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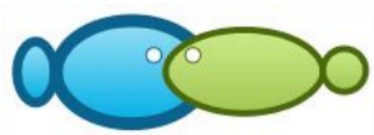
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Diversity of penja fish (amphidromous goby) in Leppangan River, West Sulawesi, Indonesia

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Abstract. Penja fish is a group of Gobioidae fish and belongs to amphidromous migratory fish, being present throughout the waters that have access to the river as a route for its migration. One location that is currently still inhabited by this fish group is Leppangan River, West Sulawesi. This study was aimed to determine the species of penja fish (amphidromous goby) within the Leppangan river. Fish samples were collected using trap net and clove oil, further identified based on their morphometric and meristic characteristics. The number of penja fish caught in the Leppangan River was 174 individuals consisting of 6 genera and 9 species. The results of identification of all samples consisted of *Sicyopterus lagocephalus*, *Sicyopterus longifilis*, *Stiphodon semoni*, *Stiphodon atropurpureus*, *Sicyopus zosterophorum*, *Smilosicyopus leprurus*, *Schismatogobius* sp, *Eleotris fusca* and *Eleotris* sp. Species of *S. zosterophorum* has the largest number of 67 individuals and dominated about 38.5% of the total number of species caught in the Leppangan river during the study. The presence of penja fish in the Leppangan river adds information on the distribution of Gobioidae fish populations, particularly those which migrate amphidromously.

Key Words: Gobioidae, amphidromy, species composition, penja fish.

Introduction. Penja fish is one of the Indonesian fishery commodities that are in great demand as one of the consumption fish that has high economic value. The penja fish migrate amphidromously, so the pattern of life begins with the river then performs a planktonic phase for several months at the sea and returns to the river for its growth and reproduction (McDowall 2007; Keith et al 2008). Penja fish that often be caught by fishermen in every migration season is a group of fish belonging to the suborder Gobioidae consisting of two families namely Gobiidae and Eleotridae. According to Carpenter & Niem (2001), Gobiidae family is the largest of the fish families in marine waters with a maximum size of 30 cm and more than 220 genera and 1500 species have been described, while the family of Eleotridae is estimated to have about 40 genera and 150 species.

West Sulawesi Province is one of the areas along the coast of local fishermen that are active in fishing penja during a new moon. One area that is currently exploited for penja fish is Leppangan river. Penja fish may be found in almost all rivers that have entrance to marine waters as the path of migration. This study was aimed to determine the diversity of penja fish species settled in the Leppangan river, in addition as one reference material to compare the presence of penja fish species in different locations.

Material and Method. The study was conducted from November 2017 to July 2018 in the Leppangan river, West Sulawesi (Figure 1). Sampling was done using trap net and clove oil, then fish samples were preserved by 70% alcohol and taken to the laboratory to be identified based on their morphometric and meristic characteristics of each species (Sakai & Nakamura 1978; Burhanuddin & Iwatsuki 2003; Keith et al 2015).

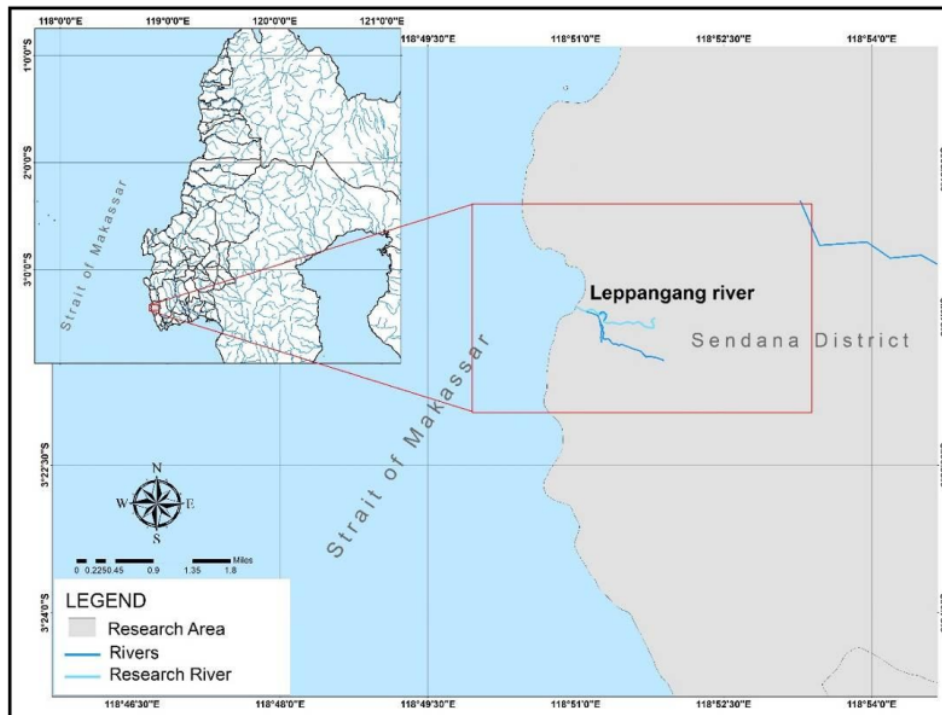


Figure 1. Sampling location in Leppangang river, West Sulawesi.

