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A New Aulopodid Species, *Hime microps*, from the Eastern South Pacific, with Comments on Geographic Variations of *H. japonica*

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Abstract A new aulopodid fish, *Hime microps*, is described after two specimens from the Nazca submarine ridge (25°43′S, 85°29′W at 160–165 m; 25°42′S, 85°24′W at 162–168 m). This species is related to *H. japonica* and *H. curtirostris* but differs in having no pyloric caeca and smaller eyes with the horizontal diameter shorter than the snout length. Specimens of *H. japonica* from off Japan, the Hawaiian submarine ridge and the Tasman Sea are compared and found to be morphologically identical.

In the last review of the Aulopodidae (Mead, 1966), 4 species included within the single genus *Aulopus* Cloquet, 1816 were recognized in the Indian and Pacific Oceans, two of them being known from Australia (*A. purpurissatus* Richardson, 1843, *A. milesi* Valenciennes, 1849) and two from the warmwater western North Pacific (*A. japonicus* Günther, 1880 limited to southern Japan and the Philippines and *A. damasi* Tanaka, 1915 from Japan). This group of "Pacific species" is distinguished from the Atlantic species (*A. filamentosus* (Bloch, 1792), *A. cadenati* Poll, 1953, *A. nanae* Mead, 1958) in having a dorsal fin base much longer (contrary to shorter) than the distance from its end to the adipose fin origin. Subsequently, *A. japonicus* was recorded from off Hawaii (Strasburg, 1966), New Caledonia (Fourmanoir and Rivaton, 1979) and New Zealand (Paulin, 1984), and two more Pacific species were described: *A. curtirostris* from Queensland, Australia (Thomson, 1967), and *A. bajacali* (belonging to the Atlantic species-group of Mead, 1966) from near Alijos Rocks, 170 miles offshore Baja California (Parin and Kotlyar, 1984). As regards to the generic composition of the Aulopodidae, Johnson (1982), as well as Starks (1924) and in contrast to Mead (1966), recognized two genera—*Aulopus* for the Atlantic species-group (type-species *Salmo filamentosus* Bloch) and *Hime* Starks, 1924 for the Pacific species-group (type-species *A. japonicus* Günther).

While dealing with the collection of bottom fishes from the Nazca submarine ridge, we came across an undescribed species most closely related to *H. japonica* and *H. curtirostris*. This new species is described and illustrated below.

Hime microps sp. nov.

(Fig. 1)

Holotype. ZIL (Zoological Institute of the Academy of Sciences USSR, Leningrad) 47256, female, 225 mm standard length (SL), Nazca ridge (25°43′S, 85°29′W) at 160–165 m, October 17, 1979, bottom trawl, coll. G. A. Golovan and N. P. Pakhorukov.

Paratype. ZIL 48670, male, 251 mm SL, 25°42′S, 85°24′W, depth 162–168 m, April 26, 1987, bottom trawl, coll. N. V. Parin and party.

Diagnosis. Base of dorsal fin 1.5–1.7 times as long as distance from its hinder end to origin of adipose fin. Horizontal diameter of eye much shorter than length of snout and almost equal to fleshy interorbital space. Edges of tongue edentulous, teeth present only in median lognitudinal patch. Pyloric caeca absent. D 16–17, A 10–11, P 11; lateral line scales 43–45; vertebrae 41–43; branchiostegals 14–15; gill rakers on 1st arch 21–23.

Description of holotype. Counts and proportional measurements are shown in Tables 1 and 2.

Body subcylindrical anteriorly, compressed posteriorly, broadest at origin of pectoral fins, deepest at origin of dorsal fin. Head wedge-shaped, its upper profile slightly convex. Eye approximately circular (horizontal diameter a little longer), entering into dorsal profile, 1.2 times shorter than snout. Bony interorbit narrow, concave; fleshy interorbit nearly equal to horizontal diameter of eye. Snout slightly depressed, rounded. Nostrils close together, the anterior one with a conspicuous filamentous flap posteriorly. Mouth large, oblique. Upper jaw extending to below posterior third of eye, expanded posteriorly.

