

Short communication

The Invasive of Freshwater Prawn *Macrobrachium lanchesteri* (De Man, 1911) from Watershed in Palangkaraya University, Kalimantan, Indonesia

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Abstract

Freshwater prawn species *Macrobrachium lanchesteri* (De Man, 1911) in Kalimantan for the first time was reported to be found only in East Kalimantan and there have been no reports of this species being found in Central Kalimantan. This study aims to reveal the presence of invasive freshwater prawn and habitat characteristics found in the watershed of Palangka Raya University. This study was conducted in October–November 2019 covering five stations. Specimens were collected using a purposive sampling method. Environmental parameter measurements were made including types of substrate, water velocity, tree cover, water depth as well as width. The identification of specimens from the watershed of Palangka Raya University based on morphological characteristics shown that the species very similar to the alien freshwater prawn, *M. lanchesteri*. Based on the results of research, this report has revealed the presence of this invasive species in Central Kalimantan, Indonesia.

INTRODUCTION

Freshwater shrimp is one of the tropical invertebrate that has an important role in the structure of nutrients cycle. According to Covich and McDowell (1996), freshwater shrimp can preserve nutrients and can move nutrients from the river back to the surrounding forest, increase the nutrient cycle and play a role to preserving nutrients locally. Habitat of the shrimp covers the entire waters from rivers, swamps and lake. In the Southeast Asia region, there are three families of freshwater shrimp, namely Atyidae, Palaemonidae and Alpheidae. In Indonesia, shrimps generally belong to the family Palaemonidae and Atyidae (Holthuis, 1980; Chan, 1998). According to Grave *et al.* (2008); Wowor *et al.* (2009), the Palaemonidae family is dominated by the

genus *Macrobrachium* and is a genus with a high degree of diversity of freshwater crustaceans with about 240 species. Freshwater prawns are a major source of protein that often globally cultured in many countries .

Based on the research by Syafrudin (2016), two of the shrimps found in the Kahayan watershed, Palangka Raya City were *Litopenaeus vannamei* and *Macrobrachium rosenbergii*. Wowor *et al.*, (2009) explained that *M. lanchesteri* only found in East Kalimantan. There is no reported for freshwater shrimp (*Macrobrachium lanchesteri*) in the rivers of Central Kalimantan. This study was aimed to reported and described morphological characters of *M. lanchesteri* from watershed in Palangka Raya University, Central Kalimantan, Indonesia.

MATERIAL AND METHODS

Sampling was conducted at five station in the watershed area of Palangka Raya University and identification specimens was carried out in Department of Biology, Faculty of Mathematics and Natural Sciences, Palangka Raya University. The research map can be seen in figure 1.

In the station I, the substrate was mud with a slow-water current. Water depth was 58 cm, and the width was 1.23 m. There were many “Kiambang” plants (*Salvinia molesta*). The water turbidity was high because this location was often used as a fishing ground by the local people. The characteristics of station II were muddy substrate with slow water currents and high turbidity levels. Water depth was 54 cm and width was 4.61 m. In

this station, there are many stone fragments. Station III has a muddy substrate and a slow-water current also. Water depth was 38 cm, and width was 4.61 m. This station was also high turbidity levels and often used as a fishing ground. Station IV has muddy substrate with a slow-current. Water depth was 70 cm and a width was 8.6 m. Similar to station III, the water turbidity was high caused by stone fragments. Station V, the river substrate was mud with a slow current river, with depth was 55 cm and width was 9.9 m. Like other stations, this area has high turbidity levels due to many stone fragments and often used as a fishing ground. However, a total of 59 individuals of freshwater prawns only found in this station.

