First record Neostethus bicornis Phallostethidae Atheriniformes for Sumatran waters, Indonesia

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Article

First record *Neostethus bicornis* (Phallostethidae: Atheriniformes) for Sumatran waters, Indonesia

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Abstract
A specimen of *Neostethus bicornis* was collected on 8 April 2018 in Musi River, South Sumatra Province, Indonesia. The specimen was identified, photographed and preserved. No scientific publication has previously reported *N. bicornis* in the South Sumatran waters, nor in any other areas in Sumatra. Recent finding of *N. bicornis* in South Sumatran waters is a first providing evidence to confirm its presence in Sumatra.

Key words: Priapium fish, Phallostethidae, *Neostethus bicornis*, new, Sumatra, Musi River, estuarine.

Introduction

The Phallostethidae family is unique family of small fishes that occur in brackish and freshwater (rarely coastal marine) in Southeast Asia (Nelson *et al*. 2016). This family comprises a group of small, minute atherinomorph fishes distinguished from all other teleosts by the presence in males of a complex, bilaterally asymmetric, subcephalic copulatory organ, the priapium (Parenti 1989). The priapium is used to hold the female during mating while the eggs are being laid (Kottelat *et al*. 1993; Nelson *et al*. 2016).

The Phallostethidae family is consisting from four genera: *Neostethus, Phallostethus, Phenacostethus* and *Gulaphalus* (Nelson *et al*. 2016). *Neostethus* differs from all other phallostethids in having a priapium with an inner pulvinular bone (vs. lacking the bone), thin bony projections on the papillary bone that may number 80 or more (vs. lacking such bony projections) and two ctenactinia (Parenti 1989; Parenti 2014). The genus of *Neostethus* comprises from 12 species: *Neostethus lankesteri* Regan, 1916, distribute in Thailand, peninsular Malaysia, Singapore, and Borneo; *N. bicomis* Regan, 1916, peninsular Malaysia, Singapore, Thailand, Borneo, and Palawan, Philippines; *N. palawanensis* (Myers, 1935), Palawan, Philippines; *N. amaricola* (Villadolid & Manacop, 1935), throughout Philippines; *N. thessa* (Aurich, 1937), Mindanao, Philippines; *N. ctenophorus* (Aurich, 1937), Luzon, Philippines; *N. bomeensis* Herre, 1939, Borneo and Coron, Philippines; *N. zamboangae* Herre, 1942, Mindanao and Luzon, Philippines; *N.*

villadolidi Herre, 1942, throughout Philippines; *N. robertsi* Parenti, 1989, Luzon, Philippines; *N. djajaorum* Parenti & Louie, 1998, South Sulawesi Selatan, Indonesia; and *N. geminus* Parenti 2014, North Borneo (Parenti 2014).

In Indonesia, Phallostethidae were reported in 1991, and four species are already known in the area, but more should be expected (Kottelat *et al*. 1993). Furthermore, a new species of *Neostethus djajaorum* is described in Sulawesi (Parenti & Louie 1998). Information on phallostethid in Sumatra is very limited, only *N. lankesteri* and *Phenacostethus phoston* reported from Sumatra, based on records of both species in Riau in 1991 (Kottelat *et al*. 1993). In this paper, we report the occurence of *Neostethus bicornis*, providing evidence to confirm its presence in Sumatra.

Material and Methods

During 3 April 2016 and 8 April 2018, the phallostethid fishes found in four localities in South Sumatran waters (Fig.1): at mangrove habitat of Sembilang river on 3 April 2016 (2°0'27.8568" S, 104°40'35.1444" E); at mangrove habitat of Barong river on 16 March 2018 (2°9'44.8812" S, 104°53'59.568" E); at mangrove habitat of Bungin river on 17 March 2018 (2°12'59.1444" S, 104°52'14.664" E); and in freshwater habitat near mouth of Musi river on 8 April 2018 (2°23'29.85" S, 104°55'0.4368" E). The three locations mentioned above are part of Berbak-Sembilang National Park, and due to restrictions of our research permits, we had no authorization to bring any specimens outside the park, but the individuals were well photographed. One specimen from mouth of Musi river was collected, and deposited to Museum Zoology of Sriwijaya University (MZS) with catalogue number Muszoo/Ict/Deposit/Coll.01.08042018. The major morphometric and meristic characters of specimen deposited in MZS and compared with other specimens are presented in Table 1.

