

## A Review of the Genus *Lepidion* (Gadiformes, Moridae) from the Northwestern Pacific

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**Abstract** Four nominal species in the genus *Lepidion* of the family Moridae from the northwestern Pacific were reviewed taxonomically. Two of them, *L. inosimae* and *L. schmidti*, were found to be distinct species. *L. oidema* is a synonym of *L. inosimae*, and *L. modestus* is excluded from the genus.

*Lepidion* is a group of the morid fishes, living in the deeper waters of the Atlantic, Pacific and Mediterranean Sea. The genus is characterized by an elongate first dorsal fin ray, pelvic fins each consisting of several fin rays and an emarginate anal fin.

The taxonomy of the genus has long been confused. Templeman (1970) clarified the members of the genus in the North Atlantic. However, those from the northwestern Pacific remained unclear taxonomically, because of their brief original descriptions based on a few specimens and lack of additional specimens. Recently, we have collected a dozen specimens from the northwestern Pacific and we intend to review the taxonomy of the genus *Lepidion* from those waters.

### Materials and methods

Counts and measurements were mainly made according to Hubbs and Lagler (1958), but first dorsal fin rays were counted after Templeman (1970). Vertebral counts, dorsal and anal fin ray counts are based on radiographs. The specimens used in this study are deposited in the Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University (HUMZ).

### Genus *Lepidion* Swainson, 1839

*Lepidion* Swainson 1839: 318. Type species: *Gadus lepidion* Risso.

*Haloporphyrus* Günther 1862: 358. Type species: *Gadus lepidion* Risso. Substitute name for *Lepidion*, which Günther regarded as preoccupied by *Lepidia* Savigny in 1817. Article 56(a) rules that they are not homonyms.

Two dorsal fins, the first consisting of five or six rays, 2nd ray (or 1st ray, when a small ray absent anteriorly) of which greatly elongate. Anal fin single, with concave margin. Caudal fin separate. Pelvic fin slender, consisting of seven or eight rays with elongate anterior rays. Upper jaw extending in front of the lower. Villiform tooth bands on both jaws. A patch of villiform teeth on vomer. Palatine toothless. A barbel on chin. Branchiostegal rays seven.

**Remarks.** There are four nominal species among the northwestern Pacific *Lepidion*, namely, *L. inosimae* (Günther, 1887) from off Enoshima in Sagami Bay, *L. modestus* (Franz, 1910) from Yokohama, *L. oidema* (Tanaka, 1927) from off Misaki in Sagami Bay, and *L. schmidti* Svetovidov, 1936, from Sagami Bay. Among them, however, *modestus* must be excluded from the genus, because, according to Franz's (1910) original description, the pelvic fin consists of one ray which is divided into two parts, a condition that does not fit the generic character. *Lepidion* is defined by pelvic fins consisting of seven or eight rays. Based only on the feature of the pelvic fin, *modestus* could belong to another morid genus *Laemonema*. Therefore, we do not refer to it in this article.

### Key to the northwestern Pacific species

- A1. Second dorsal fin rays 55~62; anal fin rays 49~55; vomerine teeth forming a small round patch (Fig. 3A); head small (24.5~27.1% SL); upper jaw short (11.1~12.4% SL); distance from snout tip to 1st dorsal origin short (24.9~

