First record of *Osteochilus vittatus* (Cypriniformes: Cyprinidae) in Madura Island, Indonesia

[1]Veryl Hasan, [2]Soemarno, [3]Maheno S. Widodo, [4]Dewa G. R. Wiadnya

[1] Airlangga University, Fisheries and Marine Faculty, Fish Health and Aquaculture Management Department, Surabaya 60115, East Java, Indonesia; [2] Brawijaya University, Agriculture Faculty, Agroecotechnology Department, Malang, 65145, East Java, Indonesia; [3] Brawijaya University, Fisheries and Marine Science Faculty, Aquatic Resources Management Department, Veteran Malang, 65145, East Java, Indonesia; [4] Brawijaya University, Fisheries and Marine Science Faculty, Fisheries and Marine Resources Utilization Department, Malang, 65145, East Java, Indonesia.
Corresponding author: V. Hasan, veryl.hasan@fpk.unair.ac.id

Abstract. *Osteochilus vittatus*, a fish species in family Cyprinidae, is known from Southest Asia, Sumatra, Borneo and Java. In Java, it was previously known only from mainland and had never been reported to occur in Madura Island. This paper provides the first record of *O. vittatus* from Poreh River in Madura Island, thereby extending the distribution of the species approximately 170 km east from the mainland of Java. The specimens of *O. vittatus* were characterized as follows: dorsal fin rays 14-16; ventral fin rays 9; pectoral fin rays 15-16; anal fin rays 8.
Key Words: freshwater fish, distribution, bonylip barb, Poreh River.

Introduction. Southeast Asia is still connected as a broad land called Sundaland at last glacial era (Voris 2000). In the region there are many large rivers that are connected to each other from Indochina to the Java Sea (Sathiamurthy & Voris 2006). When the sea level rised, Sundaland was divided into several large and small islands that then separated the small rivers from the main river (Hanebuth et al 2000). This has resulted in the spread of several freshwater fish species to be isolated due to geological changes (Hall 2013), especially fish from the Cyprinidae which is the largest family of freshwater fish in the region (Rainboth 1991).

One of the freshwater fish species of the family Cyprinidae spread in Southeast Asia is bonylip barb, *Osteochilus vittatus*. Researchers had noted that *O. vittatus* was a native fish found in Indochina (Rainboth 1996), Thailand (Doi & Taki 1997) and Indonesia (Roberts 1989; Kottelat et al 1993). Especially in Java, *O. vittatus* was spread by the main rivers and tributaries starting from West Java to East Java (Roberts 1993). However, the existence of *O. vittatus* outside the mainland such as Madura Island has not been recorded. Research on the existence of species that were separated from the main regions needs to be done to complete the data distribution. The purpose of this study is to provide information about distribution extention of *O. vittatus* in Java.

Material and Method

The fish sampling and description of the study sites. Sixteen (16) live specimens of *O. vittatus* were obtained from a local angler during a fieldwork carried out on 9-10 July, 2018 in the Poreh River (7°02'21"S, 113°46'35"E) (Figure 1). Administratively, the site is located in Madura Island, Poreh Village, Sumenep Regency, East Java Province, Indonesia. Fishing could be freely carried out without requiring special permits, but based on local wisdom the use of non-environmentally friendly fishing gear was prohibited from

operating (Kolding & van Zwieten 2014). The fishing gear used by the angler was a small hook with bottom and bait used were crustaceans (Stein et al 2012).

Figure 1. Poreh River, Sumenep Regency, Madura Island, the fishing site of *O. vittatus.*

Fish identification. In order to ensure the validity of the species, the morphological characters analysis of *O. vittatus* was carried out based on Weber et al (1916).

Results and Discussion. The 16 live specimens of *O. vittatus* (Figure 2) had a total length between 14 and 21 cm. Eight (8) of them were used as preserved specimens in 4% formalin solution and deposited at the Hydrobiology Laboratory, Brawijaya University, Malang, Indonesa (Hydro/Os/VII/2018). The remaining eigth (8) were kept as livestock at the Fish Reproduction Laboratory, Brawijaya University, Malang Indonesia. The 8 live individuals were transported in polyethylene bags with oxygen.

Figure 2. Specimens of *O. vittatus* captured on July 10 2018 in Poreh River, Madura Island.

Diagnosis. Snout bluntly rounded, prominent, in front with a large median pore or tubercle and a lateral smaller one on each side, the three being placed in a more or less horizontal series; there may be besides other smaller pores, especially in juvenile

specimens. Maxillary barbels about as long as the eye, the rostral ones smaller. Origin of dorsal fin opposite to 8th or 9th scale of lateral line, separated by 10-12 scales from occiput. Lateral line scales 33-34. Anterior rays of dorsal fin more or less prolonged, their height equal to or more than length of head. Anal with the anterior rays prolonged, shorter than head, opposite to 21st to 23rd scale of lateral line and about 2 scales behind end of dorsal fin. Ventral fins slightly longer than pectoral fins, reaching anus or not so far, or even to anal fin. Their origin opposite to 11th or 12th scale of lateral line and to 2nd or 3rd branched dorsal ray, separated by 4 to 4½ scales from lateral line. Caudal fin deeply emarginate and the lobes pointed. In juvenil specimens there may be dark spots on the scales. Sometimes one or two series of dark spots on the dorsal fin (Figure 3). All of these characters were found in specimen of *O. vittatus* from Poreh River, Madura Island. In the present study, fin radius variation was detected (Table 1), which is due to environmental factors (Turan et al 2004).

