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Culture of *Daphnia* sp. (crustacean – cladocera): the effect of manure variation on the growth, natality, and mortality

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Culture of *Daphnia* sp. (crustacean – cladocera): the effect of manure variation on the growth, natality, and mortality

H Herman, Y Andriani, A Sahidin, T Hidayat and T Herawati

¹Fisheries Study Program, Faculty of Fisheries and Marine Science, Universitas Padjadjaran, 45363 UNPAD Jatinangor Sumedang, Indonesia

E-mail: hamdani_herman@yahoo.com

Abstract. The objective of this research was to analyze the growth rate, reproduction rate, and mortality rate of *Daphnia* sp. which cultured in variant organic manure. This research used experimental method Randomized Completely Block Design (RCBD) with four treatment and three replications. The treatments in this research were the variant manures from chicken, quail, goat, and cow with same of growth (2,4 g/l). *Daphnia* cultured with using 100 breeders since from neonets (0 day) until growth up and died in one life cycle. At the 3-days, culture of *Daphnia* sp was give peak population with maximum age of culture using quail manure is 7 days, and other treatments are 8 days . The growth rate and the reproduction rate of using quail manure was higher than using chicken manure, goat manure, and cow manure (mean GR = 3.68 : 2.32 : 2.74 : 2.97; mean RR = 3.87 : 2.59 : 3.00 : 3.31; p < 0,05). Although all the breeders of *Daphnia* sp. died at 8th day of culture, quail manure give the lowest of mortality rate than using chicken manure, goat manure, and cow manure (mean MR = 0.19 : 0.28 : 0.26 : 0.34).

1. Introduction

Daphnia sp. is the best natural feed for tropical fry fish and it has become an alternative for natural fish feed [1]. The advantages of using *Daphnia* for aquaculture are its low cost and convenient to culture [2]. *Daphnia* is one of micro crustaceans from *Brachiopoda* family and it lives in fresh water [3]. All individual of *Daphnia* are females, but when the environmental quality is poor, *Daphnia* will produce male for sexual reproduction [4].

Growth and development of *Daphnia* sp. s affected by nutrient, age, temperature, respiration, and filtered particle shape [5]. *Daphnia* sp. has two reproduction methods, parthenogenesis and sexual. Parthenogenesis occurs when the environment is suitable for *Daphniai*'s life [1]. *Daphnia* is non-selective filter feeders and it is able to eat bacteria, phytoplankton, ciliate, and detritus [6]. The food is collected by filtering apparatus, while the legs make some water to flow from anterior to posterior and move the particle to the gut by setae [4].

Natural feed brings risks for of diseases and heavy metal accumulation [7]. To minimize the risk, culturing the natural feed is the safest way. Other advantages of using natural feed culture are its high quality, parasite-free or pollution-free characteristic, and sustainability. More importantly, *Daphnia* sp. lives in aquaculture media without affecting water quality [6]. There are many food sources for cultured *Daphnia*, such as organic manure, particularly chicken manure [8], cow manure, and goat manure. Nutrient from poultry waste contains nitrogen (N) 1.48 % and phosphorus (P) 0.4 %, cow manure contains nitrogen (N) 2.03 %, and phosphorus (P) 0.21 %, and goat manure contains nitrogen