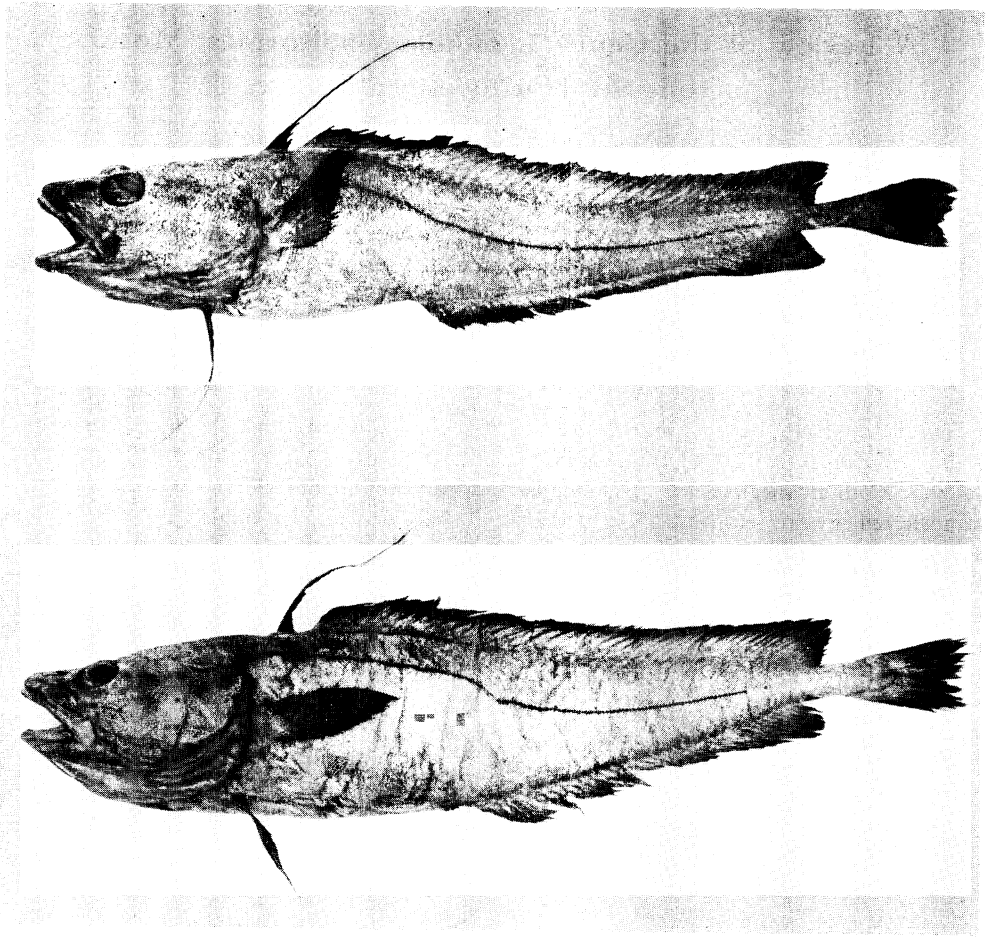


Fig. 1. Top: *Lepidion inosimae* from Emperor Sea Mounts, HUMZ 68828, SL 538 mm. Bottom: *Lepidion schmidti* from Matsuwa Island, HUMZ 59469, SL 623 mm.

- 27.2% SL) .....  
 ..... *L. inosimae* (Günther, 1887)  
 A2. Second dorsal fin rays 47~50; anal fin rays 39~42; vomerine teeth forming an inverted V in shape (Fig. 3B); head large (27.3~30.9% SL); upper jaw long (12.6~14.8% SL); distance from snout tip to 1st dorsal origin long (28.5~30.6% SL) .....  
 ..... *L. schmidti* Svetovidov, 1936

***Lepidion inosimae* (Günther, 1887)**  
 Japanese name: Sokokurodara  
 (Fig. 1, top)

*Haloporphyrus inosimae* Günther, 1887: 92, pl. 20, fig. B (original description, Enoshima, Japan).

*Haloporphyrus oidema* Tanaka, 1927: 796, fig. 472 (original description, Sagami Bay, Japan).

*Lepidion inosimae*; Svetovidov, 1936: 268 (table); Matsubara, 1955: 1296 (key); Tomiyama, Abe and Tokioka, 1958: 48, fig. 138 (short description); Matsubara, 1965: 500, fig. 1410 (short description).

*Lepidion oidema*; Matsubara, 1955: 1296 (key).

