**Tottoriblennius hiraoi**, a New Genus and Species of Miocene Blennioid Fish from Tottori Prefecture, Japan

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**Abstract** A blennioid fish, *Tottoriblennius hiraoi* gen. et sp. nov. is described on the basis of a single specimen from the Middle Miocene Iwami Formation, Tottori Prefecture, Japan. The new genus is assigned to the family Blenniidae, and distinguished from other genera by the following combination of characters: 13 dorsal spines and 14 soft rays, 17 pectoral fin rays, 9 precaudal vertebrae, 3 pelvic soft rays, and frontal densely ornamented, consisting of minute depressions. This is the first blennioid fossil record from the western Pacific Ocean, including Japan.

**Key words**: Fossil fish, Middle Miocene, Iwami Formation, Perciformes, Blenniidae, Tottori, *Tottoriblennius hiraoi* gen. et sp. now.

**Introduction**

Six Miocene fish have been described from the Iwami Formation of the Tottori Group (Uemura et al., 1979; Matsumoto, 1991) at Miyanoshita, Kokufu-cho, Tottori Prefecture, Japan. These are *Sardinella miyanoshitaensis* Sato and Uyeno, 1999; *Spirinchus akagii* Uyeno and Sakamoto, 1999; *Inabaperca tanirai* Yabumoto and Uyeno, 2000; *Scomberoides maruoi* Uyeno and Suda, 1991; *Leiognathus tottori* Yabumoto and Uyeno, 1994; and *Paralichthys yamanai* Sakamoto and Uyeno, 1993.

The excavation of fossils at Miyanoshita, where the Fuganji Mudstone Member of the Iwami Formation is distributed, was conducted each summer from 2002 to 2005 by the Tottori Prefectural Museum and yielded numerous fish fossils (Hirao et al., 2005) and a passeriform bird (Kakegawa and Hirao, 2003). As the seventh account in a series describing the fossil fishes from this locality (see Uyeno and Suda, 1991, fig. 1), we describe a new genus and species of the blennioid fish family Blenniidae on the basis of the specimen with its counterpart part that we found among the specimens collected during the excavations.

**Systematic Paleontology**

Class Osteichthyes Huxley, 1880
Order Perciformes Bleeker, 1859
Suborder Blennioidei Bleeker, 1859
Family Blenniidae Rafinesque, 1810

*Tottoriblennius* gen. nov.

**Type species**: *Tottoriblennius hiraoi* sp. nov.

**Etymology**: *Tottori*, after the name of the locality where the specimen is found; *blennius*, Latin for fish and the type genus of the family Blenniidae.

**Diagnosis**: As for type species.

*Tottoriblennius hiraoi* sp. nov.
(New Japanese name: Tottori-mukashi-ginpo)

**Holotype**: TRPM (Tottori Prefectural Museum) 664-0192 is an almost complete specimen, along with the counterpart part in which the dorsal body and head are missing. The standard length is 24.3 mm.

**Etymology**: The species, *hiraoi*, is named of Mr. Kazuyuki Hirao who organized the excavation of fish fossils at the locality.

**Locality and Horizon**: The specimen was
collected from rock (marine sediments) belonging to the Fuganji Mudstone Member of the Middle Miocene Iwami Formation in the Tottori Group, during excavations from 2002 to 2005 at Miyanoshita, Kokufu-cho, Tottori City, Tottori Prefecture, Japan (Hirao et al., 2005). The locality is discussed in Uyeno et al. (1999).

**Diagnosis:** This species differs from other members of the family Blenniidae in having the following combination of characters: frontal densely ornamented, consisting of minute depressions; 13 dorsal spines and 14 soft rays; 17 pectoral fin rays; 9 precaudal vertebrae; and 3 pelvic soft rays.

**Description of the holotype:** Body is elongate, standard length being about four times body depth at the dorsal origin and about 3.5 times head length (Fig. 1). The large eye is preserved, and the orbit diameter is about one fourth of the head length. It is difficult to recognize the outline of each bone of the head, but the mouth is terminal, not oblique, and some relatively large canine-like teeth are preserved at the anterior end of the head. Lower canine-like teeth pointing upward are on the dentaries, but their positions on the bone are not clear. Upper canine-like teeth pointing downward are on the premaxillaries, but the positions are indeterminate. Upper jaw teeth are somewhat thinner than the lower jaw teeth (Fig. 2). The frontal with dense ornamentation consisting of minute depressions has a sensory canal at the anterior, narrow portion of the frontal and four ridges on the posterior wide portion (Fig. 3).

The dorsal fin consists of 13 spines and 14 soft rays, its origin being above and slightly behind the midpoint between the pelvic and pectoral insertions. Dorsal spines are long, almost the same size, about half maximum body depth, except the last two shorter spines.

The anal fin consists of two spines and 17 soft rays, the origin being below the base of the 11th dorsal spine.

The pelvic fin consists of a spine and three rays, and inserts in front of the pectoral fin base. The pectoral fin is large with 17 rays, which reaches the origin of the anal fin. There are 4 radials, which are longer than deep.

The parhypural and hypurals 1 and 2 are fused to form a ventral plate. The dorsal hypural plate comprises hypurals 3 and 4 fused to each other, and to the urostyle fused with the uroneural 1. There are seven unbranched caudal rays on the dorsal hypural plate and six on the ventral plate (Fig. 4).

