PRODUCTION CAPABILITY OF HYBRID RICE AND NON HYBRID RICE WHICH FACING IRRIGATION POLUTED BY SEWAGE SPIRITUS PLANT

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ABSTRACT

Food self-sufficiency, particularly rice, has always strived to Indonesia, due to various constraints, which led to expectations that have not been achieved. In rice cultivation, the difficulty availability of new rice fields might be one of these obstacles.In the existing land and continuously cultivated rice plants, because it is appropriate for this case, also not spared of any interruption to production capability of rice plants. Disorders can arise such as the use of irrigation water mixed with sewage or waste from the manufacturing plant spirits.This waste is a liquid, called vinasse, and ordinary discharged into irrigation canals. Is irrigation water that has been mixed with sewage plant spirits negative or positive impact on the potential production of hybrid and non-hybrid rice, then made an experimental hybrid rice cultivation, Chiherang and Hipa 6 Jete and non hybrid rice Menthik-Wangi, which was given irrigation water mixed with sewage in various ratios, ie 0%, 10%, 20%, 30%. With two kinds of treatment, three varieties and four kinds of irrigation, formed 12 combination treatment was then made one group, which models the group made three times as replication. Experiments carried out by the method of "Randomized Complete Block Design" in which rice cultivation using polybags are adapted to lowland rice farming conditions. Measurements were performed on growth and plant products. The highest product yields are in non-hybrid rice that is Menthik Wangi, weighing 69.14 g per clump of rice that gets water containing vinasse 10%.

Keywords: self-sufficiency, rice-hybrid, vinasse.

INTRODUCTION

Rice (Oryza sativa L.) is one of the most important crop in human civilization. World rice production ranks third of all cereals, after wheat and corn. Rice is the main carbohydrate source for the majority of the Indonesian population. An increase in national food production, especially rice, is becoming increasingly difficult in the future due to various constraints, while the food needs continue to increase along with the increase in the population of Indonesia, which every year is always increasing significantly. One of the barriers of many obstacles are availability of new land suitable for rice cultivation.

In Indonesia there are various varieties of rice were cultivated farmers on their land. The main aim of farmers growing rice, is to get money to meet all their needs from the rice, which is sold as a commodity trading. So, not in order to meet the food needs of the family, nor to the State. Whereas, rice trade is regulated by the government due to the State's obligation to meet the basic food needs of the availability of people with the price that could be reached by the most impoverished population. The state also did not remain silent in order to support the

development of rice farming, so tune the development, the State develop and provide superior rice seedlings breeding by State institutions are Rice Seed Center, so in the farming community, the type of rice that is cultivated, is a hybrid rice. Nonetheless, the local superior rice is still cultivated, let alone that it is the rice taste good and meet the taste, have a higher selling price than the price of hybrid rice, because the taste and appearance is of high value. Examples of hybrid rice is cultivated by farmers Chiherang, Hipa 6 Jete, and many others, while the local kind of superior example is Menthik Wangi, Pandan Wangi, Rojolele, and there are still others.

In addition to the unavailability of the new land, rice fields, which is usual for growing rice, sometimes also experienced certain problems, such as the change in quality of irrigation water. In the rice fields located near sugar cane mills or irrigation water flow through sugar cane factories, where there are also facilities manufacture of spirits, then we can be sure the irrigation water mixed with liquid waste from the sugar cane mill and the manufacture of spirits.

With such a situation, how the production capability of hybrid and non-hybrid rice that gets water-containing wastewater, is questionable. Spiritus is ethanol which is usually produced from the fermentation of molasses, cane juice which can no longer be taken crystal sugar, then given the color blue as a sign that ethanol is dangerous if taken. Of the process of making spirits, liquid waste, known as vinasse, normally discharged directly into the existing sewer water flow in the manufacture of spirits, which is where the water is on his way to becoming a source of irrigation of rice fields in its path. Therefore, the rice plants cultivated in the paddy fields got irrigation, polluted vinasse. Vinasse actually contains high organic materials such as starch, protein and sugar, as well as lipids. Vinasse physical and chemical properties, are determined by the raw material for making ethanol. For raw materials from sugar cane syrup, vinnas resulting light brown with a solids content of 20000-40000 mg / l. If the raw material derived from molasses, then vinasse reddish black, with a solids content 50000-100000 mg / l (Soeprijanto, 2010).

