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First Record of the Remora, *Phtheirichthys lineatus* (Perciformes: Echeneidae) from Korea

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A single specimen of the family Echeneidae was collected from the coast of the East Sea, Korea. It was identified as *Phtheirichthys lineatus* by having a sucker with 10 pairs of disc laminae, 1+13 gill rakers and 40 vertebrae. A key to the family Echeneidae from Korea is provided. We propose a new Korean name "Yeol-jul-bbal-pan-i" for the species.

Key words : Echeneidae, *Phtheirichthys lineatus*, East Sea, first record

The family Echeneidae (remoras) was widely distributed in warm waters from Atlantic and Indian to Pacific Oceans, but rare in Atlantic and absent in Mediterranean (Okamura, 1986; Nelson, 1994; Hatooka, 2002). The remora presents the disc ridges like the slats in a Venetian blind, thereby causing the sucking action for riding on larger animals: sharks, bonyfishes, sea turtles, and marine mammals (Nelson, 1994). According to Hatooka (1994), it was described that the remoras from Japan were eight species belong to four genera. However, remoras from Korea were reported three species in three genera up to date (Kim *et al*., 2005). The most important taxonomic characteristics of these species are to have a sucker on head.

In the process of investigation of fishes from the East Sea of Korea, a specimen belongs to the genus *Phtheirichthys* was collected for the first time. It was identified into *P. lineatus* (Menzies, 1791), which has not been described from Korea until now. In this study, we describe *P. lineatus* as the first record from Korea based on a specimen.

Counts and measurements follow Hubbs and Lagler (1958), and number of fin rays and vertebrae were counted by radiographs of soft x-ray. The examined specimen was deposited in the Department of Biology, Kunsan National University (BKNU), Korea.

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Genus *Phtheirichthys* Gill, 1862

(New Korean name: Yeol-jul-bbal-pan-i-sok)

Phtheirichthys Gill, 1862: 239. Type species, *Echeneis lineatus* Menzies, 1791; Okamura, 1986: 662; Hatooka, 2002: 787.

Body long and slender, depth 10～14 in standard length; bluish black above, white below; dorsal and anal fin bases long; disc laminae 9～11 (Heemstra, 1986).

Phtheirichthys lineatus (Menzies, 1791)

(New Korean name: Yeol-jul-bbal-pan-i)
(English name: slender remora; Japanes nane: sujikoban)
(Fig. 1; Table 1)

Echeneis lineatus Menzies, 1791: 187, pl. 17, fig. 1, Tropical Pacific Ocean.

Phtheirichthys lineatus: Strasburg, 1967; Heemstra, 1986: 245; Lythgoe, 1994: 244; Hatooka, 2002: 787.

Material examined. BKNU 1067, 327.1 mm SL, Coast of East Sea, off Buk-myeon Uljin-gun, Kyeongsangnam-do, Korea, 16 August 2005,

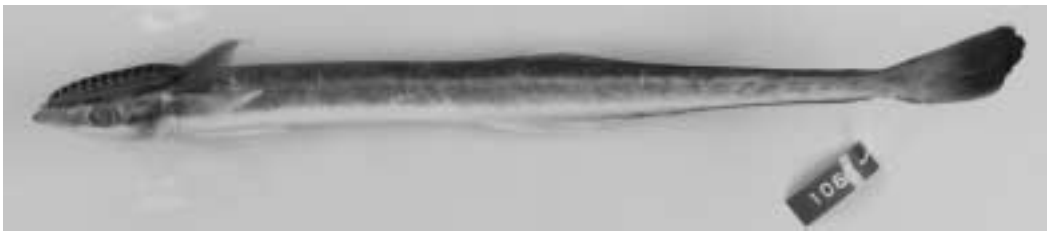

Fig. 1. *Phtheirichthys lineatus*. BKNU 1067, 327.1 mm SL.

