

## Description of a New Lutianid Fish from the Ryukyu Islands

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Three species of lutianid fishes of the genus *Paracaesio*, namely, *P. caeruleus* (KATAYAMA), *P. kusakarii* ABE and *P. tumidus* (TANAKA), are important food-fishes in Japan and Ryukyu Islands. In addition to these species, there occurs another congener in Ryukyu, and, though not commonly met with, it is known as "Hinga-shitchu" among a few experienced fish-dealers in the island of Okinawa, one of the Ryukyus. In 1960, the junior author suggested without giving it a new scientific name that the "Hinga-shitchu" might represent a new species, and since passed on the specimens of this fish to the senior author who has access in Tokyo to thousands (of *caeruleus*) or hundreds (of *kusakarii* and *tumidus*) of individuals of the three congeners mentioned above in a year. As these members of *Paracaesio* are subject to considerable individual variation in the shape of the body, coloration, size and arrangement of teeth, etc. (probably correlated with the sexes at least partly), and as the number of the specimens of the "Hinga-shitchu" available is so small, it took some time before the present authors have been led to the conclusion that a new scientific name should be given to the "Hinga-shichu" and that it is very closely related to *Apsilus fuscus*\*\* KLUNZINGER (not of VALENCIENNES, 1830) known from Red Sea and *Paracaesio xanthurus* (BLEEKER) from the East Indies.

### *Paracaesio sordidus*, new species

"Yogore-aodai"\*\*\*\* (new Japanese name); "Hinga-shitchu"  
(in Okinawa I., Ryukyu Is.)

Text-figs. 1-5, pl. I, fig. 1.

? *Apsilus fuscus* KLUNZINGER, 1870, p. 705 (not of VALENCIENNES).

? *Paracaesio xanthurus* KLUNZINGER, 1884, p. 17 (not of BLEEKER).

*Paracaesio* sp. SHINOHARA, 1960, pp. 67, 68, 76 (fig. 4).

### *Study material.*—

Holotype: Cat. No. 52,043, Zoological Institute, Faculty of Science, University of Tokyo (abbreviated to ZI hereafter). Fork length 240 mm., standard length (hind end of vertebral column exposed) 220 mm. Sex unknown. Collected in

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\* Meaning dirty "Shitchu", *Paracaesio caeruleus*.

\*\* Later, KLUNZINGER identified this with *Paracaesio xanthurus*, but his fish differs from *xanthurus* of BLEEKER in coloration.

\*\*\* Yogore means dirty, *sordidus*. Aodai means *Paracaesio tumidus* TANAKA.

Okinawa I. A few pins are inserted in the bases of the dorsal and anal fins. This specimen seems to be the one upon which the account and the photographs of the present new species were based by the junior author (*cf.* SHINOHARA, 1960). The accompanying colored figure (pl. I, fig. 1) was first taken while the caudal lobes were intact. The photograph in black and white published by the junior author in 1960 was taken a little later when the tip of the lower lobe of the caudal fin had been broken. In 1962, the caudal lobes are badly damaged.

Paratypes:

Cat. No. 51,992, ZI. Total length 355 mm., fork length 305 mm., standard length (hind end of vertebral column exposed) 275 mm. Female. Collected in Okinawa I. in March, 1961.

Cat. No. 52,041, ZI. Total length *ca.* 350 mm., fork length 298 mm., standard length *ca.* 268 mm. Female. Collected in Okinawa I.

Cat. No. 52,042, ZI. Total length 375 mm., fork length 310 mm., standard length (hind end of vertebral column exposed) 278 mm. Female. Collected in Okinawa I. Skeletonized.

Cat. No. 52,044, ZI. Length of maxillary 21 mm. on either side. Some head bones, vertebral column, the majority of the fins and their supports are missing. Collected in Okinawa I.