Figure 3. Morphology of *O. vittatus*.

Table 1

Comparison of fin rays number of *O. vittatus* from Poreh River, Sumenep Regency, Madura Island with *O. vittatus* from the study of Weber et al (1916)

Parameter	*Poreh River, Madura Island*	*Weber et al (1916)*
	Min-Max	*Min-Max*
Dorsal fin rays	14-16	13-16
Ventral fin rays	9	9
Pectoral fin rays	15-16	14-17
Anal fin rays	8	8

Distribution. The discovery of *O. vittatus* in the Poreh River, Madura Island is the first record of this species beyond its type locality (mainland of Java), and represents the easterly extension of previously known distribution about 170 km (Figure 4).

However, in addition to Madura Island, *O. vittatus* could be located on other islands too, at a further distance such as Bawean Island, Masalembo Island and Kangean Islands. For a native species, new records are important contributions for understanding biogeography and species diversity, among other biological topics (Iqbal et al 2017; Oliveira et al 2018; Cuevas et al 2018). As reported in this paper, the new record of *O. vittatus* has helped to improve the knowledge of the species as it extends the distribution range of the species further east. The spread of *O. vittatus* on Madura Island could be caused by the Poreh River was being connected to East Sunda River at last glacial era (van Bemmelen 1949), then being cut off and isolated due to rising sea levels. Besides

geological factors, the spread of fishes outside the mainland could occur due to human introduction factors (Copp et al 2005).

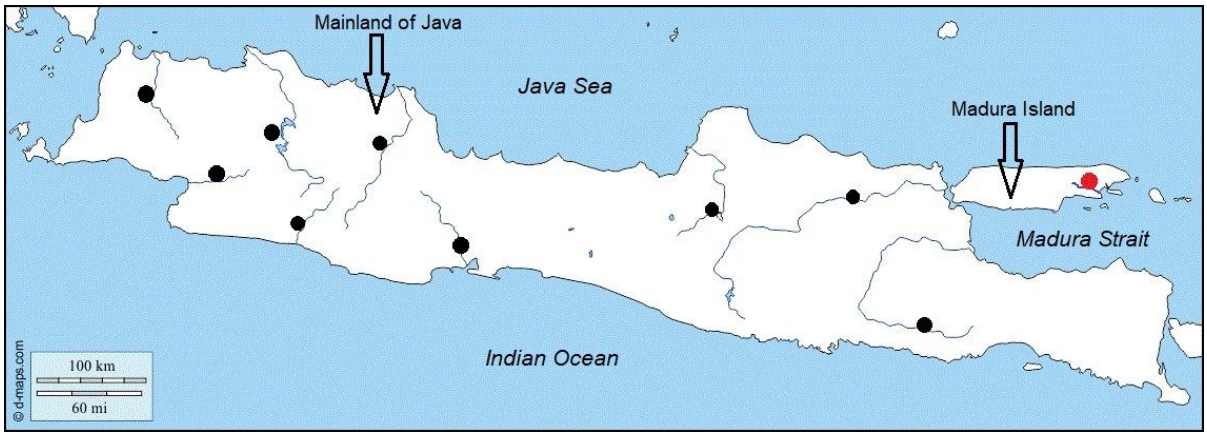

Figure 4. Distribution of *O. vittatus*. Black circles are the previous known localities of the species in the mainland of Java. Red circle is the recent record from the Poreh River, Madura Island.

Conclusions. *O. vittatus* is a southeast Asian native fish that is not only spread on the mainland of Java, but this fish also exists on the island of Madura whose position is at the eastern end of Java. The existence of *O. vittatus* in a remote area added to the data on the distribution of fish in Indonesia.

Acknowledgements. The authors would like to thank Indonesian Ministry of Finance for financial supporting to Veryl Hasan through dissertation research no. 20160221035555.

References

Copp G. H., Wesley K. J., Vilizzi L., 2005 Pathways of ornamental and aquarium fish introductions into urban ponds of Epping Forest (London, England): the human vector. Journal of Applied Ichthyology 21(4):263-274.

Cuevas J. M., Gómez S. E., García M. L., 2018 New record of the critically endangered striped smooth-hound, *Mustelus fasciatus* (Garman, 1913) (Chondrichthyes, Triakidae), in the Southwest Atlantic. Check List 14(6):1151-1153.