**Materials.** HUMZ 68828 (SL 538 mm), Emperor Sea Mounts (38°37'N, 171°07'E), 860 m, July 31, 1977; HUMZ 71911 (SL 469 mm), 71912 (SL 482 mm), Emperor Sea Mounts (34°42'N, 171°48'E), 980~1100 m, June 22, 1977; HUMZ 71943 (SL 450 mm), Emperor Sea Mounts (latitude and longitude unknown); HUMZ 71960 (SL 556 mm), 71961

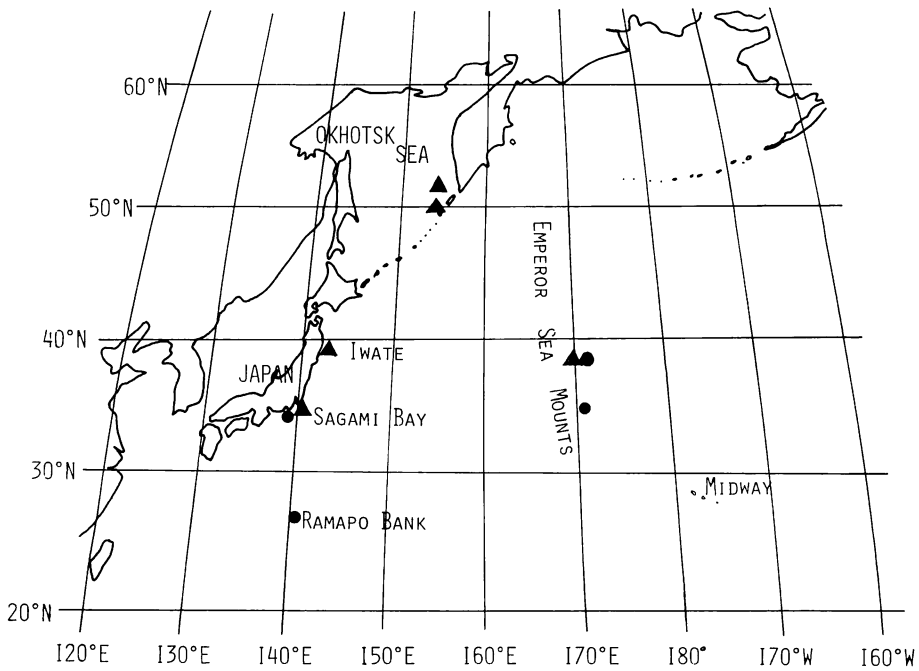


Fig. 2. Localities where specimens collected. Circle, *Lepidion inosimae*; triangle, *Lepidion schmidti*.

Table 1. Meristic counts and proportional lengths in *Lepidion inosimae* and *Lepidion schmidti*.

	<i>L. inosimae</i> Present specimens (Holotype)	<i>L. schmidti</i> Present specimens (Holotype)
Total length (mm)	465~604	689~1012 (497)
Standard length (mm)	424~556	623~924 (450)
Meristic counts:		
1st dorsal fin	1+4, 1+5 (5)	0, 1+4, 5 (5)
2nd dorsal fin	55~58 (60)*	47~50 (48)
anal fin	49~55 (52)	39~42 (41)
Pectoral fin	21~23	21~23
Pelvic fin	7	7
Gillrakers	5+11, 12	5, 6+11~13 (14)
Branchiostegals	7 (7)	7 (7)
Vertebrae	17+40~42	17, 18+37~40
Proportional measurements (%SL):		
Head length	24.5~27.1	27.3~30.9 (27.4)
Snout length	7.0~9.4	8.3~9.4 (8.6)
Postorbital head length	13.2~15.1	14.5~17.2
Interorbital width	5.6~6.8	5.8~6.8 (5.3)
Eye diameter	4.1~4.9	4.0~4.8 (5.0)
Upper jaw length	11.1~12.4	12.6~14.8 (13.7)
Caudal peduncle height	2.8~3.4	3.3~3.8 (3.8)
Snout to 1st dorsal fin	24.9~27.2	28.5~30.6 (28.8)
Snout to anal fin	44.1~50.5	49.1~57.1 (50.2)

\* Svetovidov (1963) gave 62 rays for his specimen.

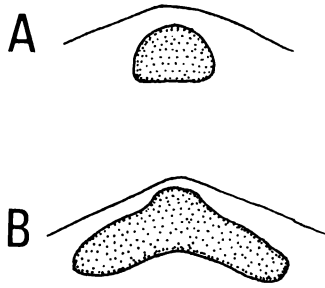


Fig. 3. Vomerine tooth patch. A: *Lepidion inosimae*. B: *Lepidion schmidti* (holotype, drawing by Dr. A. N. Svetovidov).

