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A NEW RECORD OF MUDSKIPPER *PERIOPHTHALMUS SPILOTUS* (GOBIIDAE: OXUDERCINAE) FROM SELANGOR COAST, PENINSULAR MALAYSIA

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ABSTRACT

We report the mudskipper *Periophthalmus spilotus* for the first time from Peninsular Malaysia, based on 18 individuals captured at Sementa, Selangor, from May to August, 2000. The individuals caught here are similar to those from Sumatra described by MURDY & TAKITA, (1999). Features distinguishing this species from the available congeneric species are described below. Analysis of the stomach contents of 20 specimens revealed carnivorous feeding habits.

Key words: Food habits, goby, mudskipper, new record, Peninsular Malaysia, *Periophthalmus spilotus*

INTRODUCTION

Mudskippers, small euryhaline fishes best known for their amphibious habits, are the most conspicuous and unique fishes of mangrove areas. They are active on land during low tide and can live out of water for some time. The greatest diversity of mudskippers (subfamily Oxudercinae of Gobiidae) is in the genus *Periophthalmus (Ps.)*, with 14 species (MURDY, 1989; LEE *ET AL.*, 1995, MURDY & TAKITA, 1999). Their distribution and habitats are based on the presence of suitable muddy substrates such as those found in mangrove swamps, estuaries and mudflats in the intertidal zones of the Indo-Pacific and West Africa (MACNAE, 1968; CLAYTON, 1993).

CANTOR (1849) was the first author to record the occurrence of mudskippers in Peninsular Malaysia, but he did not record any *Periophthalmus* in his review. KOUMANS (1953) found *Ps. malaccencis* in Kuala Langat, Selangor. BERRY (1972) recorded two species of genus *Periophthalmus: Ps. chrysospilos* and *Ps. vulgaris* (now *Ps. argentilineatus*, reviewed by MURDY, 1989) in the Kuala Selangor coasts. MURDY (1989) contributed the most valuable taxonomic revision of oxudercine gobies and reported three species, namely, *Ps. chrysospilos, Ps. novemradiatus* and *Ps. gracilis*, from the mangrove shores of Peninsular Malaysia. TAKITA *ET AL.* (1999) observed 12 species of mudskippers along the shores of the Straits of Malacca.

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Ps. spilotus (MURDY & TAKITA, 1999), previously known only from Sumatra, Indonesia, is now reported for the first time in Peninsular Malaysia on the basis of several specimens collected from the coastal mangrove forest floor of Selangor.

All the specimens are deposited in the Institute of Biological Sciences, University of Malaya, Kuala Lumpur. The terminology and measurements used in this text essentially follow those in MURDY (1989) and MURDY & TAKITA (1999).

Material Examined: *Periophthalmus spilotus* Murdy & Takita, 1999: 18 specimens (SL: 40.3–71.4mm) from Sementa mangrove forests. 2 specimens KMZ–NYR000516S (7), (SL: 63.3–65.1 mm); 2 specimens KMZ–NYR000619S (7), (SL: 53.5–65.6 mm); 2 specimens KMZ–NYR000722S (7), (SL: 40.3–49.7 mm); 4 specimens KMZ–NYR000722S (8), (SL: 47.0–52.8 mm); 3 specimens KMZ–NYR000814S (7), (SL: 53.5–65.0 mm); 5 specimens KMZ–NYR000814S (8), (SL: 65.0–71.4 mm).

