

## Distribution of Rice Plant Pests (*Oryza sativa L.*) in Vegetative and Generative Phases: analytical study

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### ABSTRACT

*Rice as one of the main foods that experience many obstacles in doing cultivation. One of them is insect pest attack. This study aims to study the activity of insect pests that damage rice plants to inhibit their growth and development. Increasing rice production in Indrapuri District, Aceh Besar District continues to be pursued. This research activity was carried out from April to June 2019, by adopting the observation method to detect the presence of types of pests by using sweeping equipment in the form of a net at the location of rice field plots. The collection of pests from the insect group is carried out by identifying them which refers to the insect identification key. The results showed that insect and non-insect types of pests were found that were destructive in both the vegetative and generative phases to inhibit their growth and development which had a negative impact on production.*

**Keywords:** *Rice, pests, generative, vegetative.*

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### INTRODUCTION

Rice is the source of rice as a food commodity and its availability must be fulfilled as an effort to improve the welfare of the Indonesian population, especially residents in Aceh Province. However, cultivating rice plants faces many obstacles, and one of them is pest attack. Efforts to maintain food sufficiency, it is necessary to manage the inhibiting factors, including pest attacks. Various Plant Pest Organisms were found in rice cultivation activities since the vegetative and generative phases. This is in accordance with the report from Mulcahy et al (2022) that plant pest attacks cause damage to production yields to have a negative impact on both quality and quantity which is economically detrimental.

Other types of pests that are not insects, such as mammals, vertebrates. Therefore, in carrying out this research, it will be studied related to the presence of pests in lowland rice plants which can ultimately produce an innovative management technology that is effective which is still an important component in integrated pest management by utilizing natural enemies (Zhu et al, 2018). Natural enemies are effective population regulators related to density. If there is an increase in the population of insect pests, it will be followed by an increase in the population of natural enemies (numerical responses) and functional responses, namely an increase in feeding or parasitic power (Wang et al, 2018).

This study aims to produce information related to pests that inhibit the growth and development of lowland rice plants as an effort to increase rice production in Indrapuri District, Aceh Besar District. This activity is the first step to collect OPT data in lowland rice cultivation, which until now has been carried out for 3 (three) plantings of the Rice Planting Index (IP) each year. This condition allows various pest explosions to occur. Rice plants are classified as narrow-leaved plants, with different characteristics both in terms of shape, arrangement, or parts. Characteristics of rice leaves in general the presence of scales and leaf ears. The collection of rice flowers that come out of the top book is called a panicle. The rice grains are located on the first and second branches. Panicle length depends on the type of rice variety. The panicle size can be divided into short panicles (less than 20 cm), medium panicles (between 20-30 cm), and long panicles (more than 30 cm).

According to Sarumaha (2020) rice is a family of Poaceae, Genus *Oryza*, which consists of

vegetative and generative organs. The vegetative organs include roots, stems and leaves, while the generative organs consist of panicles, grain and flowers. From germination to harvesting of rice plants it takes 3-6 months, which in total consists of two growth phases, namely vegetative and generative. The reproductive phase consists of a pre-flowering phase and a post-flowering phase. According to Zakiyah et al, (2019) important pests on rice plants and natural enemies Pests in a broad sense are any organisms that can disturb, damage or kill other organisms. Organisms that are often pests of rice, such as WBC, can cause the leaves to turn yellow-orange before turning brown and dying. If the planthopper population is in high density and the rice varieties planted are susceptible to brown planthoppers, it can cause plants to burn or "hopperburn". Brown planthoppers can serve as vectors of virus transmission until plants become hollow dwarf, and grass dwarf virus, two very destructive diseases. Planthopper explosions usually occur due to inappropriate use of pesticides, planting of susceptible varieties, plant maintenance, especially improper fertilization and environmental conditions suitable for brown planthoppers (moist, hot and stuffy) (Usyati et al, 2018).