Statistical analysis. The composition of penja fish species is calculated and compared descriptively that is made in graphical form using Microsoft Excel 2016. The composition of the species is calculated by the equation (Fachrul 2007):

$$Sc = \frac{ni}{N} \times 100$$

where: Sc = species composition;
 ni = individual composition of each species;
 N = individual composition of all fish species.

Results. Based on observations during the study, the total number of penja fishes observed and captured on the Leppangang river were 174 individuals consisting of 6 genera and 9 species (Table 1; Figure 2).

2 Checklist of Penja fish in Leppangang river, West Sulawesi Table 1

No	Family	Species	N
1	Gobiidae	<i>Sicyopterus lagocephalus</i>	21
2		<i>Sicyopterus longifilis</i>	8
3		<i>Sicyopus zosterophorum</i>	67
4		<i>Smilosicyopus leprurus</i>	12
5		<i>Stiphodon semoni</i>	29
6		<i>Stiphodon atropurpureus</i>	25
7		<i>Schismatogobius</i> sp.	6
8	Eleotridae	<i>Eleotris fusca</i>	4
9		<i>Eleotris</i> sp.	2
Total			174

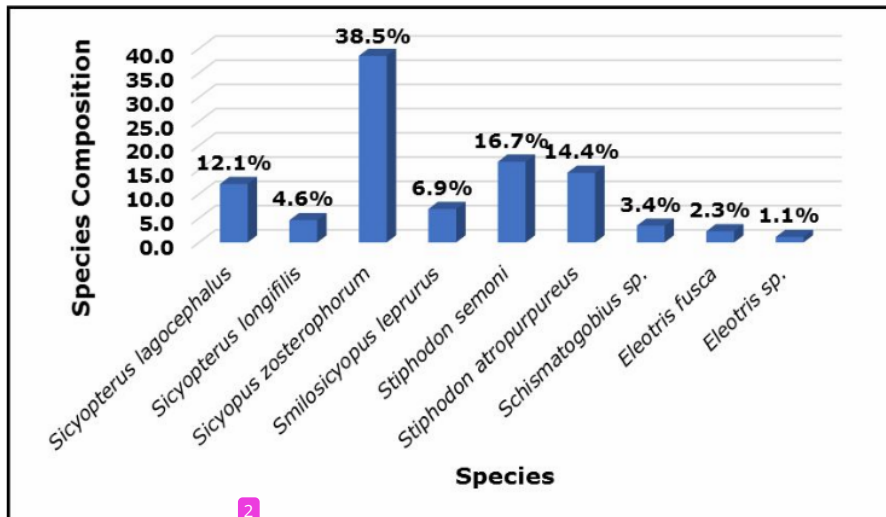


Figure 2. The composition of penja fish species caught in the Leppangan river, West Sulawesi.

Discussion. Regular penja fish fishing activities are carried out at the Leppangan River estuary when the fish are migrating from the sea to the river during a new moon, where local people only catch penja fish for consumption at the relatively small postlarva phase with a total size range of 20-40 mm.

The type of fish from the Gobiidae family found in the Leppangan River consists of two subfamilies namely Sicydiinae and Gobionellinae, where subfamily Gobionellinae is represented by one species only, namely *Schismatogobius sp.* And it is known that the number of species that have been reported to date is only 24 species (www.fishbase.org), and six of them are found in Indonesia: *S. bussoni*, *S. saurii*, *S. arscuttoli*, *S. insignis*, *S. bruynisi*, and *S. risdawatiae* (Keith et al 2017). While the subfamily Sicydiinae has as many as 6 species including *S. lagocephalus*, *S. longifilis*, *S. semoni*, *S. atropurpureus*, *S. zosterophorum* and *S. leprurus*; Keith et al (2011) states that so far known subfamily Sicydiinae consists of 10 genera including *Akihito*, *Cotylopus*, *Lentipes*, *Parasicydium*, *Stiphodon*, *Sicyopterus*, *Sicydium*, *Sicyopus*, *Smilosicyopus* and one more genus that has not been described. Ebner et al (2011) states that Sicydiinae is a subfamily of a family of high diversity, Gobiidae, found in the tropics in the Indo-Pacific region.

The existence of penja fish in the Leppangan River adds information about the distribution of the Gobioidae fish population, especially the species that migrate amphidromously, because not all species of Gobioidae migrate. So far based on data according to Carpenter & Niem (2001) there are only two families of Gobioidae suborder (Gobiidae and Eleotridae), while for the family of Gobiidae from 5 subfamilies only two subfamilies are known to migrate amphidromously i.e. subfamily Gobionellinae and subfamily Sicydiinae.

Conclusions. Identification results from all samples obtained included *S. lagocephalus*, *S. longifilis*, *S. semoni*, *S. atropurpureus*, *S. zosterophorus*, *S. leprurus*, *Schismatogobius sp.*, *Eleotris sp.* and *E. fusca*. The *S. zosterophorus* species had the highest number of 67 individuals and dominated around 38.5% of the total number caught in the Leppangan River during the study. The results of the research obtained add information about the diversity of Gobioidae fish species, especially those that do amphidromous migration.

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