

## Descriptions of Two New species of the Ponyfish Genus *Leiognathus* from Indonesia

T. ABE\* and Y. HANEDA\*\*

(With 1 plate)

インドネシア産ヒイラギ属の二新種

阿部宗明\*・羽根田弥太\*\*

カリフォルニア大学の1969年度、生物発光を目的とした Alpha Helix 号によるニューギニア探検に参加した折、インドネシアのアンボン港で採集した発光生物中に、ヒイラギ属の魚で、新種と思われるものが2種あった。いずれも食道をとりまく黄金色に輝く異常に大きい発光腺を具えている。この2種に下記の学名を与える。

*Leiognathus hataii* ABE & HANEDA

*Leiognathus aureus* ABE & HANEDA

While collecting luminous animals in Ambon, Indonesia, in 1969, the junior author noticed that two species of ponyfishes of the genus *Leiognathus* handled at the market of the island differ remarkably from the other congeners in having a larger luminous organ glittering like gold around the esophagus. Examination of the specimens of the two species have led the authors to conclude that they are new to science.

### *Leiognathus hataii*, new species

*Study material.*—Holotype (Cat. No. 52701, Zoological Institute, Faculty of Science, University of Tokyo; abbreviated to ZIUT), collected at the Ambon Fish Market, Ambon, Indonesia, on November 18, 1969, measuring 59.0 mm. in total length and 48.0 mm. in standard length. Paratypes: 1 specimen (Cat. No. 52702, ZIUT), collected along with the holotype, measuring 54.0 mm. in total length and 44.0 mm. in standard length; 2 specimens (ABE's Cat. Nos. 15428 and 15429), collected along with the holotype, measuring 53.0 mm. and 54.0 mm., respectively, in total length, and 44.0 mm. and 44.0 mm., respectively, in standard length; one of the paratypes (ABE's Cat. No. 15428) was stained with alizarin red.

*General appearance of the holotype.*—The body is compressed, its height being 43% of the standard length. The dorsal profile is slightly less convex than the ventral. The rostro-occital line is slightly concave. The mouth is fairly small, slightly oblique, and, when fully protruded, forms a horizontally directed tube. The anterior margin of the lower jaw is concave and ascends at an angle slightly less than 90°.

*Acknowledgments.* This work was supported in part by grants from the Japan Society for the Promotion of Science and the National Science Foundation (GF-274) under the Japan—U.S. Cooperative Science Program. The study was made in part during participation of the junior author in the Alpha Helix 1969 Biological Expedition to New Guinea, Scripps Institution of Oceanography, University of California.

\* Tōkaiku Fisheries Research Laboratory, Tokyo.

\*\* Yokosuka City Museum, Yokosuka

Manuscript received August 1, 1972, Contribution from the Yokosuka City Museum, No. 236.

Though difficult to count exactly, the number of scales in a longitudinal series is much larger than in *ruconis* to which the present new species resembles more closely than it does to the other species of *Leiognathus*.

There is a single minute forked spine above the eye and just behind the posterior nostril. The supraorbital and lower preopercular margins are weakly denticulated. The prepelvic furrow is bordered on either side with a black line. The preanal median keel reaches the tips of the pelvic fins. The vertical portion of the maxillary is long, almost as long as the eye-diameter and much longer than the premaxillary. The interorbital space is concave, triangular and bordered laterally by a distinct bony keel. The third and fourth dorsal spines and the third anal spine are each strongly serrated proximally at the front border.

The jaw teeth are small, incisor-like in shape, and arranged in a single row. They are flattened, and some are weakly pointed.

The gill-rakers on the first arch are fairly long, slightly shorter than the gill-lamellae, and number 5+15 (left) and 4+14 (right).

The diameter of the largest egg is 0.2 mm.

In coloration, the preocular part of the head in the present new species resembles that of *ruconis* and *insidiator*; there is a black oblique line from the antero-ventral border of the orbit to a point near the ventral end of the lower jaw. But the coloration of the other parts of the body is different from the two species just mentioned; there is a distinct vertical black line at the base of the caudal fin in the present new species. This vertical line is absent in the other two species, in which there are vertical series of dark dots and lines on the back. In the present new species there are several fairly large dark blotches along the base of the dorsal fin and several smaller dark markings forming a longitudinal series between the former blotches and a curved longitudinal dark line running from near the pectoral base to the lower part of the caudal peduncle.

