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Grow-Out of Juvenile Scalloped Spiny Lobster (*Panulirus Homarus*) with Thyroxine Hormone and Various Feed

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A B S T R A C T

Scalloped spiny lobster (Panulirus homarus) is one of the leading fisheries commodities in Indonesia. However, aquaculture scalloped spiny lobster in Indonesia has not been developed because there is still a lack of innovation in grow-out technique. Main problems, such as long culture period and no artificial feed and still rely on the trash fish, which is constrained by the availability and quality are not sustainable. The use of artificial feed and thyroxine hormone are made to ensure the success and minimize the risk of failure of the grow-out of scalloped spiny lobster in floating net cages. This research aimed to determine the technique of grow-out of the spiny lobster with the immersion of thyroxine hormone and distinct feed were fresh fish and artificial feed. This research was carried out in Hurun Bay, Pesawaran Regency, Lampung Province, Indonesia. This study consisted of three treatment were fresh fish meat and immersion of the lobster with the use of the hormone thyroxine 10 mg/l; artificial feeding and immersion of thyroxine hormone 10 mg/l, and fed with artificial feed only. The results showed that the administration of fresh fish meat and immersion spiny lobster with thyroxine hormone positive affect to growth (18.86 g), feed conversion ratio (2.74) and uniformity of individual (23.57%) scalloped spiny lobster compared to fed with artificial feed.

Keywords: artificial feed; fresh fish meat; growth; spiny lobster; thyroxine hormone

1. Introduction

Lobster is one of Indonesia's mainstay fishery commodities due to economic value, both for domestic and foreign markets (Sukamto *et al*., 2017). One type of is the scalloped spiny lobster (*Panulirus homarus*). Scalloped spiny lobster has reputation as a good quality lobster to be processed in cooking because it has sweet and tender meat. Scalloped spiny lobster also has a price of approximately IDR 300,000/kg for small sizes (100-160 g). Ministry of Fisheries and Marine Affairs (2020) stated that spiny lobster exports in various products continued to increase both in volume and export value. Scalloped spiny and lobsters are traded in three types of products: non-pigmented spiny lobster (puerulus), spiny lobster juvenile, and adult spiny lobster to fulfil domestic and foreign needs.

Periods for spiny lobster aquaculture took 8-10 months, from puerulus until adult size spiny lobster body weight of 115-140 g (Petersen *et al*., 2013), makes spiny lobster fishers prefer to catch rather than culture for fast yielded. Spiny lobster grow-out technique is well known is carried out used simple facilities (floating cages) with trash fish (Mahmudin *et al*., 2016). On the other hand, trash fish as feed has problems, in particular quantity and quality. Supply in which depends on fishery due to season and weather factors were unpredictable (Kim *et al*., 2007).

Scalloped spiny lobster cultured need technology will not experience rapid development to meet production capacity for export and national consumption. To overcome this, it is necessary to carry out various studies on scalloped spiny lobster cultured such as the use of artificial feed or formulated feed, as well as the use of hormonal techniques which are carried out to accelerate the growth of lobsters in floating net cages. Applied of thyroxine hormone in crustaceans has been proven to increase maturity of reproductive organs and growth of black tiger shrimp (*Penaeus monodon*) (Pillai *et al*., 1987), mud crab (*Scylla serrata*) (Iromo *et al*., 2015), and male scalloped spiny lobster (*Panulirus homarus*) (Adiputra *et al*., 2020). According to Nelson and Habibie (2009) thyroxine hormone has role in organogenesis process of growth and regulation of metabolism of fish and mammals. Therefore, application of thyroxine hormone in scalloped spiny lobster may accelerate growth rate. Research aimed to evaluated various feeding and tyroxine hormone doses on culture juvenile of scalloped spiny lobster in floating cages.

