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The level of parasitic infection and growth of red tilapia (*Oreochromis sp.*) fed with vegetable fern (*Diplazium esculentum*) flour

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Abstract. This research aims to analyze the level of parasitic infections and the growth of red tilapia (*Oreochromis sp.*) fed with vegetable fern (*Diplazium esculentum*) flour. This study was conducted with an experimental method using a Completely Randomized Design (CRD) research, with four feed dosages treatments: 0%, 8%, 10%, and 12%. Data obtained were analyzed descriptively and quantitatively. The effect of treatments on variables was determined using Analysis of Variance (ANOVA). The results show that there are three types of ectoparasites, namely: *Tritrichodina* sp., *Cichlidogyrus* sp., and *Chilodonella* sp. The fish organs that were attacked by the ectoparasites were gills, mucous membranes, scales, and caudal fins. Vegetable fern flour as artificial feed ingredients given to red tilapia can reduce the intensity and prevalence of ectoparasites. The intensity of ectoparasites ranged from 15 to 104 individuals/fish; prevalence rates range from 17.67 to 66.67%. The highest intensity and prevalence were found in red tilapia without the treatments and low in the treated fish. The addition of vegetable fern flour to artificial feed influences the growth of red tilapia. An 8% dose of artificial feed made from vegetable fern flour resulted in the best weight gain of 0.3913 grams.

Key Words: artificial feed, *Diplazium*, edible fern, ectoparasites.

Introduction. Red tilapia fish (*Oreochromis sp.*) is a freshwater fisheries commodity with significant economic value and potential to be developed. The FAO (Food and Agriculture Organization) Department of Fisheries and Aquaculture consider tilapia as the third best success example of in the world of aquaculture fisheries (after shrimp and salmon) (Irwandi et al 2017). Red tilapia has several advantages such as being easy to cultivate, relatively fast growth, easy to breed, and it is euryhaline and able to resist adverse environmental conditions.

The intensive development of red tilapia aquaculture in Indonesia has been carried out for a long time. However, in practice, it is prone to disease due to the intensive cultivation that maintained high-density fish stocking with intensive artificial feeding. This practice can reduce water quality, potentially triggering diseases, inhibiting growth, and can even result in death (Larasati et al 2020; Putra et al 2017).

According to the Director-General for Aquaculture, Ministry of Marine Affairs and Fisheries of Indonesia, tilapia fish production in Indonesia in 2018 amounted to 1,085 thousand tons. Tilapia production has decreased compared to production in 2017, which reached 1,265 thousand tons. It is due to infection by ectoparasites (Jansen & Mohan 2017).

The three largest tilapia producers in 2015 were Republic of China (producing 1.78 MMT), Indonesia (1.12 MMT), and Egypt (0.88 MMT) (FAO 2017). According to the Directorate General of Aquaculture, Ministry of Marine Affairs and Fisheries of Indonesia, tilapia fish production in Indonesia has continued to increase since 2011. It increased from 567,078 tons to 999,695 tons in 2014, while in 2015 the production increased to 1,084,281 tons with Indonesia's export value of 14,681 tons. However, in 2016 export value decreased to 11,879 tons due to the infection of ectoparasites.