*Luminous organ.* The luminous organ of this fish fundamentally agrees with that of other species of *Leiognathus* in structure, but the doughnut-like luminous body which surrounds the esophagus is much larger, and shines like gold. The black membrane of the luminous body faces to the intestine so as to shut the light out to the intestine.

In a specimen of 43 mm. total length the doughnut-like luminous body measures 5 mm. in height, 4.0 mm. in width and 1.8 mm. in thickness while in a specimen of 54 mm. total length of *Leiognathus ruconius* the luminous body measures 3.2 mm. (height), 2.8 mm. (width) and 1.8 mm. (thickness).

*Distinctive characters.* The present new species is characterized by the presence of a black line from the front border of the orbit to the chin (in common with *ruconis*, *insidiator* and the other new species described later on in this paper) and a black vertical line at the caudal base (common with the other new species just mentioned). The height of the body is 42 to 43% of the standard length. The mouth, when fully protracted, forms a longitudinal tube (common with *insidiator*). The lower jaw is concave at the anterior margin and ascends at an angle slightly less than 90°. The vertical portion of the maxillary is much longer than the premaxillary (as in *ruconis*). The luminous organ surrounds the esophagus resembling a doughnut of American style in shape, and shines like gold.

*Specific name.* The specific name *hataii* is in reference to the late Prof. Shinkishi HATAI. Through his courtesy the present authors enjoyed studies at the Palao Tropical Biological Station,



Measurements\* and counts of the types

Cat. No.	Holotype 52701 (ZIUT)	Paratype 52702 (ZIUT)	Paratype 15428** (ABE)	Paratype 15429 (ABE)
Sex	♀	♀		
Total length	59.0 mm	54.0 mm	53.0 mm	54.0 mm
Standard length	48.0 mm	44.0 mm	42.5 mm	44.0 mm
Greatest depth of body (near tip of pectoral fin)	43.1	42.7	42.4	43.2
Greatest breadth of body (at pectoral base)	13.5	12.5	15.3**	13.6
Least depth of caudal peduncle	4.6	4.5	4.7	5.0
Length of head	29.2	27.2	29.9	28.6
Length of snout (mouth closed)	9.2	9.1	9.4	9.1
Horizontal diameter of orbit	10.4	left 10.0 right 9.5	11.3	10.5
Vertical diameter of orbit	10.6	left 10.9 right 10.5	11.3	10.7
Interorbital breadth above eye-centers	10.2	10.9	8.7	9.8
Length of premaxillary	left 7.3 right 8.3	8.4 8.0	9.4	8.4
Length of lower jaw	15.6	16.1	16.5	16.3
Least depth of subocular space	left 11.9 right 12.5	13.6	12.9	13.2
Length of longest (2nd) dorsal spine	tip damaged	15.5	14.1	13.4
Length of longest (2nd) anal spine	9.0	9.8	10.6	9.3
Length of pectoral fin	left 20.4 right 20.7	21.6	20.0 21.2	11.3 22.7
Length of pelvic fin	left 12.5 right 12.5	10.9	12.2	12.0
D	VIII 16	VIII 16	VIII 16	VIII 17
A	III 14	III 14	III 14	III 14
P	left i+i+14 right i+i+ca. 14	i+i+ca. 13 damaged	i+i+14 i+i+13	i+i+14 i+i+14
V			left I 5 right I 5	I 5 I 5
gill-rakers	left 5+15 right 4+14			4+15 5+1+15

\* Excepting for total length and standard length, the measurements are given below in percents of standard length.

\*\* Stained. Swollen slightly.

Palau Islands, during their twenties. They wish to dedicate this new species to Prof. HATAI.

#### *Leiognathus aureus*, new species

*Study material.* Holotype (Cat. No. 52703 ZIUT), collected at Ambon Fish Market, Ambon, Indonesia, on November 18, 1969; total length 56.5 mm., standard length 46.5 mm. Paratypes, five specimens (Cat. Nos. 52704 ZIUT, 15430 ABE, 15431 ABE, 16076 ABE, 16077 ABE). The measurements are given below. The specimens were all collected along with the type specimens of *Leiognathus hataii* described above.