Vinnas wastewater is often regarded as a pollutant, for polluting the environment with the resulting odor and reddish black color in water containing vinnas, so the impression is not good, but in fact this waste water contains the elements needed by plants. According Fitriyah (2012), PG PS Madukismo wastewater contains plant nutrients which include N, P, K, Ca and Mg which is the macro and micro nutrients that are to be available for plant growth. From these circumstances, wastewater vinasse actually provide nutrients such as that of the foliar fertilizer. Therefore, if the irrigation water in rice cultivation containing vinasse, then of course the rice crop will provide growth response varies according to the characteristics of each variety of rice. By using rice varieties as already mentioned, as an example of the type of rice that is cultivated by farmers, we conducted trials of rice cultivation with irrigation containing vinasse, like rice fields but by using polybags. The experiment was conducted at the Laboratory of Experimental Farm of Faculty of Agriculture UPN "Veteran" Yogyakarta is located in the village Wedomartani, Ngemplak, Sleman, Yogyakarta on July 15, 2013 until December 15, 2013.

MATERIALS AND METHODS EXPERIMENT

Materials **used** in the experiment to study the response of rice crops by irrigation contain ingvinasse, the seeds of rice hybrids that Chiherang and Hipa6 Jete and non-hybrid types that Menthik Wangi. Other materials were vinasse, the liquid waste from the manufacture of spirits/ethanol, garden soil, well water, in organic fertilizers as basal fertilizer such as Urea, SP36, KCl. Trial support tools in the form of a black polybag size (25 x35) cm, and other tools as **needed** during the experiment.

Materials and **tools** available **were** applied to the experimental design as "Randomized Complete Block Design" (RCBD), the first treatment factors such as rice varieties, as V1: VaritasChiherang; V2: Varieties Hipa6 Jeteand V3: Varitas Menthik Wangi. The second treatment factor **were** vinasselevelsin irrigation water which **consisted** of four types namely K0: A solutionvinasse 0%, K1: vinasse10% solution, K2: vinasse 20% solution, and K3: vinasse 30% solution. Thus **was** formed 12combined treatment and each treatment combination represented 10 polybag seedlings. Of the12combinations of treatment, and the norganized into agroup, the arrangement of the combination treatment **were** randomized. For there petitionofa number of combination treatmentin a group, then the group was composed of three treatment combinations, so that in this experimentare (12 x10x3) =360 polybags rice plant**s**. Thus, the base made of blocks grouping, as replications in afactorial experiment.

When explain about the reseach that have already done, please use past tense

The red color, it should be removed/ changed in the right tense

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Stages in this experiment begins with the preparation of plant growth media, **were** to fill in garden soil that has been crushed into apolybag, then water added tosaturate and become mud. In the mud in apolybag the nimplantedthre erice seedlings to be grown up toa period of a week, and when the rice seeds have grown well, rice seeds reduced down to justa piece of rice seeds, which is maintained to grow. Fertilization to support plant growth, it is suggested, Urea 200 kg/ha, SP-36 fertilizer as much as100 kg/ha, and KCl150kg/ha, or the equivalent ofureaas 1.25 g /plants, fertilizers SP-36 as much as 0.94g/plants, and fertilizer KCL much as 0.625 g/plant. SP-36 fertilizer embedded into the growing medium be fore rice seedlings planted, Urea applied after the plant **was** 7days and 35 days after planting, whereas KCl **applied** to7-day old plants; 35 days and 55days.

Watering subsistence rice plant, **by** stagnant, as well as the condition of the water in the rice field, which bathes the rice plants up to 10 cm, from the time the seed **was** planted, up to about 90 days old plants. The next **was** to retain the moisture of the growing medium, until the rice ready for harvest. Irrigation water prepared according to treatment defined, by mixing water with vinasse, ie 0% vinasse; 10% vinasse; 20% vinasse; and 30% vinasse up to 100% solution as irrigation water. If the time come, the age of the plants about 90 days, then the plant after producing panicles, which is an arrangement of flowers, then became grains of rice, the rice pieces consisting of outer skin called chaff, and hard seeds that contain lots of carbohydrates which then became human food.

RESULTS AND ANALYSIS OF RESULTS

From the observation of plant growth, resulting in grain for about three months, the rice crop **were** handled carefully as it should be on the cultivation of rice, **could** be composed of various data, which when analyzed statistically, can be obtained depiction rice crop response to water, which **were** mixed vinasse. **Could** be described here, tabulation of observations seedling growth of plants, which showed the following results,

Table 1. Average Number of Tillers of Rice Per Clump (rod)

Treatments		Age of Rice Plants				
		4 wap	6 wap	8 wap	10 wap	12 wap
Rice Varieties	Chiherang	2.17**a**	8.00**a**	29.81**b**	64.42**a**	53.17**a**
	Hipa 6 Jete	2.44**a**	10.64**a**	37.17**a**	52.40**b**	44.42**b**
	Menthik-Wangi	2.50**a**	9.92**a**	36.58**a**	69.00**a**	57.08**a**
Level Vinnas On Irrigation Water	0%	3.48**p**	10.19**p**	32.22**p**	54.56**q**	43.22**q**
	10%	1.56**q**	9.44**p**	35.78**p**	67.89**p**	57.44**p**
	20%	2.26**pq**	10.04**p**	34.89**p**	63.89**p**	54.00**p**
	30%	2.19**pq**	8.41**p**	35.19**p**	61.44**pq**	51.56**p**

Description: The result of the calculation which listed in the same column and marked with the same letters show there is no significant difference between treatments based on Duncan's Multiple Range Test, at the 5% level of significant difference; wap = weeks after planting.

