

The High Low of the Guludan and the Pruning Period Against the Growth and Result of Yellow Potato Bulbs in The Kabupaten Rejang Lebong Plateau.

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ABSTRACT

Potatoes (*Solanum tuberosum*), is one of the many vegetable commodities that are cultivated in the Highlands, including in Rejang Lebong Regency on a plateau of 750 SD 1100 m above sea level. The study was conducted mid-July to December 2019, at the Pat Petulai Rejang Lebong University pilot Garden. The research aims to further the influence of high-low differentiation and the period of pruning the growth and results of yellow potato bulbs. The research method uses the complete random group factorial design (RAKL-F). The high treatment of Guludan (G) of the ground surface is G0 = 0 cm, G1 = 10 cm, G2 = 20 cm, G3 = 30 cm. and second treatment time period of pruning buds (P) after planting ie P0 = without pruning buds, P1 = 25 days after planting, P2 = 30 days, P3 = 35 days. The number of planting populations used in the study was 288 seedlings of potato bulbs. The observed variables include: height of the plant, number of main stems, number of shoots, diameter of trunk, heavy weight of the tuber, tuber diameter, number of tubers and dry weight of the tuber. The research results, based on the 5% DMRT test, the high treatment of Guludan 10 cm berbedanyata with another treatment of the number of rods, the diameter of the trunk. The high treatment of Guludan 20 cm, berbedanyata with another treatment of wet weight. The treatment without trimming is not berbedanyata with other treatment of plant height, number of rods. Pruning of 35 days, is distinct from the other treatment of wet weights and the number of bulbs. 5% DMRT test, high combination of Guludan 10 cm with pruning period of 25 days and 35 days, differs in real with other treatment of plant height, number of shoots, number of main stem and diameter of the tuber. A combination of high and 20 cm with a 25 day trimming, not berbedanyata with another combination of treatment of wet weight. The DMRT test is 5%, with no trimming (P0) and high and there is an interaction to the average number of main rods and tuber diameters.

Keywords: Generative; Guludan; Trimming; Tuber; and Vegetative

INTRODUCTION

Potato (*Solanum tuberosum*), is one of the vegetable commodity that is widely cultivated by farmers in the high Plains in Indonesia, Rejang Lebong District located 750 SD 1100 m above sea level. Very fulfilling the requirements to be developed potato plants. The potential of land in Rejang Lebong area of 2000 ha, newly directed around 300 ha, with new production reaching 137.60 ton/ha, year 2017 increased to 137.88 ton/ha (BPS,2018).

According to Wattimena (2006), the varieties of potatoes needed in Indonesia are adaptable to physical and biological environmental problems in accordance with usability (processed and non-processed), according to the short day in Indonesia, and resistant to pests and diseases. According to Rukmana (2002), the number of clones or varieties in Indonesia more than 300 clones. The varieties used in the study are Granola varieties. Round, oval, tapered, or kidney-like potatoes; Small to large size, (Pitojo, 2004). Through previous research has been conducted by the authors on the test of various varieties of potatoes in different planting distances to the results of potato tuber (*Solanum tuberosum*) in the plateau of Rejang Lebong Regency (Losi and Adnan, 2017). Then effectiveness of organic mulch and organic fertilizer liquid waste household to growth and results of the yellow potato plants in the village of Air Rambai Curup (Adnan and Mardia Apriansih, 2019). Test the seed weight and the slope of the tuber in planting holes to the growth and results of red potato bulbs, (Adnan, 2018). Furthermore, the high low of Guludan and the pruning period against the growth and results of yellow potato bulbs in the plateau Kaabupaten Rejang Lebong, Adnan, et al. 2019). With a low height and has a different soil fertility. According to Zen Zainudin (2016), using a guludan can reduce the area of land planted with potatoes. Agrotani. Mitra farmer Indonesia. Guludan or bewith can give the crop advantage to produce 2.5 kg of the lowest potato tuber ' 1.5 kg. For the had can reach 30 tons whenintensive care.

