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THE INFLUENCE OF THE CLOTHING SYSTEM ON GROWTH SOME VARIETIES OF RICE (*ORYZA SATIVA* L.)

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ABSTRACT

This research was carried out based on lowland rice cultivation which was carried out in the Land of UPT Benih Induk Padi Murni Tanjung Morawa, Deli Serdang Regency, North Sumatra Province from June 2020 to September 2020. The method used in the cultivation of lowland rice was comparing between 4 (four) system treatments. planting with 5 (five) varieties of rice on the growth of lowland rice with a factorial Randomized Block Design (RBD) consisting of 2 factorials, namely: Planting System (S) namely S1 = Upland System, S2 = 2:1 planting system, S3 = planting system 3 : 1, S4 = 4 : 1 planting system and Varieties (V) namely V1 = Ciherang, V2 = Mekongga, V3 = Inpari 32, V4 = Sidenuk, V5 = Situbagendit. The results showed that the planting system had a significant effect on plant height, number of tillers, number of productive tillers, and amount of chlorophyll. Varieties significantly affected plant height, number of tillers, number of productive tillers, panicle length. The combination of several varieties on the cropping system has no significant effect on the growth of several rice varieties.

KEYWORDS: Planting System, Varieties, Rice.

INTRODUCTION

Rice plant (*Oryza sativa* L.) is the main food crop in Indonesia with the production and consumption level of rice always ranks first among other food commodities. Around 90% of the Indonesian population uses rice as a staple food because rice can contribute 40-80% of calories and 45-55% protein. The contribution of rice in fulfilling these nutritional needs is even greater for the low-income population.[1]

According to data from the Indonesian Central Statistics Agency, in 2020 the condition of rice production in North Sumatra in 2020 with a standard area of rice fields: 368,830 ha, obtained rice production of 4,200,112 tons of GKG or the equivalent of 2,479,383 tons of rice. When juxtaposed with the population of North Sumatra Province of 14,562,549 people, the need for rice is 1,957,882 tons of rice. To meet the increasing demand for rice, it is necessary to seek breakthroughs in cultivation technology that can increase productivity.

In an effort to increase rice production by using varieties-high yielding varieties and balanced fertilization. Use of varieties superior yields will increase compared to ordinary varieties, generally superior varieties with high yields and resistance to pests and diseases. With The high demand for staple food in the form of rice so far has caused There are many studies on superior rice varieties, because superior rice varieties has several advantages including: short life and low production tall.

One of the technological components applied to achieve the current yield quantity is the jajar legowo 2:1, 3:1 and 4:1 cropping system. Based on the research results, the row planting system is one of the technological components in the application of Integrated Crop Management (PTT) so that it can increase rice yields (Basri et al. 2010). The jajar legowo system reduces the possibility of pest attacks, suppresses disease attacks, increases plant population, increases rice productivity by 12-22%.[2]

The jajar legowo planting system is a technological engineering aimed at improving the yield of rice farming, which is a change from the spacing of the tile system (regular) to jajar legowo planting.[3] The jajar legowo

plant adds to the plant population and increases production yields from the usual cropping system. Legowo jajar planting provides several advantages including: providing convenience in weed control, more efficient use of fertilizers and more efficient water regulation.

The purpose of this study was to obtain an appropriate cropping system and the right varieties so as to produce optimal growth.

MATERIALS AND METHODS

This research was carried out based on lowland rice cultivation which was carried out in the Land of UPT Pure Rice Seeds, Tanjung Morawa, Deli Serdang Regency, North Sumatra Province from June 2020 to September 2020.

This study used a factorial randomized block design (RBD) with 2 levels studied, namely: Planting System

(S): S1 = Upland System, S2 = 2:1 planting system, S3 = 3:1 cropping system, S4 = 4-planting system: 1 and Varieties (V): V1 = Ciherang, V2 = Mekongga, V3 = Inpari 32, V4 = Sidenuk, V5 = Situbagendit. There were 20 treatment combinations and each treatment was repeated 3 times so that 60 experimental units were observed.