Walang sangit is a pest that destroys rice grains in the ripening phase, by sucking the grain while filling. If disturbed, the insects will defend themselves by emitting an odor. Walang sangit damages the plant when it reaches the flowering phase until the milk ripens. *L. acuta* attack causes the rice to change color and calcify, and the grain becomes empty (Zakiyah et al, 2019). According to Sarumaha, (2020) ground bedbugs in Asian countries are important pests in rice cultivation. This pest has a gradual metamorphosis (paurometabola), which passes through three growth stages (eggs, nymphs and imago). The life cycle of ground bedbugs is about 32-35 days. Imago are attracted to light and fly activity at night. Stem borer is an important pest in rice plantations that causes heavy damage to high yield losses. The presence of this pest is characterized by the presence of moths (butterflies) and the death of rice shoots, the death of panicles and stem borer caterpillars. These insect pests damage rice plants at all stages of growth, both during the seedling, tillering, and flowering phases. If the attack occurs during the nursery until the tiller phase, then this pest attack is called sundep, and if an attack occurs during flowering, it is called beluk (Wang et al, 2018).

## **METHOD**

Rice cultivation in Indrapuri District, Aceh Besar District, Aceh Province has so far experienced many obstacles, especially disturbances from Plant Pest Organisms (OPT). The pest attacks found in lowland rice plants came from insect and non-insect groups. This research was carried out in the Rice Fields Area of Paddy Plants, Indrapuri District, Aceh Besar District, Aceh Province and in the Basic Plant Protection Laboratory, Unsyiah Plant Protection Department, from April to June 2019, by adopting the observation method, namely taking samples of the types of pests by sweeping using insect netting equipment and observing directly on the rice field area. The collection of insect pests was brought to the laboratory to be identified using an identification key. The types of pests that have been identified are described according to the morphological character of each type of pest found in the field, both against insect pests and non-insect pests.

## **RESULT AND DISCUSSION**

Observations showed that non-insect pests were found in the vegetative phase in rice cultivation from the molluscs or Mas conch pests (*Pomacea canaliculata*), and from the Aves group such as Peking sparrows (*Lonchura punctulata*), Pigeons (*Columba* spp). In this phase The golden snail pest was more dominant. The dominance of the golden snail is thought to be related to the availability of food sources that have a positive correlation with the pest, where the leaves and stems of the rice plant are optimal and favored by the golden snail. The golden snail is an important pest on rice plants that eat rice plants from nursery to planting. The most severe attacks usually occur when the plant reaches 1-30 days and can inhibit the number of tillers from rice plants. Meanwhile, the sparrows and pigeons visited the rice seedling site with the aim of obtaining food sources from the types of rice seeds which were potential seeds at the seeding location.

The presence of birds in these locations is not as important as the presence of snails in rice seedling. The presence of golden snail pests needs to be anticipated so that rice plants can grow and develop effectively. The bondol bird group is one of the pests that usually attacks the community's rice plants, such as Peking bondol (*L. punctulata*), Javanese bondol (*L. leucogastroides*), or haji bondol (*L. maja*). This bird pest can eat seeds as much as 10% of its body weight. Peking Bondol pests can eat an average of 5 g of rice a day. The bondol bird group eats the grains on rice panicles that have entered the

ripe period of milk or rice with a planting period of 70 days. As a result of the attack of the bondol bird, rice production has decreased by 30-50%. This pest generally attacks in groups when the weather conditions start to cool (Zakiyah, 2019).

The existence of insect groups whose species also act as pests in the vegetative phase of rice cultivation. The results showed that in this phase the groups of pests found were Homoptera, Hmeiptera, Coleoptera, Orthoptera, and Lepidoptera. All groups of insect pests are destructive to the leaves and stems of rice plants. All groups of insect pests from the phylum arthropoda contain insect species whose role is as pests and inhibits the growth and development of rice plants.

Species of insect pests in the larval or nymphal stages damage rice plants in the vegetative phase. The mechanism of damage to rice plants is carried out by using mouth tools by biting and chewing or other types of oral insect pests. The highest pest attack in this phase was dominated by *Scirpophaga innotata* and brown planthopper (*Nilaparvata lugens*). Pest attack symptoms. *innotata* on rice plants is that the leaves turn white thin and roll vertically or known as false white pests. The damage caused by the attack of the false white pest is indicated by the presence of white color on the leaves in rice cultivation. Larvae of pests *S. innotata* eats the green tissue of the leaves from inside the leaf folds and leaves the lower layer of the leaf surface so that the rice plants are white. As a result of ineffective management, in 1990 the pest attack of *S. innotata* increased up to 135,000 and suffered economic losses. *N. lugens* or brown planthopper (WBC) attacks rice plants by sucking the liquid contained in rice plants. WBC pests can also act as vectors for transmitting viruses to rice plants. As a result of this pest attack, rice plants become dry like burning or their growth becomes stunted. According to Baihaki (2009), *N. lugens* is an important pest of rice in Indonesia. The attack causes puso in large areas in a short time. This pest is easy to adapt to form new biotypes and can transfer dwarf virus to grass dwarf virus which is more destructive than the brown planthopper it self.

