

## SHORT COMMUNICATION

### RECORD OF TWO ENDEMIC DAMSELFLIES FROM OBI ISLAND, MOLUCCAS, INDONESIA WITH HABITAT DESCRIPTION

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#### ABSTRACT

Obi Island as part of the Wallacea region has a variety of fauna with limited information such as Odonata taxa. In observations conducted in lowland secondary forests, two endemic damselflies were discovered, namely *Argiolestes obiensis* and *Drepanosticta obiensis*. Both species have habitat preferences for rocky streams with dense vegetation in the forest. In addition to habitat information, the first photograph of both species from the field was obtained in this study. This information is useful for data deficient species.

**Key words:** *Argiolestes* damselfly, *Drepanosticta*, habitat, Obi, Odonata

#### INTRODUCTION

Wallacea's fauna is distributed in an intriguing patchwork of endemic species and distinctive assemblages that are a reflection of the region's complicated ecological and geological origins. Nestled between Sundaland and Sahul, the islands of Wallacea are home to a wide variety of fauna that have adapted to their unique island ecosystems (Hall, 2009). In particular, Sulawesi's unique environment and isolation support a staggering number of endemic species, such as the small yet enigmatic Tarsier (*Tarsius* spp.) and the elusive Babirusa (*Babyrousa celebensis*). Conversely, the Lesser Sunda Islands showcase a fusion of Asian and Australasian characteristics, featuring renowned species like the critically endangered Flores hawk-eagle (*Nisaetus floris*) and the Komodo dragon (*Varanus komodoensis*) (Meijaard & Sheil, 2008). In addition, a variety of endemic birds, such as the colorful paradise crow (*Lycocorax pyrrhopterus*), may be found on the Maluku Islands, which are located at the intersection of important biogeographical regions (Holmes & Richardson, 2006). The interaction of past biogeography, evolutionary processes, and ecological dynamics that shaped Wallacea's distinct faunal groups is reflected in these distribution patterns.



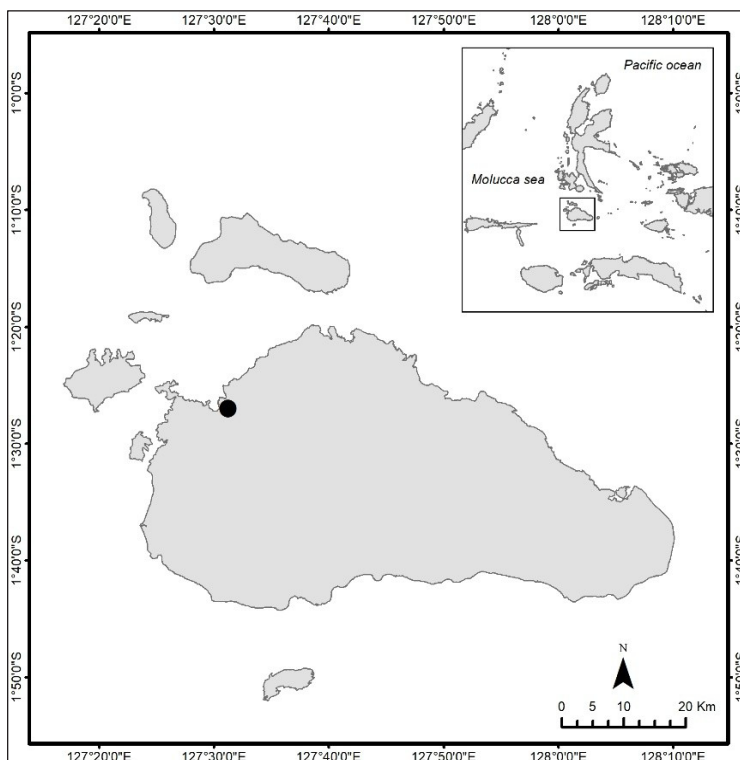
As part of the Wallacea region, Obi Island is home to a variety of unique animals. In the insect group, several taxa such as the Order Odonata are the main focus of the study but still have limited information. An odonate survey conducted by Lieftinck in 1953 in the Wallacea region, including Moluccas resulted in a baseline list of dragonflies distributed there. Only 16 species of odonates from Obi Island were recorded and have been compared with other Indo-Australian dragonfly lists (Monk et al., 1997). Currently, the number of dragonflies and damselflies recorded on Obi Island is 48 species (IUCN, 2024). Of these damselflies, only 3 species have been confirmed as endemic to Obi Island, including *Palaiargia obiensis*, *Argiolestes obiensis*, and *Drepanosticta obiensis* (Lieftinck, 1956; Lieftinck, 1957; van Tol, 2007; Kalkman et al., 2010).