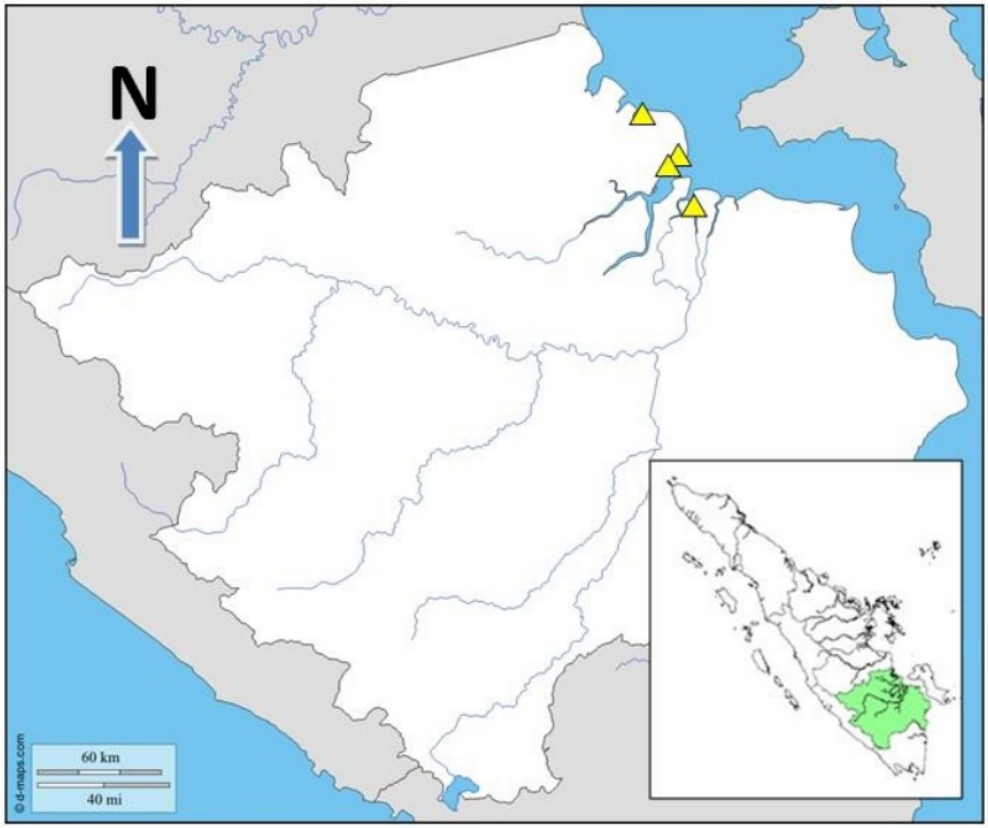

Figure 1. Map showing location of *N. bicornis* in South Sumatran waters.

Table 1. Morphometric and merictic characters of phallostetids. SL = standard length, D1 = first dorsal rays, D2 = second dorsal rays, A = Anal rays, V = vertebrae, OSP = other specimens.

Characters	MZS	PAR
SL	20.6 mm	12.9-20.9 mm
D1	1	1
D2	6	5-6
A	16	15-16
V	36	36-37

Comparison of other specimens are on the basis of Parenti (1989).

Results and Discussion

The phallostethid fishes found in South Sumatran waters were identified up to species level as *N. bicornis* with the help of keys given by appropriate references (Roberts 1971; Parenti 1989; Kottelat *et al*. 1993; Parenti 2014). *Neostethus bicornis* is distinguished from all other phallostethid fishes by the mature males with two elongate ctenactinia (Fig. 2); vs. one elongate and one short ctenactinium in other *Neostethus,* except *N. geminus*. *Neostethus bicornis* share two elongate ctenactinia with N. *geminus*, but differs from *N. bicornis* in being smaller (reaching no more than 25.7 mm SL vs. 31 mm SL) and having a relatively compact priapium with a fore shortened, broad aproctal axial bone that meets but does not overlap the pulvinular appendage (vs. a relatively elongate priapium with a long and narrow aproctal axial bone that overlaps the pulvinular appendage medially), thin, nearly translucent, broad papillary bone expanded distally into a tab (vs. a short papillary bone); and females with a thin fold of skin (Fig. 3), vs a thickened ridge just posterior to the fold and separated from lacking a ridge and a gap. In addition, our identification of *N. bicornis* was confirmed by Dr. Lynne Parenti, the leading expert for phallostethids in the world.

Figure 2. The preserved specimen of *N. bicornis* caught at freshwater habitat near mouth of Musi river on 8 April 2018 in Musi River, Banyuasin district, South Sumatra Province, Indonesia (Photo: Muhammad Iqbal).

Except information on *Neostethus lankesteri* in Riau (Kottelat *et al*. 1993), information of *Neostethus* in Sumatra almost nothing. No scientific publication has previously reported *N. bicornis* in the South Sumatran waters, nor in any other areas in Sumatra. Recent finding of *N. bicornis* in South Sumatran

waters is a first providing evidence to confirm its presence in Sumatra. The only possible explanation for data limitation on *Neostethus* in Sumatra could be combination of small size make it overlooked and presumed as fish larva; and lacking number of ichthyologists who can identify the phallostethid fish to genus or species level.

Figure 3. The live specimens of female *N.bicornis* caught on 17 March 2018 in Bungin River, Banyuasin district, South Sumatra province, Indonesia (not preserved).

The habitat of *N. bicornis* found in South Sumatran waters is the estuary of rivers surrounding or near mangrove forest. The east coast of South Sumatra province and Musi river are great significance and it is considered of the most important wetlands in Indonesia (Wibowo & Suyatno 1998). South Sumatran waters has rich fish fauna biodiversity, but it is still unexplored well. Recent attention to the fish fauna biodiversity in South Sumatran waters revealed some new records for Sumatra, such as *Crossocheilus obscurus*, *Fluvitrygon oxyrhynchus, F. signifer, Lobocheilos ixocheilos* and *Urogymnus polylepis* (Iqbal & Yustian 2016; Iqbal *et al*. 2017a, b, c; Iqbal *et al*. 2018a, b, c). The finding of *N. bicornis* in Sumatran water is of interest as it provides additional opportunities to examine the spatial distribution and genetic relationship for phallostethids in Indo-Malay Archipelago in the future.

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