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The First Record of Long Headed Eagle Ray, *Aetobatus flagellum* (Pisces: Myliobatidae) from Korea

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Abstract – A specimen of *Aetobatus flagellum* was collected at Uljin in June 2005 for the first time in Korea. This specimen is characterized by the cephalic fin, the long snout, the dorsal fin between pelvic fins, spiracles on the dorsal side of the disc, the deeply notched nasal curtain and the one row of the teeth in the lower and the upper jaws. And unlike *Aetobatus narinari*, it does not have any spots on the its dorsal side of the disc. We report this specimen as the first record from Korea and name it 'Bak-jui-ga-o-ri'[1)] in Korean.

Key words – first record, *Aetobatus flagellum*, Myliobatidae, Korea

There are 7 genera and 42 species of Myliobatidae around the world (Nelson 1994). Members of this family inhabit the coastal shallow waters in temperate and tropical seas (Last and Stevens 1994; Aonuma and Yoshino 2002). They feed on crabs, shrimps, bivalves, squids and small fish (Compagno 1986). They are an amphidromous and ovoviviparous fish (Dulvy and Reynolds 1997; Riede 2004).

Myliobatidae are classified into 7 genera (*Myliobatis*, *Aetomylaeus*, *Aetobatus*, *Pteromylaeus*, *Rhinoptera*, *Mobula* and *Manta*) based on characteristics such as shapes of the snout and the nasal curtain, the locations of the dorsal fin and the spiracles, arrangement of the teeth in jaws and the caudal spine (Last and Stevens 1994; Aonuma and Yoshino 2002). Until now, two genera and two species of Myliobatidae, *Myliobatis tobijei* and *Mobula japanica*, have been reported in Korea. (Kim *et al.* 2004).

We first collected *Aetobatus flagellum* Bloch and Schnieder, 1801, from the Korean waters. This present specimen agreed closely with the description of the holotype of *A. flagellum* (Bloch and Schneider 1801), which was characterized by the disc about two times as wide as long, the tapering head and margins of pectoral fins, the short dorsal fin and the nasal curtain deeply notched. In addition, characteristics such as the locations of the dorsal fin and spiracles and the one row of teeth in each jaw agreed with specimens described by Compagno and Last (1999) and Aonuma and Yoshino (2002). The specimen was deposited in the Korea Ocean Reaserch and Development Institute, Korea (KILAB00080).

Family Myliobatidae

Genus *Aetobatus* Blainville, 1816

(New Korean name: Bak-jui-ga-o-ri-sok)

Aetobatus Blainville, 1816: 112 (type species: *Raja aquila* Linneaus, 1758)

Stoasodon Cantor, 1849: 1416 (synonym, type species: *Raja narinari* Euphrasen, 1790)

Goniobatus Agassiz, 1858: 385 (synonym, type species: *Raja flagellum* Bloch and Schneider, 1801)

