

STUDY OF THREE VARIETIES OF IRRIGATED RICE PADDY ON MINAPADI-SRI CULTIVATION

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Abstract

Rice includes staple foods that can not yet be replaced with other plants. Therefore, the need for rice continues to increase, so the production of rice crops needs to be improved. Efforts to increase rice production continue to be done, but our country still import rice. This is due to the uneven increase in population with the production of rice crops. One of the efforts to increase rice production is the adoption of SRI (System of Rice Intensification) method adopted from Madagascar. SRI rice production has reached 10ton / ha while the farmer level (conventional) is still around 4-5 t / ha. To increase the added value of land, the SRI method is combined with the maintenance of fish in the water channel (minapadi-SRI). So far, SRI methods applied to irrigated rice fields have been drained around the land and the center of the field, but the water has not been fully utilized. To increase the productivity of the land, the fish can be maintained in the channel, so as to increase the added value of the land. The combination of rice and fish can improve the welfare of farmers. Besides, the fish kept in the rice field tastes good and tasty. Fish kept for two months so the fish is not too big (babyfish) can increase farmers income. The water channel is made as deep as 20 cm with a width of 50 cm. The purpose of this study is to see the growth and yield of three varieties of rice crops in various types of fish. The design used in this study, in the form of Group Random Design (RAK) three groups with experiments in the form of Split Plot. The main plot of fish species (Nila fish, Tawes, Mas Majalaya) and child maps are varieties (PB42, Batang Piaman, and brown rice). Observation of the yield and yield components of rice and fish. The data obtained were analyzed using analysis of variance with F test of 5% real level. The comparison of median value of treatment using Test of Real Differences Honest 5% real level. The result of this research is the number of tillers of Batang Piaman varieties are 37 stems, PB42 35 stems and 28 brown rice. Fish included with 2cm size to 6cm with harvest.

Keywords: increasing rice production, babyfish, water channel, fish species, irrigated rice field.

INTRODUCTION

Rice is still the staple food of the Indonesian people and most of the population in the world. National rice needs continue to increase every year as population increases, whereas the area of rice fields continues to decrease due to various interests. Various efforts to increase production have been carried out both through extensification and intensification. One of the last decade's efforts to give hope is the application of SRI (the System of Rice Intensification) in rice cultivation. Various research reports and crop yields of farmers show a one to threefold increase in yield.

The most suitable paddy field for the development of SRI is irrigated rice fields with more guaranteed water availability. Water on SRI does not need to inundate the entire surface of the paddy field, it is enough to guarantee that the soil remains in a wet condition (around field capacity). The results of the research by Kasli and Effendi (2011) provide hope for further modifying the SRI pattern. It was reported that the best results on SRI that were tried were the water in the pot about -10 cm above the ground. Thus rice can be planted in parts that are not inundated (plots), enough water is provided in the trenches made between the plots of rice planting. Planting conditions like this provide an opportunity to allow water to remain in the ditch between paddy fields from planting to near harvest. If the age of rice planted is around 100 days, then there will be about 80 days of standing water. Enough time to keep fish.

Farmers in several regions in Indonesia are accustomed to utilizing standing water in paddy fields to maintain fish, either directly between stagnant rice clumps or making special plots in the middle of rice fields, on the edge around paddy fields or alternating with rice planting. This cultivation method is known as Minapadi. West Sumatra is one of the areas where farmers are used to doing it. Ramli (2010) reported that in Lima Puluh Kota District around 150 ha of rice fields were used for minapadi.

Combining SRI with minapadi is very possible. The merger is directly a form of product diversification from irrigated rice fields. However, some issues still need to get answers so that the application at the farmer level is more practical, scientifically accountable and profitable not only for farmers' income, but also nationally beneficial because it can play a role in strengthening food security. Rozen et al.. (2011) do Minapadi-SRI in paddy fields with tilapia species and the results can increase farmers' income, but it has not been studied how much water is beneficial for the life of the fish in the ditch.

Some of these problems can be formulated as follows: if SRI rice cultivation is combined with fish maintenance it is certainly necessary to ascertain how high the water in the ditch is beneficial for both, what is the most appropriate width of the ditch, what is the most beneficial type of fish, how good the management institution starting from rice and fish cultivation, processing the results and marketing of its products. These questions need to get answers that can be justified. For this reason, this research plan was prepared.

