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Morphology of Javan Broadhead Planarian (*Bipalium Javanum*)

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Abstract. Indonesia is one of the countries at the center richest biodiversity in the world, so that Indonesia is referred to as megabiodiversity country. One of the typical fauna in Indonesia is the broadhead planarian Javan (*Bipalium javanum*). Javan Broadhead Planarian is a parasitic worm that lives in humid areas and is protected from sunlight. Little research has been done on the Javan Broadhead Planarian, especially in terms of morphology. This research was conducted to determine the morphology and characteristics of the planarian broadhead javan. The research was conducted in two stages. The first stage is taking samples of worms at Kedung Pedut Kulon Progo Waterfall. The second stage is taking morphological image data. Data collection of habitat, behavior, dorsal and ventral body parts was carried out using a macro-lens camera, and headplate and creeping sole image data were taken using a stereo microscope. The data taken is in the form of image data taken using a camera with a macro lens and a stereo microscope. Based on the research conducted, the results obtained from the image data of the habitat, behavior, headplate, dorsal and ventral body parts, and creeping sole.

Keyword : Morphology, Javan Broadhead Planarian, *Bipalium javanum*

Running Title : Morphology of Javan Broadhead Planarian

INTRODUCTION

Indonesia is one of the countries that is the center of the richest biodiversity in the world, so that Indonesia is called a megabiodiversity country. Megabiodiversity means a lot of genetic uniqueness, high diversity of species, ecosystems, and endemism (Sutoyo, 2010). One animal that has a high diversity is a group of worms or helmints. Helmint is a group of worms that is divided into 3 phyla, namely Platyhelminthes, Nematelminthes, and Annelida. Platyhelminthes. Platyhelminthes already has simple organs or organs, namely the muscular pharynx, ocelli, and more complex organs such as the genitalia and excretory organs. But they still have a gastrovascular system like the Coelenterata, which only has one opening that serves as the mouth and anus (Radiopoetro, 1985). One of the worms belonging to the Phylum Platyhelminthes that is still rarely studied and studied is the Javan Broadhead Planarian (Bipalium javanum).

According to Chaisiri, et al (2020), Bipalium javanum is an endemic species found in Indonesia. Bipalium javanum is a flat-headed worm species that is included in the Geoplanidae family that preys on earthworms. These worms are usually found in Asia, which has a warmer climate (Wismabrata, 2018). Little research has been done on the morphology and anatomy of lower animals, especially the Platyhelminthes group. For this reason, research is needed on the morphology and anatomy *of Javan Broadhead Planarian* (*Bipalium javanum*). Classification of Javan Broadhead Planarian is:

Kingdom : Animalia
Phylum : Platyhelminthes
Subphylum : Rhapditophora
Order : Tricladida
Family : Geoplanidae
Subfamily : Bipaliinae
Genus : *Bipalium*
Spesies : *Bipalium javanum*

MATERIALS AND METHOD

The tools needed to collect morphological data are a stereo microscope, a DSLR camera, and a smartphone. While the materials needed are javan broadhead pplanarian and tissue. Morphological research was carried out by observing the Javan broadhead planarian (*Bipalium javanum*) in their natural habitat, then taking pictures using a DSLR camera. Data collection uses a DSLR camera to retrieve data in the form of images of the structure of the rayang's body, habitat, behavior, and extracellular digestion process from the Javan Broadhead Planarian. Meanwhile, insert images from the headplate and creeping were observed using a stereo microscope and the images were taken using a smartphone camera.

RESULTS AND DISCUSSION

Based on morphological studies, Javan Broadhead Planarian or hammer worms have a slender body shape with a hammer-like head so they are called planarian broadhead javanese (Bandoro, 2020). The body is shiny black and on the ventral part there is a white longitudinal line that plays a role in movement. In the ventral part there is also the pharynx, and on the dorsal part of the head there are eye spots that function as photo receptors (Radiopoetro, 1985). Bipalium javanum body length can reach 20 cm with a width of 0.5 cm, while the head width reaches 1 cm. The neck shrinks and widens in the middle, and the ends of the body are rounded (Bandoro, 2020).