Table 1. Comparison of meristic counts in *Phtheirichthys lineatus*

Characters	Present specimen (BKNU 1067)	Hatooka (2002)	Heemstra (1986)
Total length (mm)	378.8	–	–
Standard length (mm)	327.1	–	–
Dorsal fin rays	33	29~38	32~38
Anal fin rays	35	29~35	31~38
Pectoral fin rays	19	18~21	17~21
Vertebrae	40	39~41	40
Disc laminae	10	9~11	–
Branchiostegal rays	9	–	–
Gill rakers	1+13	–	(1~3)+(14~17)

collected by Yeon-Soo Bae.

Description. Dorsal fin rays 33, anal fin rays 35, pectoral fin rays 19, pelvic fin rays 5, vertebrae 40, branchiostegal rays 9, gill rakers 1+13 (Table 1).

In percentages to the standard length (SL): body depth 7.0%, head length 15.5%, caudal peduncle length 8.2%, caudal peduncle depth 2.8%, snout length 6.6%, eye dimeter 2.7%, interorbital width 8.4%, distance of predorsal 52.1%, distance of prepectoral 15.5%, distance of preventral 16.8%, distance of preanal 48.9%, length of dorsal fin base 40.8%, length of anal fin base 42.9%. In percentages to the head length: body depth 45.2%, caudal peduncle length 52.7%, caudal peduncle depth 17.9%, snout length 42.4%, eye dimeter 17.4%, interorbital width 54.2%, length of sucker 100%, width of sucker 42.4%. In percentage to the sucker length, sucker width 42.4%.

Body much slender and long; head flattened, and snout pointed; lower jaw longer than upper; head and sucker small and their length almost equal each other, sucker situated on the top of head, with ten pair laminae on ridges along sucker (Fig. 1 and 2); scales small and prolonged oval type, loosely and irregular arrangement in all body surface except sucker. Swim bladder absent. Tongue rather large. Upper and lower jaws with irregular 3 to 4 rows of conical teeth, and palatine teeth with conical and irregular. Second dorsal and anal fins opposite and similar to each other in their morphology. Pectoral and pelvic fins pointed and without spinous ray, caudal fin rounded (Fig. 2).

Color in 10% formalin solution. Dorsal and upper part of body bluish black, but lower part of body white, and without any patterns in body surface. A longitudinal stripe of upper part of body whitish (Fig. 1). Pectoral fin dark grayish, pelvic and anterior part of anal fin pale, dorsal fin blackish, caudal fin black, but its upper and lower margin white (Fig. 2).

Distribution. East Sea of Korea, Japan (Okamura, 1986; Hatooka, 2002).

Remarks. This species has free swimming and found on a variety of hosts, frequently adhering to barra cuda (*Sphyraema*) (Heemstra, 1986; Hatooka, 2002). *P. lineatus* is similar to *Echeneis naucrates* in morphology. However, *P. lineatus* easily distinguished from *E. naucrates* by having 10 paris of sucking laminae (18~28 pairs in *E. naucrates*) and vertebrae 40 (30). Heemstra (1986) mentioned that sucker is thought to represent a greatly modified spinous dorsal fin.

Key to the family Echeneidae from Korea

1a. Body stout and short without darker strips 2

Fig. 2. Morphology of sucker (left) and caudal fin (right).

1b. Body long and slender with darker strips ····· 3
2a. Sucker with 12～14 pairs of disc laminae. Caudal fin truncate ····· *Remorina albescens* 흰빨판이
2b. Sucker with 16～20 pairs of disc laminae. Caudal fin emarginate ····· *Remora remora* 대빨판이
3a. Sucker with 18～28 pairs of disc laminae. Pectoral fin with 22～23 soft rays ····· *Echeneis naucrates* 빨판상어
3b. Sucker with 10 pairs of disc laminae. Pectoral fin with 19 soft rays ····· *Phtheirichthys lineatus* 열줄빨판이

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우리나라의 동해 연안에서 채집된 빨판상어과 어류 1개체를 동정한 결과 지금까지 우리나라에서는 보고되지 않은 *Phtheirichthys lineatus* (Menzies)로 확인되었다. 본종은 외형상 *Echeneis naucrates*와 유사하지만 빨판의 판상체가 10개이고, 새파수가 1+13개이며, 척추골수가 40개인 점에서 전자와 쉽게 구별되었다. 본 종의 신한국명은 "열줄빨판이"라고 명명하였다.