When explain the tables, use present tense

Please check the grammar and revise accordingly

From Table 1 it **can** be seen in general that **achieve** the highest number of tillers on when the plant reaches the age of 10 wap (weeks after planting). Judging from the highest value, in terms of variety, it **is** shown by the variety Menthik Wangi, and when viewed from the side vinasse levels in water inundation, obtained at a level of 10%. From both of these, **shows** that the growth of rice plants being reached its maximum growth, evident from the number of seedlings which then decreases at an increasingly older age of the plant.

In terms of crop production, it can be seen in the following table which presents the results of observations of the number of panicles per clump of rice plants at various levels vinasse in water inundation.

Table 2. Number of Panicles Per Clump Rice (stalk)

Varieties	Vinasse Levels In Water Inundation				Average
	0%	10%	20%	30%	
Chiherang	32.56 **PQ**	28.56 **Q**	46.78 **P**	45.33 **P**	38.31
Hipa 6 Jete	28.44 **P**	26.22 **P**	30.78 **P**	26.67 **P**	28.03
Menthik-Wangi	32.33 **Q**	55.56 **P**	33.22 **PQ**	40.78 **PQ**	40.47

Description: The result of the calculation which listed in the same column and marked with the same letters show there is no significant difference between treatments based on Duncan's Multiple Range Test, at the 5% level of significant difference.

From Table 2 it can be seen which the highest average number of panicles achieved by a variety MenthikWangi, and which reached the highest number of panicles, is the clump of rice plants which receive water inundation, which contains vinasse as much as 10%. Meanwhile, rice plants Chiherang, and varieties Hipa 6 Jete, the highest number of panicles, contained in a clump of plants that receive water inundation, which contain as much as 20% vinasse.

Related to the amount of rice panicles of each seedling in a clump of plants, of grain produced, after the weight was measured result as displayed in the following table.

Table 3. Grain Weight Per Clump (g)

Varieties	Vinasse Levels In Water Inundation				Averages
	0%	10%	20%	30%	
Chiherang	45.50 **Q**	46.17 **PQ**	70.17 **P**	67.83 **P**	57.42
Hipa 6 Jete	51.20 **P**	47.20 **P**	55.40 **P**	48.00 **P**	50.45
Menthik-Wangi	54.97 **Q**	94.45 **P**	63.14 **Q**	63.99 **Q**	69.14

Description: The result of the calculation which listed in the same column and marked with the same letters show there is no significant difference between treatments based on Duncan's Multiple Range Test, at the 5% level of significant difference.

From Table 3 it can be seen that the average weight of the heaviest grain is achieved by, MenthikWangi rice varieties, is a clump of rice plants, which were given water inundation with vinasse content of 10%. For Chiherang varieties, and varieties Hipa 6 Jete, grain weight heaviest found in clumps of plants are given water inundation with vinasse content of 20%.

CONCLUSION

In terms of the growth of the rice plant, based on observations in the number of tillers per plant clumps, the largest number is in plants aged 10 wap, sequentially from Menthik Wangi, Chiherang and Hipa 6 Jete. If viewed from water-logging, the number of tillers from largest to smallest, obtained in water containing vinasse 10%, 20%, 30%, 0% .This means, the lower levels of vinasse in water inundation, more tillers plant, which grows , Of the weight of grain produced, indicating that any of rice tillers, providing pithy grain yield. **So**, if it intends to cultivate rice, but its irrigation water contaminated with vinasse, preferably its vinasse levels lowered, so that his plants seedlings can grow a lot. From this fact, vinasse considered as contaminants in irrigation water, in rice cultivation even provide a good influence on the growth, if the levels are not too high.Therefore, from a good plant growth, produced a good

Revise the conclusion:
1. **Make the conclusion more clear**
2. **Therefore, is used in discussion**

crop production anyway. So in this case, in terms of pollution rather pungent smell bad and the ugly appearance of colored water.

ACKNOWLEDGEMENT

We extend our thanks to Suhariyanto, which has allowed its research data we use to compile this paper. This research was conducted as a final project for a bachelor's degree in agriculture, when the client is completing his education in Agro Technology Studies Program, Faculty of Agriculture, UPN "VETERAN" YOGYAKARTA.

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