

# Provisional Classification of Temperate Sea Bass, the Genus *Lateolabrax* (Pisces : Moronidae) from Korea

Chi-Hong Kim and Je-Cheon Jun

Puan hatcheries, National Fisheries Research and Development Agency,  
Puan 579-855, Korea

Korean temperate sea bass was examined for the taxonomically review. Based on the color pattern on the body sides and some morphometric characters, it was classified as two species, *Lateolabrax japonicus* and *Lateolabrax* sp.. *Lateolabrax japonicus* was redescribed and *Lateolabrax* sp. was provisionally described. *Lateolabrax* sp. is similar to *L. japonicus*, but differs from it by having some black spots on the body sides, fewer number of gill rakers, larger eye, higher position of the pored lateral line scales, and wider secondary body depth.

## Introduction

In temperate basses of the genus *Lateolabrax*, two species had been identified from Korea previously record : *Lateolabrax japonicus* and *L. latus*. The two species are significantly different from each other based on the number of dorsal fin rays, body depth and so on (Chyung, 1977). Recently two forms of *L. japonicus* from Japan and Korea were reported based on the morphological and genetic analysis, and were considered them as a distinct species respectively without taxonomically description (Yokogawa and seki, 1995 ; Park *et al.*, 1996). Through the morphological and taxonomically study of the temperate basses in recent from Korea, we regarded them as two independent species *L. japonicus* and *Lateolabrax* sp.. So *Lateolabrax* sp. is provisionally described as a differing species from *L. japonicus* in this paper.

## Materials and Methods

Materials : *L. japonicus* - 6 specimens, 465.0-640.0mm SL, Puan-gun, Chollabuk-do, 15 Jul. 1995 ; 69 specimens, 77.0-353.0mm SL, Kohung-gun, Chollanam-do, 16 Sep. and 23 Aug. 1996 *Lateolabrax* sp. - 8 specimens, 280-450mm SL, Puan-gun, 30 Aug. 1995 ; and 75 specimens, 43.2-87.3mm SL, Kohung-gun, 20 Apr. 1996. Methods : The specimens were fixed in 10% formalin solution and measured with a caliper to nearest 10th of a millimeter. The methods of counts and measurements followed mostly Hubbs and Largler(1964). Radiography by soft x-ray (Hitex 80-A, Japan) were used in counting the number of vertebrae and fin rays. All the specimens deposited at the laboratory of Puan hatcheries.

1. *Lateolabrax japonicus* (Cuvier et Valenciennes)

(Korean name : Nong-eo) (Fig. 1 A)



Fig. 1. *Lateolabrax japonicus*, 353mm. SL.(A) and *Lateolabrax* sp., 380mm. SL.(B).

*Labrax japonicus* Cuvier and Valenciennes, 1828 : 116~117, pl. 32

(original descr. in French, type locality : Japan)

*Lateolabrax japonicus*, Jordan and Mets, 1913 : No. 1, 30 (Pusan, Korea) ; Mori, 1952 : 1, 53~56 (Yellow Sea) ; Lindberg and Krasnyukova, 1969 : Part 3, 60~63 (Pusan, Korea) ; Chyung, 1977 : 298~300 (Korea) ; Chon, 1980 : 137 (East Sea, Korea).

Diagnosis : Body elongate and compressed ; 3~4 linear dots or absent on body side during young ; gill rakers, 23-27 ; lateral line, a gentle slope ; spawning, winter.