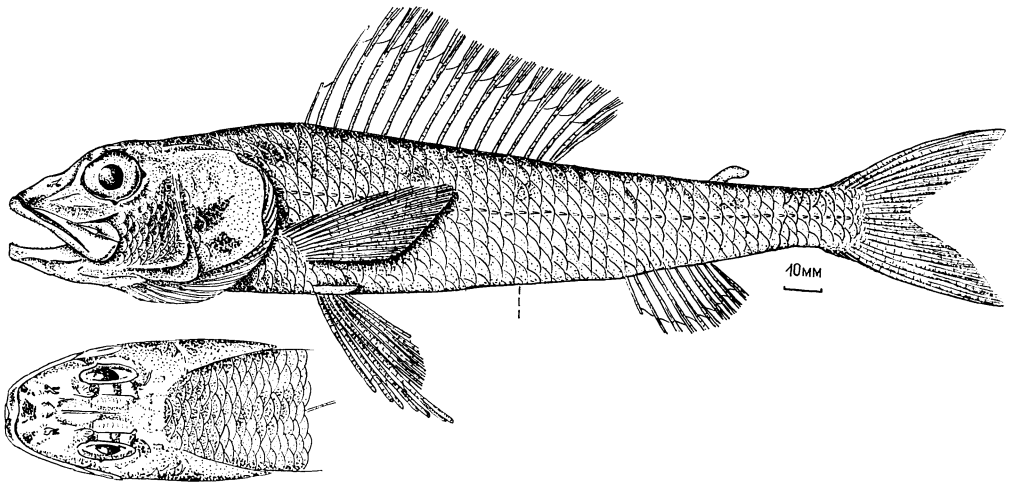

Fig. 1. *Hime microps* sp. nov., holotype, 225 mm SL, Nazca submarine ridge (25°43′S, 85°29′W), ZIL 47256.

Scales present on postorbital part of head, body and base of caudal fin; more or less ctenoid on head, sides of body, smooth-edged on ventral surface of anterior part of the breast and in axil of pectoral fins. Cheeks with 8 vertical rows of scales. Lateral line complete, terminating over base of midcaudal ray.

Gill rakers long on 1st arch, much shorter on the 2nd, replaced by patches of spines on the 3rd and 4th. Pseudobranchiae well developed. Three rows of conical, pointed teeth, most of them depressible, the inner ones longer than the outer ones on premaxillary and dentary; similar teeth present in two rows on vomer and palatine bones, tongue with a median longitudinal patch of small teeth, its edges completely edentulous. Pyloric caeca absent.

Dorsal fin long, with two anterior rays simple, originating above origin of pectoral fins, terminating behind the vertical line through vent. Base of dorsal fin 1.5 times as long as distance from its posterior end to origin of adipose fin. Adipose fin inserted above 9th ray of anal fin. Base of anal fin 1.3 times shorter than distance from its origin to posterior edge of vent and 1.4 times shorter than distance from its end to base of anteriormost ventral caudal ray. Pectoral fins extending to beneath base of 10th dorsal fin ray. Pelvic fins extending to anterior edge of the vent, ends of the anterior four rays thickened.

Color in alcohol straw-yellowish, upper part of body mottled with irregularly grey blotches. All fins pale, without markings.

Comparisons. *H. microps* differs from the Australian species, *H. purpurissatus* and *H. milesi* in having less dorsal fin rays (16–17 vs. 19–22) and an anal fin base that is shorter (vs. longer) than the distance from its end to the anteriormost caudal fin ray.

H. microps resembles *H. damasi* originally described after a specimen collected at Tokyo market (Tanaka, 1915) and recently recorded from off Chiba, Izu, Kochi, Okinawa Is. and Taiwan (Abe, 1983; Yamakawa, 1984; Kao and Lin, 1986) in having the diameter of eye less than the length of the snout. The new species differs from *H. damasi* in having more lateral line scales (43–45 vs. 35–37), more dorsal fin rays (16–17 vs. 14), and fewer pectoral fin rays (11 vs. 12–13) as well as in absence of dark blotches on the caudal fin.

In most meristic characters and proportional measuruments, *H. microps* is similar to *H. japonica* (see Tables 1 and 2). However, *H. microps* has no pyloric caeca (9–13 in *H. japonica*) but has a smaller horizontal diameter of the eye (22.5–24.3% of the head length in contrast to 25.7–33.3%) which is obviously shorter than the snout length. These two species can be distinguished also by lingual dentition: in *H. microps* teeth are developed only in a median longitudinal patch while in *H. japonica* they are present near the edges of the tongue.

