

## Resistance Improvement of Rice Varieties

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### Abstract

The treatment of IR64 variety has a low attack intensity of 3.70% on the last day of observation. The highest intensity of brown plant-hopper pest attack was on sintanur varieties with attack intensity of 34.07%, and the lowest intensity of brown plant-hopper pest was IR66 with 1.11%. It is clear that sintanur varieties are varieties that are susceptible to brown plant-hopper pests. In addition to sintanur varieties, the Cigeulius variety has a criterion susceptible to brown plant-hopper pests, namely 31.48%, the response of plants to pests and diseases caused by the most destructive brown planthopper pest damage to rice plants, according to the resistance assessment more than half of the plants wither and the plants become stunted or die, according to the symptoms caused in the field of research land.

**Keywords:** Sintanur varieties; Brown plant hoppers; Plant hopper pests; IR64; Leaf surfaces; Silica content

### Introduction

Accordingly, damage to the rice plant network is caused by most of the reo-virus in the plant-hopper is pathogenic and causes various symptoms in the host plant. IR64 is more resistant than sintanur varieties, but more susceptible when compared to IR66 varieties. It was seen in the observation of 101st plant age; the intensity of the attack on IR66 varieties was the lowest with symptoms of leaves per clump of yellowing rice plants at the time of observation. This is also the tolerance of rice plants on brown plant hopper with its ability to recover or process the healing of rice plants after being damaged due to the attack of brown plant-hopper pests. In this case, pests are present in rice plants, but the damage and losses can be minimized because of the ability of these varieties to repair and replace damage caused by brown plant-hopper pests, so that the plant can continue to grow again. Cibogo and IR64 varieties have the same low intensity of attack that is 3.703%, and the Inpari 13 variety is 4.813% [1]. According to the initial description, the variety is a variety of rice plants with rather resistant criteria with the characteristics of the first yellow and first few leaves when observed on the ground. So this level of resistance becomes resistant. Because IR64 is more resistant compared to Sintanur varieties, it is more susceptible when compared IR66. Commonly, varieties that are sensitive to brown plant hopper are which hair or hair on the torso are rare or few but rather long and between long hairs there are also small, relatively dense small feathers. In resistant rice cultivars have a variety of feathers or hair but are generally longer and more abundant in the leaves and stems of rice plants. Coarse fibre on the leaf and stem surface of rice varieties tested in accordance with the description of varieties according to is that each variety has a rough leaf and stem surface on resistant varieties while in varieties susceptible to leaf surfaces and rather rough rod. In IR66 varieties tend to have coarse stem walls and this is also the same in IR64 varieties, whereas in Sintanur varieties have rather coarse stems and large stems and the presence of cavities in the stem [2].

### Discussion

In rice varieties that are resistant to brown plant-hopper biotypes, three have the highest silica content and in varieties that are resistant to plant-hopper biotypes, one and two has little silica content meaning that the most silica content in rice plants has hard and stocky stems causing activity, especially feeding brown plant-hopper is disturbed and resistant to brown plant hopper. In accordance with the description of varieties about pest resistance, it can be inferred that Sintanur varieties