Doi A., Taki Y., 1997 Genetic differentiation of *Osteochilus hasseltii* (Telestei: Cyprinidae) in Thailand. The Raffles Bulletin of Zoology 45(1):61-72.

Hall R., 2013 The palaeogeography of Sundaland and Wallacea since the Late Jurassic. Journal of Limnology 72(2):1-17.

Hanebuth T., Stattegger K., Grootes P. M., 2000 Rapid flooding of the Sunda Shelf: a Late-Glacial sea-level record. Science 288(5468):1033-1035.

Iqbal M., Setiawan A., Aprilia I., Isa M., Yustian I., 2017 First record of *Lobocheilos ixocheilos* Kottelat & Tan, 2008 (Cypriniformes, Cyprinidae) in South Sumatra province, Indonesia. Check List 13(6):931-933.

Kolding J., van Zwieten P., 2014 Sustainable fishing of inland waters. Journal of Limnology 73(1):132-148.

Kottelat M., Hui T. H., 2008 A synopsis of the genus *Lobocheilos* in Java, Sumatra and Borneo, with descriptions of six new species (Teleostei: Cyprinidae). Ichthyological Exploration of Freshwaters 19:27-58.

Kottelat M., Whitten A. J., Kartikasari S. N., Wirjoatmodjo S., 1993 Freshwater fishes of Western Indonesia and Sulawesi. Periplus Editions, Jakarta, Indonesia, 221 pp.

Oliveira C. A. M., de Oliveira A. G., Pavanelli C. S., 2018 Expanding the geographical distribution of *Astyanax biotae* Castro & Vari, 2004 (Characiformes, Characidae), with comments on its conservation status. Check List 14(2):387-392.

Rainboth W. J., 1991 Cyprinids of South East Asia. In: Cyprinid fishes: systematics, biology and exploitation. Winfield I. J., Nelson J. S. (eds), Chapman and Hall, London, pp. 156-209.
Rainboth W. J., 1996 Fishes of the Cambodian Mekong. FAO, Rome, Italy, 265 pp.
Roberts T. R., 1989 The freshwater fishes of western Borneo (Kalimantan Barat, Indonesia). Memoirs of the California Academy of Sciences 14:1-210.
Roberts T. R., 1993 The freshwater fishes of Java, as observed by Kuhl and van Hasselt in 1820-23. Zoologische Verhandelingen 285:1-94.
Sathiamurthy E., Voris H. K., 2006 Maps of Holocene sea level transgression and submerged lakes on the Sunda Shelf. The Natural History Jjournal of Chulalongkorn University 2:1-44.
Stein J. A., Shultz A. D., Cooke S. J., Danylchuk A. J., Hayward K., Suski C. D., 2012 The influence of hook size, type, and location on hook retention and survival of angled bonefish (*Albula vulpes*). Fisheries Research 113:147-152.
Turan C., Erguden D., Turan F., Gurlek M., 2004 Genetic and morphologic structure of *Liza abu* (Heckel 1843) populations from the rivers Orontes, Euphrates and Tigris. Turkish Journal of Veterinary and Animal Sciences 28(4):729-734.
Van Bemmelen D. W., 1949 The geology of Indonesia. Vol. IA: General geology of Indonesia and adjacent archipelagos. Government Printing Office, The Hague, 732 pp.
Voris H. K., 2000 Maps of Pleistocene sea levels in Southeast Asia: shorelines, river systems and time durations. Journal of Biogeography 27(5):1153-1167.
Weber M. V. C., de Beaufort L. F., Bleeker P., 1916 The Fishes of the Indo-Australian Archipelago. Vol. III. Brill, Leiden, 476 pp.

Received: 21 October 2018. Accepted: 30 January 2019. Published online: 28 February 2019.
Authors:
Veryl Hasan, Airlangga University, Fisheries and Marine Faculty, Fish Health and Aquaculture Management Department, Surabaya 60115, East Java, Indonesia, e-mail: verylbp@gmail.com
Soemarno, Brawijaya University, Agriculture Faculty, Agroecotechnology Department, Malang, 65145, East Java, Indonesia, e-mail: smno@ub.ac.id
Maheno S. Widodo, Brawijaya University, Fisheries and Marine Science Faculty, Aquatic Resources Management Departement, Veteran Malang, 65145, East Java, Indonesia, e-mail: lynxpardel@yahoo.co.id
Dewa G. R. Wiadnya, Brawijaya University, Fisheries and Marine Science Faculty, Fisheries and Marine Resources Utilization Department, Malang, 65145, East Java, Indonesia, e-mail: dgr_wiadnya@ub.ac.id

How to cite this article:
Hasan V., Soemarno, Widodo M. S., Wiadnya D. G. R., 2019 First record of *Osteochilus vittatus* (Cypriniformes: Cyprinidae) in Madura Island, Indonesia. AACL Bioflux 12(1):338-342.