Table 1. Comparison of meristic characters of *Hime microps* sp. nov., *H. japonica* (Günther) and *H. curtirostris* (Thomson). [1] Counted in 3 specimens; [2] counted in 1 specimen.

Characters	*H. microps*		*H. japonica*					*H. curtirostris*	
	Nazca ridge		Japan and East China Sea (n=11)		Hawaiian ridge (n=2)	Seamounts of Tasman Sea (n=5)		Queensland, Australia (n=4)	
	Holotype	Paratype	Range	Mean	Range	Range	Mean	Range	Mean
Dorsal fin rays	16	17	16–17	16.1	16	16	16.0	16	16.0
Anal fin rays	10	11	9–10	9.8	10	9–10	9.8	10	10.0
Pectoral fin rays	11	11	11	11.0	11	11	11.0	11	11.0
Vertebrae	41	43	42–43	42.1	43	42–43	42.2	42–43	42.2
Lateral line scales	43	45	41–43	41.8	42	42–44	43.0	43–44	43.5
Predorsal scales	15	16	13–15	13.8	12–14	12–14	13.4	12–14	12.8
Scales between dorsal fin base and lateral line	4½	4½	3½–4½	4	3½–4½	4½	4½	4½	4½
Scales between anal fin base and lateral line	4½	4½	3½–4½	4	3½–4½	4½	4½	4½	4½
Branchiostegals	14–15	—	14–15	14.2	14	14–15	14.2	14	14.0
Gill rakers (upper)	6	5	4– 7	6.5	5– 6	5– 6	5.6	4– 5	4.8
Gill rakers (middle+lower)	17	16	13–18	16.0	15–17	15–17	15.8	13–15	14.0
Gill rakers (total)	23	21	17–25	22.4	20–23	20–23	21.4	18–20	18.8
Pseudobranchial filaments	28/29	29/29	21–28	25.2	26–28	29–35	32.0	22–28	24.0
Pyloric caeca	absent	absent	10–13[1]	11.5	9–11	10–11[1]	10.3	10[2]	10.0

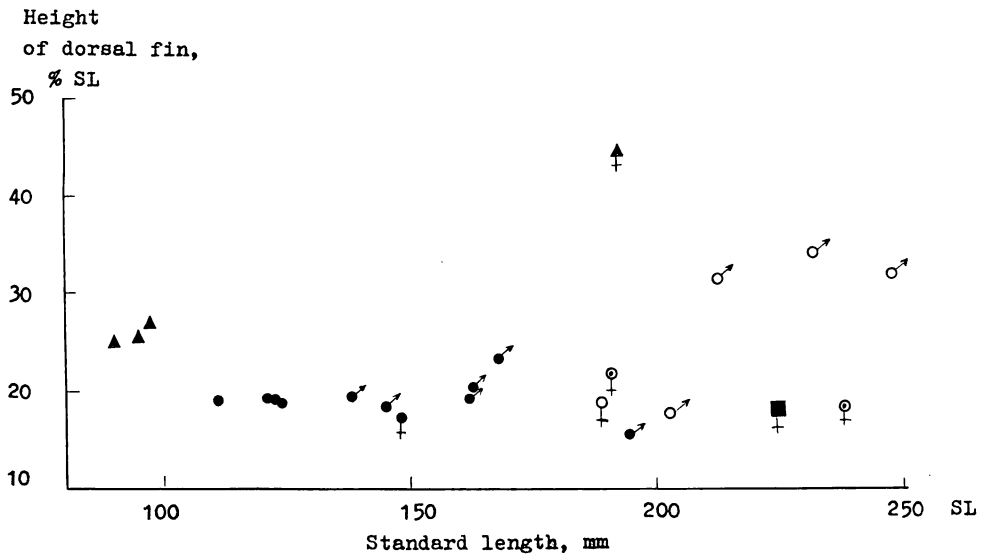

Fig. 2. Relationship between height of dorsal fin (=length of the longest ray) and standard length in *Hime microps* sp. nov. (■), *H. japonica* (●, off Japan; ○, Hawaiian ridge; ⊙, Tasman Sea), and *H. curtirostris* (▲).