*General appearance of the holotype.* The body is compressed and oblong, its depth being

Measurements\* and counts of the types

Cat. No.	Holotype 52703 (ZIUT)	Paratype 52704 (ZIUT)	Paratype 15430 (ABE)	Paratype 15431**(ABE)	Paratype 16076 (ABE)	Paratype 16077**(ABE)
Sex	♀					
Total length	56.5 mm	68.5 mm	67.5 mm	69.0 mm	68.0 mm	55.5 mm
Standard length	46.5 mm	56.5 mm	55.5 mm	57.0 mm	56.8 mm	46.7 mm
Greatest depth of body (near tip of pectoral fin)	37.6	38.2	37.5	38.6	38.2	35.7
Greatest breadth of body (at pectoral base)	12.5	12.9	13.0		13.2	13.0
Least depth of caudal peduncle	4.3	4.2	4.3	4.4	4.4	4.3
Length of head	30.1	28.3	28.5	28.1	28.4	28.1
Length of snout (mouth closed)	left 9.2 right 8.6	8.7 8.8	9.0 9.0	8.8 9.3	9.2 9.0	9.7 10.4
Horizontal diameter of orbit	left 10.8 right 10.8	9.0 9.0	9.9 9.9		10.4 9.7	8.7 8.7
Vertical diameter of orbit	left 10.8 right 10.8	9.7 9.7	9.9 9.9		10.4 9.9	8.7 8.7
Interorbital breadth above eye-centers	9.0	9.6	9.0	9.3	8.8	8.7
Length of premaxillary	left 8.6 right 7.5	7.3 7.1	7.4 7.4		7.9 8.1	7.6 7.6
Length of lower jaw	12.3	13.3	13.5	12.8	13.0	13.4
Least distance between corner of mouth and orbit	left 5.6 right 5.4	5.0 5.3	5.4 5.4		5.3 4.8	5.4 5.6
Least depth of subocular space	left 12.9 left 12.9	11.5 11.5	12.4 12.4		12.0 12.7	12.8 12.1
Length of longest (2nd) dorsal spine	tip damaged	15.0	14.4	14.0	16.2	13.0
Length of longest (2nd) anal spine	11.8	9.7	10.8	9.6	10.6	9.7
Length of pectoral fin	left 17.8 right 17.4	19.5 19.5	18.9 19.8	16.7 17.5	19.4 18.5	16.2 16.9
Length of pelvic fin	left 11.0 right 10.8	10.6 10.6	11.0 10.6	10.5 10.5	10.9 11.1	10.4 9.7
D	VIII 16	VIII 16	VIII 16	VIII 16	VIII 16	VIII 16
A	III 14	III 14	III 14	III 14	III 14	III 14
P	left i+i+13 right i+i+13	i+i+14 i+i+14	i+i+15 i+i+15	i+i+16 i+i+16	i+i+15 i+i+15	i+i+15(+) i+i+16
V					left I 5 right I 5	
Gill-rakers	left right	right 4+15				

\* Excepting for total length and standard length, the measurements are given below in percents of stand length.

\*\* Stained. Swollen slightly.

37.6% of the standard length. The ventral and dorsal profiles of the body is almost equally convex. The rostro-occipital line is nearly straight. The eye-diameter are somewhat larger than the snout length, nearly equal to interorbital breadth above eye-centers, and less than 1/3 of the head length. There are two minute spines above the orbit and just behind the posterior nostril.

The supraorbital rim is very weakly denticulated. The lower margin of the preoperculum is weakly denticulated. The mouth is small, oblique, and when protracted forms a short horizontal tube. The lower jaw, when the mouth is closed, ascends obliquely. The vertical portion of the maxillary is short, its length being 1/2 of the eye-diameter, and ends at a point midway between the lower orbital rim and the anterior margin of the lower jaw. The teeth of the jaws are small, incisor-like, not attenuated but weakly pointed, well separated from one another, and arranged in a single row. The third and fourth dorsal spines and the third anal spine are proximally serrated at the front margin. The gill-rakers of the first arch are short, much shorter than the gill-lamellae, and 4+15 on the right side. The caudal fin is deeply forked.