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1) 박쥐가오리

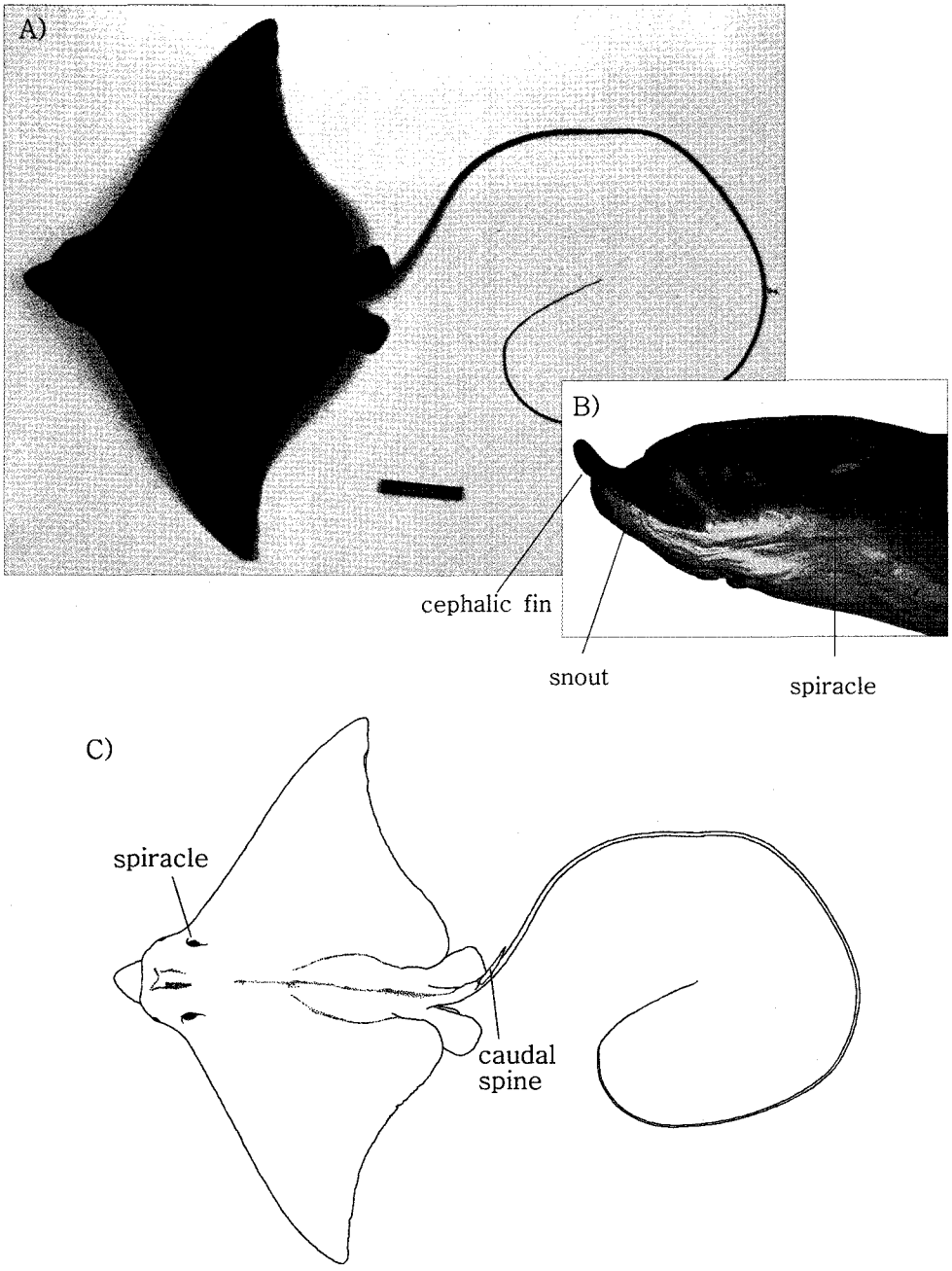

Fig. 1. The dorsal view of *Aetobatus flagellum* (♂), KILAB00080. A) a photo of dorsal side, B) a photo of lateral side, C) a picture of dorsal side.

***Aetobatus flagellum* (Bloch and Schneider, 1801)**

(New Korean name: Bak-jui-ga-o-ri)

(Fig. 1, Fig. 2, Table 1)

Raja flagellum Bloch and Schneider, 1801: 361, pl. 73 (type locality: Coast of Coromadel, India)

Goniobatus flagellum Agassiz, 1858: 385 (type locality: Sandwich Island, Hawaii)

Aetobatus flagellum McEachran and Séret, 1990: 68

Materials Examined

The specimen examined in this study was collected at Hupo, Uljin, Kyungsangbuk-do in 20 June 2005. It was transported to the laboratory and examined for its morphological characters. Then the specimen was stored in ethyl alcohol (95 %).

Color

Dark brown, unspotted on the dorsal side of the disc.