The results showed that pest attacks in the generative phase of various types of birds, among which the sparrows *L. atricapilla* and *L. punctulata* were the most important sparrow species in inhibiting rice production, were observed. The generative phase of the rice plant and entering the stage of cooking milk to harvest is the stage that is very favored by the bird pest group. The pest directly eats the yellow rice grains until the panicles break. This condition results in loss of crop yields. One way to manage this pest can be done by producing sound as an effort to repel birds from lowland rice plants. This is in accordance with a report from Manueke et al (2018) that from seedling to harvesting paddy fields are attacked by several bird pests (*Passerspp.*), and other pests. The golden snail pest in the generative phase as an important pest on rice plants needs serious attention even though it does not damage rice plants. This is related to the behavior of the golden snail which lays eggs by sticking to the stems of the rice plant so that the photosynthetic activity of the rice plant is inhibited. If this condition is left unattended by not managing the golden snail pest properly, it may have a negative effect on production. According to Usyati et al (2018) that *P. canculata* is a voracious polyphagous herbivore, attacking young rice plants from seedling to one month after planting. Symptoms of attack are indicated by the presence of missing leaf parts. Vegetative, namely when the rice grains are almost ripe / ripe until ready to harvest, even post-harvest.

Observations showed that the rice planting area close to residential areas was attacked by pests so that the leaves and stems were broken. This rat pest is active in attacking rice plants at night and during the day these pests hide in their nests, namely in holes in rice fields, bushes and in people's yards. Its rapid reproduction and the damage it causes are very detrimental to the economy and crop failure. According to Sarumaha (2020) rice field rats are the main pests in rice cultivation that can cause damage from the nursery phase, generative phase and postharvest phase in agricultural product storage. The damage caused by this pest can be in the form of quantitative damage, namely a reduction in production weight due to direct consumption and can also cause qualitative damage due to a decrease in product quality. According to Wang et al (2018) pest attacks resulted in crop failure and in 1998 in Indonesia this pest attack occurred up to 159,000 ha with attack intensity 24.8%.

The location of the rice field planting area bordering the mountain forest was attacked by pig pests, but the level of damage did not result in crop failure, because it was quickly anticipated and production could be maintained. The attack of pig pests on rice fields adjacent to mountain forests occurs at night, and to anticipate the attack of pig pests by setting traps. According to Aeni (2019) the management of wild boar pests is carried out by means of sanitation, technical culture, mechanical, biological, and chemical. Mechanically, this is done to prevent wild boars from entering the plantation area through the creation of physical barriers, namely: (1) making a strong fence around the plantation, (2) making a fairly

wide and deep ditch around the plantation. Another effort is to catch wild boars, which can be done using nets or snares.

If the attack of each pest is not addressed immediately, it can cause economic losses. The insect pest diversity index in the generative phase is moderate to high. According to Zhu et al (2019), most of the rice plant pests are insects. The dominant rice plant pests are stem borer, ganjur (*Pachytiplosis oryzae*), leafhoppers, walang sangit (*Leptocorixaacuta*), white pests (*Nymphula depunctalis*) and armyworms (*Spodopteralitura*). According to Cabasan (2019), bedbugs (*Scontinophorasp.*) are one of the pests of rice plants that cause considerable losses and the types of stem borer that attack the most are white borer (*S. innotata*), yellow borer (*S. incertulas*), striped borer (*Chilo suppressalis*). ) and the pink borer (*Sesamia inference*). According to Mulcahy et al (2022) that the most active planthoppers attacked were green leafhoppers (*Nephotettix oryzae*), brown leafhoppers (*Nilaparvata lugens*), white leafhoppers (*Sogatella furcifera*) and striped leafhoppers (*Nephotettixapicalis*) and green ladybugs (*Nezara viridula*) and rice hispa. (*Diclandispa armigera*)

## CONCLUSIONS

There are pests from both insect and non-insect groups that need serious attention from all parties for their management so that rice production is effective. It is necessary to provide counseling to farmers to be given an understanding of the bioecology of these pests in Indrapuri District in particular and to all farmers in general regarding their management mechanisms, so that rice production can be maximized.

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