(SL 424 mm), Ramapo Bank (26°38'N, 140°53'E), 580~1100 m, Nov. 1, 1977.

**Description.** Meristic counts and proportional lengths are in Table 1. Body elongate, highest at pectoral fin, thence tapering to caudal peduncle. Head depressed, dorsal profile slightly convex. Head small, equal to distance between origins of pelvic and anal fin. Snout greatly rounded. Mouth terminal and wide. End of upper jaw at about center of eye. Nostril nearer to eye than to snout tip. Anterior nasal opening with a membranous wall posteriorly, forming a short anteriorly directed nasal tube. Posterior one also with a low membrane on its margin. Interorbital slightly convex, its width a little less than distance between anterior nasal openings, or 1.2 times orbit. Eye almost touching dorsal profile of head. Suborbital width about 2/3 of orbit. Upper jaw short and less than half head length. A barbel on chin about equal to eye diameter.

Jaws with villiform teeth, upper tooth band broader than lower one. Vomer with a small cluster of villiform teeth in a round patch (Fig. 3A).

Gillrakers rod-like with blunt tips, longest one about 2/3 of gill filament.

First ray of first dorsal fin minute, 2nd ray greatly elongate to about 20th ray of second dorsal fin when laid down. Second dorsal fin completely separate from first dorsal fin, its outer margin almost straight, posterior rays somewhat elongate to form a lobe. Outer margin of anal fin evenly concave at middle, posterior part of anal fin also forming a lobe. Caudal fin truncate. Length of

pectoral fin a little greater than postorbital head. Pelvic fin slender, outer rays elongate beyond origin of anal fin. Caudal peduncle slender, its height less than distance between posterior end of second dorsal fin and origin of caudal fin.

Lateral line exposed on body surface over scales, running from upper part of gill opening, parallel to dorsal profile of body to about 12th dorsal ray, and curving gradually downward to middle part of trunk, thence running almost straight to middle of caudal peduncle.

Body fully scaled, including most parts of dorsal and anal fins. Area around nostril, jaws and branchiostegal membrane scaleless. Outer surfaces of pectoral and pelvic fins, and caudal fins scaled basally.

Color in formalin: Head and body grayish brown. Lateral line brown. Paired fins, outer half of dorsal and anal fins, and caudal fin black. Nostril, margin of orbit and branchiostegal membrane black. Anus black.

**Distribution.** Sagami Bay in Japan, Emperor Sea Mounts, and Ramapo Bank (Fig. 2).

**Remarks.** *Lepidion inosimae* was first reported from the waters off Enoshima, Japan, and has rarely been reported since. Later, Tanaka (1927) described another species *Haloporphyrus oidema* from off Misaki in Sagami Bay, though the generic name is now replaced by *Lepidion*. As for the meristic counts, *L. inosimae* has 5 rays in the first dorsal fin and *L. oidema* has 4 rays. This difference is not significant in this genus, because there is a minute ray, which is easily missed externally, or sometimes absent. The most conspicuous meristic difference between the two is the number of anal fin rays (52 in *L. inosimae* and 49 in *L. oidema*). However, the anal fin of *L. inosimae* were found to consist of 49~55 rays, which overlap the count for *L. oidema* (Fig. 4). Morphologically we could not find any significant differences between these two species. Therefore, we consider that *L. oidema* should be placed under the synonymy of *L. inosimae*.

Known localities of the catch may show that this species has more southern distribution than *L. schmidti*.