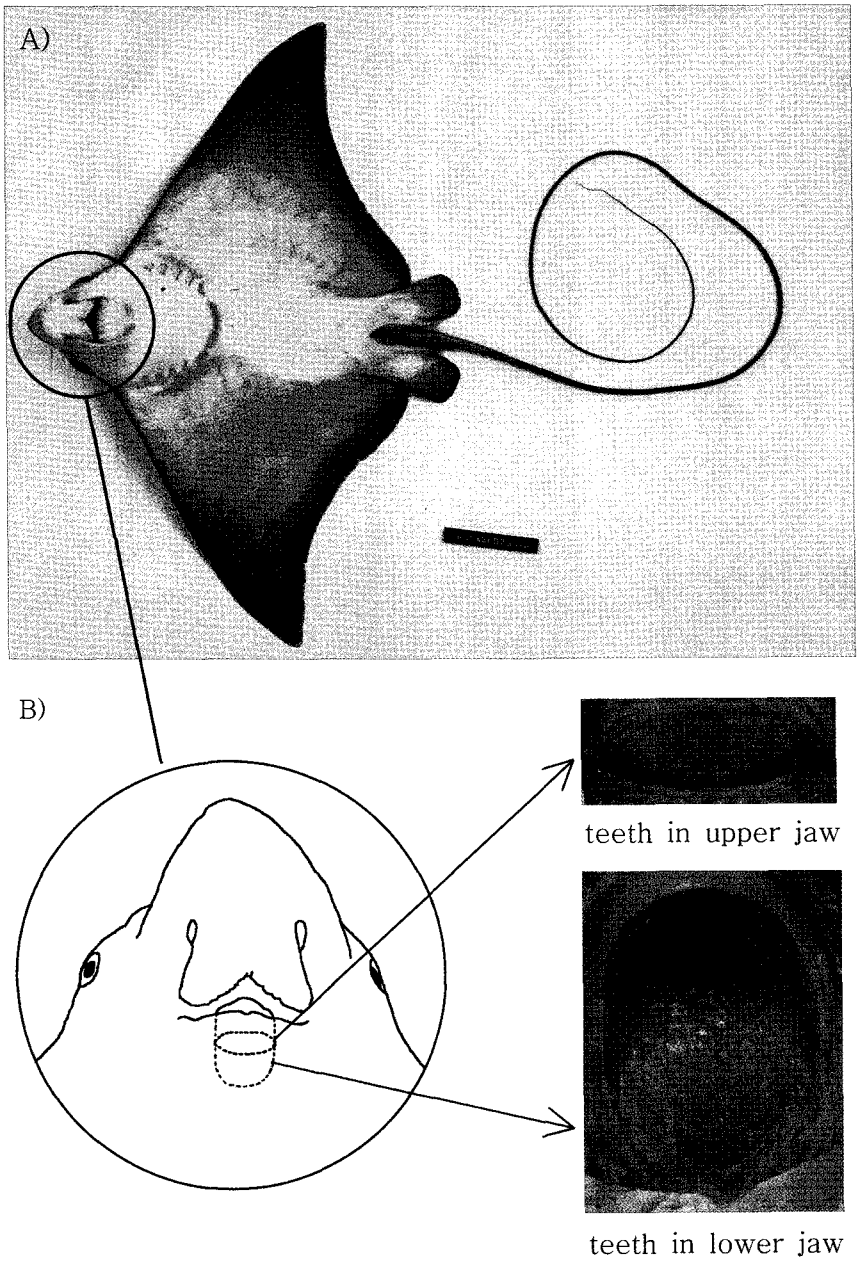

Fig. 2. The ventral view of *Aetobatus flagellum* (♂), KILAB00080. A) a photo of ventral side, B) the teeth in upper and lower jaws.

White with blackish margins on the ventral side of the disc.