RESULTS AND DISCUSSION

Plant Height (cm)

From the results of the variance, it can be seen that the planting system treatment (S) had a very significant effect on plant height at the age of 14 and 28 DAP, but had no significant effect on plant height at 42, 56, 70 and 84 DAP. The treatment of variety (V) had a very significant effect on plant height at each age.

Table 1: Rice Plant Height (cm) on Planting System Treatment and Varieties at Ages 14, 28, 42, 56, 70 and 84 DAP.

Treatment	Plant height (cm)					
	14 DAP	28 DAP	42 DAP	56 DAP	70 DAP	84 DAP
Planting System						
S_1 (sistem tegalan)	32,52 bB	59,20 bB	91,80 cC	114,05	120,77	127,48
S_2 (sistem 2:1)	38,16 aA	63,15 aA	94,89 bB	113,91	121,13	128,35
S_3 (sistem 3:1)	34,40 bB	59,16 bB	93,81 bB	114,37	122,63	130,88
S_4 (sistem 4:1)	38,45 aA	64,04 aA	96,56 aA	114,83	121,25	127,68
Varieties						
V_1 (Ciherang)	36,93 bB	62,17 bB	95,22 bB	115,53 bB	122,33 cC	129,13 bB
V_2 (Mekongga)	35,12 cC	59,40 cC	92,10 cC	113,22 bB	119,64 bB	126,07 cC
V_3 (Inpari 32)	33,13 cC	57,67 dD	90,05 dD	109,58 cC	117,82 bB	126,05 cC
V_4 (Sidenuk)	39,43 aA	67,57 aA	104,57 aA	123,78 aA	131,29 aA	138,80 aA
V_5 (Situbagendit)	34,80 cC	60,13 cC	89,40 dD	109,33 cC	116,13 bB	122,93 dD

Note: The numbers followed by the same letter in the same row or column are not significantly different at the Duncan test level of 5% and 1%.

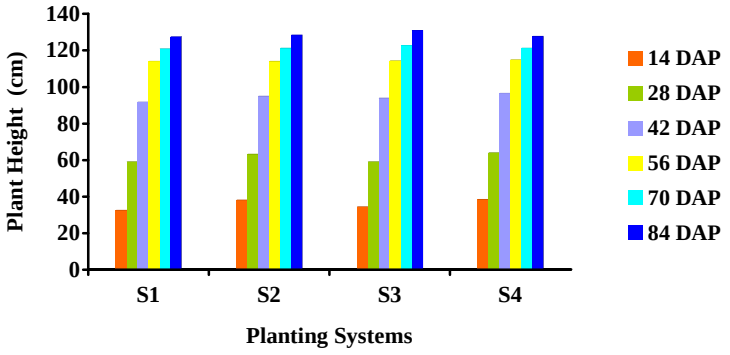

Figure 1: Diagram of Rice Plant Height with Several Treatments of Planting Systems at Ages 14, 28, 42, 56, 70 and 84 DAP.

In From the diagram it can be seen that the S4 planting system (4:1) at the age of 14-56 DAP showed the highest plant height with an average of 14 DAP 38.45 cm, 28 DAP an average of 64.04 cm, 42 DAP an average of 96

56 cm and 56 DAT an average of 114.83 compared with the planting system S3 (3:1 system), S2 (2:1 system) and S1 (moor system) in this experiment. Meanwhile, at the age of 70-84 DAP, the highest number of plant heights was obtained in the S3 planting system treatment (system 3:1). Plant growth, absorption of nutrients and sufficient sunlight was received in the photosynthesis process because of the empty space in the cropping system, thus allowing the absorption of sufficient fertilizer. is in the optimal field. Unlike the case with using the S1 (tegalan) planting system, plant growth is slower. In competition for plant growth in the S1 (tegalan) planting system, there may be absorption of nutrients as well as in getting sunlight, air for the plant growth process and ultimately affecting plant height growth.

