Netting House Application as a Facility for Rice (*Oryza sativa L*) Breeding Activities in Rice Fields

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Abstract. Paddy is an annual plant that can adapt to waterlogged land. Rice is a self-pollinating plant (autogamy) which is a grammar group with a stem composed of several segments, fibrous roots, the presence of a tongue and leaf ear, and a collection of rice flowers (spikelets) called panicles. Cross-pollination can be done in several ways, namely artificial and natural pollination. Natural pollination is done with the help of wind, birds, and insects. The success of producing superior non-hybrid (Inbrid) rice by cross-pollination is complicated because rice is a self-pollinating plant. Artificial cross-pollination with the help of human hands will make it easier to produce new types of superior inbred rice. At the beginning of the establishment of the Seed Technology Study Program from 2009-2020, Seed Technology students carried out rice plant breeding practices in greenhouses. The available greenhouses are composed of glass walls and glass roofs. This can increase the temperature in the room. The optimum temperature for rice plant growth is 23°C-25°C. Meanwhile, the temperature in the greenhouse >30°C has an unfavorable impact on rice plants. The lack of success during the practice, namely the temperature in the greenhouse, is very high, reaching >30°C, thus increasing the transpiration rate in rice plants. As a result, rice plants experience stress due to a lack of water. This research aims to make a net house with a plastic roof (netting house) in the rice fields so that rice plants can grow optimally supported by temperature and rainfall. The netting house function can also protect rice plants from pests like rats, leafhoppers, bugs, and other pests. The benefits of this research are as a means for practicum and research activities for students, Education Laboratory Institutions (PLP), and lecturers to produce new varieties of rice.

1. Introduction

Rice is one of the crucial commodities in Indonesia. Rice is a favorite food that has been attached to people's hearts. The culture and habits of the Indonesian people who have the stigma of "not being full if you haven't eaten rice" indicate how Indonesian people have a strong culture of eating rice (Haryadi, 2006). Good quality rice can be done by breeding rice, namely by cross-breeding between two elders who have special characters. Increasing the yield potential of a plant can be done by modifying the type of plant (Donald, 1968). Before crossing, first characterized by observing quantitative characters of rice plants such as plant height, number of productive tillers, panicle length, amylose content, amylopectin content, flowering age, grain weight of 1000 grains, In Indonesia, the increase in new types of rice has been started since 1995. Abdullah et al. (2008), One way to assemble superior varieties is by collecting singular characters from various parents in a combination, so it takes a long time to produce traits that align with expectations. In 2016 research conducted by Adimiharja et al. (2016) which was carried out at the Lampung State Polytechnic has produced promising lines, namely RP1, RP2, RP3, RP4, RP5 (the

result of crossing the Rojolele variety with Pandan Wangi), RG1, RG2, RG3, RG4, RG5 (the result of crossing the Rojolele variety with this variety). Gilirang), MR1 and MR2 (a cross between Mentik Wangi and Rojolele).

The self-pollinating plant line assembly course (PGTMS) is a course that directs students to become experts in the field of plant breeding. The course focuses on self-pollinating plants such as rice, tomatoes, chilies, soybeans, etc. The practicum activities are carried out in a greenhouse with a closed room condition consisting of a glass roof and glass walls. This condition becomes an obstacle to the practicum results that are not following the student's competence. Many plants wilt quickly due to lack of water due to high room temperatures that reach >30°C. Matthews et al. (1997) showed that an average temperature increase of 1°C would reduce rice production by 5-7%. Many nuisance pests in the greenhouse interfere with practical activities such as rats, birds, stink bugs, and other nuisance pests. Rice can grow well in an environment with sufficient water soil with a specific ratio of sand, silt, and clay fractions. This research aims to create a place for practicum activities and rice research in the fields.