Comparative Materials: *Periophthalmus chr-ysospilos* Bleeker, 1852: 15 specimens (SL: 49.7–81.5 mm) from two localities (Morib and Jeram) were used for comparison. 1 specimen KMZ–NYR990504M (3), (SL: 77.0 mm); 1 specimen KMZ–NYR990616M (3), (SL: 73.7 mm); 2 specimens KMZ–NYR9900928J (5), (SL: 72.7–81.5 mm); 2 specimens KMZ–NYR990928J (4), (SL: 74.1–75.4 mm); 1 specimen KMZ–NYR991027J (3), (SL: 66.5 mm); 2 specimens KMZ–NYR991027J (2), (SL: 64.4–65.7 mm); 2 specimens KMZ–NYR991023M (2), (SL: 59.7–65.7 mm); 4 specimens KMZ–NYR991023M (1), (SL: 49.7–64.4 mm). *Periophthalmodon schlosseri* (Pallas, 1770): 15 specimens (SL: 79.5–187.0 mm) from two localities (Morib and Sementa) were used for comparison including, 3 specimens KMZ–NYR981027M (1), (SL: 129.0–185.0 mm); 4 specimens KMZ–NYR981027M (2), (SL: 117.0–126.0 mm); 1 specimen KMZ–NYR990802M (5), (SL: 164.0 mm); 1 specimen KMZ–NYR990913M (5), (SL: 104.0 mm); 1 specimen KMZ–NYR991109M (6), (SL: 88.2 mm); 1 specimen KMZ–NYR991207M (6), (SL: 94.6 mm); 1 specimen KMZ–NYR000415S (7), (SL: 187.0 mm); 1 specimen KMZ–NYR000516S (7), (SL: 80.0 mm); 1 specimen KMZ–NYR000619S (7), (SL: 79.5 mm); 1 specimen KMZ–NYR000814S (8), (SL: 80.6 mm).

Comparative materials for mudskippers, *Ps. spilotus*, *Ps. chrysospilos* and *Periophthalmodon (Pn.) schlosseri*, which have a rounded pelvic fins, are shown in Figure 1. These materials were collected between October 1998 until August 2000, on Selangor coasts. Abbreviations of institutions listed in the text follow LEVITON *ET AL.* (1985). First dorsal fin (D1), second dorsal fin (D2), standard length (SL) and total length (TL) were used throughout.

OBSERVATIONS

Diagnosis.—Besides having erectable eyes and a dermal cap covering the ventral portion of the eyes, the species from genus *Periophthalmus* have a single row of canninoid teeth in the upper jaw. The entire body, except for the snout, ithmus and interorbital region, is covered by cycloid scales. D1 height is of moderate length, greyish, with no stripe or spots and no elongated spine; D2 with a single dusky stripe medially; D1 and D2 are not contiguous to each other. Pectoral and caudal fins dusky coloured; a reddish spot was seen on the pectoral fins of live specimens. Anal and pelvic fins were translucent; the pelvic fins had a frenum, and completely united forming a disk. Total D2 elements 12–14 (rarely 14 with mean 13.7) and anal fin rays 13–15 (rarely 14 with mean 14.0). Pectoral fin rays 12–13 (rarely 13 with mean 12.4). The longitudinal scale counts were 56–62. The number of scales between D1 and D2 origin is 4–5, between D2 termination base and the origin of caudal fin are 11–14 scales, and between anal fin termination and the origin of caudal fins are 13–14.

Descriptions.—Count of first dorsal (D1) fin spines: IIIV–X; second dorsal (D2) fin spines, I, 13–15; anal fin rays, I, 12–14; pectoral fin rays, 12–14; pelvic fin rays, I, 5;

Figure 1. The pelvic fins of (a) *Ps. spilotus*, (b) *Ps. chrysospilos*, (c) *Pn. schlosseri*.

Figure 2. The diagnostic crescent-shaped red spot on the pectoral fins of *Ps. spilotus*.

