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Laying Eggs of *Pomacea canaliculata* L. on *Oryza sativa* L. in Various Ways of Plant Cultivation in Village Tulus Ayu, Sub District Belitang

Peletakkan Telur Pomacea canaliculata L. pada Oryza sativa L. pada Berbagai Cara Budidaya Tanaman di Desa Tulus Ayu Kecamatan Belitang

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ABSTRAK

Padi merupakan tanaman yang banyak dibudidayakan di Indonesia. Sehingga padi merupakan tanaman hortikultura yang memiliki penyakit dan hama pengganggu tanaman. Contohnya padi di Belitang banyak memiliki hama keong karena Belitang merupakan sentral produksi padi dan mempunyai saluran irigasi terbesar sehingga cocok untuk budidaya padi. Hama keong menyukai tempat daerah yang tergenang air. Selain itu hama keong sekali bereproduksi memiliki jumlah telur yang sangat banyak sehingga petani bisa mengalami gagal panen. Tujuan dari penelitian ini yaitu mengetahui jumlah peletakkan telur keong mas yang dibudidayakan di dua lahan yang berbeda umur dan varietas. Metode penelitian ini dengan cara pengambilan contoh secara sengaja dalam satu lahan dengan menghitung jumlah lajur pada lahan dan menentukkan sampel pada lajur untuk diamati. Berdasarkan hasil penelitian di dapatkan dikedua lahan dengan umur tanaman padi yang berbeda jumlah butir telur/tanaman berbeda setiap lahan dikarenakan adanya faktor lingkungan dimana volume air sedikit mengakibatkan jumlah telur meningkat , cuaca dan pengendalian petani.

Kata kunci: monokultur, hama keong, tanaman padi

ABSTRACT

Rice is a widely cultivated crop in Indonesia that the crop becomes a food crop with many pests and diseases. As happen in Belitang, the area many rice cultivation infested by golden snails because Belitang is a center of rice production with the biggest irrigation structure in the region. The golden snails prefer to live in submerged areas. Furthermore, the snail produces a high number of eggs in one ovulation which may produce a high

number of golden snails and cause serious damage on rice to mage harvest failure. The research of this know the number of eggs packets of golden snails laid in two rice cultivations with different ages and varieties. The method applied in the study was a survey method for which samples were taken purposively, by following certain intervals in every row of rice plants. The observation was made to calculate the number of snail egg packets. The result showed that in the two different rice cultivation there were different numbers of snail egg packets. The difference might be caused by different environmental factors between both locations where a lower water surface caused a higher number of snail eggs.
Keywords: cultural technique, golden snail, rice crop

INTRODUCTION

Rice is a food commodity that produces rice which has an important role in the Indonesian economy. So that rice becomes the main priority of the community in meeting the needs of carbohydrates that can produce energy for the body (Donggulo et al., 2017). The government continues to seek solutions, but current rice productivity cannot be expected (Sa'diah et al., 2020).

Based on the available data, the productivity of lowland rice is 5.08 tons/ha while for upland rice it is 2.95 tons/ha (Amrullah et al., 2014). The increase in production was hampered by various changes and developments in the strategic environment outside the agricultural sector (Masturi et al., 2021). The proper planting distance will get enough sunlight for the photosynthesis process and have enough space for balanced growth (Saputra et al., 2021; Syah et al., 2021).

The proper spacing will get enough sunlight for the photosynthesis process and have enough space for balanced growth (Sution et al., 2020). In addition to using the spacing of rice, the age of rice also affects the productivity of rice yields (Martina & Asep, 2020). In general, planting systems and seedling age in lowland rice were known to affect the growth and yield of lowland rice (Anggraini et al., 2013) (Donggulo et al., 2017; Junaidi & Djoko 2021; Wijaya et al., 2019).

The main pests that attack rice plants are brown planthoppers (Gunawan et al., 2015), rice borers, and snails. To suppress pest attacks, physical, mechanical, and chemical technical culture techniques are used (Ayunin et al., 2020; Adijaya et al., 2016; Rusli et al., 2019). Rices cultivation certainly has obstacles such as pest attacks (Syahbanuari et al., 2020; Gunawan et al., 2015). To suppress pest attacks, physical, mechanical and chemical technical culture techniques are used Amrullah et al. (2014). The results of research showed that rice stem borer moths and egg groups were found to be the lowest in the treatment with organic matter.