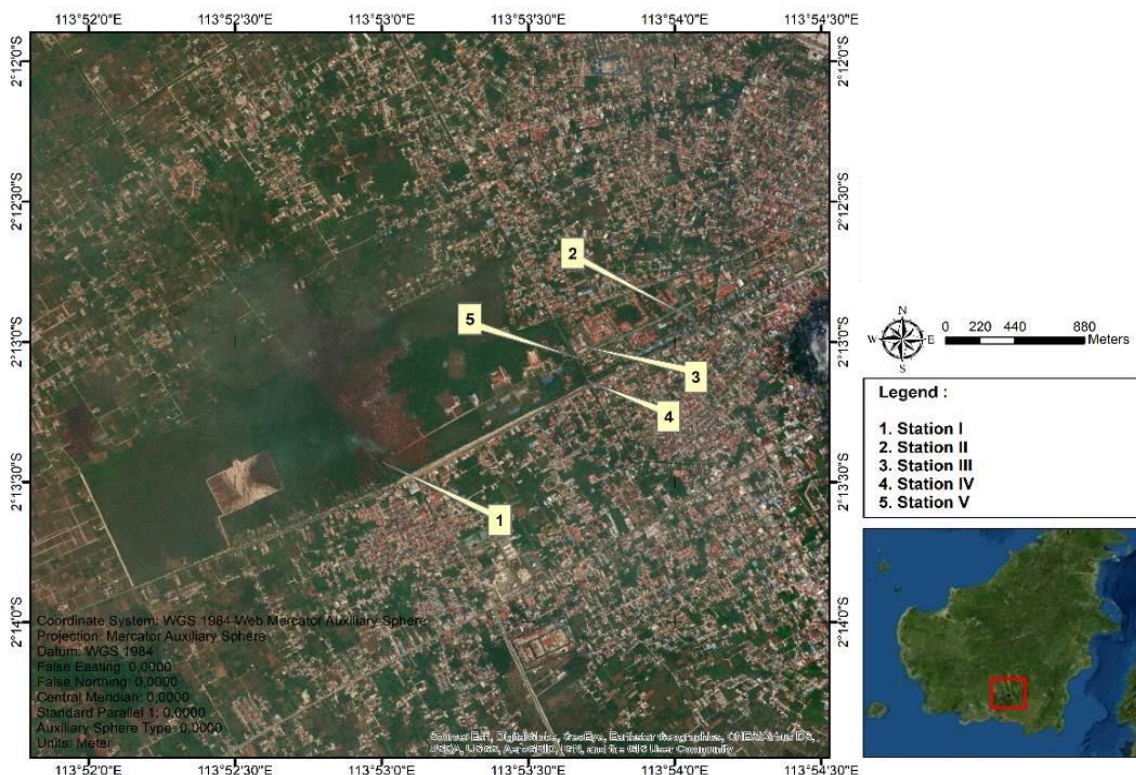


Fig 1. Research map: observation point (□)

The method of this study was purposive sampling. The specimens were collected using a hand net or caught by hand. The specimens were put into a bottle and preserved in 70% ethanol. For identification purposes, specimens were taken into the University of Palangka Raya, Central Kalimantan, Indonesia. For identification purposes, specimens were taken into the Department of Biology, University of Palangka Raya, Central Kalimantan, Indonesia. The species were determined based on morphological characteristics, taxonomy and body measurements following Wowor et al. (2004). The characteristic of the habitat at each station was documented in figure 2. The

environmental factor measurement was carried out at the beginning of sampling. Physical factors that observed visually are substrate type, habitat, and canopy cover, while the water depth and width were measured using a meter. Water velocity was divided into two categories as follows: <2 m/s means fast-flowing, while > 2 m/s means slow flowing.

RESULT AND DISCUSSION

This study have done at 5 stations. Totally, 59 individuals has been collected from one station (Station V). Based on the identification result, morphologically, our specimens fit well with the description of *Macrobrachium lanchesteri* reported

by Wowor *et al.*, (2004). Rostrum teeth of this species were not evenly distributed and there were parts that not serrated and had a fracture at the end of the rostrum (Figure 3B), the carpus of *M. lanchesteri* were longer than the chela (Figure 3C). *Macrobrachium lanchesteri* is a river shrimp that usually found in non-flowing waters and open waters, such as ponds, mining ponds, ditches, rice fields, and drainage. This species can be a competitor for many native species in obtaining food sources. This species can survive in the new environment with water temperature extremely high (Wowor, 2010) and multiply rapidly so that their population will be increased. The prawn has a unique characteristic with a clear white body without a pattern. According to Tjahjo and Purwaningtyas (2004), explained that the feed of shrimp are generally plants and algae, while insects and mollusks as a supplement food

Macrobrachium lanchesteri is an invasive species from southern Thailand (Wowor *et al.*, 2009). The introduction of this species was caused by fishery activities that introduce the cultural fisheries (Purnamasari, 2017). According to Lanchester (1901); De Man, (1911), *M. lanchesteri* is an endemic species and was first discovered in Southern and central Thailand. *M. lanchesteri* are distributed in Thailand, Malaysia, Myanmar, Singapore, Sumatra, Borneo and Java (Ng, 1995).

Each habitat has a different ecological character. The habitat affects the number and character of the shrimps (Supriadi, 2012). *M. lanchesteri* was found in Palangka Raya University with slow flowing river, river depth was 38-70 cm and there were settlements and open area. This was confirmed by Johnson (1961), stated that *M. lanchesteri* was found in slow flowing.



Fig. 2. Sampling location of freshwater shrimp in the watershed area of Palangka Raya University (A) Station I, (B) Station II, (C) Station III, (D) Station IV, (E) Station V.

Table 1. Environmental Parameters Observed from Study Sites

Station	Substrate	Flow	Habitat	Tree Cover	River Depth	River Width	Σ Shrimp Samples
1	Mud	Slow	Open area	0-20 %	58 cm	1,23 m	0
2	Mud	Slow	Urban area	0-20 %	54 cm	4,61 m	0
3	Mud	Slow	Urban area	0-20 %	38 cm	4,61 m	0
4	Mud	Slow	Urban area	0 %	70 cm	8,6 m	0
5	Mud	Slow	Urban area	0-20 %	55 cm	9,9 m	59

Note : Fast flowing = < 2 m/s; Slow flowing = 2 m/s



Figure 3. *Macrobrachium lanchesteri* (De Man, 1911) (A) Body coloration, (B) Cephalothorax appendages, (C) Second pereopod.

Among the five stations, *M. lanchesteri* was only found at station V because this species was more resistant and suited to stagnant water conditions and open waters with muddy substrates. Environmental conditions and nutrients at this station support the growth of *M. lanchesteri*. This is consistent with the research of Taufik (2011), *M. lanchesteri* is found in slow flowing water with a muddy substrate. This is also confirmed by Johnson (1961) that *M. lanchesteri* is usually found in slow flowing waters in open water.

CONCLUSION

The type of the freshwater shrimp is *Macrobrachium lanchesteri* with habitat characteristics in slow river flow with a mud substrate, a river depth of 55 cm and a river width of 9.9 m. The river is not clear because there are many broken rocks which are used as fishing grounds for the local community.

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