Redescription of a mullet, Chelon melinopterus (Perciformes: Mugilidae)

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Abstract. Chelon melinopterus is redescribed. Synonymy and illustration are also provided for the species. Ellochelon luciae Penrith et Penrith, 1967 is a junior synonym. Range is the tropical Indo-Pacific except the continental coast from the Red Sea through the Arabian Sea to the Gulf of Thailand. Occurrence in Japanese waters is the northrnmost record of this species. It inhabits estuaries of river with mangrove swamp.

Key Words: Redescription; Mugilidae; Chelon melinopterus; Synonymy

Mugil melinopterus was described based on one specimen obtained from Vanikolo, the Solomon Islands by Valenciennes in Cuvier and Valenciennes (1836). Early major ichthyologists such as Weber and de Beaufort (1922) and Roxas (1934) used Mugil as the genus for the species. Smith (1948) revised the genera of the African Mugilidae. He allocated this species to Liza, but misidentified it as L. oligolepis (Bleeker, 1858-1859) (=M. parmatus Cantor, 1849; the generic name is provisional). Some authors after Smith followed him (see below synonymy). Thomson (1964) listed all nominal species of the family, and gave his status for each name. In his list, M. melinopterus and M. oligolepis were regarded as valid name, identified as L. melinoptera, L. oligolepis, respectively. Recent authors usually followed his status (see below synonymy).

On the other hand, Penrith and Penrith (1967) described *Ellochelon luciae* as a new species on the basis of seven specimens from St. Lucia estuary, Zululand. Some authors (see below synonymy), however, used *Liza* as the generic name of this fish without any discussion.

In this paper, I redescribe M. melinopterus. And, as the result of examination of type materials of M. melinopterus and E. luciae, I clarify that the former is a senior synonym of the latter, Chelon should be used as the generic name for this species.

Specimens examined are deposited in Bernice P. Bishop Museum, Honolulu (BPBM); Museum National d'Histoire Naturelle, Paris (MNHN); Museum of the Tokyo University of Fisheries (MTUF); National Science Museum, Tokyo (NSMT): South African Museum, Cape Town (SAM); Department of Marine Sciences, University of the Ryukyus, Okinawa (URM-P).

Methods of counting and measuring follow Senou *et al.* (1987). The terminology of the jaw teeth follows Ebeling (1957). Vertebrae and associated bones were examined with soft X-ray negatives. Lengths for specimens are given as standard length (SL).

Chelon melinopterus
(Valenciennes in Cuvier & Valenciennes, 1836)
(New Japanese name : Hirugi-menada)
(Fig. 1 ; Tables 1 & 2)

Mugil melinopterus Valenciennes in Cuvier and Valenciennes, 1836:146, pl. 313 (type locality: Vanikolo); Weber and de Beaufort, 1922:246 (Sinabang Bay); Roxas, 1934:413, pl. 1, fig. 7 (Manila; Luzon and Mindanao).

Mugil oligolepis (not of Bleeker): Smith, 1935:635, fig. 17, pls. 21-B and 22-C, D (Isipingo Lagoon).

Liza oligolepis (not of Bleeker): Smith, 1948:840, fig. 10; Smith, 1950: 321, fig. 885 (Isipingo and Delagoa Bay); Munro, 1955: 94, pl. 16, fig. 261 (Ceylon); Munro, 1967: 167, pl. 18, fig. 277 (New Guinea); Senou and Suzuki, 1980: 59, pl. 4, fig. D (Yaeyama Is.); Suzuki et al., 1982: 19 (listed from Yaeyama Is.).

Liza melinoptera: Thomson, 1964: 22 (listed); Thomson, 1984: no pagination, fig. (western Indian Ocean); Smith and Smith, 1986: 717, fig. 222.6 (Natal; Indo-West Pacific).

Ellochelon luciae Penrith et Penrith, 1967: 69: fig. 1 (type locality: St. Lucia estuary).

Liza luciae: Smith, 1975:64 (listed); Thomson, 1984: no pagination, fig. (St. Lucia estuary); Smith and Smith, 1986:716, fig. 224.4 (northern Transkei to southern Mozambique).