*Measurements and counts of the type specimens.—*

	Holotype	Paratypes			
Cat. No.	52,043	51,922	52,041	52,042	52,044
Sex	♂?	♀	♀	♀	?
Total length	?	355 mm.	<i>ca.</i> 350 mm.	375 mm.	Length of maxillary 21 mm.
Fork length	240 mm.	305 mm.	298 mm.	310 mm.	
Standard length	220 mm.	275 mm.	<i>ca.</i> 268 mm.	278 mm.	
Greatest depth of body	at base of 5th-7th dorsal spines 84 mm.	near dorsal origin 102 mm.	at dorsal origin 102 mm.	Skeletonized	Head bones only
Greatest breadth of body	at middle of pectoral fin 37 mm.	just behind operculum 45 mm.	at dorsal origin 45 mm.		
Least depth of caudal peduncle	26 mm.	27 mm.	29 mm.		
Length of head.*					
Left	62 mm.	78 mm.	75 mm.		
Right	63 mm.	78 mm.	75 mm.		

\* Up to 1961, the senior author measured the length of head parallel to the longitudinal axis of body. In the present paper, the measurements are taken with the use of dividers from the snout tip to the hindmost point of the operculum.

Length of snout				
Left	18 mm.	20 mm.	21 mm.	
Right	19 mm.	21 mm.	21 mm.	
Horizontal diameter of orbit.				
Left	16 mm.	20 mm.	20 mm.	
Right	16 mm.	19 mm.	19 mm.	
Vertical diameter of orbit.				
Left	15 mm.	19 mm.	18 mm.	
Right	15 mm.	19 mm.	18 mm.	
Interorbital breadth above eye-centers	24 mm.	30 mm.	28 mm.	
Greatest length of upper jaw.				
Left	25 mm.	29 mm.	28 mm.	
Right	24 mm.	29 mm.	28 mm.	
Greatest depth of upper jaw.				
Left	8 mm.	9 mm.	9 mm.	
Right	8 mm.	9 mm.	9 mm.	
Least depth of preorbital.				
Left	5 mm.	5 mm.	5 mm.	
Right	4 mm.	5 mm.	4 mm.	
Length of 1st dorsal spine	13 mm.	17 mm.	15 mm.	17 mm.
Length of 2nd dorsal spine	damaged	30 mm.	32 mm.	27 mm.
Length of 3rd dorsal spine	34 mm.	42 mm.	damaged	31 mm.+x
Length of 4th dorsal spine	tip damaged 33 mm.+x	42 mm.	33 mm.+x	38 mm.
Length of 5th dorsal spine	tip damaged 30 mm.+x	ca. 36 mm.	damaged	36 mm.
Length of 6th dorsal spine	25 mm.+x	32 mm.	ca. 29 mm.	32 mm.+x
Length of 7th dorsal spine	26 mm.	35 mm.	damaged	damaged
Length of 1st soft ray of dorsal	24 mm.	27 mm.	26 mm.	25 mm.
Length of 2nd soft ray of dorsal	23 mm.	25 mm.	27 mm.	24 mm.+x
Length of 3rd soft ray of dorsal	23 mm.	27 mm.	damaged	damaged
Length of 8th soft ray of dorsal	27 mm.	29 mm.	34 mm.	29 mm.
Length of 9th soft ray of dorsal	30 mm.	32 mm.	38 mm.	40 mm.
Length of 10th soft ray of dorsal	19 mm.	23 mm.	24 mm.	25 mm.
Length of 1st anal spine	11 mm.	17 mm.	14 mm.	14 mm.
Length of 2nd anal spine	22 mm.	24 mm.	24 mm.	25 mm.
Length of 3rd anal spine	24 mm.	27 mm.	25 mm.	27 mm.
Length of 1st soft ray of anal	24 mm.	27 mm.	26 mm.	25 mm.
Length of 2nd soft ray of anal	21 mm.	24 mm.	26 mm.	25 mm.
Length of 3rd soft ray of anal	22 mm.	25 mm.	26 mm.	28 mm.