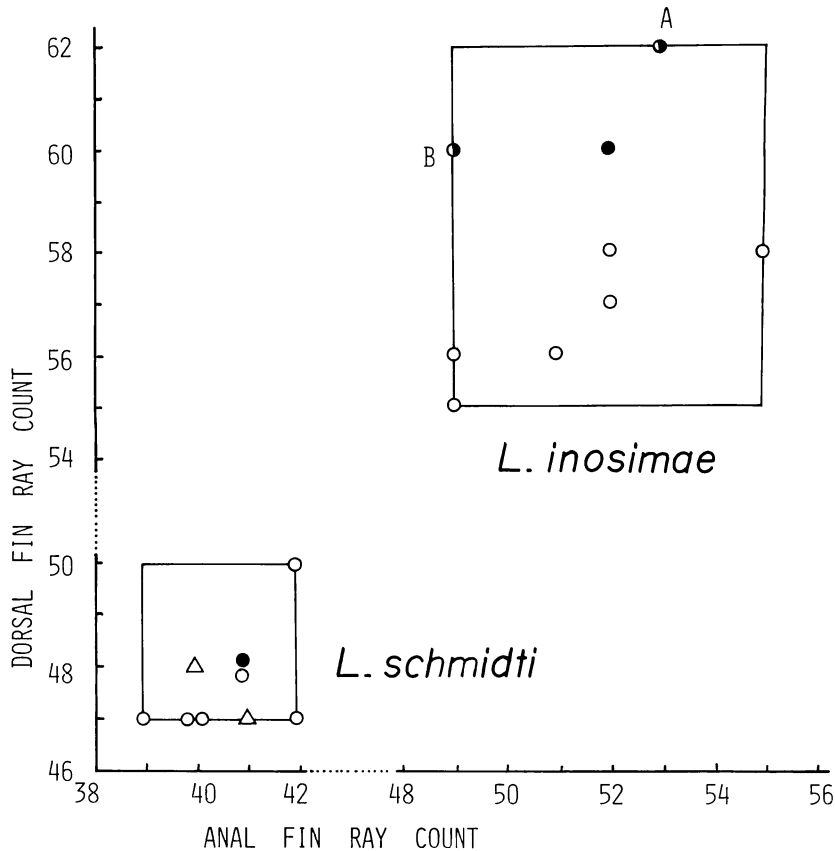


Fig. 4. Relation of 2nd dorsal and anal fin ray counts in *Lepidion inosimae* and *L. schmidti*. Open circles, specimens used in this study; solid circles, holotypes of each species; triangles, Templeman's (1979) *L. schmidti*; A, data from Svetovidov (1936); B, Tanaka's (1927) *L. oidema*.

***Lepidion schmidti* Svetovidov, 1936**

New Japanese name: Kitanokurodara  
(Fig. 1, bottom)

*Lepidion schmidti* Svetovidov, 1936: 226, fig. 1 (original description, Sagami Bay, Japan).

**Materials.** HUMZ 59469 (SL 623 mm), ca. 50 miles off Matsuwa Island in the Kurile Islands, 375 m, Aug. 10, 1975; HUMZ 59473 (SL 722 mm), Okhotsk Sea (51°52'N, 154°55'E), Mar. 16, 1977; HUMZ 69322 (SL 685 mm), off Iwate, Japan (39°00'N, 142°43'E), 1350 m, July 19, 1977; HUMZ 71910 (SL 647 mm), Emperor Sea Mounts (34°42'N, 171°48'E), 980~1100 m, June 22, 1977; HUMZ 72012 (SL 759 mm), Emperor Sea Mounts (38°03'N, 170°18'E), 920~1080 m, July 16, 1977; HUMZ

72039 (SL 924 mm), Emperor Sea Mounts (latitude and longitude unknown), depth and date unknown.

**Description.** Meristic counts and proportional lengths are in Table 1. Body elongate, highest at pectoral fin, thence tapering to caudal peduncle. Head depressed, dorsal profile slightly convex or almost straight. Head large, about 2 times upper jaw length. Snout greatly rounded. Mouth terminal and wide. Posterior end of upper jaw at about center of eye. Nostril nearer to eye than to snout tip. Anterior nasal opening with a membranous wall posteriorly, forming a short anteriorly directed nasal tube. Posterior one without any flap. Interorbital slightly convex, its width equal to internasal distance, or 1.3~1.4 times orbit. Eye almost touching dorsal

profile of head. Suborbital width about 2/3 of orbit. Upper jaw about half of head length. A long barbel on chin, 1.6~1.8 times eye diameter, or longer than interorbital width.

Broad band of villiform teeth on both jaws. Vomer with villiform teeth in a inverted V-shaped patch (Fig. 3B).

