RESEARCH PAPER

The technology increasing rice production in Swampland

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Abstract

The study was to analyzed the technology increasing rice production on marginal. The study was conducted in Monmata Village, Krueng Sabee Sub-district, Aceh Jaya District with an assessment area of ± 5 ha. This assessment was conducted from February to December 2017, but for field activities commenced in May according to the local farmer's planting schedule, involving farmer groups at the site of activity. Randomized block design was arranged with 3 replications and 1 factor. The were is Inpara 2, Inpara 3, Inpara 8 Inpara 9, Inpari 34 dan Inpari 35. Treatment and farmers as replication so that the number of study plots as many as 18 units. Sampling was done in every plot of 10 plants. Parameters are heigh plant, number of tillage, Length every panicles, Number of Grain every panicle, Number of Grain Content every panicles, The Number of Grains of does not contains every panicle, Weight 1000 Grains, weight grains on Hectare, Resistance to disease. The result showed that the Inpara 2 gave the highest yield of 5.29 ton ha^{-1} followed by Inpara 3 with yield of 5.1 ton ha^{-1} and Inpari 35 4.85 ton ha^{-1}. From the six varieties of Inpara 2, Inpara 3 and Inpari 35, both to be developed in lowland rice field in Aceh Jaya District.

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Introduction

The rice is the best commodity In Aceh which may has a fairly economical prospect that can influence the development of economic at the moment and in the future. Aceh has massive land to plant the rice but the availability of land is marginal such as puddle of land. This land has characteristics of heavy water on soil. But it is does not reason to doesn't planting rice in this land. Rice will growth better if it is well managed, rice will be rised. This land can be controlled by using technology which has can be increasing production of rice such as the best varieties for corresponding to swampland (BPS, 2015).

New varieties is one component of technology that has a real role in increasing the production and quality of agricultural products. According to Bouman *et al,* (2001) and Hashidoko *et al,* 2006 said so far the contribution of new varieties to the increase of national rice production is quite large.

The best varieties are generally short-lived (maturing) so it is very important for farmers in managing cropping patterns. Inbred Paddy Swamp (Inpara) are superior varieties of rice that are well cultivated in swampland conditions, resistant to immersion, and adaptability to acid conditions.

Nurjannah *et al.,* 2017 said that new technology as swampy rice varieties have been released by the Agency for Agricultural Research such as Inpara 1 tolerant of Fe and Al toxicity, Inpara 2 HDB / Blast resistant, Inpara 3 immersion for 6 days in the vegetative phase, Inpara 4, Inpara 5 and Inpara 6. With integrated crop and resource management, rice productivity in swamp land can reach 4-6 ton/ha. The purpose was study to Increased the rice production by applying a package of rice enhancement technology in tidal land using new varieties Inpara that adaptive and in accordance on this conditions.

Material and method

Place of study

The research was conducted at Monmata Village, Krueng Sabee Sub-district, Aceh Jaya District with an assessment area of ± 5 ha. This assessment was conducted from February to December 2017.

Media planting

Swampy land was used as planting medium to increase production of rice on marginal. The based of soil analysis, this land has pH 4.00.

Rice plants

The seeds used were varieties is Inpara 2, Inpara 3, Inpara 8 Inpara 9, Inpari 34 dan Inpari 35. treatment and farmers as replication so that the number of study plots as many as 18 units. Sampling was done in every plot of 10 plants. Preparing Seeds Seeds are soaked for 24 hours before seedling, nursery beds made with width 1-2 m and length in accordance with the state of the land. To prevent a mouse attack, create a plastic fence around the nursery. Planting is done after the seeds are 15 days after seedling and the number of seeds planted no more than 3 seeds per hill. Legowo 2: 1 and 3: 1 parallel planting system with 20 x 10 x 40 spacing with 2 lines of intercropping and 1 empty line, 2 rows of legowo parakeets (25 clumps / m2).

Fertilization

The fertilizer used in the cultivation of wetland rice in this activity uses inorganic fertilizer which is given as basic fertilizer a week after moving.

The use of inorganic fertilizers is carried out according to the cultivation instructions, ie 200 kg/ ha Urea, 50 kg/ha SP-36, KCL 50 kg/ha and Phonska of NPK 200 kg/ha. Urea is administered 3 times at week after moving, age 25 HST and age 40 HST while SP-36 and KCL are given twice, each 1/2 dose at the age of one week after moving, and at 25 days after planting. Fertilizers are administered in a manner distributed among the rows of plants.

Stitching and weeding

Seed is done a week after planting, while the first and second weeding done each at 30 days and 60 days after planting. If we need to do the third weeding, depending on the circumstances in the field.

Maintenance

Maintenance Weed control is done technically and chemically by using herbicides. Weed mechanically can be controlled by using hoe or cored, while chemically can follow the instructions. Weeding is done when the plants are 3 and 5 weeks after planting. While the control of pests and diseases, carried out in accordance with the threshold of pest and disease control.

Data analysis

Data analysis was using micro soft excel. This study used Randomized Block Design (RAK) with 3 replications and consisted of 1 factor.

Parameter

Observations were growth and yields components, including:

Plants heigh

Plant height measurements were performed when plants were 3, 6, and 10 MST. Plant samples were observed as many as 10 clumps of plants for each treatment. In each sample of the plant made a marker of the sample, the measurement of plant height growth was done using a metered device. Measured from the ground to the highest leaf tip.

Number of tillers

Observation of the number of tillers was calculated when the plants were 3, 6 and 10 MST and the number of productive tillers was done before harvest. The number of tillers is calculated per hill from the sample plants that have been assigned to each plot.