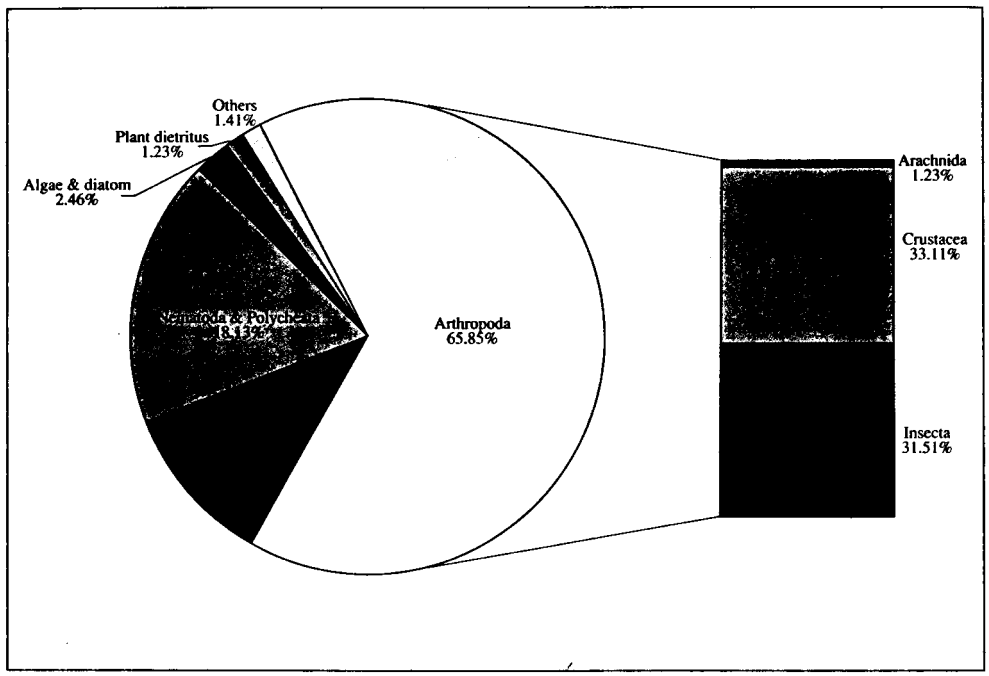

Figure 3. The percentages of animal groups in the stomach contents of *Ps. spilotus*.

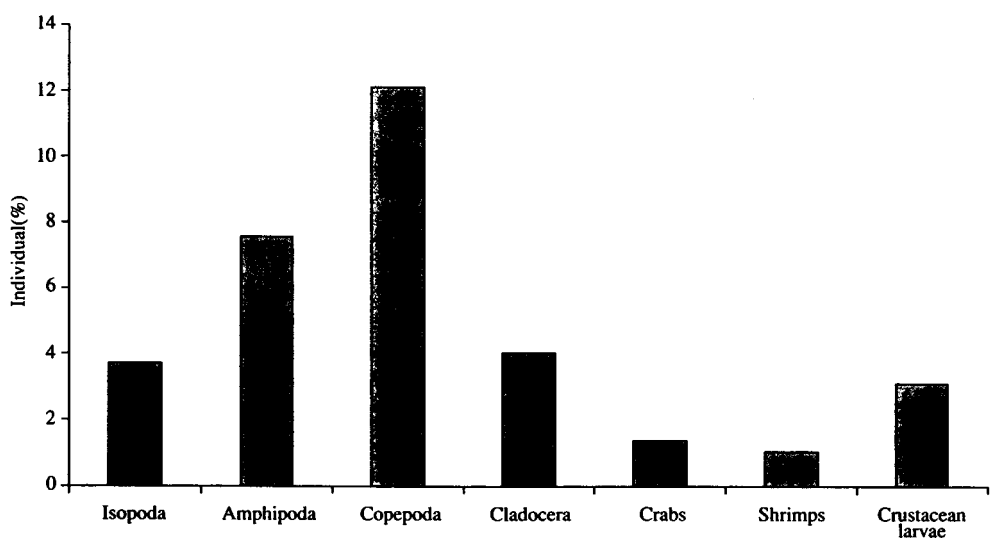

Figure 4. The components of Crustacea in the stomach of *Ps. spilotus*.

caudal fin rays, 17. The following proportional measurements are expressed as percent of SL: Body depth 15.6–18.9% SL (mean 17.1%), head length 24.0–28.1% SL (mean 25.8%), head width 20.5–25.8% SL (mean 23.7%) and head depth 19.1–21.9% SL (mean 20.7%). Length of D1 base 13.7–19.5% SL (mean 16.6%), length of D2 base 21.9–25.1% SL (mean 23.3%), length of anal fin base 20.8–23.7% SL (mean 22.3%), pectoral fin length 20.7–26.6% SL (mean 23.8%) and pelvic fin length 11.2–14.9% SL (mean 13.3%).