For both sloped and flat, the same size is generally equal to the width of 120 cm, the distance between furrows 50 cm, for the optimal height and need to be examined further. On the high plains of the Guludan cutting slope (unidirectional contours) can control erosion and not decrease the yield (Sinukaban 2007 in Henny, H et al., 2011).

Then the pruning needs to be done against the shoots that grow on the main stem, where the buds need to be discarded, which will interfere with the occurrence of competition in the nutritional needs necessary for the formation of bulbs or the period of generative crops.

To know the trimming of the right buds it is necessary to do a time period of pruning buds that grow underarm leaves or shoots that grow the main tree of potato plants. The trimmed plant will regularly provide a good micro environment for the growth of the plant itself, where the eye rays of the day as the main energy source can penetrate all parts of the plant, giving a good micro climate, reduce excessive moisture, can also minimize the development of fungi and other plant destruction organisms (OPT).

Potato plants are mostly made throuasgh bulbs, multiplication with tuber has a ratio of between 1:3 to 1:15, meaning that one potato tuber can produce 3 to 15 bulbs. This comparison or ratio is influenced by several things: varieties, planting and tuber treatment (Oztruk & Yildirin. 2010; Singh et al. 2012).

According to Adnan (2018), the potato is very sensitive to the eye rays of the day directly, the affected partof the tuber will change the color of green so that it will grow the bud when not immediately closed to the surface of the ground.

Furthermore, if the new small bulbs are embossed on the ground is not piled, it will be hampered in the formation of potato bulbs. With the treatment of making guludan or proper and appropriate and the arrangement of pruning unproductive shoots, the results of the research acquired technology innovations that can support the increase in the production of potato bulbs.

RESEARCH METHODS

This study was implemented mid-July to December 2019, at the STIPER Rejang Lebong pilot Garden. Materials and tools: seed potatoes, manure, goat manure, NPK fertilizer, insecticide Coracrown, Dithane-45 and Hoe, sickles, machetes, sprayer, Altimeter, hygrometer, soil Tester (pH moisture), mists, wheelbarrow, stationery and camera.

This experiment used the complete group random design factorial (RAKL-F).. The first factor is high and (G) of the ground (G0) height of Guludan 0 cm, (G1) 10 cm, (G2, 20 cm, and 30 cm (G3). Second factor time period pruning buds (P) IE (P0) without trimming buds HST, 25 HST (P1), 30 HST (P2), and 35 HST (P3). The number of planting populations used 288 seeds of potatoes.

The study area of land used length of 10 x 20 m width, the land is destroyed as deep as 20 to

30 cm, the length of long furrows 150 cm x Width 120 cm, the number of 48 plot, and high-level and appropriate treatment, giving chicken dung fertilizer 2 weeks before planting. The distance between 50 cm, the distance between furrows 50 cm. Granola Seed Size 30 gr to 40 gr.

Maintenance includes: safe, incubation, fertilization of NPK 10 grams to 15 grams, 20 and 50 HST, appointment, bulking, watering, spraying insecticide, fungicide. Harvesting age 90 HST. Observation: Height of plant, number of main stem, number of shoots, diameter of trunk, weight of heavy tuber (gram), Diameter of tuber, number of tuber and dry weight of tuber

RESULTS AND DISCUSSION

1. Effect of high treatment of Guludan against Vegetativ

DMRT 5% test, high treatment of Guludan 10 cm from soil surface berbedanyata with another treatment of the number of stems, G0 treatment is not berbedanyata with other treatment of stem diameter. The height is up to 20 cm, berbedanyata with other treatment of wet weight (table, 1).

Table 1. 5% DMRT test, high-treatment of guludan over number of rods, trunk diameter, wet weight

High Guludan (cm) and Number of rods			
0	1	2	3
2c	3.5d	0b	5,5a
Stem Diameter			
9a	3a	9a	8a
Tuber Basah			
395b	575c	889d	225a

Description: The numbers followed the same letter in the same column at 5%, meaning that they differ from the other treatment of the number of rods.