Thousands of hectares of rice seedlings, or young rice plants, have been damaged by the golden snail, which has been identified as *P. canaliculata*. The golden snail is a mollusk designated as a plant-disturbing organism (OPT) or the main pest of rice (*Oryza sativa*) in rice fields (Adijaya et al., 2016; Harahap, 2017; Kasidiyasa et al., 2018; Manueke et al., 2017; Manueke et al., 2018; Sari et al., 2018; Taopik & Widya 2019; Tresnaningsih et al., 2016; Yuliani & Aidannisa 2019). This organism has the potential as a major pest because rice fields are a suitable habitat for its development (Saputra et al., 2018). Stated that golden snails are herbivores, which eat everything and are very voracious. Rice is cultivated in swamps and irrigation.

Belitang rice cultivation has differences such as having the largest irrigation channel in South Sumatra (Anggraini, 2018; Hutapea & Sasmita, 2017). The Purpose of research was to determine the number of golden snail eggs laying on rice plants that cultivated on two lands with different ages and different varieties and in Tulus Ayu village, Belitang sub-district, East Oku district, South Sumatra province eggs.

MATERIALS AND METHODS

The Materials and Methods used in this study were stationery, pins, cameras, farmer's land, and containers. The materials used in this study were rice plants and questionnaires. This study uses the case method with intentional sampling in one field by counting the number of lanes on the land and determining the sample in the lane to be observed. The types of data used in this study are primer data and secondary data. Primer data were obtained directly through interviews with farmers. Meanwhile, secondary data is supporting data from primer data. Data obtained directly from direct observation in the field

Observations were made by visiting the location first and then determining the farmers' rice fields. The research location was determined purposively. Sampling is done by determining the number of plant samples taken from the total number of plants in 1 land. For each field, 30 plants were taken from all paths in the observed land. There are 30 points in one sample of farmer's land. The primer data collection was carried out by direct interviews through questionnaires with respondent farmers (Arsi et al., 2021).

$$t = \frac{(\sum D)/N}{\sqrt{\frac{\sum D^2 - \left(\frac{(\sum D)^2}{N}\right)}{(N-1)(N)}}}$$

where:
X = Calculation of the 1st land
Y = Calculation of the 2nd land
D = Total X-Y
D2 = Total (X-Y)2
(∑ D)2 = Total (X-Y) squared

Interviews were conducted on farmers who own land on the basis that these farmers develop the agricultural sector with rice as a commodity. The survey of respondent farmers was carried out by visiting cultivated agricultural land. Analysis of the collected quantitative data was analyzed using a T-test with an error rate of 5%. Then the data is presented in the form of tables and graphs (Rinaldi et al., 2020).

RESULTS

Based on the results of direct interviews with farmers in the study, namely the following information: the name of the farmer Sumadi 45 years old with the latest vocational education, the area of rice cultivated in monoculture is 3/4 ha with the status of privately owned land. The chosen commodity is rice because of its crop rotation and high economic value. The seeds used were resistant varieties, seeds purchased by farmers at the farm shop, rice plants were planted in May with a spacing of 30 x 30 cm. The fertilizers used are Urea, NPK, and TSP are applied by spraying. In addition to using chemical fertilizers, farmers also provide insecticides, fungicides, and synthetic herbicides to control pests and diseases. Plant care carried out is weeding weeds which are carried out once during the growing season and other treatments include replanting on dead plants.

The technical culture that is carried out is tilling the soil by doing the spacing. Harvesting is carried out at the age of 112 DAS, harvesting is done using a thresher, then the products are sold to the factory. The capital issued per planting season is the purchase of seeds of 60,000 IDR/package and other expenses such as fertilizers, pesticides, and wages of working farmers. Planting was carried out in June, spacing used was 30 x 30 cm. Farmers use fertilizer as a nutrient addition to the soil. The fertilizers used are urea and TSP fertilizer at a dose of 50 kg/ha. In addition to using chemical fertilizers, farmers also use synthetic insecticides and herbicides to control pests and diseases. Maintenance by weeding weeds every one month and embroidery. Harvesting was done when the plants were 80-96 days after planting. Farmers sell their crops to factories.

The capital issued per planting season is 180,000 IDR/15 kg of seeds, 780.000 IDR Urea and TSP fertilizers, 150.000 IDR/1liter of pesticides. Labor used other than farmers, namely seven people outside of family members with a wage 50,000 IDR /day. 5.2. Conch Pest.