In general, this study aims to increase the added value of irrigated rice fields, whose area is believed to be shrinking further, while still producing rice as the main national food in addition to the addition of animal food products in the form of fish. Although some of the rice fields are used as fish maintenance, the total production will not interfere with the availability of rice because the SRI results are 2-3 times the national average, in fact the additional income from fish will be more profitable for farmers. Especially if the fish they produce make processed foods such as babyfish by adding certain flavors, it might just be a *babyfish balado*, *babyfish flavored with rendang* and so on.

Another advantage of SRI is the reduced use of water. As stated earlier by Sato and Uphoff (2007), it shows that the application of SRI to rice cultivation in irrigated rice fields can save around 40% of water needs. This happened because during its growth, rice with the SRI method did not need to be inundated, enough wet conditions even to the ground a little they were still tolerated by rice (Anwar et al., 2007 and Rozen, 2008), especially if the fertilizer used came organic matter (Anwar et al., 2009 and Rozen et al., 2010).

In one of the counseling materials from the CTF (2011), it was explained that minapadi is a method used by farmers by combining rice cultivation and fish-raising techniques, which are carried out simultaneously in the rice fields. For this business, the construction of rice fields is not necessary, but it is only necessary to make a *caren (kemalir)*, which is a kind of ditch around in a plot of rice fields with a diagonal or crossing a plot of rice fields. This slime serves as a fish shelter and to facilitate harvesting of fish. The wide width of the slime generally ranges from 40 - 60 cm with a water depth of 40 cm. The types of fish that are usually maintained in this way include: Mas, Carp, Tawes, Nilem, Mujair and Nila (tilapia). Carp and tilapia are the types that are best kept in rice fields because they grow well with shallow water and heat resistance.

Meanwhile, Suriapermana et al., (1989) explained that the factors that influence the choice of fish are the volume of water, availability of seeds, feed, markets, and habits of farmers.

In Minapadi, the inundation water level of rice plants is limited to 10-15 cm, and in the caren part the water level is 20-30 cm. Sasa and Syahromi, (2006) stated that compared to Tawes, Nilem, Kancra and Carp, gold fish (ikan Mas) is the best type of fish in the Minapadi system. This is reflected in the high yield of rice which reached 5.7 t / ha in the minapadi plot that used goldfish as a treatment, with the highest net profit of Rp 5.15 million / ha / season. Methane gas emissions from minapadi plots that use carp are 51.2 kg CH₄ / ha / season. Salsabila et al., (2013) reported that the strains of tilapia which were maintained in a positive way had an effect on the results obtained, the best strain was larasati tilapia.

Other factors that need to be considered are fish populations and feeding. Solid stocking fish that is commonly done on minapadi according to BBAT Sukabumi (1995) is for 2-3 cm sized fish as much as 2-3 fish / m² and for fish measuring 3-5 cm as much as 1-2 fish / m². While the feed dosage and feeding frequency also needs to be considered (Darini, 2010). In the Minapadi system, fish feed is enough only with fine bran with a dose of 4-5% of the fish's body weight.

Some of the explanations above confirm that the SRI method of rice cultivation has the opportunity to be developed by combining it with the Minapadi system into MINAPADI-SRI. The results of this development are expected to still be able to increase rice yields and be added with fish products which are processed into typical foods which will later increase farmers' income and expand employment. Food security can be maintained and farmers become more prosperous.

MATERIALS AND METHODS

This study used an experimental method with field experiments using Split Plot Design in Randomized Block Design with two factors and three groups. The main plot is the type of fish (Tawes, Mas, and Nila) while the subplots are varieties (PB42, Batang Piaman, and Red Rice). The plot area for one experimental unit is 16 m².

The data obtained were then analyzed using ANOVA with the F Test at a real level of 5%. Comparison of the median value of treatment using the Honestly Significance Differences (HSD) at the 5% real level.