2. Effect of a single high treatment of guludan towards vegetative and generative time

High-low Guludan affects the vegetative period of potato plants, allegedly conducting the research fall in the dry season so that the water saving power contained in the soil is still fulfilled for the preparation of growth of the number and diameter of the trunk. High visible Guludan 0 to 10 cm still affects the period of growth plant plant.

While the height of Guludan 20 cm berbedanyata with another treatment of wet weight. The higher the condition and affect the water content, humidity and temperature in the soil. It is suspected that the period of wet weight formation that the location of low or too high does not affect the wet weight formed. Because the condition is too low or too high will affect the storage of water content needed by wet weights of potato bulbs. The wet weights of the optimal potato bulbs are formed at a height of Guludan 20 cm from ground level. Mean Guludan too low or too high is not good in the formation of the generative potato tuber period, especially in the formation of wet weights needed potato bulbs.

3. Effect of single-treatment period of trimming against plant height, number of rods, wet weight and number of bulbs

The test results DMRT 5%, P0 treatment without the trimming is distinct from the number of rods, but not berbedanyata against the height of the plant, (table 2). 35 Day trimming treatment differs real with other treatment of wet weight, number of bulbs.

Table 2. 5% DMRT test, trimming period treatment of high average crop, number of rods, wet weight and number of bulbs.

The treatment	Variable	Variable	Variable	Variable
P	TT	JB	BB	JU
P0	18,1a	25d	1010a	62a
P1	19,8a	14,5a	1565b	82b
P2	17,0a	19,5b	1635c	83b
P3	18,2a	22c	1895d	96c

Description: The numbers followed the same letter in the same column at 5%, meaning that they differ from the other treatment of the plant height

The pruning period is a time set in conducting the Pengkasan shoots that Wiwilan which inhibits the growth of the plant period of crops. The trimming is done with the aim of eliminating the sprout growing buds of the leaves or shoots that grow the main dibatang. Apparently the treatment without trimming has no real effect on the high variable plant and potato rod count.

That the observation of the period of high growth of plants is done dry season, the condition is not qualified to grow for plants such as temperature and humidity in the field in September to November 2019, with the tool data obtained that the humidity 50 Rh, the temperature reaches 35 SD 40 0 C, while the requirements grow potatoes Humidity 85 Rh, the corresponding 18 SD 22 0 C.

The condition has not support the desired potato plants that can inhibit the growth of plant crops. But without trimming (P0) will affect the number of plant stems. Suspected shoots are left to grow to be the number of secondary rods. From the results of the pruning period done in the dry season the plant growth does not need to be done because the vegetation has not bothered for its continued growth.

Trimming against wet weights and the number of bulbs. Pruning is to dispose of shoots or branches where the shoots will occur in the intake of nutrients from crops or obtained through the roots of plants. So that the nutrient is not perfect used for the generative Tanman period, especially in the formation of potato bulbs. The pruning period every 35 days is carried out from planting to the end of trimming, it is optimal to do because the eliminated part has not affected the generative period of crops, can even be a push to store the nutrients needed generative. It is suspected that the dry season of pruning does not need to be done because the painting will encourage transpiration through the cutting of cell tissues. With the time of the long pruning period on 35 days after planting not too disruptive generative period formation on the formation of potato bulbs, when compared to the pruning period 25 days, 30 days

4. Effect of high combinations of guludan with period of trimming against plant and generative time

The advanced test of DMRT is 5%, the combination of high-quality Guludan 10 cm with 25 day pruning period (G1P1) and 35 day trimming (G1P3) Berbedanyata with the combination of other treatment of plant height variable and number of rods.