Description : Proportional measurements and counts for specimens shown in Table 1. Body elongate and compressed, outline evenly convex ; head moderately large and pointed. Mouth moderately large and oblique. Mandible slightly protrude, maxilla extending beyond posterior margin of eye, with small supplemental bone. Teeth small, villiform ; arranged in narrow lines front on jaws. Tongue toothless. Opercle rhombic, with small scales, posterior margin serrated. Nostrils close together with flap, upper front of eye. Eye moderate, a little shorter than snout. Interorbital space slightly convex, a little wider than eye. Gill rakers comblike, longer at center. Pectoral a little before posterior margin of opercle. Dorsal a lit-

tle before ventral ; fifth spine longest ; spinous and soft base connected, 1-2 concealed in body. Anal middle of soft dorsal vertical, just behind anus. Caudal peduncle slender, about two times longer than depth. Scales small ; ctenoid, outer margin serrated. Body and head scaled except upper maxilla and beneath the mandible. Pored lateral line scales continuous from upper opercle to caudal base, slightly curved to dorsal. Color in fresh, light green greyish on dorsal and silverly on ventral. Dorsal fin with black spots scattered irregularly. Upper part of body, 3-4 linear dots or not until about 200mm SL., but absent in adult. Pectoral, ventral and anal fins yellow pale ; caudal blackish grey.

Habits and Distribution : Spawning at coast or river mouth, from early to late December. Young fishes ascend into the river during the spring and descend into the sea during autumn in group. The food habit of this species is carnivorous. The present species is distributed widely from northern and southern parts of Japan to the southern sea and the Yellow Sea of Korea.

## 2. *Lateolabrax* sp.

(New Korean name : Chom Nong-eo) (Fig. 1 B)

*Lateolabrax japonicus* ; Jordan and Mets, 1913 : No. 1, 30 (Pusan, Korea) ; Mori, 1952 : 1, 53-56 (Yellow Sea) ; Lindberg and Krasnyukova, 1969 : Part 3, 60~63 (Pusan, Korea) ; Chyung, 1977 : 298~300 (Korea) ; Chon, 1980 : 137 (East Sea, Korea). Chinese form of *Lateolabrax* ; Yokogawa and Seki, 1995 : 437~445 (Japan). Spotted type of *Lateolabrax japonicus* ; Park *et al.*, 1996 : 437~444.

Diagnosis : Body elongate and compressed ; Black spots scattering irregularly on lateral body sides ; gill rakers, 19~23 ; lateral line, some more curved ; secondary body depth,

wide ; spawning, autumn.

Description : Proportional measurements and counts for specimens shown in Table 1. Body elongate and compressed, outline evenly convex ; head moderately large and pointed. Mouth moderately large and oblique. Mandible slightly protruded, maxilla extending beyond posterior margin of eye, with small supplemental bone. Teeth small, villiform ; arranged in narrow lines front on jaws. Tongue toothless. Opercle rhombic, with small scales, posterior margin serrated. Nostrils close together with flap, upper front of eye. Eye moderate, a little shorter than snout. Interorbital space slightly convex, wide as eye but a little narrower during young. Gill rakers comblike, longer at center. Pectoral a little before posterior margin of opercle. Dorsal a little before ventral ; fifth spine longest ; spinous and soft base connect-

ed, 1~2 concealed in body. Anal middle of soft dorsal vertical, just behind anus. Caudal peduncle slender, about two times longer than depth. Scales small ; ctenoid, outer margin serrated. Body and head scaled except upper maxilla and beneath mandible. Pored lateral line scales continuous from upper opercle to caudal base, some more curved to dorsal in young. Color in fresh, light greyish on dorsal and silvery light on ventral. Dorsal fin with black spots scattered irregularly. Both adult and young have spots scattering irregularly on lateral body sides having some variation in the numbers. Pectoral, ventral and anal fins yellow pale ; caudal blackish grey.

Habits and Distribution : Spawning at coast or river mouth, from middle of October to middle of November around Kohung bay. Fertilized eggs are colorless, floating and globe shape.