The golden snail found in the field was in the form of a bunch of pink eggs attached to the stems of the rice plant in a slimy state like they had been laid, while the eggs when they were picked up and placed on the tissue were no longer slime (Figure 1).

The golden snail lays eggs at night and the eggs are attached to hard objects such as twigs, wood, bamboo or plant stems that are not submerged in water. A female golden snail is able to produce 50−500 eggs in one laying or 1000−1200 eggs in a month. Once laying golden snail eggs can produce 15−20 groups of eggs. The hatchability of the eggs is 80%. The eggs will hatch in 7−14 days. The eggs are pink or pink in color. The eggs can survive in water if the period of exposure to water is short enough.

The golden snail is a rice field animal that has a golden shell. This animal is a pest of rice fields in rice production. This snail has a life cycle of 2.5−3 months depend on the habitat. The golden snail usually eats 3−5 kg/week with an individual number of 100−250 tails/m2. These animals like soft-structured plants such as young water spinach, water hyacinth, taro and young rice (Kartika, 2016). These animals actively eat and reproduce at night. Plants that are attacked by these animals usually have mucus patches that dry up in their path of travel. This animal eats leaves at high speed so it is very detrimental (Kartika, 2016). Rice fields in Belitang are waterlogged land. So the snail pest likes it and lays its eggs there. Observations of the number of egg/plant groups in these two fields experienced differences. In the first week of the second week, there was an increase while in the second week of the 4th week it decreased. Based on the results of the t-test, the number of groups of golden snail eggs (*P. canaliculate*) in the two rice fields in Tulus Ayu Village, Belitang District, East Oku Regency, South Sumatra Province was not significantly different (Table 1).

The results of field observations of egg groups found in the first land were higher than those in the second field. Then in the 2nd week the number of egg groups found increased in the second field (Figure 2). T-test of the average number of eggs/field of P. canaliculata on both rice fields in Tulus Ayu Village, Belitang District, East Oku Regency, South Sumatra Province.

The number of eggs differed significantly in the first week of observation. Then the observations of the second week and fourth week were not significantly different (Table 2). The number of eggs in the first observation until the third observation on land 2 was higher than inland 1. However, in the fourth observation, the number of eggs decreased on land 2 (Figure 3).

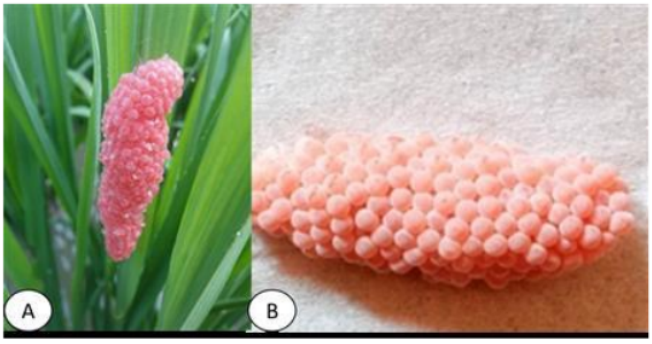

Figure 1. The golden snail group taken from the farmer's land (A), the golden snail eggs to be counted (B) Tulus Ayu Village

Table 1. Number of egg/plant groups of *P. canaliculata* in both fields

Observation Week to	Group Egg/Plant		T count	T Table	Description
	land 1	land 2			
1	1.00	1.23	0.004^{ns}	1.00	Different not real
2	1.27	1.23	0.001^{ns}	1.00	Different not real
3	1.07	1.23	0.003^{ns}	1.00	Different not real
4	1.03	1.10	0.001^{ns}	1.00	Different not real

Note: ns) Not significantly different, *) Significantly different at 5% P test level

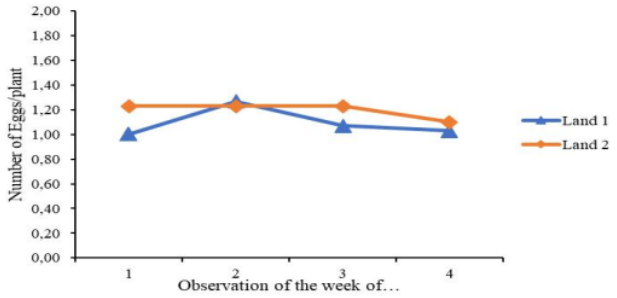

Figure 2. Number of groups of eggs/plants of Pomacea canaliculata on both rice fields in Tulus Ayu Village, Belitang District, Ogan Komering Ulu Timur