Valamugil parmatus (not of Cantor): Smith, 1975: 64 (listed). Liza melinopterus: Wu, 1984: 494, fig. 340 (Xiamen); Tzeng, 1986: 110, fig. (Taiwan); Liang, 1991: 353, fig. 213 (Guangdong).

Materials examined.

BPBM 10597, 1 specimen, 224.0mm, Palau Is.,1964; BPBM 33467,2specimens, 50.0 & 126.0mm, Marquesas Is., in freshwater, Summer, 1986, coll. by G. Marquet; BPBM

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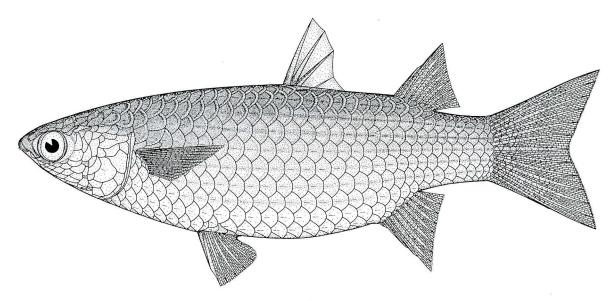


Fig. 1. Chelon melinopterus, URM-P 15832, 145.2 mm SL, from Iriomote Island. Drawn by H. Senou.

35439, 1 specimen, 72.0mm, Marquesas Is., in lower part of stream, coll. by J. E. Randall. MNHN A. 3669, holotype of M. melinopterus, 149.7mm, Vanikolo, coll. by Quoy and Gaimard. NSMT-P 2998, 1 specimen, 131. 9mm, Lake Yamor, New Guinea, Apr. 28, 1943; NSMT-P 28186, 1 specimen, 150. 8mm, Miyara Riv., Ishigaki I., Sept. 1,1974; NSMT-P 50599-50604, 6 specimens, 98.5-158.0mm, Tongatapu I., Jun. 23-Jul. 20, 1986, coll. by Y. Matsunaga. MTUF uncat., 2 specimens, 85. 2-85. 8mm, Marohogo Riv., Majunga, Madagascar, Sept. 27, 1973. SAM 24307, 3 paratypes of E. luciae, 132. 1-148. 0mm, St. Lucia estuary, Zululand, January, 1965; SAM 24697, holotype of E. luciae, 136.6mm, St. Lucia estuary, Zululand, January, 1965. URM-P 15828-15830, 3 specimens, 104.6-127.8mm, Udara Riv., Iriomote I., in estuary, May 9, 1981, coll. by H. Senou; URM-P 15831-15836, 6 specimens, 117.8-159.0 mm, Arabara Riv., Iriomote I., in estuary, Sept. 15, 1982, coll. by H. Senou.

Description. Counts and proportional measurements are shown in Tables $1 \ \mathrm{and} \ 2$.

Body moderately elongate, becoming strongly compressed toward tail. Back without a keel on midline.

Head small, triangular in front view. Interorbital space nearly flat. Adipose eyelid rudimentary, existing as very thin membrane along posterior rim of eye. Maxilla hooked downward at corner of mouth, its posterior tip reaching beyond corner of mouth and remaining exposed when mouth closed. Connecting tissue between end of maxilla and corner of mouth not or scarcely visible when mouth closed.

Lachrymal serrate on lower and posterior edges, the serration of lower edge starting from anterior edge of the corner of mouth. Lower edge of lachrymal emarginate at corner of mouth; posterior edge of lachrymal round, the upper end reaching anterior edge of eye.

Mouth terminal, with a prominent symphyseal knob at tip of lower jaw. Upper lip not thickened, bearing a row of primary teeth on lower edge. Primary teeth minute, ciliform, and monocuspid, invisible to the naked eye. Each tooth supported by well developed, bifurcate fibrous strands. Lower lip without teeth forming thin edge, directed