The combination of high and 10 cm with a 30 day pruning period (G1P2) and a combination of high treatment of Guludan 30 cm with no trimming (G3P0) differs from the other combination of the number of shoots. The combination without high Guludan 0 cm with no trimming period (G0P0) does not differ real with the combination of other treatment of the trunk diameter. Combination of high treatment of Guludan 20 cm from ground level with 25 day pruning period (G2P2) Berbedanyata with other treatment combination of wet weight and number of bulbs, (table 3)

Table 3. High combination of Guludan with period of pruning to the height of the plant, number of stems, number of shoots, diameter of the trunk, wet weight and number of bulbs.

combination		variable					
(G)		TT	JB	JT	DB	BB	JU
Go	P2	46,1 ^a	7,5 ^e	22,5 ^b	1,5 ^a	320 ^c	18 ^b
	P0	53,5 ^b	4,5 ^{bc}	22,5 ^b	1,0 ^a	310 ^{cd}	16 ^b
	P1	55,0 ^{bc}	6,0 ^a	29,0 ^{cd}	1,1 ^a	310 ^{cd}	17 ^b
	P3	56,6 ^c	4,0 ^a	18 ^a	1,3 ^a	455 ^t	23 ^c
G1	P0	50,7 ^{ab}	7,0 ^a	19 ^a	1,1 ^a	210 ^b	14 ^b

P1	67,2c	3,0a	29cd	1,3a	420e	21c
P2	57,0c	4,5b	43,5f	1,0a	460f	22c
P3	57,5c	9,0f	35de	0,9a	480f	24c

G2	P0	46,5 ^a	6,0 ^d	27 ^c	1,2 ^a	325 ^d	19 ^c
	P1	55,9 ^c	4,0 ^b	28 ^c	1,0 ^a	410 ^c	23 ^c
	P2	55,6 ^c	5,0 ^c	34 ^d	1,2 ^a	600 ^h	23 ^c
	P3	51,3 ^c	5,0 ^c	34 ^d	1,5 ^a	545 ^g	25 ^c
G3	P0	63,0 ^d	4,5 ^b	39 ^f	1,6 ^a	155 ^a	11 ^a
	P1	60,3 ^d	3,0 ^a	28,5 ^c	1,0 ^a	420 ^e	23 ^c
	P2	44,9 ^a	4,0 ^b	32 ^d	1,1 ^a	265 ^{bc}	19 ^c
	P3	52,9 ^d	4,0 ^b	28 ^c	1,1 ^a	415 ^e	24 ^c

Description: The numbers followed the same letter in the same column at 5%, meaning that they differ from the other treatment to the height of the plant.

5. The treatment of high combinations of guludan and the pruning period against plant and generative times.

The Advanced Test DMRT 5%, a combination of high-quality and 10 cm with a period of pruning 25 days (G1P2) Berbedanyata with other treatment combinations of high variable plants and the number of rods and the number of shoots. While the advanced Test DMRT 5%, the combination without high Guludan G0 with without the P0 trimming period is no different from the real combination of other treatment to the diameter of the table rod (3).

High and 10 cm from ground level with a spaceship period of 25 days after planting, can spur the plant growth part of the potato tuber plant. Allegedly high Guludan 10 cm, moisture and soil temperature can support the growth of plant plant parts such as high crop, number of stems and the number of shoots. High low and is a place of rooting grows in search of nutrients around the planting medium. At high and 10 cm tall provides the optimal water and nutrient needs in the growth of plant potato plants, when compared to other treatment combinations. Pruning aims to eliminate the buds that are useless for plants. With pruning 25 days after planting can spur the growth of plant parts such as plant height, number of shoots and diameter of the trunk. It is suspected that the pruning period 25 days after the time lapse planting is sufficient to support subsequent growth. Visible part of the variable observed there is a correlate of growth of plant plants after pruning is done. When observed and analyzed from a combination of other treatments on the growth of vegetativ plants are observed.

6. Influence of high combinations of guludan and period of pruning to generative period.

Advanced Test DMRT 5%, the combination of high treatment of Guludan 20 cm from ground level with 25 day pruning period (G2P2) not berbedanyata with another combination of treatment of wet weight, and number of bulbs, table (3). Bahwaa high low in height and affects the variable of wet weights, allegedly and at a height of 20 cm temperature conditions, humidity, and water content in the media in the form and still support the need for the formation of more optimum bulbs in the water content needed. Likewise, the trimming is done on plants age 25 HST. Allegedly pruning in a period of 25 days, quite effectively carried out that will affect the need for wet weights needed. Pruning removes parts of shoots that are useless for the plant. It will directly reduce the need for the water needed for wet weight formation before harvesting.