2. Materials and Methods

Juveniles scalloped spiny lobster used in this stud came from an independent nursery process from puerulus phase to juveniles scalloped spiny lobster owned by PT. Kreasi Bahari Mandiri, located in Teluknaga, Tangerang Resident. Artificial feed (CP 50%) was used with brand Fengli Platinum 0 from Might Sun feed company. Fresh fish as feed provide by fishers and gently cut to get precise size. Juveniles scalloped spiny lobster cultured in 3 cages

with dimension of 3 x 3 x 3 m, and each cage contained 85 individuals. During cultured feed tray applied as a feed control and behavior assessment. Shelters made by one-inch PVC pipes and length 15 cm of approximately 5-7 pieces per cage. At the top of the cage, dark net serves to protect from direct light exposure. Research experimental design were used: fresh fish meat and immersion of the lobster with the use of the hormone thyroxine 10 mg/l; artificial feeding and immersion of thyroxine hormone 10 mg/l, and fed with artificial feed only.

Immersion of juvenile scalloped spiny lobster applied with 10 mg tablets of hormone thyroxine with 1 liter of seawater into a bucket, Furthermore, juvenile scalloped spiny lobster dipped into bucket that filled with seawater and dissolved thyroxine hormone. Dipping conducted for 10 minutes and directly returned into cage. Scalloped spiny lobster maintenance by twice per day feeding at 8 am and 6 pm, with feeding rate of 10%. Evaluation conducted two weeks for spiny lobster immersion using thyroxine hormone and growth and culture period is 75 days. Absolute body weight, specific growth rate and coefficient of variation measured and descriptive analysis used for comparison among treatments.

3. Results and Discussion

Evaluation of various feed and application of thyroxine hormone for cultured juvenile of scalloped spiny lobster may supported aquaculture of spiny lobster in future. Results showed absolute body weight on treatment 1 highest and most benefit for grow-out of scalloped spiny lobster (Fig.1). Absolute body weight with fresh fish meat and immersion of thyroxine hormone is high compared to other treatment due to natural foods for lobsters and has higher protein contents (Fig.1). According to Anggraini *et al*. (2018) protein content of fresh fish was 78.42%, and artificial feed 32.95% of crude protein. Treatment two or artificial feeding and thyroxine hormone immersion showed absolute body weight was better than artificial feed (treatment three) (Fig.1). This result presumed because dipping of scalloped spiny lobster with hormone thyroxine can support faster growth. Adiputra *et al*. (2020) mention that hormone thyroxine can accelerate growth and produce optimal body weight. Oktaviani *et al*. (2017) thyroxine hormone has role in organ differentiation, in particular activating polymerase enzymes used for DNA transcription. Thyroxine hormone is first converted to triiodothyronine. Increased synthesis of RNA, especially mRNA from results of transcription spurred process of protein synthesis, protein is used for differentiation and addition of tissues.