Table 1. Counts of Chelon melinopterus

	Holotype of Mugil melinopterus MNHN A.3669	9 specimens from Iriomote I. URM-P 15828-15836	Holotype of <i>Ellochelon luciae</i> SAM 24697	3 paratypes of <i>E. luciae</i> SAM 24307
Dorsal rays	I V -9	I V -9	IV-9	IV-9
Pectoral rays	15(L)/15(R)	15-16 (mostly 16)	14(L)/14(R)	14-15
Pelvic rays	I, 5	I, 5	I, 5	I, 5
Anal rays	III, 9	III, 8-10 (mostly 9)	III, 9	III, 9
Branched caudal rays	6+6=12	6+6=12	6+6=12	6+6=12
Lateral scale series	ca. 28(L)/27(R)	27-29 (rarely 29)	27	26-ca. 28
Transverse scale rows	9	9-11 (rarely 11)	9	9-10
Cheek scale rows	4	3-4 (mostly 4)	4	4
Number of pyloric caeca	_	5 (6 specimens)	_	5 (1 specimen)
Vertebral counts	12+12=24	12-13+11-12=24	12+12=24	12+12=24
Number of gill rakers	_	36-40+45-59=81-99 (6 specimens)	-	36+53=89 (1 specimen)

Table 2. Proportional measurements of Chelon melinopterus expressed as percentages of the standard length

	Holotype of Mugil melinopterus MNHN A.3669 149.7 mm SL	9 specimens from Iriomote I. URM-P 15828-15836 104.6-159.0 mm SL	Holotype of Ellochelon luciae SAM 24697 136.6 mm SL	3 paratypes of <i>E. Iuciae</i> SAM 24307 132.1-148.0 mm SL
Total length	124. 2	125. 1-127. 5	,=	126.4 (1 specimen)
Fork length	117.0	115. 7-118. 3	~	118.4 (1 specimen)
Prefirst dorsal fin length	55. 3	54.7-57.2	55. 6	53. 4-55. 8
Presecond dorsal fin length	79. 5	78, 2-81, 5	80. 5	78. 2-80. 5
Prepelvic fin length	40.9	40.6-43.2	40.8	41. 3-42. 2
Preanal fin length	74. 7	74.9-79.3	72.0	73. 7-75. 4
Caudal peduncle length	18.9	17.1-20.0	19. 7	18. 5-19. 6
Head length	27.0	24.5-27.2	26.6	26. 2-27. 6
Snout length	7.5	7. 1-7. 9	7.4	7. 4-8. 1
Postorbital length	13. 2	12. 0-13. 5	13.6	13. 5-13. 7
Eye diameter	7.4	6.7-7.6	7. 1	7.0-7.7
Postadipose eyelid length	-	2.5-4.0	<u></u>	3.6-4.7 (2 specimens)
Adipose eyelid gap	_	5. 4-6. 7	-	5. 2- 6. 1
Interorbital width	10, 2	10. 2-11. 5	10.8	11.0-12.0
Thickness at pectoral fins	17.0	17.8-20.1	19. 3	19. 1-20. 6
Thickness at first dorsal fin	-	14. 4-17. 9	17.6	17. 4-19. 3
Thickness at second dorsal fin	=	8.6-10.5	9.4	9. 5-11. 2
Distance between anterior and posterior nostrils	1. 4	1. 3-1. 5	1. 5	1. 1-1. 4
Width of mouth	10.0	9. 2-10. 4	9. 4	9. 3-10. 1
Thickness of upper lip	1. 5	1. 5-2. 0	1. 5	1. 5-1. 6
Lower jaw length	6. 0	5. 4-6. 2	5. 9	5. 7-6. 1
Depth at mouth corner	7. 3	6. 4-7. 9	7. 6	6. 4-6. 7
Depth at eye	14. 1	14. 8-16. 4	14. 3	14. 3-14. 7
Depth at pectoral fin	19. 3	22. 8-26. 0	24. 3	22. 2-24. 7
Depth at first dorsal fin	26.8	29. 6-33. 9	33. 4	29. 1-33. 2
Depth at anal fin	24. 4	23. 2-27. 8	29. 2	27. 2-29. 1
Caudal peduncle depth	13. 5	12. 0-13. 6	12.2	-
Pectoral fin length	19. 7	18. 4-20. 4	21. 2	20. 9-22. 3
Axillary scale length	4. 7	4. 8-5. 9	5. 3	5, 2-7, 4
First dorsal spine length	15. 4	15. 2-17. 7	15. 2	16. 4-16. 8
Second dorsal spine length	14. 1	13. 8-16. 1	14.3	15. 1-16. 5
Third dorsal spine length	11.4	12. 1-13. 8	13. 5	14. 1-14. 7
Fourth dorsal spine length	7. 3	5. 2-8. 1	7.8	7. 2-8. 0
Dorsal obbasal scale length	9. 5	9.5-12.8	10.9	10. 7-11. 6
Second dorsal fin hight	15. 0	15. 2-17. 7	-	18.1-18.8 (2 specimens)
Second dorsal fin base length	8. 6	7.8-8.8	9. 6	9. 4-10. 1
Pelvic fin length	16.6	15. 6-17. 7	19. 5	18. 7-19. 4
Pelvic obbasal scale length	=	6.5-7.9	7.4	7. 1-8. 0
Interpelvic flange length		8. 7-11. 1	12. 2	11.5-11.9
Anal fin height	18. 4	15. 2-18. 6	19.0	18. 2-19. 5
Anal fin base length	10.7	9.7-11.8	11. 3	11. 4-12. 8