Furthermore, based on the test of DMRT, 5% height, and 10 cm with pruning period of 35 days (P3) not berbedanyata with high treatment of Guludan 20 cm and the pruning period of 35 days (G2P3) with a height of Guludan 30 cm with a period of pruning 35 days (G3P3) but berbedanyata with other treatment.

High low and variable results are observed does not affect the variable diameter of the

tuber. Suspected high low and temperature conditions, humidity, water content contained in the Guludan, does not affect in the formation of tubers diameter. Formation of tuber diameter at a height of Guludan 10 cm to 30 cm from the ground surface has no effect on the diameter variable bulbs.

Pruning period of 35 days after planting berbedanyata with the treatment of other trimming period of varibael of tuber diameter. The more time the pruning period is done after planting will affect the diameter of the formed tuber. Suspected the longer the delay period is left to help the diameter of the formed bulbs. The sprouts storing water metabolism can help the water supply needed in the formation of larger bulbs. The metabolic process for enlargement of the cell tissues produced for the tuber diameter is very supportive of its development formed on potato bulbs.

7. Effect of trimming period treatment is the interaction of tuber diameter.

The 5% DMRT test, the treatment without the trimming period does not different with others on the interaction of the tuber diameter. DMRT 5% test, period without trimming (P0) There is interaction to the average number of main stem. The Un-high treatment of the ground surface is an interaction of the average number of stems (table, 4).

Table 4. 5% DMRT test, the effect of pruning period is the interaction of tuber diameter.

Variable	Pruning period (P)			
	P0	P1	P2	P3
Tuber Diameter	1,5 ^a	1,6 ^a	1,8 ^a	1,9 ^a
Number of Rods	2,1 ^b	1,2 ^a	1,6 ^a	1,8 ^a
High Guludan				
	G0	G1	G2	G3
Number of Rods	1,8 ^a	1,9 ^a	1,7 ^a	1,3 ^a

Description: The numbers followed the same letter in the same column at 5%, meaning that they differ from the other treatment of the tuber diameter.

8. Treatment period of pruning and high and there are interactions with the Vegetati and generative period

DMRT 5% test, period without trimming (P0) There is interaction to the average number of main stem. Suspected treatment without trimming means the entire sprout that grows undischarged from the main stem, the growing part of the buds supports the growth of the number of rods. The undiscarded part buds will support growing into the number of rods. The average number of growing stems is an interaction without the pruning of shoots that grow into a greater number of stems when compared to the crop trimming treatment.

Without the pruning buds means keeping the buds becoming more mature so that the formation of young stems and eventually develops into stems. The growing bud is a part of a cell tissue that develops metabolized due to physiological cell activity forming the stem organ. The 5% DMRT test, further the generative period of the pruning periods there is interaction but does not differ from the real diameter of the tuber. Allegedly without trimming and trimming, the bud stores the nutrients that can subsequently be transliterated to the formation portion for the growth of tuber diameters. Because at the time of the study fall dry season suspected water content in the soil is not adequate need for the formation of bulbs. Lack of water needs on the tuber is allegedly supplied by water contained from the organs on the plant shoots that are still active its cell tissues.

The DMRT 5% test, the high treatment of guludan there are interactions but no different real treatments to the number of rods, (table, 4). It is suspected high and in the period of vegetative growth, the water content needed is still the same level of need. But there is a high and no interaction of all the variables observed in the period of generative potato plants.

CONCLUSION

1. The height of the 2cm and the pruning period of 35 days affects potato tuber results
2. High Guludan 0 SD 10 cm effect on plant growth
3. Without trimming the real effect on plant growth of crops

ADVICE:

Considering the low height of the Guludan used will affect the results of potato bulbs
Trimming time affects the growth and results of potato bulbs

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