The number of precaudal vertebrae is 9, and the first vertebral is large, two times the second one. There are 22 caudal vertebrae.

**Concluding Remarks**

The following combination of characters indicates that this new genus *Tottoriblennius* is a member of the suborder Blennioidei: 1) the pelvic fin with one spine and three soft rays inserts in front of the pectoral fin base, 2) the pectoral radials being longer than deep, 3) two anal spines, 4) the parhypural and hypurals 1 and 2 being fused to form a plate, and the dorsal hypurals 3 and 4 fused to each other and to the urostyle fused with the uroneural 1, and 5) dorsal- and anal-fin spine pterygiophores are single elements (Nelson, 1994). This new genus has the following combination of characters that place it in the family Blenniidae: 1) single dorsal fin, 2) mouth terminal, 3) large lateral eye, and 4) number of dorsal spines fewer than that of dorsal soft rays (see Nelson, 1994).

*Tottoriblennius* *hiraoi* has dense frontal ornamentation consisting of minute depressions. An ornamented frontal has been recognized in the tribe Nemophini, not in other tribe (Springer, 1986; Springer and Smith-Vaniz, 1972), but this new genus differs from Nemophini by having 17 pectoral fin rays (10 to 16 in Nemophini), 9 precaudal vertebrae (11 to 16 in Nemophini), and a long pectoral fin reaching the anal fin origin.

Smith-Vaniz (1976 and 1987) recognized 48 species in five genera in Nemophini. The nemophin fish, *Xiphasia*, with 13 dorsal fin spines (the same number as *Tottoriblennius*), but has an extremely elongate body and numerous
soft rays (around 100). Short bodied nemophin fishes *Pteroscirtes* and *Meiacanthus* have a smaller number of dorsal fin spines (4 to 11) than *Tottoriblennius* (13). *Tottoriblennius* has a frontal with a narrow anterior portion (interorbital region), but most species of Nemophini have a broad one. The present new genus *Tottoriblennius* differs from other genera, tribes of the family Blenniidae as described above and is probably related to Nemophini in having the or-

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Fig. 1. Holotype (TRPM 664-0192) of *Tottoriblennius hiraoi* gen. et sp. nov. A and B, apart specimen and counter part; C, drawing of B.
Fig. 2. Head region of the holotype (TRPM 664-0192) of *Tottoriblegnnius hiraoi* gen. et sp. nov. Abbreviations: Br=branchiostegals; Cl=cleithrum; Dpt=dorsal pterygiophore; El=lateral ethmoid; Fr=frontal; l.j.t.=lower jaw teeth; u.j.t.=upper jaw teeth; P,3rd f.r.=3rd pectoral fin ray; P, sp.=pectoral spine; Pop=preopercle; Q=quadrate; Ra=radials.
namented frontal, which is a derived blenniid character (see Smith-Vaniz, 1976).

Fossil blenniids, Oncolepis isseli from Eocene Monte Bolca, Italy (Bassani, 1989), Blennidarum blondeaui from Eocene France (Norlf and Lapierre, 1979), Blennidarum bicpitits from Lower Oligocene France (Steurbaut, 1984), Blennius schwarzhansi from Miocene Turkey (Ruckert-Ulkumen, 1996), Blennius fossilis from Upper Miocene Croatia (Karmberger, 1891), Otolithus (Ophididarum) soldanii from Pliocene Italy (Pieragnoli, 1919), and Blennius fluviatillis from Pleistocene Italy (Mastrorilli, 1965) have been described. Among these, B. blondeaui, B. bicpitits, B. schwarzhansi, and O. (O.) soldanii were described on the basis of otolithes. T. hiraoi has a smaller number of segmented dorsal fin rays (13) and precaudal vertebrae (9) than O. is-ssel (20 dorsal fin rays and 24 or 26 precaudal vertebrae). This new species differs from B. fos-silis in having a large number of dorsal spines, 13 in T. hiraoi and 11 in B. fossilis. T. hiraoi has smaller numbers of segmented dorsal fin rays (13) and caudal vertebrae (22) than B. fluviatillis (15 or 16 segmented dorsal fin rays and 25 or 26 caudal vertebrae). Problennius was cited as a genus of the family Blenniidae from Eocene western Asia by Romer (1966) and Carroll (1988).

This new genus and species, T. hiraoi is the first record of a blennioid fossil from the western Pacific region, specifically Japan.

Acknowledgments

The authors wish to express their sincere grati-
tude to Mr. Kazuyuki Hirao of Tottori Prefectural Museum, who organized the excavation of the fish fossils, Dr. Takao Yano of Tottori University and Mr. Tateyu Aoki for their help during the fieldwork. We are grateful to Dr. Kim R. Larsen for his help in obtaining rare literature. The study by the first author was supported by a Grant-in-Aid for Scientific Research (B), No. 15340179 to Makoto Manabe from Japan Society for the Pro-
Fig. 4. Caudal region of the holotype (TRPM 664-0192) of *Totorobiliennius hiraoi* gen. et sp. nov. Abbreviations: Hy3+4=hypurals 3 and 4; Ph+Hy1+2=parhypural and hypurals 1 and 2; Pu2=second preuralcentrum; Pu3=third preuralcentrum; Un1=first uroneural; Us=urostyle.
motion of Science (JSPS).

References