This field experiment has been carried out on the farmer's partner member Farmers Group Banda Langik, on the Sungai Bangek, Koto Tengah Subdistrict, Padang City in February-September 2018. The land used is technical irrigated rice fields whose farmers are accustomed to

the System of Rice Intensification. Data collected for rice plants are: yield and yield components of rice which includes total and productive tillers, weight of 100 grain, grain yield per clump and per harvest plot. As for fish, the data collected is livelihood, average weight, and yield.

RESULTS AND DISCUSSION

1. Height plant

Observation data on rice plant height are shown in Table 1. The results of the analysis show that there is no interaction between varieties with fish species on the height of rice plants. The main plot or type of fish is also not significantly different, but subplots or varieties have a significance difference.

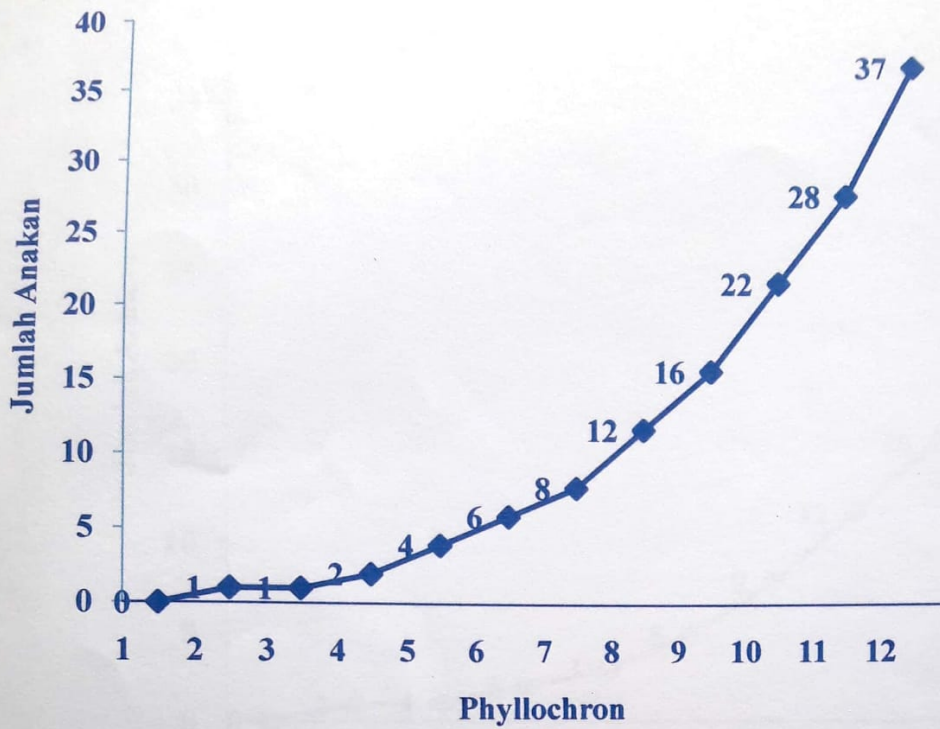
Height plant to 3 Varietys on Minapadi-SRI

| Treatment | BM | BPB42 | BP | Mean |
|-----------|----------|---------|---------|---------|
| Tawes | 106,30 | 90,73 | 80,37 | 92,47 a |
| Mas | 112,04 | 93,23 | 78,63 | 94,63 a |
| Nila | 100,23 | 84,60 | 73,29 | 89,05 b |
| Mean | 106,19 A | 89,52 B | 77,43 B | |
| KK A | 7,94% | | | |
| KKB | 8,24% | | | |