horizontally forward. Corner of mouth on a vertical through anterior nostril.

Tongue with a longitudinal keel on the midline, the anterior edge of tongue forming an obtuse or right angle in front view. Tip of tongue free from mouth floor.

Ventral inner edges of right and left dentaries connected to each other by a short midlongitudinal joint at symphysis. Free space formed by edges of both dentaries relatively wide just behind of symphysis, and width gradually narrowing toward posterior part of mandible. Angle of lower jaw 107.5 to 123.6 degrees.

Gill opening extending to below between center of pupil and posterior margin of eye. Each gill raker with pointed tip, bearing two rows of minute cirri along edge. Longest raker at corner of gill arch, its length about 2.0-2.5 in longest gill filament on lower arm.

Scales on body and lateral and ventral sides of head weakly ctenoid. Interorbital space and back of snout covered with cycloid scales. Interorbital scales large anteriorly, reaching to or beyond anterior nostrils. Lachrymal with small scales. Lateral surface of basal half of second and third dorsal spines with a row of minute scales. Outer surface of pectoral, inner surface of pelvic, 2nd dorsal, anal and caudal fins covered with minute scales. Most of scales on body with a single elongate groove.

Stomach gizzard-like and biconical, bearing five unbranched pyloric caeca.

Three supraneural bones set between 2nd and 3rd, 4th

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and 5th, 6th and 7th vertebrae, respectively. First pterygiophore of spinous dorsal fin set between 7th and 8th vertebrae. A pair of very long, antenna-like neural postzygapophyse on second vertebra, which curved downward near dull posterior tip; its tip reaching beyond posterior edge of third neural spine.

Color when fresh: body dark on back, silvery on side and ventrally. Upper portion of iris orange. Spines of first dorsal fin darkish; fin membranes pale gray. Second dorsal and anal fins darkish with pale outer part. Pectoral fin somewhat darkish with a silvery half-moon mark on basal part. Caudal fin darkish with a blackish posterior margin and pale submarginal area. Pelvic fin whitish.

Color in alcohol or formalin: several faint dark stripes sometimes present on lateral side of body after silvery color disappeared. Basal part of pectoral fin without melanistic pigmentation.

Distribution.

The tropical Indo-Pacific except the continental coast from the Red Sea through the Arabian Sea to the Gulf of Thailand. Occurrence in Japanese waters is the northrnmost record of this species.

Habitat.

In the Yaeyama Islands, this species is commonly found in estuaries of river with mangrove swamp.

Remarks.

The diagnostic characters of the holotype of M. melinopterus agree well with the specimens from Iriomote Island except some proportional measurements such as total length, preanal fin length, thickness at pectoral fins, etc. (Tables 1 and 2). I believe that these little differences are individual variation within a species. In comparison with the Iriomote's specimens, the type series of E. Iuciae have longer fork length, longer pectoral fin, higher second dorsal fin, longer second dorsal fin base, and longer pelvic fin (Tables 1 and 2). I think that these differences are geographical variation, because all diagnostic characters except these points coincide well with the Iriomote' ones. Therefore, M. melinopterus and E. Iuciae are regarded as same species, the former is a senior synonym of the latter.

The proper generic name for this species is *Chelon* (= a senior synonym of *Liza*; see Senou, unpubl. and Senou *et al.*, 1996) by the following reasons: mouth terminal; mandible without a pair of lobes on ventral surface; no opercular spine; upper lip without plate-like horny teeth, bearing a row of primary teeth on its inferior edge; pectoral fin without free rays; lower lip forming thin edge, directed horizontally forward; maxilla hooked downward at corner of mouth, its posterior tip reaching beyond corner of mouth and remaining exposed when mouth closed; caudal fin forked; scales on body weakly ctenoid.

