



Population of Natural Enemies in Three Varieties of Rice Plants in Turikale Subdistrict, Maros District

AUTHORS INFO

Nining Triani Thamrin
Faculty of Science and Technology
University of Muhammadiyah Sedenreng Rappang
niningtriani1606@gmail.com

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Aksal Mursalat
Faculty of Science and Technology
University of Muhammadiyah Sedenreng Rappang
aksalmursalat@gmail.com

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Abstract

Rice (*Oryza sativa* L.) is an annual crop that plays an important role in meeting the food sources of the Indonesian population. In addition, rice plants have a diversity of insects as their natural enemy. This study aims to determine the population of natural enemies of 3 rice varieties, namely Inpari 30, Ciliwung, and Mekongga varieties. The research location is the rice fields in Turikale Subdistrict, Maros District. The method used for the study was the survey location of rice fields with each paddy field size of about 20 x 15 m. The results showed that there were 3 types of predators namely *Lycosa*, *Coccinella*, and *Orthetrum* which were found in each variety with varied total numbers at every 2-week observation interval. The highest population of *Lycosa* was found in the Inpari 30 (6 wap) variety, the highest *Coccinella* population also was found in the Inpari 30 (10 wap) variety, while the highest *Orthetrum* population was found in the Mekongga variety (6 wap). The highest proportion of each variety was *Lycosidae* 50% in the Inpari 30 variety, *Lycosidae* 51.35% in the Ciliwung variety, and *Lycosidae* 44.44% in the Mekongga variety

Keywords: rice, varieties, *lycosa*, *coccinella*, *orthetrum*

A. Introduction

Rice (*Oryza sativa* L.) is a food crop that is the main food source for the Indonesian population. Over time the need for rice is increasing every year while the need for an effort to increase rice production is urgently required. However, until now the efforts to increase rice production still faces some obstacles including the existence of a pest attack that attacks rice plants which causes a decrease in rice crop production. Usyati, et al (2008) stated that the average loss of agricultural production due to OPT attacks was $\pm 30\%$ of the potential yield, and yield losses due to pests around 20-25%.

One of the solutions in controlling pests in IPC is to utilize natural enemies. In the concept of integrated pest control (IPC), it is emphasized that pest control should be carried out biologically

by utilizing natural enemies that already exist in plantations. Natural enemies on a good balance of nature always manage to control the pest population which can be managed to remain under the economic level. Therefore, providing natural enemies an opportunity to work means reducing the use of pesticides.

The natural enemies that inhabit rice plantations are very diverse and can be used to suppress pest populations if managed properly (Acep, 2015). The utilization of natural enemies does not cause pollution, in terms of ecology remain sustainable and in the long run, are relatively inexpensive. Control by biologically utilizing natural enemies is the work of biotic factors such as parasitoids, predators, and pathogens to prey or host, so as to produce a general balance that is lower than the conditions indicated if the factor is absent or does not work (Bach, 1979; Stern, 1959). Therefore, it is necessary to conduct research to determine the population of natural enemies from the three varieties of rice plants namely Inpari 30, Ciliwung, and Mekongga variety.

This study was aimed to explore and discover the natural enemy existence of these three rice varieties, namely Inpari 30, Ciliwung, and Mekongga variety.

B. Methodology

This study was conducted at rice fields in Turikale Subdistrict, Maros District. Materials and tools used in this study included killing bottles, gauges, collection bottles, insect nets, labels, plastic bags, bamboo stakes, scissors and writing stationery.

This study used a survey location method to determine the sampling location. Each rice field plot was determined with a size of 20 x 15 m and divided into 3 sub-plot observations which were spread with each 10 plants of each cluster.

Observation Method

1. Direct observation

Direct observation was performed on 10 clusters per sub-plot observations which were randomly systematically determined. Each cluster was observed from the stem base to the leaves. The observation was performed every 2 weeks until before harvesting, then the natural enemies found were put into a killing bottle then observed and calculated the number of individuals. Furthermore, the natural enemies obtained were counted and identified up to the family level referred to the insect determination (Borror & DeLong, 1971).