Table 2. Number of eggs/group of pomacea canaliculata in both fields

Observation of the Week	Number of Eggs/Group		T Count	T Table	Description
	Land 1	Land 2			
1	172.13	270.20	1.69*	0.01	Real Different
2	176.87	287.50	1.91^{ns}	0.06	Different Not Real
3	211.53	238.87	0.47^{ns}	0.64	Different Not Real
4	235.70	224.10	0.20^{ns}	0.840	Different Not Real

Note: ns) Not significantly different, *) Significantly different at 5% P test level

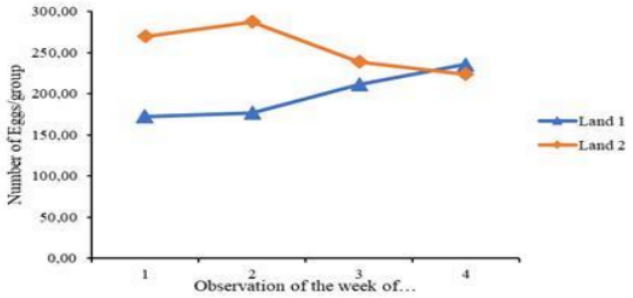

Figure 3. Number of eggs/group of P. canaliculate on both rice fields in Tulus Ayu Village, Belitang District, Ogan Komering Ulu Timur Regency

DISCUSSION

Rice cultivation carried out by farmers in Tulus Ayu Village, Belitang District, East Oku Regency, South Sumatra Province, found rice plants on the land of different ages. In the first field, the age of rice has started to enter the age of 1 month while in the second land it has only entered the age of 2 weeks. Both of these lands use a

monoculture cropping system. Monoculture is a single cropping pattern, where only one type of cultivated land is planted on a plot of land. The advantage of the monoculture system is that it only focuses on one plant commodity so that it is expected that the resulting product will be optimal because there is no competition with other plant commodities so that plant growth can be achieved optimally and maintenance is easier to do. The disadvantages of this monoculture system are that there is no added value from other commodities, it can reduce soil quality and the level of attack by plant-disturbing organisms is high.

The second land volume of water is not to high. Before planting, farmers sow their rice seeds first in other fields, then after they are big enough, they are transferred to paddy fields using a spacing of 30 cm x 30 cm. The treatment carried out by farmers is by giving synthetic pesticides to eradicate pests. Both of these lands have similarities, namely using a monoculture planting system, from the shape of the land both flat and waterlogged. Farmers before planting do plowing the fields first. Serves to loosen the soil, remove dirt, garbage and weeds on the ground. In this process, farmers use tractors and animal power in the form of cows. Based on the results of the research on both fields, the number of egg groups fields in the second week increased due to the temperature and comfortable place, causing *P. canaliculata* adults to produce a lot and lay their eggs in rice plants, while in the last two weeks the Pomacea egg group was planted.

The first observation on land 1 population of *P. canaliculata* as many as 796.23 grains while inland 2 the population of P. canaliculata as many as 1,020.67 grains. Inland 1 there was an increase in the number of observation points, while in the second land the number of grains was not stable. Land one with land two is not significant because of other factors such as environmental factors where land 2 is slightly inundated increasing egg population. While from observations it is known that the number of *P. canaliculata* egg groups is the same, namely 1 group of plantings, all the results are not significantly different. Based on the results of the study in two fields, the number of eggs/plants in the first field increased because farmers did not spray regularly and could also be influenced by environmental factors.

While on the second land it decreased due to environmental factors and the age of the eggs that would hatch and there were some eggs that had hatched a lot, stated that the distribution pattern of *P. canaliculate* was generally in groups This is evidenced by presence of golden snails that mate in the population in groups (Kasidiyasa et al., 2018). The golden snail is very greedy and eats a lot of aquatic plants such as rice, algae, water hyacinth, taro, lotus, and other young weeds.

The golden snail can damage rice as much as 31.6% with a size of 11−20mm. The control carried out by farmers in Tulus Ayu Belitang Village is by tilling the soil after planting and before planting, mechanically controlled using hands to take snails directly, and control using synthetic pesticides (Bunga et al., 2017).

CONCLUSSION

Based on the results of field observations, it was concluded that rice plants in Tulus Ayu Village, Belitang District, East Oku Regency in both fields with different ages of rice plants, the number of groups and the number of eggs differed in each land due to environmental factors where the volume of water slightly resulted in the number of eggs increasing, weather and climate change.

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