Gillrakers short and rod-like with blunt tip, longest one about half of gill filament.

First ray of first dorsal fin minute, 2nd ray (or 1st ray, when the minute first ray absent) greatly elongate to 11th-20th rays of second dorsal fin when laid down. Second dorsal fin completely separate from first dorsal fin, its outer margin almost straight, posterior rays somewhat elongate to form an obscure lobe. Outer margin of anal fin evenly concave at middle part, posterior part of anal fin also forming a lobe. Caudal fin truncate. Pectoral fin small, its length slightly shorter than postorbital head. Pelvic fin slender, outer rays elongate and longer than pectoral fin. Height of caudal peduncle about equal to distance between posterior end of second dorsal fin and origin of caudal fin.

Lateral line exposed on body surface over scales, running from upper part of gill opening, parallel to dorsal profile of body to 12th or 13th dorsal ray, and curving gradually downward to middle part of trunk, thence running almost straight to middle of caudal peduncle.

Body fully scaled, including most parts of dorsal and anal fins. Area around nostril, jaws and branchiostegal membrane scaleless. Outer surfaces of pectoral and pelvic fins, and caudal fin scaled basally.

Color in formalin: Head and body grayish brown to blackish brown. Lateral line blackish brown. Paired fins and outer half of dorsal and anal fins, and caudal fin black. Margins of orbit and anterior nasal opening black. Anus black.

**Distribution.** Sagami Bay and waters off Iwate Prefecture in Japan, Emperor Sea Mounts, and Okhotsk Sea (Fig. 2).

**Remarks.** *Lepidion schmidti* was originally described from Sagami Bay, Japan and has never been recorded since in the Pacific Ocean. This species is clearly characterized by the

definitely smaller numbers of second dorsal fin and anal fin rays (47~50 (48 in the holotype) and 39~42 (41) respectively) than those of known species (Fig. 4, Table 1). In addition, we have found that the shape of vomerine tooth patch is much different between these two northwestern Pacific species. Its shape in the holotype and our specimens of *L. schmidti* is like an inverted V, whereas *L. inosimae* has a rounded vomerine tooth patch (Fig. 3). This is a useful diagnostic character in identification of the northwestern Pacific *Lepidion*.

As noted above, no specimen of this species had been added from the Pacific and its adjacent seas. Templeman (1970), however, reported two large specimens taken from the Bay of Biscay in the Atlantic, and tentatively named them *L. schmidti*. Numbers of second dorsal fin rays (47 and 48) and anal fin rays (40 and 41) in his specimens clearly fall in our present extended ranges of this species (Fig. 4). We could not have access to Templeman's specimens, but the examination of their vomerine tooth patch is desirable.

#### Acknowledgments

We wish to express sincere thanks to Dr. A. N. Svetovidov of Zoological Institute, Academy of Sciences, Leningrad, U.S.S.R., for offering us the information on the holotype of *L. schmidti*. We are also indebted to Iwate Prefectural Fisheries Experimental Station and the T.S. Hokusei Maru of Hokkaido University for supplying us with specimens of *Lepidion*.

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北西太平洋産ソコクロダラ属 *Lepidion* の分類学的再検討

仲谷一宏・尼岡邦夫・阿部晃治

本属は第一背鰭や腹鰭の前方軟条が糸状に伸長すること、腹鰭が7~8軟条よりなること、臀鰭の外縁が彎入することなどで特徴づけられる。本属魚類は北西太平洋からは、ソコクロダラ *L. inosimae*、クロダラ *L. modestus*、カッタイダラ *L. oidema*、および *L. schmidti* の4種が知られている。著者らは北西太平洋から本属の魚類を数多く採集し、分類学的再検討を試みた。その結果、本属にはソコクロダラとキタノクロダラ (*L. schmidti* に対する新和名) の2種を認めることができ、カッタイダラはソコクロダラのシノニムであることが判明した。また、クロダラは腹鰭が2又した1軟条よりなり本属から除外されるべきであるとの結論を得た。

ソコクロダラとキタノクロダラは鰭条数や鋤骨歯の形態により簡単に識別できる。

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