Length of 4th soft ray of anal	22 mm.	26 mm.	24 mm.	24 mm.
Length of 5th soft ray of anal	23 mm.	24 mm.	24 mm.	24 mm.
Length of 6th soft ray of anal	23 mm.	25 mm.	25 mm.	23 mm.
Length of 7th soft ray of anal	27 mm.	30 mm.	29 mm.	28 mm.
Length of 8th soft ray of anal	21 mm.	24 mm.	26 mm.	26 mm.
Length of interpelvic process*	10 mm.	10 mm.	12 mm.	
Length of pelvic spine.				
Left	33 mm.+x	39 mm.	38 mm.	
Right	35 mm.	ca. 39 mm.	39 mm.	
Length of longest (outermost) soft ray of pelvic fin.				
Left	46 mm.	49 mm.	50 mm.	
Right	46 mm.	49 mm.	51 mm.	
Length of longest (5th from top) pectoral fin-ray.				
Left	69 mm.	84 mm.	84 mm.+x	
Right	58 mm.+x	79 mm.+x	74 mm.+x	
Length of longest caudal fin-ray.				
Upper lobe	damaged	ca. 98 mm.	damaged	102 mm.
Lower lobe	„	95 mm.+x	„	101 mm.
Length of longest gill-raker (at junction of upper and lower limbs of gill-arches, and upper rakers of lower limb).				
Left				9 mm.
Right	8 mm.	11 mm.	10 mm.	9 mm.
D. (all soft rays branched; last ray bifid to base)	X 10	X 10	X 10	X 10
A. (all soft rays branched; last ray bifid to base)	III 8	III 8	III 8	III 8
P.				
Left	16(=ii+14)	17(=ii+14+i)	17(=ii+14+i)	17(=i+13+iii)**
Right	16(=ii+14)	17(ii+13+ii)	17(=ii+14+i)	17(=ii+12+iii)
V. (all soft rays branched).				
Left	I 5	I 5	I 5	
Right	I 5	I 5	I 5	
Pored scales in lateral line.				
Left	72(=71+1)	71(=69+2)	72	72(=70+2)
Right	72(=70+2)	73(=70+3)	72	
Scales above lateral line, at dorsal origin.				
Left	1/2 8	1/2 7	1/2 8	1/2 8
Right	ca. 1/2 8	1/2 7	1/2 8	
Scales above lateral line, at base of last dorsal spine.				
Left	1/2 1/2 6	1/2 1/2 5	1/2 6	1/2 6
Right	1/2 1/2 6	1/2 1/2 5	1/2 6	

\* From the line connecting pelvic origins. \*\* Or, ii+12+iii.

Scales above lateral line, at middle of caudal peduncle.					
Left	1(mid-dorsal)+5	1+4	1+4	1+5	
Right	1(mid-dorsal)+5	1+ca. 4	1+4		
Scales below lateral line, at anal origin.					
Left	16 1/2	16 1/2	16 1/2	ca. 16 1/2	
Right	16 1/2	ca. 16 1/2	16 1/2		
Scale rows on cheek.					
Left	6+1	6+1	7+1+1*		
Right	6+1	6+1	7+1+1*		
Gill-rakers on 1st arch.					
Left				10+1+20	
Right	11+1+19	11+1+21	11+1+19	11+1+21	
Pyloric caeca					
Branchiostegals.					
Left				7	
Right				7	
Vertebrae					
				24(=10+14)	