From the diagram, it can be seen that the height of rice plants at the age of 14 and 56 DAP increased in the Sidenuk variety (V4), presumably due to differences in the genetic characteristics of the varieties used, where the Sidenuk variety had a better adaptation period and faster and better growth to conditions. different environment compared to other varieties. Tall plant is also one of the selection criteria in rice plants, but High growth does not guarantee the level of production. Plants will grow lower when planted at a location higher than sea level. Growth is a process in plant life that results in changes in size, weight gain, volume and stem diameter from time to time. The success of the growth of a plant is controlled by growth factors.[4]

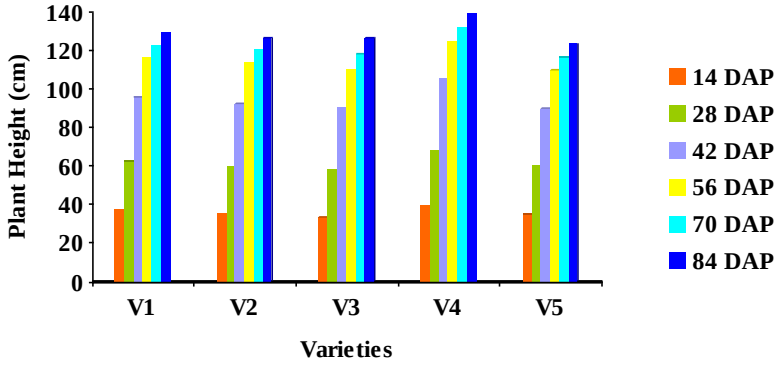

Figure 2: Diagram of Rice Plant Height with Multiple Varieties Treatments at Ages 14, 28, 42, 56, 70 and 84 DAP.

Number of Tillers (clump)

From the results of the variance, it can be seen that the planting system (S) treatment had a significant effect on the number of tillers at the age of 14, 56, 70 and 84 DAP, but it had no significant effect at the age of 28 DAP, a very significant effect on the age of 42 DAP. The treatment of variety (V) had no significant effect on the number of tillers at the age of 14 and 28 DAP, but it had a very significant effect on the age of 42, 56, 70 and 84 DAP.

The number of tillers in the treatment of the planting system and varieties at observations of 14, 28, 42, 56, 70 and 84 DAP are shown in Table 2.

Table 2: Number of Rice Tillers (clumps) in the Treatment of Planting Systems and Varieties at Ages 14, 28, 42, 56, 70 and 84 DAP.

Treatment	Number of Tillers (clump)					
	14 DAP	28 DAP	42 DAP	56 DAP	70 DAP	84 DAP
Planting Systems						
S_1 (sistem tegalan)	1,52 b	6,97	13,63 aA	13,16 a	13,16 a	13,16 a
S_2 (sistem 2:1)	1,89 a	7,53	11,73 bB	11,13 b	11,13 b	11,13 b
S_3 (sistem 3:1)	1,83 a	6,79	12,51 bB	12,95 a	12,95 a	12,95 a
S_4 (sistem 4:1)	1,84 a	6,73	10,99 cC	9,80 b	9,80 b	9,80 b
Varieties						
V_1 (Ciherang)	1,87	7,35	13,57 aA	12,32 bB	12,32 bB	12,32 bB
V_2 (Mekongga)	1,75	6,80	12,83 bB	12,58 bB	12,58 bB	12,58 bB
V_3 (Inpari 32)	1,84	7,38	12,85 bB	14,47 aA	14,47 aA	14,47 aA
V_4 (Sidenuk)	1,87	7,08	10,13 cC	8,78 dD	8,78 dD	8,78 dD
V_5 (Situbagendit)	1,53	6,42	11,68 cC	10,65 cC	10,65 cC	10,65 cC

Note: The numbers followed by the same letter in the same row or column are not significantly different at the Duncan test level of 5% and 1%.