Number of Grain every panicle

The number of grain probes is calculated by taking all the grains all over the sample plants and then averaging. The calculation is done after harvest, from the sample plants specified on each plot.

The Number of without Grains every panicle

The number of unhulled grain every panicle is calculated by taking all the empty grain all the panicles of the sample plants then averaged. Counting is done after harvest.

Weight 1000 Grains

Grain counted as many as a thousand grains then weighed the weight, this is done after harvest.

Weight of grain on Hectare

Observation weight of grain on hectare at the harvest.

Results and discussion

Results

Table 1. illustrated has a significant effect on Height plant on rice production at 3, 6, and 9 weeks after planting. the height of plant rice was found at age 3 MST than 6, and 9 weeks after planting.

The height of plant rice at age 3 MST was found on Inpara 9 is 23.5 cm and the lowest was found on Inpari 35 is 14.7 cm. The height of plant rice at age 6 MST was found on Inpara 3 is 62.5 cm and the lowest was found on Inpari 34 is 53.7 cm. The height of plant rice at age 3 MST was found on Inpara 3 is 101.5 cm and the lowest was found on Inpari 35 is 94,2 cm.

Table 1. The average of Height plant on rice production at 3, 6, and 9 weeks after planting.

Age	Varieties					
	Inpara 2	Inpara 3	Inpara 8	Inpara 9	Inpari 34	Inpari 35
3 WAP	21.9	15.4	17.4	23.5	16.8	14.7
6 WAP	57.1	62,5	59.8	58.8	53.7	55.8
9 WAP	98.6	101.05	100.5	100.25	98.6	94.2

Table 2. illustrated has a significant effect on Number of tillers rice production at 3, 6, and 9 weeks after planting. the Number of tillers rice production was found at age 3 WAP than 6, and 9 weeks after planting. The number of tillers rice production at age 3 WAP was found on Inpara 9 is 12,40 and the lowest was found on Inpari 35 is 8.50. The number of tillers rice production at age 6 WAP was found on Inpara 2

is 19,10 and the lowest was found on Inpari 34 is 80.70. The number of tillers rice production at age 9 WAP was found on Inpara 2 is 23,10 and the lowest was found on Inpari 35 is 18,70.

Table 3 illustrated has a significant effect on the Number of Grain every panicle, The Number of without Grains every panicle, Weight of 1000 Grains and weight of grain on Hectare.

The highest of amount of grains every panicle was found on inpara 2 is 101,00 and the lowest was found on inpara 37 is 74,97.

Table 2. The average of number of tillers every parnicles plant on rice production at 3, 6, and 9 weeks after planting (WAP).

Age	Varieties					
	Inpara 2	Inpara 3	Inpara 8	Inpara 9	Inpari 34	Inpari 35
3 WAP	11.50	12.40	10.20	10.50	12.10	8.50
6 WAP	19.10	18.10	16.40	16.20	15.80	17.30
9 WAP	23.10	21.20	20.40	21.80	18.70	20.50

The best of Weight 1000 Grains was found on inpara 2 is 25,47 g and the lowest was found on inpari 34 is 24,64 g. the highest weight of grain on Hectare was found on inpara 2 is 5,29 ton ha^{-1} and the lowest was found on inpari 34 is 3,78 ton ha^{-1}.

Discussion

Based on Tables 1, 2, and 3 it is obvious that the resulting value for growth and yield of rice. Rice production can still be improved through the application of the latest technology for example by using varieties that are resistant to waterlogging and resistant to pest attack.

The best results are found in the inpara rice varieties. These inpara varieties are the latest findings to increase rice production growing on tidal swamp land.

Table 3. The Number of Grain every panicle, The Number of without Grains every panicle, Weight 1000 Grains weight and weight of grain on Hectare.

Parameters	Varieties					
	Inpara 2	Inpara 3	Inpara 8	Inpara 9	Inpari 34	Inpari 35
The number of grain every panicles	101,00	98,00	91,00	92,33	74,94	97,67
The Number of without Grains every panicle	28,20	21,40	18,51	27,87	25,30	18,84
Weight 1000 Grains	25,47	25,34	25,42	24,98	24,68	25,27
Weight of grain on Hectare	5,29	5,10	4,67	4,54	3,78	4,85

These findings are tested on tidal land, especially to increase the yield of rice. Hasegawa *et al,* 2002 and Chai *et al.,* 2007 said tidal peat land is a land that is classified as very low nutrient content and has a very low ph. Taiz and zeiger, 2002 said so that the results of paddy growing on this field will produce a low yield of course. The research of Tamrin *et al,* and Pujiharti (2017) shows rice varieties cultivated in tidal land of the inpara varieties which stands for swampland irrigation.

These findings are new findings to address the problems occurring due to environmental factors that are not getting special attention so that their impacts have an impact on yield reduction.

According Bouman, *et al* (2005) dan Ery *et al*, 2008 said the implementation of the latest innovations in all stages of rice cultivation has the opportunity to promote sustainable food self-sufficiency.

Conclusion

Inpara 2 gave the highest yield of 5.29 tons ha^{-1} followed by Inpara 3 with yield of 5.1 tons ha^{-1} and Inpari 35 4.85 tons ha^{-1}. From the six varieties of Inpara 2, Inpara 3 and Inpari 35, both to be developed in lowland rice field in Aceh Jaya District.

Authors contribution

Inpara is solutions to rising the production of rice on water flooded, on swampland and other marginals.

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