Meanwhile, based on morphological observations, the results obtained that the body of Javan Broadhead Planarian has a shiny black color with a head shaped like a hammer, and in the ventral part there is a creeping sole which plays a role in the movement process by secreting mucus. The body length of the rayang is 8 cm, the body

width is 0.3 cm, and the head is 0.7 cm wide. In the ventral part of the body, there is a pharynx which functions to suck the fluid from its prey.

Figure 1. Morphology of Javan Broadhead Planarian (*Bipalium javanum*)

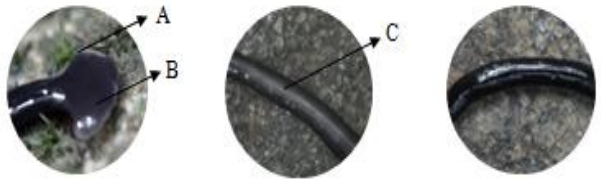

Figure 2. Insert Morphology of Javan Broadhead Planarian (*Bipalium javanum*). A: Auricle, B: eye spot, C: Creeping sole, D: dorsal

The body of *Bipalium javanum* is flexible, can elongate or shorten or bend in all directions. The outside of the body consists of a layer of epidermal cells which contain pigments and glandules. The head is triangular in shape, has 2 eye spots and protrusions called auricles, which functions as a tactile organ. The mouth is on the ventral side, and next to the caudal area there is a genital porus (Radiopoetro, 1985). Javan Broadhead Planarian (*Bipalium javanum*) moves using cilia found on the "creeping sole" or pads on the ventral part of the worm's body. Cilia function to help worms slide over mucus. In addition, mucus also functions to protect the epidermis from friction against hard objects (Radiopoetro, 1985). Javan broadhead planarian (Bipalium javanum) is commonly found in humid places, namely fertile soil, under weathered rocks or wood, and avoiding sunlight. This worm will thrive in habitats that have high humidity, therefore this worm is widespread in areas with tropical and subtropical climates (Bandoro, 2020).

Figure 3. Habitat of Javan Broadhead Planarian (*Bipalium javanum*)

Javan Broadhead Planarian (*Bipalium javanum*) is a carnivorous animal that preys on earthworms, snails. and larvae. In addition, this worm is also a cannibal animal (preying on the same sex). The worms detect prey using chemoreceptors located under the head and ventral grooves. The worms track and ensnare their prey with mucus secreted from the ventral parts of its body. After the prey is mobilized, the worm's pharynx will then lengthen and release digestive enzymes. The prey that has been digested with digestive enzymes, the tissue will melt and then be sucked by the pharynx (Radiopoetro, 1985). Apart from having a negative impact because they prey on earthworms, it also has an important role in the ecosystem, namely preying on snails (Jain, 2020). Snails are herbivores, which feed on leaves and are often considered pests to farmers. In this case, Javan Broadhead Planarianhas an important role in reducing the number of snails so that the farmers' crops can thrive.

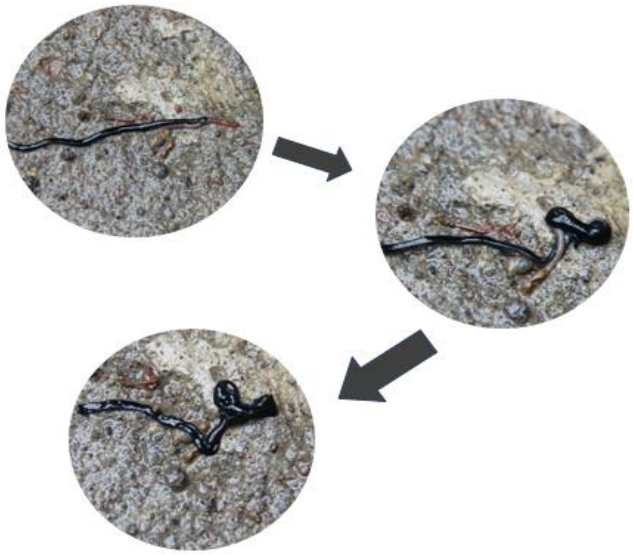

Figure 4. Digestive process of Javan Broadhead Planarian (*Bipalium javanum*)

CONCLUSIONS

The Javan broadhead planarian (*Bipalium javanum*) has a flat, oval body shape with a hammer-like head. *Javan broad head* planarian lives in a comfortable place and is protected from the sun. This worm is parasitic because it preys on earthworms, thus disturbing the level of soil fertility.

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