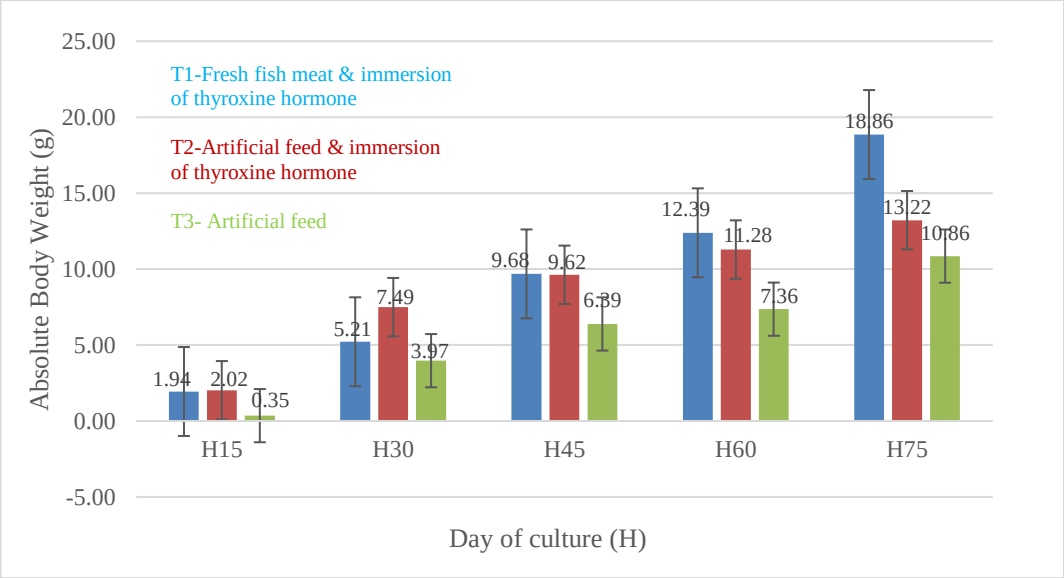

Fig. 1 – Absolute body weight of scalloped spiny lobster (*Panulirus homarus*) with various feed and immersion of thyroxine hormone.

Specific growth rate of scalloped spiny lobster in this study for each treatment are presented in Figure 2. Specific growth rate of scalloped spiny lobster at treatment one and two showed high value at start of captivity. This was showed due to influence of thyroxine hormone immersion. Adiputra *et al*. (2020) stated that thyroxine can accelerate growth and produce optimal body weight. Meanwhile, specific growth rate of scalloped spiny lobster at 45, 60 and 75 days were decreased. This is presumably due to several factors that affect the growth rate, such as increasing age, artificial feed that leached, and spiny lobster not able to adapted to artificial feed. Rihardi *et al*. (2013) which states that growth influenced by several factors in particular internal and external factors. Internal factors were heredity, sex, age, parasites, and disease. While main external factors were feed and water temperature.

Coefficient of variation of studied showed diversity dimensions of body weight of scalloped spiny lobster in rearing cages (Fig.3). Coefficient of variation obtained were different for each treatment. Lowest coefficient of variation was at treatment one, followed by treatment two and highest coefficient was at treatment three (Fig.3). Value of the coefficient of variation indicates value of diversity of a population, where the higher the value of the coefficient of variation indicates the population being measured has a wide or more heterogeneous diversity, whereas if the value of the coefficient of variation is low it means that the population measured has a narrow or homogeneous level of diversity.

This is presumably due to differences in feed and hormones in each treatment, where at treatment one, juvenile scalloped spiny lobster was dipped with hormone thyroxine and fresh fish which is a natural food for spiny lobster so that fed immediately. However, at treatment two coefficient of variation was lower than treatment three, this was allegedly due to administration of thyroxine which gave a high appetite and may trigger growth.