In surveys conducted on Obi Island, 2 species of damselflies endemic to the island were found, namely *Argiolestes obiensis* and *Drepanosticta obiensis*. New local distribution records were obtained from outside the expected distribution range. This is also the first photograph to provide a clear visualization of each species. Similarly, habitat description needed for evaluation is provided here based on the observations.

## MATERIALS AND METHODS

### *Study area*

These observations were conducted in the lowland secondary forest on the western side of Obi Island, Moluccas, Indonesia (Fig. 1). On December 15-25, 2023, a river was explored that has the potential as a general dragonfly habitat because it is usually dispersed close to water bodies. The sampling method used was exploring the river with a track length of approximately  $\pm 500\text{m}$ . Individual odonates found were counted and distinguished between species. The habitat characteristics were observed, light intensity was measured, and the dominant plants were identified. Individuals found were documented using a Nikon D5300 camera with a Sigma AF 18-300mm f3.5-6.3 DC Macro lens. Individuals of each suspected species were collected using an insect net and stored in a 6 x 9 cm entomological paper envelope (Cezário et al., 2020). Specimens were then translocated to the laboratory for examination and identification using a Leica MZ75 stereo microscope. Identification to determine taxa used the Moluccas odonata determination key (van Tol, 2007; Kalkman et al., 2010).



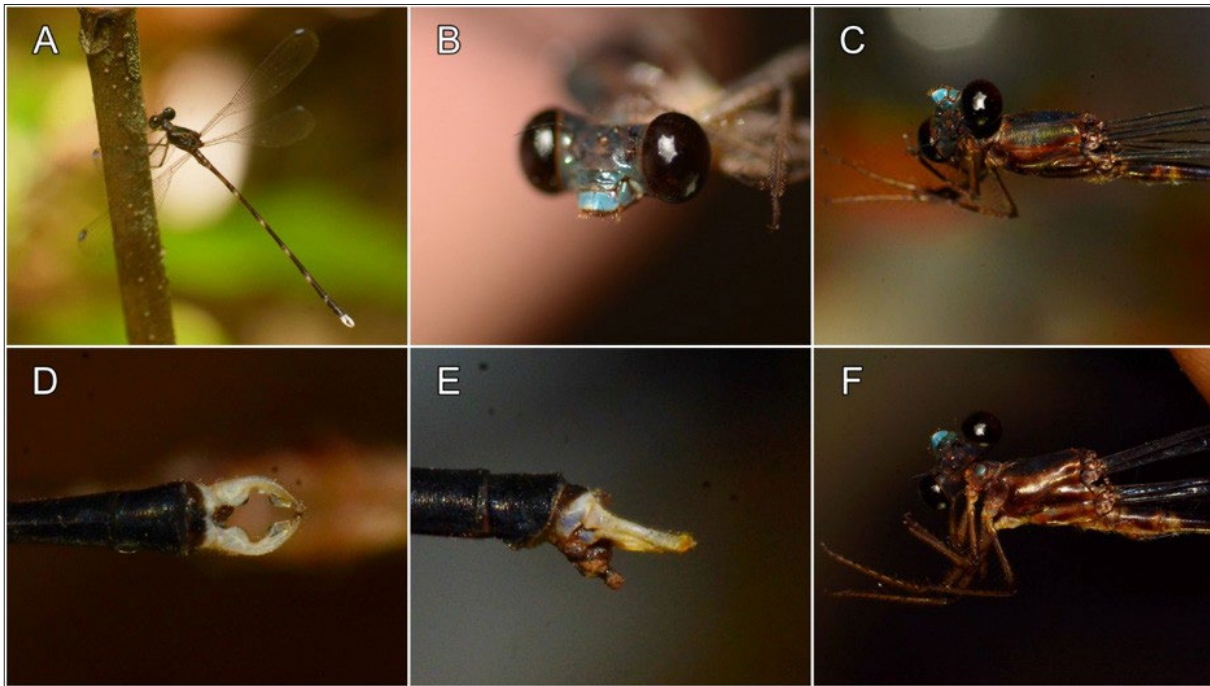
**Figure 1.** The observation point is located on Obi Island, Maluku, Indonesia.