C. melinopterus is distinguished from other congeners by the combination of the following characters: a pair of very long, antenna-like neural postzygapophyse on second vertebra, which curved downward near dull posterior tip; its tip reaching beyond posterior edge of third neural spine; third supraneural bone and first pterygiophore of spinous dorsal fin set between sixth and seventh, seventh and eighth vertebrae, respectively; predorsal scales bearing a single elongate groove; stomach gizzard-like and biconical, bearing five unbranched pyloric caeca; upper lip without horny ridge and projection; primary teeth monocuspid; adipose eyelid little developed, present as thin membraneous tissue in posterior region of eye; no keel on back; lateral scale series 26-29 (mostly27-28); gill rakers 36-40+45-59=81-99; pectoral-fin base silvery when fresh; no distinct dark marking or melanistic pigmentation on pectoral-fin base after preservation.

Some species having lower lateral scale counts, exposed end of maxilla and/or undeveloped adipose eyelid were often confused with *C. melinopterus*. For example, *L. melinoptera* reported by Jordan and Seale (1906) from Samoa is *Ellochelon vaigiensis* (Quoy et Gaimard, 1825), judging from their description *i.e.* yellow caudal and black pectoral fins. According to Senou (unpubl.), *E. vaigiensis* is only species of the genus, closely related to "Mugil" parmatus.

Thomson (1984) considered that *M. ceramensis* Bleeker, 1852, *M. oligolepis* of Day (1876) and *M. anpinensis* Oshima, 1922 are synonyms of *L. melinopterus* (=C. melinopterus). Regarding *M. ceramensis*, it is probably a junior synonym of Chelon macrolepis (Smith, 1849), judging from the number of lateral scale series (30 or 31) shown by his drawing for the species (Bleeker, 1983: pl. 460, fig. 5 a, b) and the result of reexamination of Bleeker's material by Weber and de Beaufort (1922). *M. oligolepis* of Day (1876) is clearly "Mugil" parmatus, judging from his description (end of maxilla just visible) and figure (pl. 76, fig. 2). According to Senou (1993), *M. anpinensis* is a junior synonym of Chelon subviridis (Valenciennes, 1836).

Concerning L. oligolepis of Matsubara (1955), his description is inadequate to identify the species. In Japan, C. melinopterus was first reported by Senou and Suzuki (1980) under the name of L. melinoptera.

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ボラ科メナダ属ヒルギメナダ (新称)の再記載 瀬能 宏

要旨

Chelon melinopterus (Valenciennes, 1836)を 再記載する。本種は以下の特徴によりメナダ属 の他種から区別される。主上顎骨後方部が鈎状 に屈曲し、後端は閉口時に露出する。第2脊椎 骨後方の神経関節突起は非常に細長く, 先端の 少し手前でやや下方へ湾曲し、先端は鈍く、第 3神経棘の後縁をはるかに超える。第3前背鰭 骨と棘状背鰭の第1担鰭骨は第6・7, 第7・8 脊椎骨間にそれぞれ挿入される。体は弱い櫛鱗 に被われ, 背鰭前方鱗の溝は不分岐である。胃 の幽門部の筋肉はよく発達し、幽門垂は不分枝 で、その数は5である。上唇は肥厚せず、角質 の突起や隆起はなく,前下縁に単尖頭の1次歯 を備える。脂瞼は痕跡的である。背中線上に隆 起縁を欠く。縦列鱗数は26~29(大部分が27~ 28)。鰓耙数は36~40+45~59=81~99。胸鰭の 基底部は一様に銀色で特徴的な斑紋や黒色素胞 の集合がない。Ellochelon luciae Penrith et Penrith, 1967は本種の新参同物異名である。本種はイン ド-太平洋域に分布するが、紅海からアラビア 海を経てシャム湾に至る大陸沿岸からの記録は ない。なお、日本は分布の北限となり、主な生 息場所がマングローブの発達する河川汽水域で あることにちなみ、新和名ヒルギメナダを提唱

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