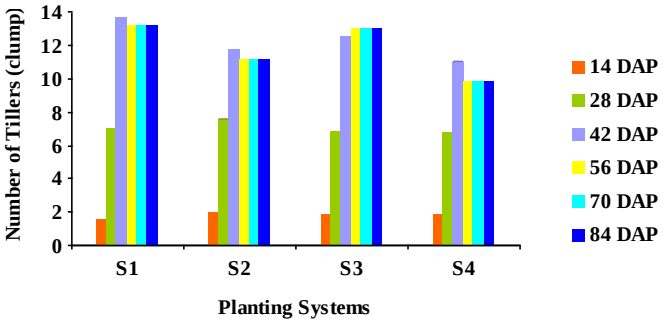

Figure 3: Diagram of the Number of Rice Tillers with Several Treatments of the Cropping System at Ages 14, 28, 42, 56, 70 and 84 DAP.

From the diagram, it can be seen that the S1 garden system (moor system) at the age of 28-80 DAP showed the highest number of tillers compared to the S3 (3:1 system), S2 (2:1 system) and S4 (4:1 system) planting systems. While at the age of 14 DAP the highest number of tillers was obtained in the S2 planting system (2:1 system). The treatment with the 4:1 cropping system yielded the least number of tillers compared to the 3:1 and 2:1 cropping systems. This is due to the difference in the vegetative period for each plant with different planting methods. The upland rice planting system was carried out by seeding for 21 days, so that the vegetative period was shorter than the rice planting method using the 4:1 planting system, the 3:1 planting system and the 2:1 planting system which was sown until the age of 10 days. Prayatna (2007) revealed that the number of rice tillers with a shorter seeding period would be more optimal than rice with a longer seedling period.[5]

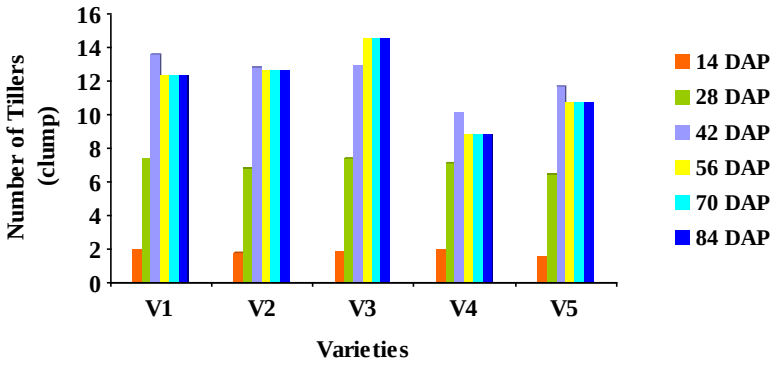

Figure 4: Diagram of the Number of Rice Tillers with Several Varieties Treatments at Ages 14, 28, 42, 56, 70 and 84 DAP.

From the diagram, it can be seen that the ciherang varieties at the age of 14 and 42 DAP gave more tillers, namely 1.87 clumps and 13.57 clumps, compared to the Mekongga, Inpari 32, Situbagendit and Sidenuk varieties. At the age of 28, 56, 70, 84 DAP, the Inpari 32 variety gave 14,47 clumps of tillers, respectively, compared to the Mekongga, Ciherang, Situbagendit and Sidenuk varieties. The effect of rice varieties on the development of the number of tillers increased until the age of 84 days after planting.

Number of productive tillers (clump)

From the results of the variance, it can be seen that the planting system treatment (S) had a very significant effect on the number of productive tillers. In the treatment of varieties (V) a very significant effect on the number of productive tillers.

The number of productive tillers in the treatment of planting systems and varieties is shown in Table 3.

Table 3: Number of Rice Productive Tillers (clump) in the Treatment of Planting Systems and Varieties.