**Table 1. Proportional measurements and meristic counts of *Lateolabrax japonicus* and *Lateolabrax* sp. from Korea**

Locality	<i>Lateolabrax japonicus</i>		<i>Lateolabrax</i> sp.	
	Kohung	Puan	Kohung	Puan
Date of collection	23 Aug., 16 Sep. 1996	15 Jul. 1995	20 Apr. 1996	30 Aug. 1995
Number of individuals	69	6	75	8
Size (SL, mm)	175.0 (77.4~353.0)	582.0 (465.0~640.0)	65.4 (43.2~87.3)	405.0 (280.0~450.0)
In % of Standard length				
Head length	31.4±2.5	31.8±1.4	33.0±2.0	30.3±1.4
Body depth	25.8±1.9	24.3±1.1	28.3±1.6	27.7±2.0
Prepectoral length	29.9±2.3	27.8±2.1	30.4±2.1	28.2±1.6
Predorsal length	33.2±2.5	32.7±2.0	34.1±1.9	31.3±0.9
Preventral length	34.8±2.5	33.8±1.6	34.3±1.9	34.0±1.1
Preanal length	69.7±3.2	68.4±2.5	67.3±2.6	67.8±1.4
In % of Head length				
Snout length	27.1±4.1	28.0±2.6	30.6±3.1	26.7±2.7
Eye diameter	19.7±2.6	19.8±1.1	24.8±2.5	21.9±1.0
Interorbital width	24.1±2.3	23.6±1.8	22.3±2.6	21.6±1.8
Caudal peduncle length	65.5±5.5	64.7±2.5	63.5±8.3	69.8±3.3
Caudal peduncle depth	31.6±3.9	32.1±1.6	32.5±3.9	31.6±2.0
Number of				
Scales	77~101	94~98	94~99	98~103
Dorsal fin rays	X III ~ X IV, 12~13	X IV, 12	X III ~ X IV, 11~12	X V, 11~12
Anal fin rays	III, 8~9	III, 8	III, 7~8	III, 8
Gill rakers	23~27	24~27	19~23	21~23
Vertebrae	34~36	34~35	34~36	35~36

Their diameter is about 1.1~1.3mm mean. Their hatching time is 50~60hrs. 10 days after hatching total length is 3.2~3.5mm, 30 days 10.5~11.0mm, 100 days 40.0mm, one year 200mm, 2 years 310mm, and 3 years 430mm in aquaculture (Kim and Kim, 1995). Young fish ascend into the river during the spring and descend into the sea during the autumn in group. The food habit of this species is carnivorous. The present species is distributed to the coast of east China, Korea, and Japan.

### Discussion

*Lateolabrax* sp. had been considered as the same species of *L. japonicus* (Fowler, 1936 ; Lindberg and Krasnyukova, 1969 ; Chyung, 1977 ; Chon, 1980 ; Yamada, 1986). However Yokogawa and Seki (1995) considered that *L. japonicus* specimens from Japan (Japanese form) and from China (Chinese form) which is similar to *Lateolabrax* sp. might be separate as sibling species based on their morphological and genetic characters. Park *et al.* (1996) also reported that the present two populations from Korea should be separated at subspecies level by isozyme analysis. However there are some pending questions waiting for solution because there have been no concrete taxonomically discussion. In the morphological comparisons with two taxa *Lateolabrax* sp. can be distinguish from *L. japonicus* in having fewer number of gill rakers (*Lateolabrax* sp. : 19~23 ; *L. japonicus* : 23~27), wider secondary body depth (*Lateolabrax* sp. : 26.1~28.3 ; *L. japonicus* : 21.9~25.6, in percent of SL.) and higher position of pored lateral line scales (*Lateolabrax* sp. : 75.8~82.7 ; *L. japonicus* : 69.9~74.7, in percent of body depth) (Fig. 2, 3, 4). In comparison of eye diameter as similar results as Yokogawa and Seki (1995) were recognized. *Lateolabrax* sp. is some more

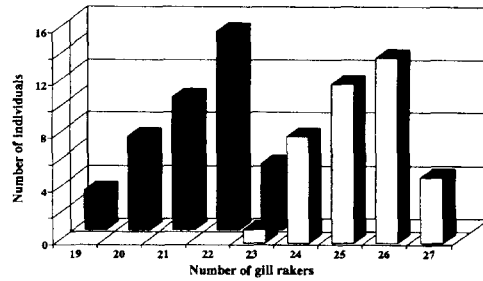


Fig. 2. Comparing the frequency distribution of number of gill rakers between the two species. Dark block ; *Lateolabrax* sp. and open block ; *Lateolabrax japonicus*.