## RESULTS AND DISCUSSION

### *Argiolestes obiensis* Lieftinck, 1956

*Argiolestes obiensis* was found as many as 6 individuals, all of which were adult males during daytime observations (Fig. 2). The identification of this species is based on the key to the sex determination of adult males of the genus *Argiolestes* (Kalkman et al., 2010). The individuals were found perched on the leaves of herbaceous plants around the river and some perched on branches above the water's surface. These damselflies mostly moved close to water bodies to prey and created territories for breeding activities. Female individuals were not found during this observation, possibly due to the tendency of females to hide in other spots.

This species was found in lentic waters in the lowland forest in the western part of Obi Island. There are two streams, a rocky river with a fast current and a small rocky river filled with dead leaf litter. Both streams have shaded characteristics because they are covered by a dense canopy. The light intensity conditions in the habitat are around 50-200 lux and very shady so sunlight cannot penetrate completely. The understory vegetation found around the habitat is mostly fern species of Polypodiopsida. In general, the vegetation found were species from the Dipterocarpaceae, Thymelaeaceae, and Euphorbiaceae families (Fig. 3A). Following the general characteristics of the genus *Argiolestes*, small and shallow riverine habitats in tropical rainforests are preferred (Kalkman et al., 2010; Michalski & Oppel, 2010). This information on habitat characteristics can complement the information for the evaluation of this species, which is categorized as data deficient (DD) by the International Union for Conservation of Nature (IUCN) status (Dow, 2019a).



**Figure 2.** Male *Argiolestes obiensis* (A-F). A. Full body, B. head, C. Dorsolateral, D. Dorsal anal appendages, E. Lateral anal appendages, and F. Lateral head-thorax.