*General appearance of the holotype.*—The body is fairly deep and moderately compressed. The interorbital area is convex, mostly naked, and its width above the eye-centers is much greater than the length of snout (which is a little greater than the diameter of eye) and slightly less than the postocular length of the head. The nape is moderately elevated, and the scaled predorsal area is weakly keeled medially (that is, along the mid-dorsal line). The eyes are of moderate size, the horizontal diameter being just half the length of the post-ocular length of the head. The mouth is oblique, and the lower jaw projects very slightly beyond the upper. The nostrils are paired on either side and elliptical in shape; the anterior nostril is narrow and shorter than the posterior one, and provided with a very low, rounded cutaneous flap at the hind margin. The flap does not reach\*\* the posterior nostril which is close to the anterior nostril. The maxillary is naked, mostly exposed, expanded posteriorly and reaches the vertical through the anterior margin of the pupil. The greatest depth of the maxillary is much greater than the least depth of the preorbital. There is an incision on the orbital rim below the eye-center. The circumocular area is naked. The demarcation of the temporal scaly area is not very distinct. Excepting for the ventral and posterior parts of the preoperculum where there are striations, the opercular bones are all scaled. Below the 6th regular row of cheek scales,\*\*\* there is a row of a little smaller scales near the ridge of the preoperculum which is hidden beneath the skin. The presence of this scale row is one of the distinctive characters of the present new species. There are a pair of flat-

\* Two or three scales only.

\*\* In two paratypes (Cat. Nos. 51,922 and 52,041), the flap of the anterior nostril reaches the posterior nostril.

\*\*\* The 1st to the 6th scale rows on the cheek are nearly parallel to the postero-ventral part of the naked circumocular area, and are arranged fairly regularly.

tened weak spines near the postero-dorsal margin of the operculum, and the lower spine is more accutely pointed. The preoperculum is striated posteriorly and ventrally, but it is not appropriate to say that it is denticulated.

The caudal fin is forked. The posterior parts of the upper and lower lobes of this fin have been lost. When the junior author gave the account of a specimen\* in 1960, the lobes were existent, and he stated that the length of the caudal fin was 43.2% of the standard length. The pectoral fin is long, just reaching the vertical through the anal origin.\*\* The ventral fin is fairly long, and just reaches the vent.† The dorsal and anal fins are of moderate height, and their spines are rather weak.†† The longest soft rays of the dorsal and anal fins are the penultimate ones, and the longest dorsal fin-ray reaches the lowest part of the caudal peduncle‡ while the longest anal fin-ray does not reach this part.

The interpelvic process is triangular in shape, and slightly shorter than the axillary process of the ventral fin. The length of the latter process is nearly one-third of the length of the ventral fin, and the tip of the process does not reach the vertical through the hind margin of the membrane connecting the innermost fin-ray of the ventral with the belly. The axillary process of the pectoral fin is absent, and there is an indistinct, nearly horizontal cutaneous fold above the base of this fin. The dorsal and anal fins are each received in a groove which is covered by scales externally and deeper anteriorly. These fins are not scaled, while the other fins are scaled proximally.

The lateral line is nearly parallel to the dorsal contour of the body, extending rearwards to the proximal part of the caudal fin. There are only 2 pored scales behind the hind end of the vertebral column.§

The color of the body in ethyl alcohol is dark brown everywhere,§§ with lighter

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\* As stated above, the present specimen and the specimen upon which the junior author gave an account (1960) seems to be identical. He thinks that the figure 4 on plate IV of his paper published in 1960 was based on the latter specimen. A colored photograph reproduced in the present paper (pl. I, fig. 1) of a specimen of the present new species was most probably taken from the holotype, and the length of the longest caudal fin-ray in the photograph is approximately 40% of the standard length. That the length of the caudal fin is remarkably great in the present new species seems to apply to the female as well (though less pronounced) to the male. Because of the poor state of the viscera, the sex is not known of the holotype, but it is likely that it is a male.

\*\* As in a paratype (Cat. No. 52041). In a paratype (Cat. No. 51922) the pectoral fin reaches slightly beyond the vertical through the vent.

† In a paratype (Cat. No. 51922) the ventral fin does not reach the vent, and the distance from the tip of the fin to the vent is nearly equal to the distance between the latter and the anal origin.

†† In a paratype (Cat. No. 51922) the longest dorsal fin-ray does not reach the lowest part of the caudal peduncle.

§ In a paratype (Cat. No. 51922) 2 pored scales on the left side, and 3 on the right side.