Colouration.—The following description is based on freshly dead specimens. Head and trunk greyish; whitish-blue and black spots on the trunk; numerous black spots densely concentrated on opercle and ventral to eye. Pectoral fins dusky with a red spot (crescent shape – Fig. 2). Pelvic and anal fins white; D1 spine yellowish, interspinous membrane basally reddish brown, distally black with white margin; D2 margin red with a black stripe through middle of fin, base pale. Ground colour in preserved specimens brown with white ventrum; no blotches were seen on dorsum and a few black spots were found on the trunk. Colouration of pectoral, caudal, pelvic, and anal fins as in freshly dead specimens; D1 greyish with pale margin and D2 pale with a dusky stripe medially; pectoral and anal fins grey with no spots on pectoral fins; pelvic and anal fins translucent.

Habitat.—Specimens were collected from two distinct zones of mangrove forest of Sementa (3° 5' N, 101° 21' E), the mixed forest zone and the *Rhizophora* zone. The main species of the mixed forest zone were *Avicennia officinalis, Sonneratia alba, Rhizophora apiculata and Bruguiera cylindrica.* Here, the trees reached 12 m in height. The mangrove forest floor was muddy and well shaded by the trees. The *Rhizophora* zone was exclusively occupied by mature *Rhizophora apiculata.* The forest had a height of about 10 to 15 m. The floor was loamy mud with many burrows of brachyuran crabs scattered on the mud surface. *Ps. spilotus* was found living sympatrically with other species of mudskippers such as *Ps. novemradiatus, Ps. gracilis, Pn. schlosseri,* and *Boleophthalmus boddarti.* They were seen to be associated with burrows of crabs, *Uca* sp or *Macropthalmus* sp.

Stomach Contents.—Examination of the stomach contents of 20 specimens indicated that this species feeds mainly on arthropods (65.9%) especially Crustacea (33.1%) and insects (31.5%) (Fig. 3). Amongst the Crustacea, Copepoda and Amphipoda were highly consumed by this species as the percentages found were 12.2% and 7.6%, respectively (Fig. 4). Other items recognised in the stomach were Nematoda, Polycheata, Mollusca (gastropods and bivalves) and plant fragments.

DISCUSSION

The obvious character that distinguishes the genera *Periophthalmus* and *Periophthalmodon* is the row of teeth in the upper jaw (MURDY, 1989). Within the genus *Periophthalmus*, only *Ps. chrysospilos* has united pelvic fins (Fig. 1). Furthermore, the male *Ps. chrysospilos* had a characteristic elongated D1 spine and in both males and females, orange spots scattered on the trunk and opercle. Live specimens of *Ps. spilotus* had whitish-blue spots scattered on the trunk and opercle and a few small black spots scattered laterally on the trunk. A crescent-shaped red spot is found on the pectoral fins of *Ps. spilotus* (Fig. 2).

Mudskippers from the genus *Periophthalmus* have been considered carnivorous (KHOO, 1966; CLAYTON, 1993) but detailed studies found plant material in the stomach (LIM, 1967; LIM, 1971). *Ps. spilotus* in this study, although predominantly carnivorous consumed, small fragments of plant material (Fig. 3).

This study found *Ps. spilotus* to be restricted to the mangrove forest, and living sympatrically with *Ps. novemradiatus, Ps. gracilis, Pn. schlosseri,* and *B. boddarti* in Sementa mangrove forest, Selangor. These findings support TAKITA *ET AL.* (1999), who reported that *Ps. spilotus* was associated with mangrove forest and occurred together with *Ps. novemradiatus* and *Ps. gracilis.*

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