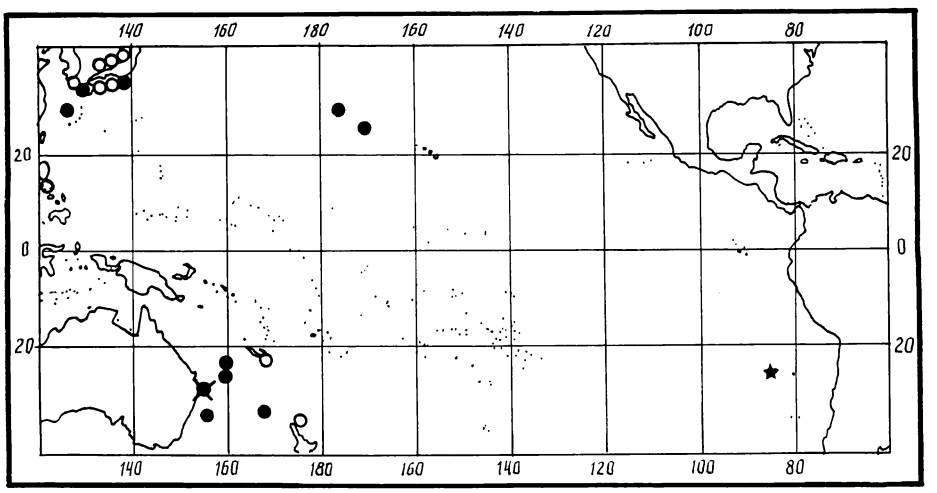

Fig. 3. Capture locations of *Hime microps* sp. nov. (★), *H. japonica* (●, specimens examined; ○, from literature), and *H. curtirostris* (◉).

Another related species, *H. curtirostris*, has never been compared with *H. japonica* and we found no characters showing any significant differences between these two in the original description of the former (Thomson, 1967). We had no opportunity to examine the types of *A. curtirostris* but four specimens from near the type locality borrowed from the Australian Museum (AMS I 15523 and I 15537) proved to be very similar to *H. japonica*. We prefer, however, to consider this species valid as it is distinguishable by having an enlarged dorsal fin with a thread-like prolongation of the second ray at least in adult females. In *H. japonica*, the third or fourth ray is the longest but not filamentous, and the height of the dorsal fin in adults is associated with sex: the anterior rays are much longer in the largest male specimens (Fig. 2). *H. microps* differs from *H.*

Table 2. Comparison of proportional measurements of *Hime microps* sp. nov., *H. japonica* (Günther) and *H. curtirostris* (Thomson).