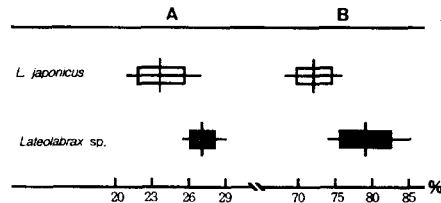


Fig. 3. Comparison the rate of secondary body depth in standard length(A) and pored line scales height in body depth(B) between the two species.

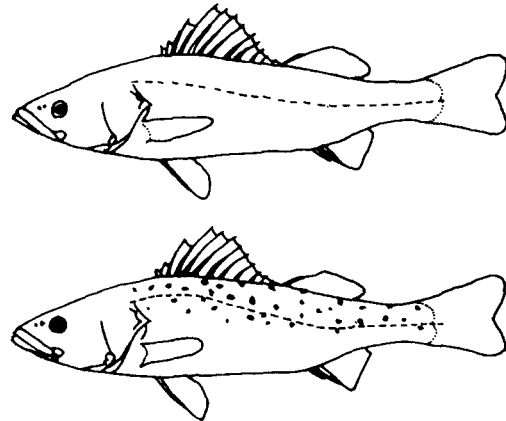


Fig. 4. Morphological difference of lateral line scales between the two species. Upper ; *Lateolabrax japonicus* and lower ; *Lateolabrax* sp.

larger than *L. japonicus* in young fish respectively (*Lateolabrax* sp. :  $24.8 \pm 2.5$  ; *L. japonicus* :  $19.7 \pm 2.6$ , in percent of HL) (Fig. 5). Moreover difference of spawning season between the two taxa have been known. Spawning periods of *Lateo-*

*labrax* sp. is from middle of October to middle of November whereas *L. japonicus* is from December to January the next year (Kang *et al.*, 1993 ; Kim and Kim, 1995 ; Hayashi, 1971 ; 1972). Because the two taxa are sympatrically distributed in coastal waters of Japan, Korea, and China, we regarded *Lateolabrax* sp. as not a subspecies but a independence species(Fig. 6). Through the further study of these species it will be found some more biological and ecological characters of the two species in the genus *Lateolabrax* from Korea respectively. So we consider that the *Lateolabrax* sp. should be treated as a provisional distinct species until further informations are available.

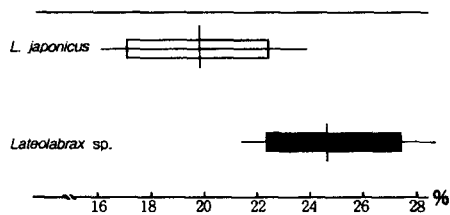


Fig. 5. Comparison of the eye diameter in head length between the two species.

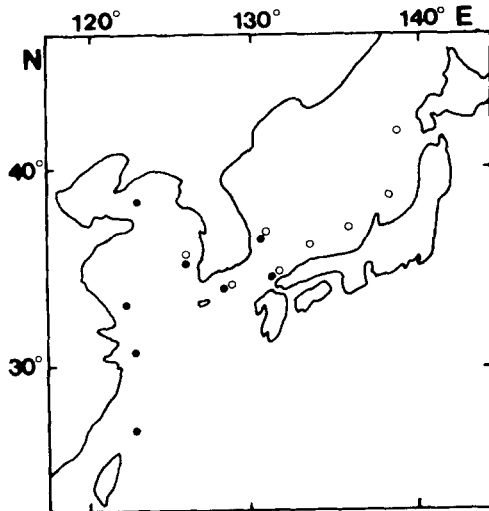


Fig. 6. Distribution of the two species(Okada, 1959 ; Chon, 1980 ; Yamada, 1986 ; and present study) Dark ; *Lateolabrax* sp. and open ; *Lateolabrax japonicus*.