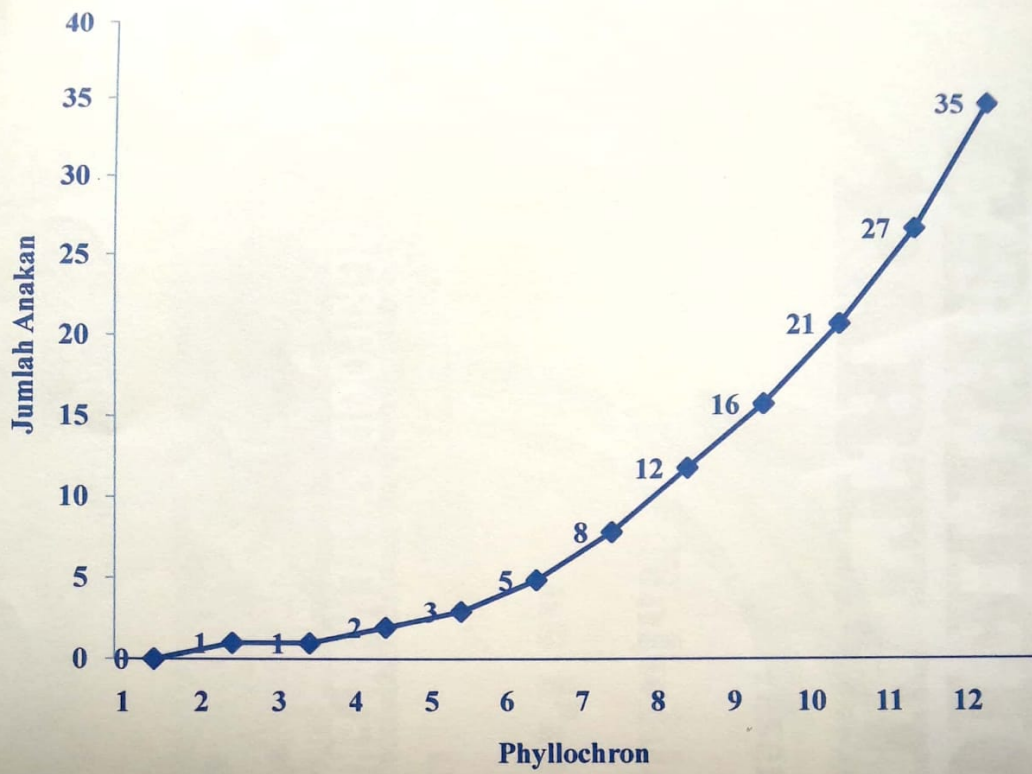
Angka-angka pada baris yang sama diikuti huruf besar yang sama dan angka-angka pada lajur yang sama diikuti huruf kecil yang sama berbeda tidak nyata menurut uji DNMR 5%

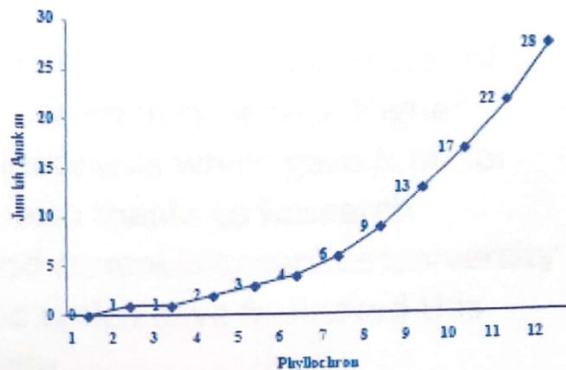
Interaction non significant for varieties with fish but Varietys factor is significant and Fish factor is significant too

From Table 1 above, it can be seen that the Red Rice varieties are higher in plants than the Batang Piaman and PB42 varieties. The average height of Red Rice plants is more than 100cm while the average plant height of PB42 and Batang Piaman is below 100 cm. Plant height is more influenced by genetic factors than the plant itself. Red rice includes local rice so that the height of the Red Rice plant is higher. Unlike the case with superior varieties that have been assembled into rice plants whose plant height is lower with early maturity such as PB42 and Batang Piaman varieties.



Data on the total number of tillers of three rice varieties with different types of fish in Minapadi-SRI cultivation are shown in Table 2. The results of the variance analysis on the total number of tillers showed significant interactions, as well as the main plot and subplot gave a significant effect on the total .





Jumlah anakan varietas Beras Merah pada Phyllochron ke `12

CONCLUSIONS

1. Stage of the phyllochron 12th on the Batang Piaman variety is 37 tillers, PB42 is 35 tillers and Brown Rise is 28 tillers.
2. SRI method can be used combination with fish.

It is recommended to apply the Minapadi-SRI pattern to the cultivation of lowland rice so that the formation of the tillers increases, so the results will increase as well. The application of SRI can be combined with fish (Minapadi-SRI) so that the results obtained will multiply.

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