Character	*H. microps*		*H. japonica*					*H. curtirostris*	
	Nazca ridge		Japan and East China Sea (n=11)		Hawaiian ridge (n=2)	Seamounts of Tasman Sea (n=5)		Queensland, Australia (n=4)	
	Holotype	Paratype	Range	Mean	Range	Range	Mean	Range	Mean
Standard length (mm)	225	251	111–195	145.4	191–238	189–248	217.0	90–157	109.8
Measurements in % of SL									
Head length	31.6	29.4	28.7–32.1	30.2	28.6–30.4	31.0–31.9	31.4	28.6–32.2	30.4
Body depth at origin of dorsal fin	21.2	19.5	16.6–21.4	18.4	19.4	17.8–23.0	21.1	16.1–24.1	19.6
Body depth at origin of adipose fin	10.6	10.8	8.7–11.7	10.2	9.7–10.2	10.7–12.1	11.6	8.2–10.2	9.5
Caudal peduncle depth	7.5	7.4	6.1– 8.1	7.2	6.5– 7.1	7.6– 8.2	7.8	7.0– 7.9	7.3
Body width (max.)	16.2	15.3	12.6–16.1	14.2	15.7–17.5	12.9–15.9	14.1	13.7–15.3	14.5
Snout to origin of dorsal fin	36.2	33.9	33.1–37.9	35.9	34.9–37.2	34.5–37.9	35.8	32.6–37.8	35.5
Snout to origin of adipose fin	80.0	78.9	77.5–81.5	79.6	79.6–80.3	79.4–81.3	80.1	78.4–80.4	79.8
Snout to origin of anal fin	73.5	74.9	70.7–76.6	73.8	74.3–77.3	71.6–74.6	73.3	69.6–73.3	71.4
Snout to pectoral insertion	32.6	32.1	29.3–33.8	31.3	33.0–33.6	31.5–33.8	32.8	31.2–33.3	32.4
Snout to pelvic insertion	38.0	38.6	35.5–39.0	37.1	35.9–36.1	37.0–39.9	38.3	33.8–37.8	36.4
Snout to vent	62.2	62.4	57.4–60.5	59.3	62.3–63.4	60.1–61.6	60.8	55.4–58.3	56.8
Length of dorsal fin base	28.7	30.1	26.1–30.2	27.8	27.7–28.2	29.1–31.3	30.1	25.3–28.7	27.0
End of dorsal fin base to adipose fin	19.3	17.9	16.1–21.5	18.1	17.0–17.2	16.9–20.2	18.1	18.9–22.1	20.1
Length of longest dorsal fin ray	18.4	28.8	15.9–23.7	19.3	18.5–22.0	17.7–34.5	26.9	25.0–44.6	30.4
Length of penultimate dorsal fin ray	13.4	19.9	12.8–15.9	14.1	11.0–14.3	12.3–20.3	18.1	11.1–15.3	13.1
Length of anal fin base	9.1	12.2	8.6–10.5	9.7	9.2	8.9–11.3	10.6	9.5–10.3	9.9
End of anal fin base to anterior caudal fin ray	13.8	12.7	12.5–15.4	13.6	12.6–13.4	12.1–13.6	13.1	14.6–17.7	16.1
Length of 2nd anal fin ray	8.7	8.4	8.2– 9.9	9.1	7.3– 8.0	7.4– 9.5	8.3	8.3– 9.8	9.0
Length of ultimate anal fin ray	7.7	10.4	7.2– 8.0	7.8	7.4– 8.4	5.6–12.5	8.8	6.1– 8.3	7.4
Length of pectoral fin	19.6	18.3	18.9–21.8	20.3	17.6–19.6	17.7–21.6	19.8	20.0–21.0	20.4
Length of pelvic fin	23.5	21.5	22.6–28.2	25.7	22.7–23.0	23.5–25.7	24.8	26.7–27.4	27.1
Origin of dorsal fin to origin of anal fin	12.0	15.9	8.1–13.1	11.1	10.5–11.3	9.5–12.8	11.1	11.1–12.9	11.7
Origin of pelvic fin to origin of anal fin	36.0	35.5	35.0–39.1	37.7	38.4–42.4	33.2–36.9	35.6	34.7–40.8	37.0
Vent to origin of anal fin	13.8	11.8	13.8–15.5	14.9	12.6–13.9	11.2–15.3	13.1	13.7–16.7	15.5
Measurements in % of head length									
Horizontal diameter of eye	22.5	24.3	28.9–33.3	31.6	28.7–29.3	25.7–29.7	28.3	31.0–34.4	33.0
Vertical diameter of eye	19.7	18.9	24.6–28.1	26.5	25.7–26.7	22.7–24.1	23.6	24.1–28.9	27.3
Snout length	27.0	28.4	20.6–23.4	21.7	24.1–26.5	20.8–24.8	23.3	17.8–22.4	20.3
Postorbital length	49.0	42.7	43.0–48.5	46.1	48.5–50.0	43.6–48.1	45.8	43.1–47.8	45.4
Bony interorbital space	14.1	16.9	14.0–18.8	16.7	14.7	12.7–16.1	15.3	15.5–19.7	17.5
Fleshy interorbital space	23.9	25.7	22.4–27.1	24.6	26.7–27.9	24.1–28.6	25.3	22.0–28.9	23.9
Upper jaw length	47.2	47.3	46.1–48.6	47.3	48.3–48.5	43.7–46.6	45.8	44.8–49.2	46.8
Length of longest gill raker	9.8	8.1	10.4–14.7	12.6	8.1–10.3	7.6–12.7	10.1	10.3–15.2	12.6

curtirostris in the same characters as from *H. japonica* as well as in the absence of a filamentous dorsal ray in the mature female holotype.

Distribution. *H. microps* is known only from one of the submarine mountains (Shoal Guyot in Newman and Foster, 1983) in the southernmost portion of the Nazca ridge (Fig. 3).

Etymology. The species is named in reference to its comparatively small eyes.

Comparative material. For comparison with *H. microps* the following material was examined.