Treatment	Varieties					Average
	V1 (Ciherang)	V2 (Mekongga)	V3 (Inpari 32)	V4 (Sidenuk)	V5 (Situbagendit)	
Planting Systems						
S_1 (sistem tegalan)	12,87	15,20	14,27	8,40	15,00	13,15 aA
S_2 (sistem 2:1)	10,67	11,53	13,13	7,80	11,20	10,87 bB
S_3 (sistem 3:1)	12,53	12,20	12,20	8,47	11,40	11,36 bB
S_4 (sistem 4:1)	12,80	8,53	9,87	6,80	11,27	9,85 cC
Average	12,22 abAB	11,87 bB	12,37 aA	7,87 cC	12,22 abAB	

Note: The numbers followed by the same letter in the same row or column are not significantly different at the Duncan test level of 5% and 1%

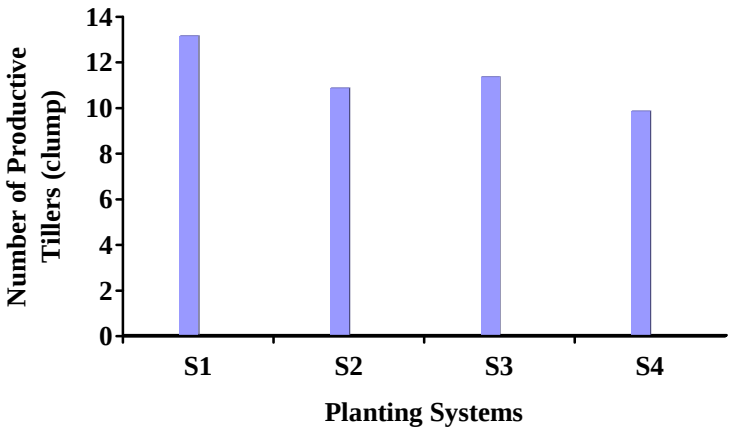

Figure 5: Diagram of the Number of Paddy Productive Tillers with Multiple Cropping System Treatments.

Based on the diagram above, the S1 (tegalan system) planting system shows that independently the various planting systems have significantly different effects compared to the S3 planting system (3:1), the S2 planting system (2:1), the S4 planting system (4:1). In the moor system for plant growth, the absorption of nutrients and sunlight received is sufficient so that the tillers are more productive than the 2:1 system, 3:1 system and 4:1 system.

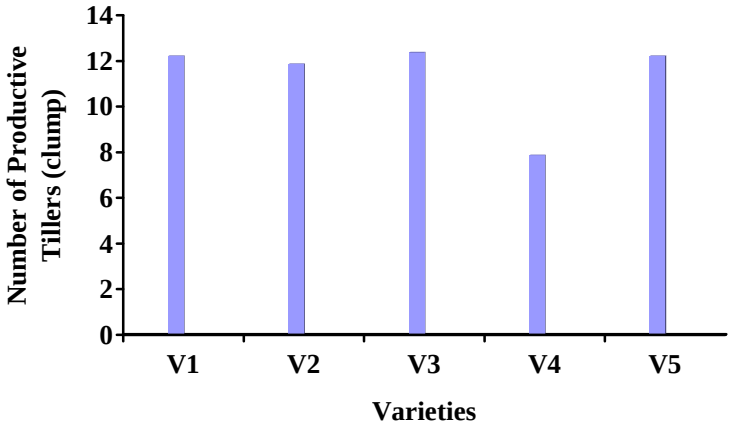

Figure 6: Diagram of the Number of Rice Productive Tillers with Several Varieties Treatments.

From the diagram above, it can be seen that the effect of rice varieties on the number of productive tillers is more, namely the Inpari 32 variety which is 12.37 clumps, Ciherang is 12.22 clumps and situbagendit is 12.22 clumps significantly giving more productive tillers than Mekongga variety was 11.87 clumps and sidenuk was 7.87 clumps. Husnah (2010) stated that productive tillers are tillers that develop further and produce panicles, rice

plants have the potential to form productive tillers seen from the number of tillers, but this is not always the case because tiller formation is influenced by the environment.[6]

Amount of Chlorophyll

From the results of the variance, it can be seen that the planting system treatment (S) had no significant effect on the amount of chlorophyll. In the treatment of varieties (V) no significant effect on the amount of chlorophyll. The amount of chlorophyll in the treatment of planting systems and varieties is shown in Table 4.