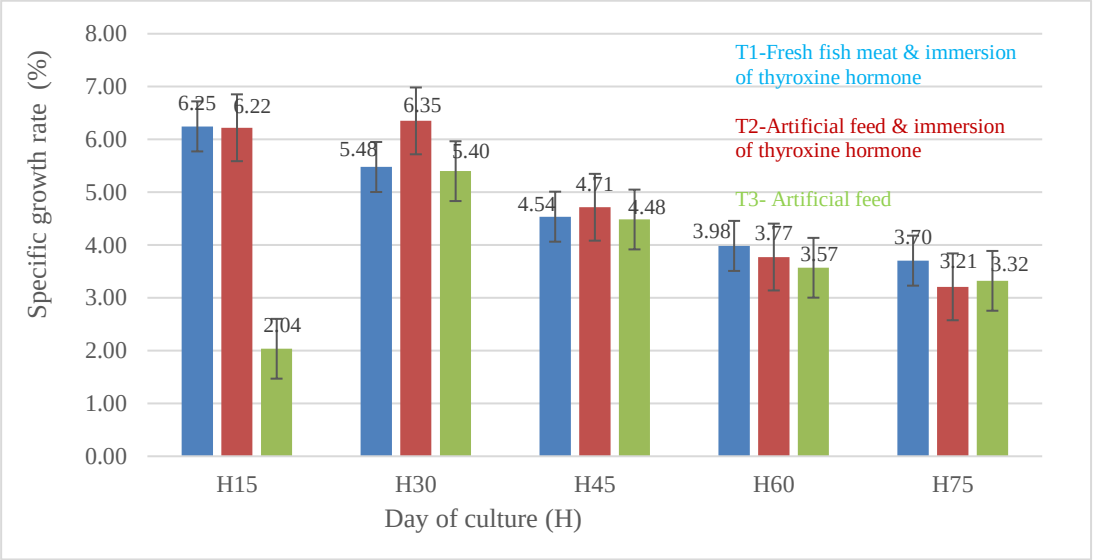

Fig. 2 – Specific growth rate of scalloped spiny lobster (*Panulirus homarus*) with various feed and immersion of thyroxine hormone.

In this study, observations were also made for behavior in scalloped spiny lobster during study. Scalloped spiny lobster juvenile behavior changes included responses to feeding, interactions among individuals, possibility of predation, movement, response to light, response to humans and other behaviors to support the correct rearing process. At the beginning of maintenance, scalloped spiny lobster in all treatments tended to stayed at bottom of net, especially during the day. But at night scalloped spiny lobster active with move to surfaced or walking on the sides of cage. This behavior due to nature of spiny lobster in which carry-out activities at night (Setyono, 2006). Response of scalloped spiny lobster to fresh fish feed is faster than artificial feed. Mahmudin *et al*. (2016) agreed that spiny lobster are omnivorous animals that tend to carnivorous. Response of scalloped spiny lobster to light and humans was immediately avoided. However, as long as cultured period scalloped spiny lobster begin to adapt. It can be seen not only at night, during the day, lobsters often come to surface and on side of cage getting used to human presence. Scalloped spiny lobsters were often seen chased with others.

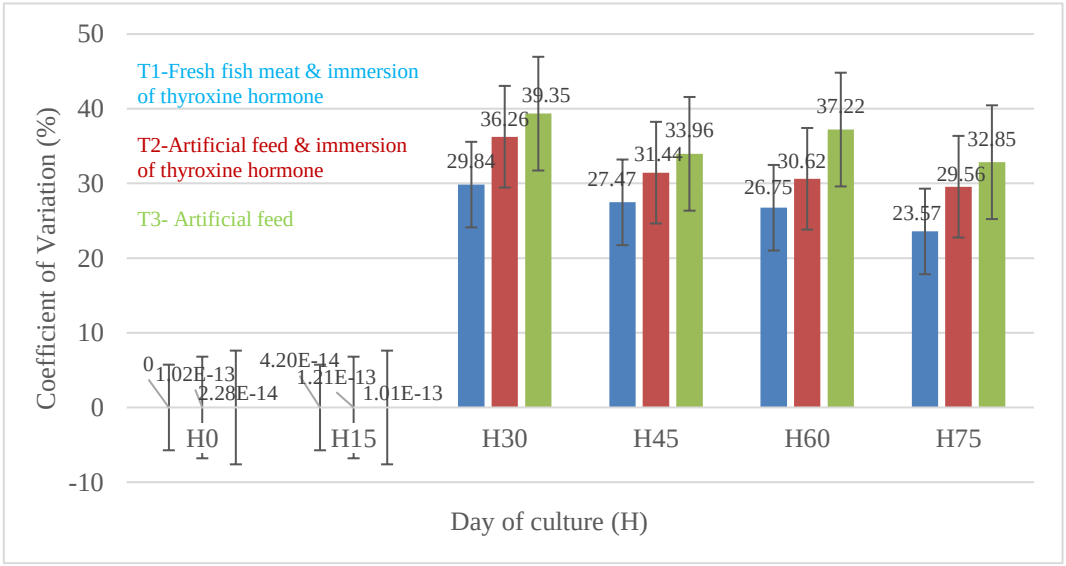

Fig. 3 – Coefficient of variation of grow-out juvenile scalloped spiny lobster (*Panulirus homarus*) with various feed and immersion of thyroxine hormone.

4. Conclusions

Immersion of thyroxine hormone and fresh fish feed effective for grow-out of juvenile scalloped spiny lobster in floating cages.

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