The color in formalin is brownish with slight violet tinge; the head is whitish above and in front of the eyes; the operculum, the upper and posterior parts of the lower jaw, the membrane behind and beneath the vertical portion of the maxillary are nearly black. When the mouth is closed, the black membrane appears as a black oblique line from the orbit running downward and forward. There is a dark marking on either side of the snout. A short vertical black line at the caudal base is very distinct. There are about a dozen wavy dark vertical lines on the back; the anterior ones are broader than the posterior ones. The base of each fin-ray of the dorsal and anal fins is black forming a longitudinal line of black dots. The lower half of the head and body are covered with extremely fine vertical lines and with minute black dots anteriorly. The upper and lower lobes of the caudal fin are minutely dotted with brown.

The scales are weak, deciduous and very difficult to count exactly.

*Distinctive characters.* The present new species is characterized by the presence of a black line from the front border of the orbit to the chin (in common with *ruconius*, *insidiator* and *hataii* described above), a black vertical line at the caudal base (as in *hataii*), extremely fine vertical lines on the lower half of the head and body, and black dots at the base of each fin-ray of the dorsal and anal (as in *hataii*). The lower jaw ascends obliquely.

*Luminous organ.* The luminous body of this fish is similar to that of *Leiognathus hataii*. The color of the luminous body is also beautiful bearing metallic golden glitter.

In a specimen of 55 mm. total length, the doughnut-like luminous body measures 6.0 mm. in height, 5 mm. in width and 2.3 mm. in thickness.

#### References

- DAY, F. 1876: The fishes of India, Two vols., 778 pp., 198 pls. London.
- HERRE, A. W. 1953: Check list of Philippine fishes. (U.S.) Fish & Wildlife Service Research Rep. 20, 977 pp.
- JAMES, P. S. B. R. 1967: *Leiognathus leuciscus* (GÜNTHER) and *Leiognathus smithursti* (RAMSAY and OGILBY) (family Leiognathidae: Pisces)—two new records from the Indian seas. J. Mar. Biol. Ass. India, ix, no. 2, pp. 300-302.
- KÜHLMORGEN-HILLE, G. 1968: An illustrated field key to the fish family Leiognathidae in the Gulf of Thailand. Mar. Fisher. Lab., Bangkok Contr. No. 12, 7 pp.
- MUNRO, I. S. R. 1955: The marine and fresh water fishes of Ceylon. xvi+351 pp. 56 pls. Canberra.
- MUNRO, I. S. R. 1958: The fishes of the New Guinea Region. Territory of Papua and New Guinea Fisheries Bull., no. 1, pp. 97-369.
- SCOTT, J. S. 1959: An introduction to the sea fishes of Malaya, xii+180 pp. Kuala Lumpur.
- TAYLOR, William R. 1964: Fishes of Arnhem Land. Records of the American-Australian Scientific



Expedition to Arnhem Land, vol. iv, pp. 45-307.

TIEWS, K. and P. CACES-BORJA, 1965: On the availability of fish of the family Leiognathidae LACEPEDE in Manila Bay and San Miguel Bay and on their accessibility to controversial fishing gears. Philip. Journ. Fisher., vii, no. 1, pp. 59-85 pls. 1 & 2, figs. 1-16.

WEBER, M. and L. F. DE BAUFORT. 1931: The fishes of the Indo-Australian Archipelago, vi. Leiden.