2. Netting

Netting was performed to catch the natural enemies that were actively flying around the plant canopy. The netting was performed using net with 10 insect swings and 20 replications in a designated rice sub plot plantation. The selection was performed on the observation field with systematic distribution. The arthropods obtained were put in a plastic bag and collected into a collection bottle containing 70% alcohol followed with identification, as well as recording the total number and type.

C. Result and Discussion

1. Population of Natural Enemies

The natural enemies found in rice plantations during the study were Lycosidae, Coccinelidae and Orthetrum. The observation indicated that the population of the three varieties was fluctuative following the figure.

As shown in Figure 1, an increased number of insects was shown simultaneously among the three varieties at 6 wap, then decreased individual population was shown at 8 and 10 wap. This result was similar to Bambaradeniya & Edirisinghe (2008), who stated that the arthropod community on terrestrial land in plantations either in rice, weeds, and soil surface consists of insects and spiders which is strongly influenced by the rice cultivation.

Figure 2 above shows the population of Coccinelidae that increased simultaneously for all three varieties at 6 wap and increased again at 10 wap for both varieties, namely Inpari 30 and Ciliwung variety, but the same did not occur in Mekongga variety as the number of Coccinelidae did not increase at 10 wap.

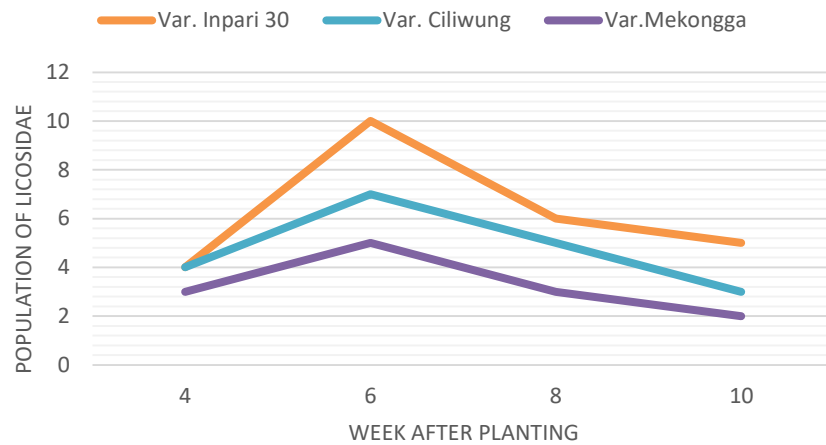


Figure 1. Lycosidae Population in Three Rice Plant Varieties

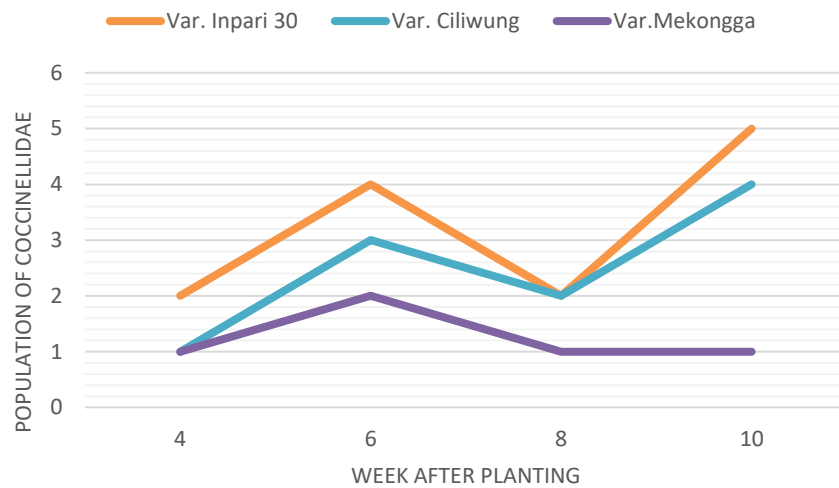


Figure 2. Coccinellidae Population in Three Rice Plant Varieties

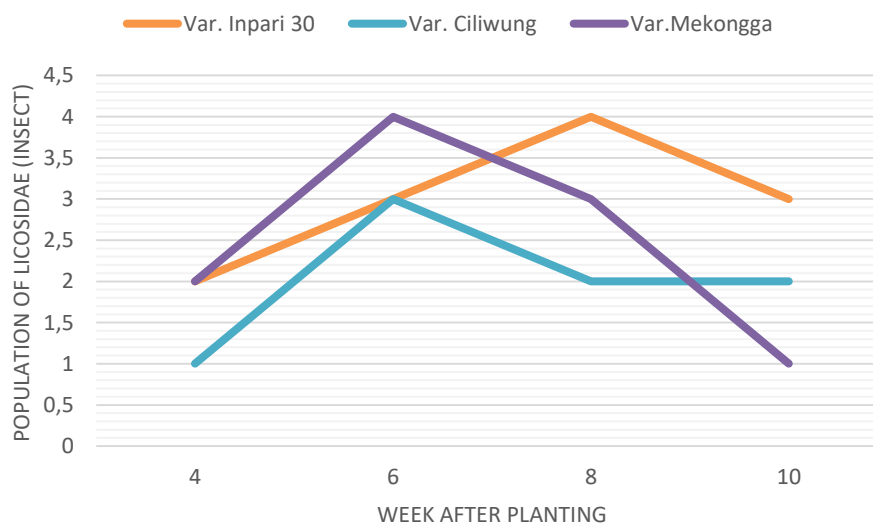


Figure 3. Orthetrum Population in 3 Rice Varieties

Orthetrum population increased at 6 wap in Ciliwung and Mekongga variety and the following week showed the decrease in the total number of insects, but the number of populations in the Inpari 30 variety increased at 8 wap and also decreased at 10 wap.

2. The Amount and Proportion of Natural Enemies in 3 Rice Varieties

The natural enemies in the three varieties showed different amounts and proportions as seen on the following table:

Table 1. The Amount and Proportion of Natural Enemies in Inpari 30 Variety

Order	Family	Amount (insect)	Proportion (%)
Araneida	Lycosidae	25	50
Coleoptera	Coccinellidae	13	26
Odonata	Orthetrum	12	24
Total		50	100

Source : Primary data after processing (2019)

The most natural enemies obtained in the Inpari 30 variety was from the Lycosidae family with 25 insects made up 50% proportion of the total natural enemies, followed by Coleoptera family with 13 insects proportioned as 26% and the lowest population was from the Orthetrum family with 12 insects proportioned as 24%.

Table 2. The Amount and Proportion of Natural Enemies in Ciliwung Variety

Order	Family	Amount (insect)	Proportion (%)
Araneida	Lycosidae	19	51.35
Coleoptera	Coccinellidae	10	27.03
Odonata	Orthetrum	8	21.62
Total		37	100

Source : Primary data after processing (2019)

The highest natural enemy population in the Ciliwung variety was obtained from the Lycosidae family with 19 insects proportioned as 51.35% of the total natural enemies found in the Ciliwung rice plant variety, followed by Coccinellidae family with 10 insects proportioned as 27.03% and the lowest population was obtained from Orthetrum family with 8 insects proportioned as 21.62%.

Table 3. The Amount and Proportion of Natural Enemies in Mekongga Variety

Order	Family	Amount (insect)	Proportion (%)
Araneida	Lycosidae	12	44.44
Coleoptera	Coccinellidae	5	18.52
Odonata	Orthetrum	10	37.04
Total		27	100

Source: Primary data after processing (2019)

Based on the observation result, the highest natural enemy population in Mekongga variety was from the Lycosidae family with 12 insects proportioned as 44.44%, then followed by the Orthetrum family with 10 insects proportioned as 37.04% and the lowest population was from the Coccinellidae family with 5 insects made up a proportion of 18.52 %.

D. Conclusion

Based on the results, the population of natural enemies found, namely Lycosidae, Coccinellidae, and Orthetrum family in three varieties of rice plants was relatively high. Increased potential and role can be expected once the predator population can be maintained and increased to reduce increased pest populations.

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