Hime japonica (Günther): A) 11 specimens from off Japan and East China Sea: ZIL 6476, Tokyo, 1 specimen, 169 mm SL; ZIL 22397, Nagasaki, 3, 124–162 mm SL; ZIL 22398, Tokyo, 2, 163 and 195 mm SL; ZIL 23007, Nagasaki, 1, 148 mm SL; ZIL 36103, 28°38′N, 126°36′E, at 140 m, 4, 111–138 mm SL. B) 2 specimens from the Hawaiian submarine ridge: ZIL 39717, Maro Reef, 25°28′N, 170°34′W, at 275 m, 1, 191 mm SL; ZIL 47257, 28°34′N, 176°32′W, at 85 m, 1, 238 mm SL. C) 5 specimens from seamounts in the Tasman Sea; ZIL, 47258, 23°04′N, 159°37′E, at 320 m, 2, 232 and 248 mm SL; ZIL 47259, 32°32′S, 167°33′E, at 145 m, 1, 189 mm SL; ZIL 47260, 25°35′S, 159°23′E, at 330 m, 1, 213 mm SL; ZMMU (Zoological Museum of Moscow State University) 16355, 33°00′S, 156°05′E, at 140 m, 1, 203 mm SL.

H. curtirostris (Thomson): 4 specimens from off Brisbane, Australia: AMS I. 15523, 26°31′S, 153°40′E, at 135 m, 1, 193 mm SL; AMS I. 15537, 27°00′S, 153°39′E, at 180 m, 3, 90–97 mm SL.

Comments on the variations and distribution of *Hime japonica*

H. japonica was recorded from the waters of Japan (Günther, 1880; Honma, 1952; Katoh et al., 1956; Yamakawa, 1984), Korea (Mori, 1952), the East China Sea (Lindberg and Legeza, 1965—ZIL 36103, specimens examined by us), the Philippines (Mead, 1966—USNM 135569, 13°56′N, 120°10′E, at about 200 m; according to pers. comm. of V. G. Springer, specimens not found at USNM), New Caledonia (Fourmanoir and Rivaton, 1979), the Hawaiian area (Strasburg, 1966; Parin and Kotlyar, 1984) and northern New Zealand (Paulin, 1984).

We have been able to examine specimens from three remote areas, viz. from Japan and adjacent waters, the Hawaiian ridge and the Tasman Sea, and have come to a conclusion on their conspecificity though several minor differences exist among these populations. Specimens from off Japan appear to have slightly more gill rakers than those from the Hawaiian ridge and the Tasman Sea, and in southern populations the number of pseudobranchial filaments is comparatively higher than in others (see Table 1).

Comparison of proportional measurements of which some are obviously changed with growth seems to be illegitimate on the basis of our limited material. However, comparison between 11 specimens from Japan and 5 specimens from the Tasman Sea shows little difference in such characters as the horizontal and vertical diameters of the eye, the bony interorbital space and the length of the upper jaw (see Table 2). In two Hawaiian specimens pelvic fins are shorter than in others, and their body width, distances from the snout to the vent and from the pelvic fin insertion to the origin of the anal fin and snout length are the greatest. Certainly, all these comparisons should be checked by examining additional materials.

H. japonica seems to be distributed antiequatorially in the marginal seas of the western Pacific Ocean as well as along the Hawaiian submarine ridge. Similar types of distribution are known for several species of shallow-water shorefishes, and Springer (1982) used the term "Hawaiian exception" for their occurrence there.

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(NVP: P. P. Shirshov Institute of Oceanology, Moscow 117218, U.S.S.R.; ANK: All-Union Istitute of Marine Fisheries and Oceanography, Moscow 107140, U.S.S.R.)

南太平洋東部産ヒメ科の1新種およびヒメの地理的変異

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南太平洋東部の Nazca 海嶺 (25°43′S, 85°29′W, 160–165 m; 25°42′S, 85°24′W, 162–168 m) において採集された2個体によりヒメ科の1新種, *Hime microps* を記載した. 本種はヒメ *H. japonica* および *H. curtirostris* に近縁であるが, 幽門垂を欠き, 眼が小さく, 水平径が吻長より短かい点で相違する. ヒメについて日本, ハワイ海嶺, タスマン海産の個体を比較した結果, 形態的に差異が認められなかった.