserved.

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