§§ In a paratype (Cat. No. 51922) the ground color is dark grey, and the longitudinal lines which are nearly parallel to the lateral line are darker.

longitudinal lines running mostly parallel to the lateral line.\* Excepting for the caudal fin, the membranes of the fins are all lighter than the body. The spines and soft rays of all the fins are deep brown. While fresh, the holotype was characterized by the deep violet color of the body and the reddish brown tint of all the fins, but in the preservative the coloration of all the paratypes does not differ significantly from that of the close ally, *Paracaesio tumidus* (TANAKA).

*Scales of the holotype and paratypes.*—Scales are very minutely ctenoid, and arranged in fairly regular rows. The number of scales in certain rows are given above. The presence of an additional row of scales just below the regular scale rows on the cheek is distinctive of the present new species.\*\* This additional row is located just below the ridge (or, rather the hind margin) of the anterior thickened portion of the preoperculum. Except for two paratypes (Cat. Nos. 52,042 and 52,044) which had been skeletonized before the senior author noticed this characteristic, the additional scale row is clearly observable (figs. 3 & 5) in the type specimens.

*Teeth of the holotype and paratypes.*—Teeth are present on the jaws, palatines and vomer. There is an outer row of thick conical teeth and a inner band of much smaller, fairly attenuated teeth on the upper jaw. These teeth are all curved inward. The outer teeth are rather widely spaced. The inner band of teeth are much wider anteriorly, tapering laterally and posteriorly, and the teeth are more attenuated than in the corresponding teeth of its nearest ally, *tumidus*. On the lower jaw, several anteriormost outer teeth are much thicker than the other teeth as in the upper jaw, and the inner smaller teeth are arranged in two or three irregular rows anteriorly, and the lateral and posterior teeth are arranged in a single row. The vomerine teeth are very small, and forms a small, nearly triangular patch. The palatine teeth are also very small, and arranged in a short and narrow (mostly single) row.

*Viscera of the type specimens.*—The viscera of the type specimens are in a bad state, but it is certain that, there are numerous papillae in the stomach and that the swimbladder is large, extending beyond the vent. While the holotype was in a good state, the junior author counted the number of the pyloric caeca. They numbered 5.

*Distinctive characters, and relationships.*—The following key to the species of *Paracaesio* will give the distinctive characters and show the relationships of the present new species:

- I. Pored scales in lateral line 70 or more.
  - A. Maxillary naked.
    - 1. General color cerulean- (or dark) blue and yellow.
      - a. Dorsal part of body and caudal fin yellow.

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\* In a paratype (Cat. No. 51,922) the ground color is dark grey, and the longitudinal lines which are nearly parallel to the lateral line are darker.

\*\* KLUNZINGER (1884, p. 17) states in his account of the genus *Paracaesio* that "Der sonst nackte Randtheil des Vordeckels trägt wenigstens 1 Schuppenreihe".

- i. A dark cross band below the middle of spinous dorsal, which has an elevated lobe anteriorly .....*P. pedleyi* McCULLOCH & WAITE.
- ii. No cross band. Spinous dorsal without an elevated lobe .....  
.....*P. tumidus* (TANAKA).
- b. Postero-ventral part of body yellow .....*P. xanthurus* (BLEEKER).
- 2. General color dark violet; fins bear brownish tint .....  
.....*P. sordidus*, new species.
- B. Maxillary scaled\* .....*P. cantharoides* (BARNARD).
- II. Pored scales in lateral line 50 or less.
- A. Maxillary naked. Pyloric caeca 7. General color cerulean-blue .....  
.....*P. caeruleus* (KATAYAMA).
- B. Maxillary scaled. Pyloric caeca 5. General color bluish grey, with four dark cross bands on body .....*P. kusakarii* ABE.