Lampung State Polytechnic is a vocational college that has a learning curriculum of 70% practical components and 30% theory. With a practicum component of 70%, it is hoped that Polyneta alumni, especially the Seed Technology Study Program, have the expertise to produce superior seeds. The Seed Technology Study Program has the vision to make an excellent applied expertise program in producing applied graduates with high integrity, innovation, entrepreneurial spirit, and competence in tropical plant seed technology activities.

In this study, the researcher was determined to create a net house to support students, PLP, and lecturers of rice plant researchers, especially in the Seed Technology Study Program, to produce new types of rice according to the community's interests..

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Determine the size according to the previously measured land area. Determining the building's size, design, and direction is essential in building a net house for the functionality and effectiveness of all operations in the plant shade house.

2.1. Shade House Making.

After determining the design and size, build the framework structure by making arrangements starting from the walls doors to the roof and installing ultraviolet plastic with a measure that has been adjusted to the top of the net House. The plastic used is polycarbonate, so it is not easily torn. The walls are covered with paranet. Bolts are used to attach the paranet to the frame wall to be strong and not easily blown away by the wind.

2.2. Test Room.

After the shelter assembly activity was completed, the room was ready to be tested in the fields at the Lampung State Polytechnic. The trials carried out are:

a. The first trial was to plant rice in a shade house for one season. Observations were made from planting to harvesting. The stability of indoor growth is the main factor in the success of the shade house-made.
b. In the next growing season, the second trial was carried out by conducting artificial pollination. The room's success was seen from the success of fertilization after artificial pollination was carried out.

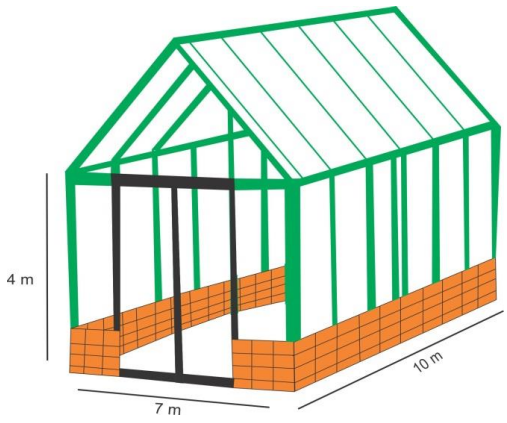

Figure 1. Netting House building design

3. Result And Discussion

A netting house is interpreted as a net house because the building is net and see-through. Along with the development, other materials such as plastic, paranet, and fiberglass were found, so the name became a plant house. A netting house can be defined as a building with a roof and walls made of nets with a light steel frame. In the research carried out, netting houses are used as a means for breeding rice plants by providing an environment suitable for the agro-climate. The roof of the netting house deliberately does not use a plastic top so that rice plants can meet their water needs when it rains. When the experiment was conducted, the air temperature and the duration of irradiation in the netting house did not interfere with rice plants' growth. Rice planting is done on bucket media. Height Air temperature and irradiation time can cause a shortage of water in the media due to evaporation at the soil surface. There are several obstacles when it rains; pollinating is complicated during high rainfall. During the flowering phase, especially during pollination, high rainfall will cause wet pollen due to rainwater, so that the pollination process will be disrupted (Purnomo, 2016).

The advantage of using a netting house application is the length of irradiation and the intensity of light according to the needs of the rice plant. Extended irradiation can affect the flowering process. In the research of Warner and John (2003), the application of 8 hours irradiation on Rhododendron plants will increase the number of flower initiations.

Figure 2. The appearance of the netting house

Figure 3. Rice plants in the netting house

Rice plants in the netting house are tall and short because of the influence of the climate. Suprihatno's research (2010) stated that climatic and weather factors could cause the characteristics of plant height that have a short size.

4. Conclusion

They are netting House provides good growth space during practicum and research. Pest attacks are still there but not as intensive as rice in paddy fields in general. Pest and disease control is easier to do in the netting house. The netting house will be better if you add Smart farming technology to determine each plant's temperature, humidity, and fertilizer needs.

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