are sensitive to brown plant-hopper biotype 3, so that the population and intensity of brown plant-hopper pest attack is the largest in Sintanur variety, Cigeulis variety which is pest resistant ie brown plant hopper biotype 3 and ciherang variety which is somewhat resistant against biotype 3 plant-hopper, while in IR66 and inpari 13 varieties, pest resistance was resistant to brown plant-hopper biotypes 1, 2 and 3 so that the population and intensity of brown plant-hopper pest was the lowest. The population and intensity of brown plant-hopper pests in all rice varieties tested affected rice growth and production [3]. Plant varieties that are resistant to pests and diseases have a group of factors contained in plants and obtained naturally, while their nature is to reject, prevent or tolerate attacks by pests and diseases. Factors that control the nature of resistance include physical, chemical, anatomical, physiological and genetic factors. Anti-xenoxis is the insect's preference for mechanical factors derived from the physical structure and surface properties of plants. The structure and physical properties of the surface of the plant include thickness of the skin, length and dense hairs on the surface of the leaf, the size of the stomata and the thickness of the cuticle layer. The insect's preference for mechanical factors is closely related to the structure of the tools and the way to take food and lay eggs held by insects [4]. The mechanism of resistance in the seven varieties of rice plants tested showed that the Inpari variety, Cibogo and IR 64 showed anti-xinoxic resistance which means that the three varieties contained morphological resistance which did not benefit the brown plant-hopper pests in the test plants, namely the presence of long and hard fur and the surface of the stem and coarse leaves that inhibit the way of eating, the feathers are found on the leaves and stems that are seen using a 10x magnification microscope on the IR 64 variety, and can be seen in the population, the intensity of the brown plant-hopper pest attack is low. In Sintanur, Cigeulis and Ciherang varieties showed the population and intensity of large brown plant-hopper pest attacks and also the yield of milled dry grain weight per low

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experimental plot, this was due to the morphological resistance of the three varieties, Sintanur, Cigeulis and Ciherang, which were very low. Sintanur varieties which have no or rarely found hair on the stem seen with a 10x magnification microscope as well as on the rather rough surface of the stem and leaves. In IR 66 varieties which showed a high population of brown plant-hopper pests, the lowest intensity of brown plant-hopper pests and the yield of milled dry grains per experimental plot were the highest compared to the production of other varieties [5]. This is because the resistance of IR 66 varieties shows tolerant resistance which means tolerant is one of the properties possessed by plants that can heal themselves from damage to pest attacks, although the number of pests that attack amounts to the same as those that attack IR 66 varieties, the presence of feathers on the stems and leaves and the rough surface of the stem and leaves. Treatment of IR66 and IR64 varieties had low attack intensity and Sintanur varieties had high attack intensity, so it was known that sintanur varieties were susceptible varieties when compared to controls [6]. High in the number of productive tillers, the weight of dry milled grain and the percentage of empty grain on Sintanur varieties is lower when compared to other varieties and also control. Rice is an agricultural commodity that is needed in Indonesia, because almost 90% are used as a main food source [7]. The main obstacle in rice cultivation in Indonesia is the problem of brown plant hopper pests which causes low rice production to cause crop failure. Brown plant-hopper is a type of insect that has the potential as the most dominant pest attacking rice plants in Indonesia and Asia. Planting resistant varieties can reduce the development of brown plant-hopper pests [8]. The causes of brown plant-hopper population explosion include the use of nitrogen fertilizer exceeding the dose, and the non-alternating planting period and insecticides. Until now, farmers still rely on synthetic insecticides to overcome the problems caused by brown plant-hopper pests. Accordingly, the use of synthetic insecticides can harm both the environment and human health. Therefore, other integrated control techniques are needed, both using natural methods such as the use and planting of resistant varieties [9]. Rice varieties that are often cultivated by farmers in Jember are Sintanur, Cibogo, Ciherang, Inpari 13, Cigeulis, IR-64, and IR-66. Among these varieties, resistance brown plant-hopper biotypes has not been identified that attacked the research site or in the field. Therefore, this research needs to be done to determine the resistance of rice varieties tested against brown plant-hoppers that attack at the study site [10]. The parameters observed are the population of brown plant hopper observed at the age of the plant after moving from the nursery, observation interval once a week. Percentage of damage to

plant leaves by systematic random sampling on rice sample units. the most resistant varieties of this research was the variety IR66 which has a low intensity of the attack on the last observation by 1.11% with a population of brown plant-hopper pest average of 6.36 insects.

## Conclusion

Thus, to inhibit the development of brown plant-hoppers population, Sintanur varieties are not recommended while other varieties can be planted in Jember regency. During the study, brown plant-hoppers preferred young aged rice, whereas in the older age of the plant population, brown plant-hoppers were rarely found

## Acknowledgement

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## Conflict of Interest

None

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