In addition to the characters given in the key given above, the length of the caudal fin, strength of the dorsal spines, shape of the nasal, the position of the longest fin-ray in the dorsal and anal and the arrangement of scales on the preoperculum seem to give clues to the understanding of the relationships. But at present, in the absence of specimens of the alien species, the authors are not able to give exact statement for all the species listed above.

### References

- Readers are requested to see "References" in ABE's paper (1960). Additional publications consulted are listed below. KLUNZINGGR's "Synopsis" has been seen in a photocopy.
- ABE, T. 1960. Description of a new lutjanid fish of the genus *Paracaesio* from Japan. Japan. Journ. Ichth., viii, nos. 1/2, pp. 56-62.
- MCCULLOCH, A. R. & WAITE, E. R. 1916. Additions to the fish-fauna of Lord Howe Island. No. 5. Trans. Proc. Roy. Soc. S. Austr., xl, pp. 437-451. pls. 40-43.
- SHINOHARA, S. 1960. A review of the Lutjanidae (snappers) found in the waters of Ryukyu. (I). Bull. Arts & Science Division, University of the Ryukyus, Mathematic & Natural Sciences, no. 4, pp. 59-76. In Japanese, with summary in English.

### Explanation of Plate I

- Fig. 1. *Paracaesio sordidus*, n. sp. In all probability the holotype. Photo taken before 1961.
- Fig. 2. *Paracaesio tumidus* (TANAKA). Cat. No. ABE '60-689. ♀ Total length 350 mm. Collected at the Central Wholesale Market of Tokyo on July 1, 1960.
- Fig. 3. *Paracaesio kusakarii* ABE. Cat. No. 51996, ZI (ABE '60-551). Holotype. Total length 344 mm.
- Fig. 4. *Paracaesio caeruleus* (KATAYAMA). Cat. No. ABE '60-552. Total length 320 mm. Collected at the Central Wholesale Market of Tokyo on June 20, 1960, along with the holotype of *P. kusakarii*.

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\* Prof. J. L. B. SMITH, 1949, states that "maxilla usually scaly" in *Aetiasis* which was introduced by Dr. K. H. BARNARD in 1937. It is not known whether Prof. SMITH had specimens of *cantharoides* without scales on the maxillary or not. The genus *Aetiasis* is believed to be a synonym of *Paracaesio*.



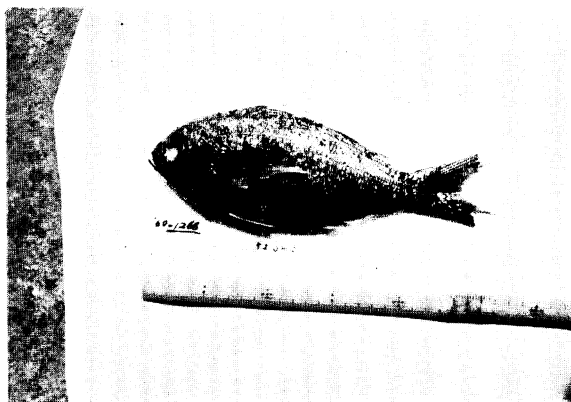


Fig. 1. Holotype of *Paracaesio sordidus*, n. sp. Cat. No. 52043, Z. I.

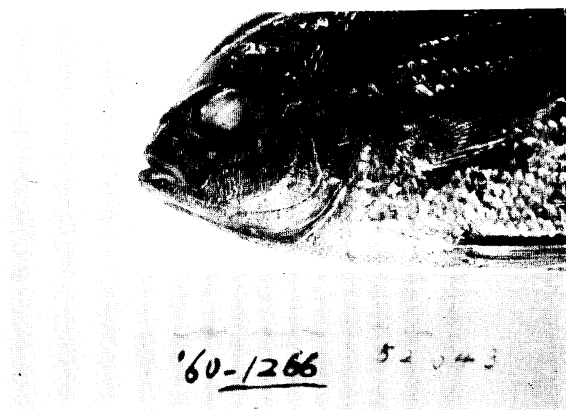


Fig. 2. As in fig. 1.