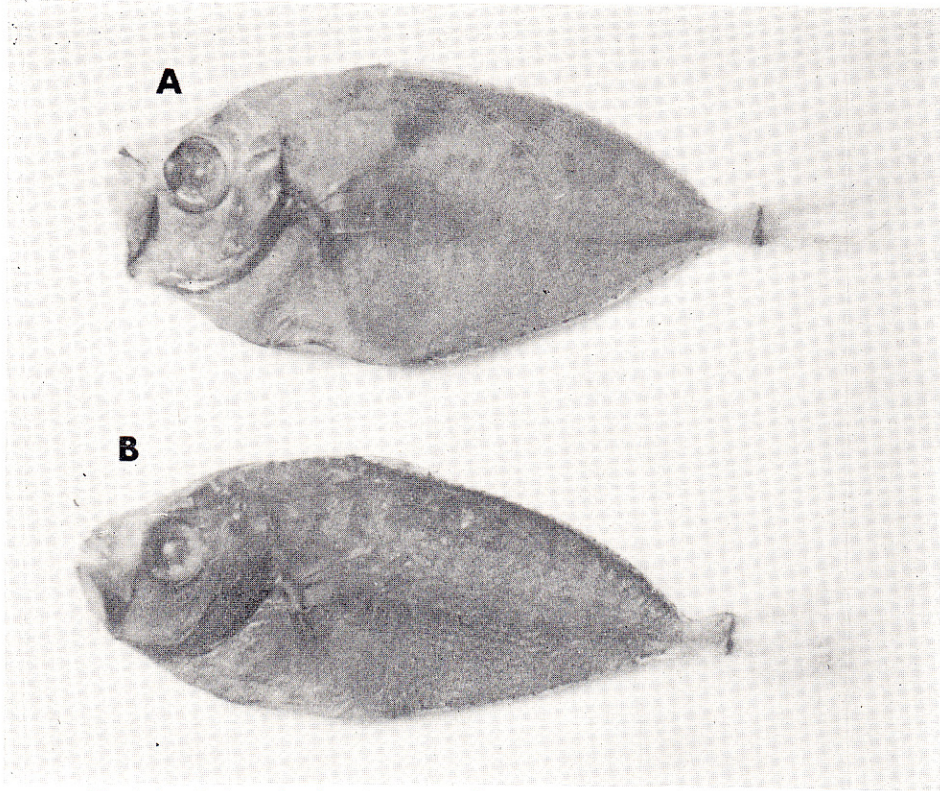


Fig. 1.A. *Leiognathus hataii*, new species. Holotype (Cat. No. 52701, ZIUT).  
B. *Leiognathus aureus*, new species. Holotype (Cat. No. 52703, ZIUT).

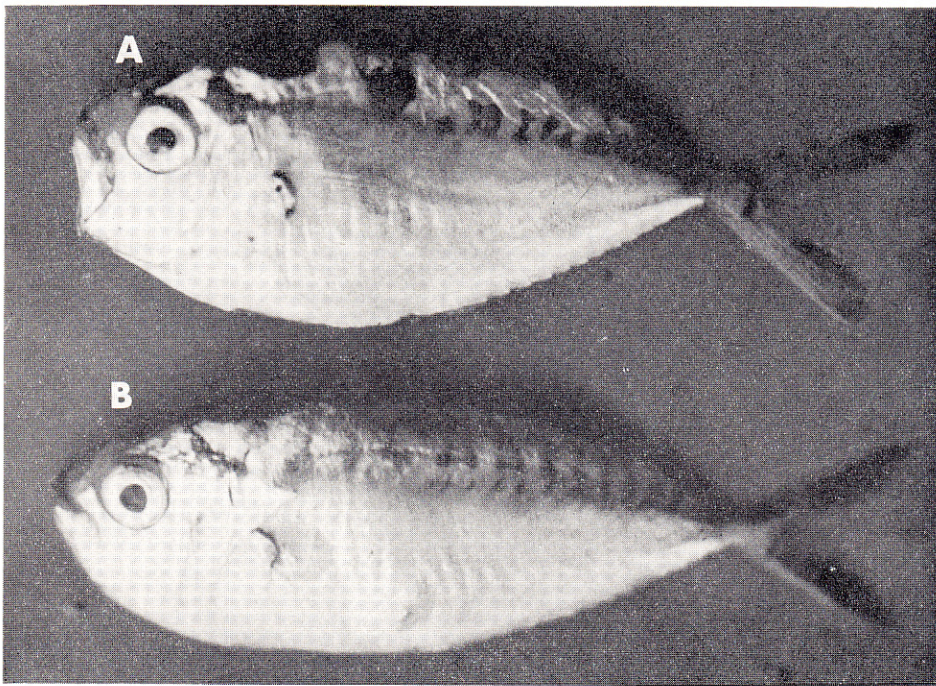


Fig. 2.A. *Leiognathus hataii*, new species. } Both photographed of fresh specimens taken in  
B. *Leiognathus aureus*, new species. } Ambon, Indonesia.