Description

Counts and measurements are given in Table 1. This specimen is shaped like a rhomboid and its disc is about 1.7 times as wide as long. Its tail is longer than the disc length more than about 3.5 times. The cephalic fin is closely united at the snout, with tip projecting forward from the head. The snout forms a single lobe, very long and narrowly tapering. The eyes and the spiracles are located laterally on the dorsal side of the disc. The pectoral fins are separated from side of the head and form angular discs. The dorsal fin is located between the pelvic fins whose rear tips are broadly rounded. There is no caudal fin. The caudal spine behind the dorsal fin is not seen in the specimen but it seems to have been removed after fishing, judging by the presence of removal mark

Table 1. Measurements of *Aetobatus flagellum* (♂)

Characters	Length (% DL)
Sex	Male
Disc length (mm)	235.0 (100.0)
Disc width	397.5 (169.0)
Tail length	833.0 (354.0)
Head length	116.0 (49.3)
Snout length	27.5 (11.7)
Mouth width	27.8 (11.8)
Lower tooth width	14.9 (6.3)
Eye diameter	10.3 (4.4)

(Fig. 1). On the ventral side of the disc, there is a nasal curtain deeply notched and reaching the mouth. The teeth make a single row in both the lower and the upper jaws. The lower jaw teeth are shaped like chevrons and the upper jaw teeth form parallel lines. The specimen has five gill slits (Fig. 2).

These characters almost correspond to the ones described by Yamada *et al.* (1989) and Nakabo *et al.* (2001). The ratio of DW to DL of our specimen is almost same as the one of Yamada *et al.* (1989), but the ratio of TL to DL is larger than that of earlier reports. The number of rows of teeth are same as those of Nakabo *et al.* (2001).

Comparison of the other species

The snout length of *Myliobatis tobijei* is shorter than that of *A. flagellum*. Its dorsal fin is located behind the pelvic fins and the teeth are in 7 rows in the jaw (Nakabo *et al.* 2001; Kim *et al.* 2004). *Aetobatus narinari* of the same genera is morphologically similar to *A. flagellum* except for the presence of bluish spots on the dorsal side of the discs. *A. narinari* inhabits coral or rocky reefs, while *A. flagellum* inhabits coastal shallow waters (Table 2) (Aonuma and Yoshino 2002).

Distribution

Aetobatus flagellum inhabits inshore waters and is often found in brackish waters (Talwar and Jhingran 1991). It is distributed in the Indo-West Pacific, the Red Sea, India, the East Indies, the South China and Japan and the East Atlantic (McEachan and Seret 1990; Aonuma and Yoshino 2002).

Remarks

Aetobatus flagellum is reported from Shikoku, Wakayama, Shizuoka, and Kyushu of the southern Japan (Yamada *et al.* 1989; Nakabo *et al.* 2001), which have been considered as northern limit areas of the species in the northwest Pacific Ocean. The Kuroshio Warm Current (KWC) flows from the East China Sea following the west coast of the north Pacific Ocean. The Tsushima Warm Current (TWC) is separated from the KWC in Kyushu of western Japan (Lie and Cho 2002). Lee and Myoung (2003) reported that tropical and subtropical species are transported into the East Sea by the TWC. We consider that *A. flagellum* collected at Uljin also must have been introduced into the East Sea following the TWC.

Aetobatus narinari Euphrasen, 1790 had been a synonym for *Aetobatus flagellum* Bloch and Schneider, 1801 (Dor 1984). I think that is why morphological characters between the two species are similar except for the bluish spots on the dorsal side of disc: only *A. narinari* has these characters. In the future, DNA analysis will clarify further the distinction between *A. flagellum* and *A. narinari*.

Table 2. Comparison of habitat and morphological characters of *Aetobatus flagellum* to the other species

Characters	*Aetobatus flagellum**[1]	*Aetobatus narinari*[2]	*Myliobatis tobijei*[3]
Habitat	coastal shallow water	coral or rocky reefs	coastal shallow water
Color	dark brown with no spot	dark brown with bluish white spot	dark brown with blackish patch
Snout type	long and narrowly tapering	long and narrowly tapering	short and rounded
Location of spiracles	on the dorsal side of the disc	on the dorsal side of the disc	on the ventral side of the disc
Rows of the teeth	1	1	7
Location of the dorsal fin	on the disc between the pelvic fins	on the disc between the pelvic fins	on the disc behind the pelvic fins

*This specimen
[1]Aonuma and Yoshino (2002)
[2]Aonuma and Yoshino (2002)
[3]Nakabo *et al.*(2001) and Kim *et al.* (2004)

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