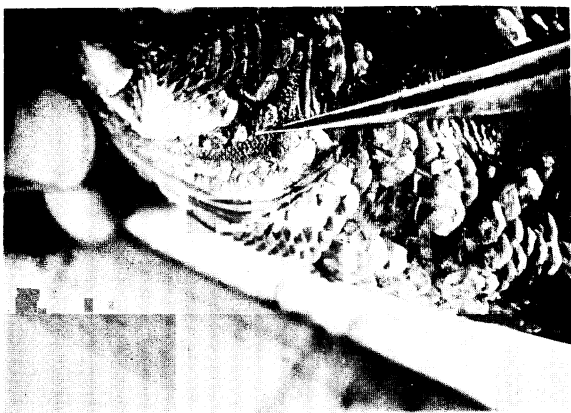


Fig. 3. As in fig. 1.

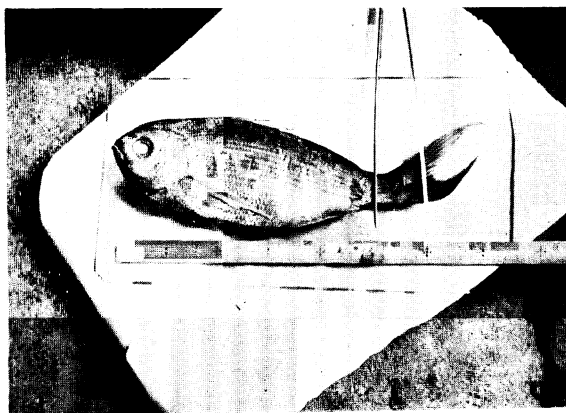


Fig. 4. A paratype of *Paracaesio sordidus*, n. sp. Cat. No. 51922, Z. I.



Fig. 5. As in fig. 4.



Fig. 6. *Paracaesio tumidus* (TANAKA). Cat. No. ABE '62-922.

Plate I

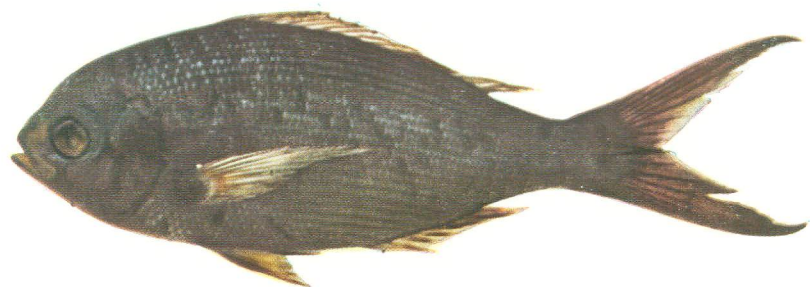


Fig. 1

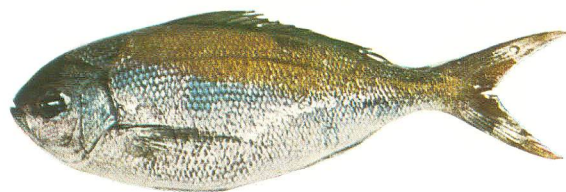


Fig. 2

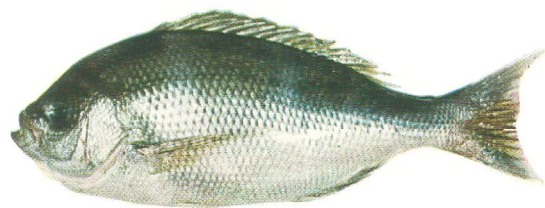


Fig. 3

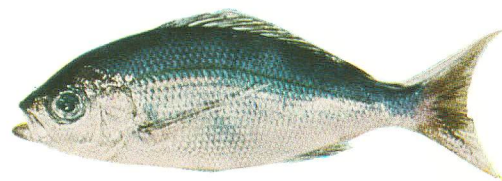


Fig. 4