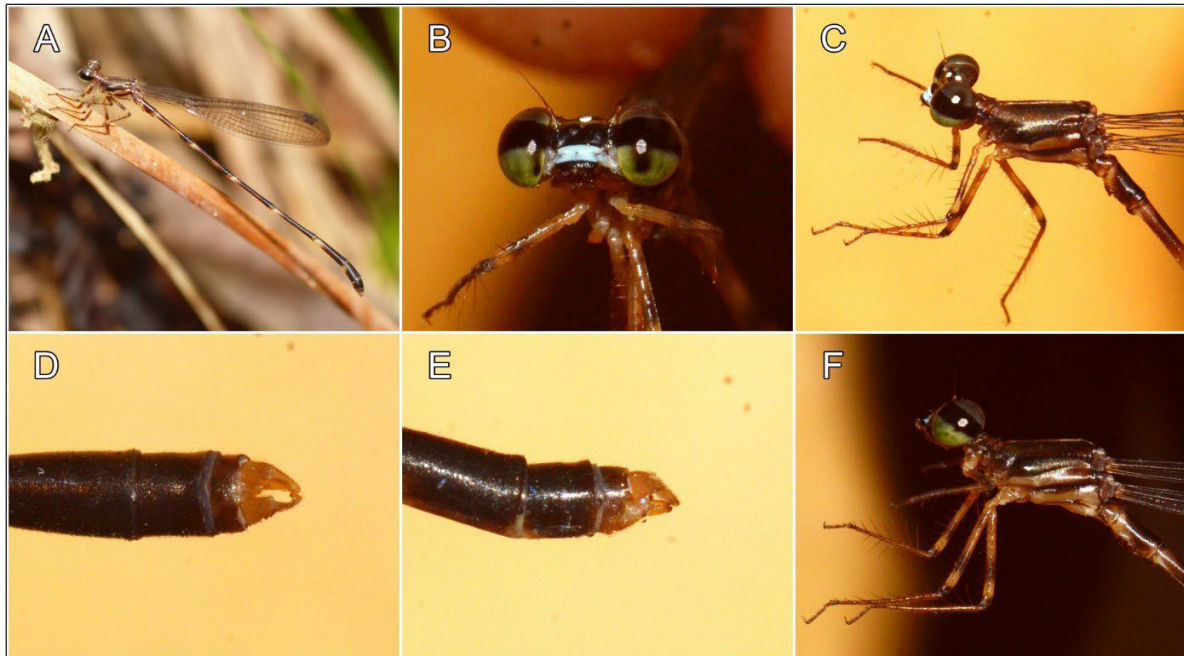
**Figure 3.** Habitats where both endemic damselflies of Obi Island were discovered, A. Site of *A. obiensis* and B. Site of *D. obiensis*.

### ***Drepanosticta obiensis* van Tol, 2007**

*Drepanosticta obiensis* was found in Baru Village, the western part of Obi Island in two locations with different habitat types (Fig. 4). The first location is at an altitude of  $\pm 70$  meters above sea level with habitat characteristics dominated by shrubs and surrounding trees is *Hopea* sp. genera (Fig. 3B). However, this habitat is moderately open because the canopy tree cover is not particularly dense. This location has stagnant water and is covered by herbaceous vegetation dominated by the species *Thelypteris angustibasis*. Only one male individual was found perched near the surrounding vegetation.

The second location is a lowland tropical forest habitat at an altitude of  $\pm 200$  m asl and there is a narrow stream with closed canopy cover. This discovery was based on the tendency of

species of the genus *Drepanosticta* to be found in small streams within dense forests. This group also has a weak ability to fly so it is not widely dispersed (Kalkman & Orr, 2013). In contrast to the first location, 3 adult males were found in this location. This species is very similar to *D. moluccana*, but can still be distinguished from some characteristics of its body parts (van Tol, 2007). The conservation status of *D. obiensis* is currently classified as data deficient (DD), so other information is needed to support its conservation methods (Dow, 2019b).



**Figure 4.** Male *Drepanosticta obiensis* (A-F). A. Full body, B. head, C. Dorsolateral, D. Dorsal anal appendages, E. Lateral anal appendages, and F. Lateral head-thorax.

Both observed endemic species are categorized as data deficient (DD) by the IUCN. The first field photos and the addition of habitat description information of these two endemic damselflies of Obi Island can complete the information needed to evaluate their conservation status. Many species need to be analyzed besides the habitat preference of these two species, such as taxonomy, population size, distribution, life cycle, ecology, and threats (IUCN, 2024).

The current threat to Obi Island's endemic odonata species may derive from changes in the forest landscape and massive nickel mining. The impacts caused may affect the quality of water in the forest (Amin et al., 2015). Poor water quality can affect the metabolism of damselfly larvae, which are very sensitive to environmental changes. This is also related to a decrease in population if there is pollution contamination to the waters of the damselfly habitat. Thus, further surveys in the Moluccas region are needed to complete the information, especially on Obi Island which has many endemic dragonfly species.

## CONCLUSION

During observations conducted on Obi Island, new local distributions of *Argiolestes obiensis* and *Drepanosticta obiensis* were discovered. This discovery adds to the descriptions of both species that were lacking photographic evidence from the field. Both species prefer lowland secondary forests near rocky streams with dense canopy cover.

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