Accordingly three species of the genus *Lateolabrax* are distributed around Korea.

## References

- Chon, Y. H. 1980. The fishes of Chosun east sea. Science Encyclopedia 464 pp. (In Korean).
- Chyung, M. K. 1977. The fishes of Korea. Iljisa, Seoul. pp. 298-300 (In Korean).
- Fowler, H. W. 1936. A synopsis of the fishes of China. Vol. 1. Reprinted by Antiquariaat Junk, Lochem, Netherlands. pp. 381-452.
- Hayashi, I. 1971. On the process of the testicular maturation of the Japanese Sea bass, *Lateolabrax japonicus*. Japan. J. Ichthyol. 18 : 39-50.
- Hayashi, I. 1972. On the ovarian maturation of the Japanese Sea bass, *Lateolabrax japonicus*. Japan. J. Ichthyol. 19 : 243-254.
- Hubbs, C. L. and K. F. Largler. 1964. Fishes of the great lakes region. Univ. Michigan press, pp. 19-26.
- Jordan, D. S. and C. W. Metz. 1913. A catalog of the fishes known from the waters of Korea. Mem. Carn. Mus. 9(1) : 65 pp.
- Kang, H. W. H. C. Sae, and S. W. Kim. 1993. Studies on the technology development for seed production of seabass, *Lateolabrax japonicus*. Technical report of NFRDA. 101 : 78-82 (In Korean).
- Kim, C. H. and S. G. Kim. 1995. Studies on the technology development for seed production of seabass, *Lateolabrax japonicus*. Technical report of WSFRI. 1994, pp. 252-256 (In Korean).
- Konishi, K. 1995. Fishes-new color guide for sport-fishermen. Weekly Sunday fishing co. Osaka, Japan. 559 pp. (In Japanese)
- Lindberg, G. U, and Z. V. Krasnyukova. 1969. Fishes of the Sea of Japan and the adjacent areas of the Sea of Okhotsk and the Yellow Sea. Part 3, Teleostomy, X X X Perciformes. Translated from Russian. Israel program for scientific translations, Jerusalem 1971, 498 pp.

- Mori, T. 1952. Check list of the fishes of Korea. Hyogo. Univ. Agr. Bio. ser. 1(3) : 1-228.
- Okada, Y. 1959-1960. Studies on freshwater fishes of the Japan. J. Fac. Fish. Pref. Univ. Mie. 4 : 634-637.
- Park, J. Y., K. K. Kim. and Y. Kim. 1996. Genetic characterization of two types of sea bass, *Lateolabrax japonicus* in Korea by isozyme analysis. J. Aqu. 9(4) : 437-444 (In Korean).
- Yokogawa, K. and S. Seki. 1995. Morphological and genetic differences between Japanese and Chinese sea bass of the genus *Lateolabrax*. Japan. J. Ichthyol. 41(4) : 437-445.
- Yamada, U. 1986. Fishes of the East China Sea and the Yellow Sea. Seikai Regional Fisheries Research Laboratory, No. 422 pp. 130-131 (In Japanese).

## 한국산 농어속 어류의 분류학적 검토

김 치 흥 · 전 제 천  
국립수산진흥원 부안수산종묘배양장

한국산 농어의 형태적 특징을 조사하여 농어 *Lateolabrax japonicus*를 재 기재하고 농어와 분류학적으로 다른 집단 *Lateolabrax* sp.를 독립된 종으로 간주하여 잠정적으로 기재하고 국명으로는 점농어라 하였다. 점농어는 체측에 뚜렷한 반점이 있고 눈이 크고 새파수가 적으며 2차 체고와 측선이 등쪽으로 구부러진 특징이 있다. 우리나라 서·남해안에는 농어와 점농어가 혼서 한다.