Table 4: Total Rice Chlorophyll on Planting System Treatment and Varieties on Initial and Final Data.

Treatment	preliminary data	Final Data
Planting Systems		
S_1 (system tegalan)	37,47	1,71
S_2 (system 2:1)	38,10	1,59
S_3 (system 3:1)	38,12	1,71
S_4 (system 4:1)	38,18	1,65
Varieties		
V_1 (Ciherang)	38,12	1,89
V_2 (Mekongga)	37,67	1,55
V_3 (Inpari 32)	37,44	1,64
V_4 (Sidenuk)	38,54	1,50
V_5 (Situbagendit)	38,05	1,76

From Table 4, it can be seen that there was no significant difference between the treatments, both from the planting system and the type of variety, because chlorophyll is labile and easy to degrade into its derived molecules. Chlorophyll degradation process can occur due to the influence of temperature, oxygen. The degraded molecules are not effective for the photosynthesis process, so they may also be less effective on solar cells. The amount of leaf chlorophyll is influenced by many factors such as plant age, irradiation time, temperature and pH. The longer the plant is harvested, the longer it will be exposed to sunlight. This sunlight is an important element in the process of photosynthesis which will benefit the metabolism of green plants. The decrease in chlorophyll pigment levels is influenced by other factors such as light, solvent and ambient air.[7]

Panicle Length (cm)

From the results of the variance, it can be seen that the planting system treatment (S) had no significant effect on panicle length. In the treatment of variety (V) a very significant effect on panicle length.

The panicle length in the treatment of planting systems and varieties is shown in Table 5.

Table 5: Rice Panicle Length (cm) in the Treatment of Planting Systems and Varieties.

Treatment	Panicle Length (cm)
Sistem Tanam	
S_1 (sistem tegalan)	28,16
S_2 (sistem 2:1)	27,53
S_3 (sistem 3:1)	27,55
S_4 (sistem 4:1)	27,37
Varietas	
V_1 (Ciherang)	27,75 aA
V_2 (Mekongga)	27,10 bB
V_3 (Inpari 32)	25,55 cC
V_4 (Sidenuk)	29,37 aA
V_5 (Situbagendit)	28,50 aA

Note: The numbers followed by the same letter in the same row or column are not significantly different at the Duncan test level of 5% and 1%.

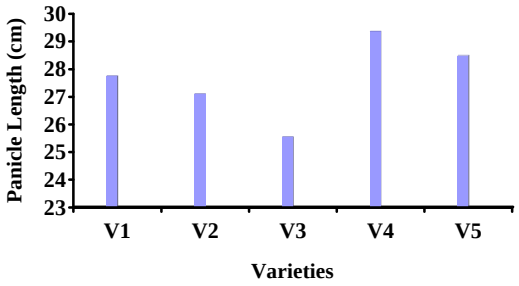

Figure 7: Panicle Length Diagram with Several Varieties Treatment.

From the diagram above, it can be seen that the effect of the type of rice variety on the longest panicle length is the Sidenuk variety, which is 29.37 cm, which is significantly different from Ciherang, which is 27.75 cm, Mekongga is 27.10 cm and Inpari 32 is 25.55 cm. not significantly different from the situbagendit variety, which is 28.50 cm. Panicle length is a parameter that determines the high and low productivity of rice. Panicle length is closely correlated with plant height and has an effect on production. A rice panicle consists of 8-10.

books that produce primary branches and subsequently produce secondary branches, in young rice panicles will usually grow lengthwise from 1 cm in length which then reproductive cells continue to develop when the panicle reaches a size of 20 cm or more length. The panicle length component is the main supporting factor for potential yields because the longer the panicle, the greater the chance of the number of grain in one rice plant.[8]

CONCLUSION

1. Planting system had a significant effect on plant height, number of tillers, number of productive tillers, but did not significantly affect the amount of chlorophyll, panicle length.
2. Varieties significantly affected plant height, number of tillers, number of productive tillers, panicle length, but did not significantly affect the amount of chlorophyll.

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