Setting of cash pruning time and giving rabbit urine to growth and results of plant melon (*Cucumis melo* L.)

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**Abstract.** Melon is an annual plant that has high economic value with bright prospects to be developed. The low production of melons needs to be improved on cultivation techniques. The purpose of this study was to get one of the right time to trim the shoots and giving the urine more often given will be able to give effect to the growth and yield of melon plants both the best quality and quantity as well as the increasing income of melon farmers. Factorial experiments (2 factors) with a randomized block design (RBD) were used in this study. The interaction between setting the shoot pruning time (P) and giving rabbit (U) urine to the growth and yield of melon plants on all influential variables was not significant. The highest weight obtained fruit weight per plant due to setting the shoot pruning time gave at P1 of 1555.21 g or 10.12%, it was higher compared to P3 which was 1412.34 g. Fruit weight per plant on U1 urine administration with the interval of giving once every 3 days showed the highest value of 1568.88 g or 14.67%, it was higher compared to U0 which was of 1368.17 g.

1. **Introduction**

Melon plants are now well developed as one of the promising business commodities. Melon has economic value and the prospect is quite good in its marketing. The development of tourism in Bali has an impact on farmers to continue to develop quality melons and can be available continuously to fill the market that is still wide open from the tourism sector in addition to fulfilling the wants and needs of the general public. Seeing the development of melon production in Bali in 2016 was only contributed by several regencies including Jembrana, Badung, Gianyar, Buleleng with 275 tons, 13 tons, 39 tons and 136 tons with a total of 463 tons. The production decreased when compared to 2012 as many as 685 tons, 2013 as many as 737 tons, 2014 as many as 893 tons, 2015 as many as 1190 tons [1]. In order to obtain quality melons and meet the market, the cultivation requires intensive handling.

Increasing the regulation of the growth of melon plants is one of the cultivation techniques that can be done by pruning. Pruning is generally used for canopy arrangements, increasing lateral shoots / productive branches, stimulating flowering and improving the quality of fruit. Proper pruning time can accelerate the release of lateral shoots which can contribute to the faster discharge of flowers and quality harvests. Pruning is often done to stimulate the growth of primary, secondary and so on, where the trimmed is the meristem at the apical end of the stem or branch rich in auxin so that growth will be more stimulated in the meristem section [2]. Until now, the most appropriate time for pruning shoots does not yet exist in detail so that it is necessary to try out the age at which the most appropriate pruning is done after transplanting.
Melon plants in their growth and production in addition to pruning require a lot of nutrients so fertilization must be done regularly. Nutrients that are needed by many melon plants are Nitrogen (N), phosphorus (P) and potassium (K). The main nutrient that must be available for the growth and development of melon plants is the element N, P, K [3]. The source of nutrients for plants can be sourced from animals (organic). Cow manure, chickens are circulating in the market quite a lot and are used by the community/farmers for each cultivation of their crops in solid form. But there are still types of animals that can be used as sources of nutrients, which come from rabbits. Until now, Baturiti Subdistrict which consists of 12 villages / Kelurahan still contributes to the maintenance of a large number of rabbits, and it turns out that it is only maintained by people in 15 villages of Mekarsari and 998 Candikuning villages [4]. The nutrient content of rabbits is higher when compared to cow manure, chicken, goat, and others do not make rabbit poopogle by the community/farmers including in the form of rabbit urine has not been widely used. Research carried out by the Ciawi Animal Research Agency in 2005 stated that rabbit urine contains N, P, and K each of 2.72%, 1.1% and 0.5% higher than other livestock manure and urine such as cattle, buffalo, sheep, horses, pigs, even chickens [5]. By giving the right kind of rabbit urine can be effective and effective. The purpose of this study was to obtain the most appropriate pruning time and the provision of rabbit urine by adjusting the interval as a source of nutrients that can increase the yield of both the quality and quantity and income of farmers of melon plants.

2. Materials and methods

This research is a factorial experiment, with the basic design of Randomized Block Design (RBD) with 2 factors tested and carried out in a greenhouse that lasts from June to September 2018. In the first factor the time of pruning consists of 3 levels: P1 = pruning shoots 7 days after planting, P2 = pruning shoots 14 days after planting, P3 = pruning shoots 21 days after planting. The second factor with 4 levels of giving rabbit urine: U0 = without urine, U1 = giving urine every 3 days, U2 = giving urine every 6 days, U3 = giving urine 9 days. From the experiment, 12 combination treatments will be obtained and will be repeated 3 times so that in total there are 36 combination treatments.

The materials used in this study were Alisha variety melon, rabbit urine, insecticide, Furadan 3G, NPK. While the tools used are scissors, sprayers, meters, stationery, scales, millimeter paper blocks, buckets, plastic measuring cups.

3. Results

The results of statistical analysis on the variables observed in this study and the results of the significance of the regulation of shoot pruning (P) and administration of rabbit urine (U) to the growth and yield of melon plants and their interactions (PxU) are presented in Table 1.

Table 1. Significance of setting the time of pruning (P) and provision of rabbit urine (K) on growth and yield of melon plant.

| No | Variable | Pruning Buds (P) | Giving Urine Rabbit (U) | Interaction (PxU) |
|----|----------|----------------|------------------------|------------------|
| 1. | Plant height (cm) | ns | ns | ns |
| 2. | Number of leaves (strands) | ns | * | ns |
| 3. | Number of lateral shoots (pcs) | ns | * | ns |
| 4. | Maximum leaf area (cm²) | ns | * | ns |
| 5. | Leaf wet weight (g) | ns | * | ns |
| 6. | Wet stem & shoot weight (g) | ns | * | ns |
| 7. | Root wet weight (g) | ns | * | ns |
| 8. | Fruit weight (g) | * | * | ns |
| 9. | Dry leaf oven weight (g) | ns | ** | ns |
From Table 1 it can be seen that the interaction between pruning and giving rabbit urine (PxU) had no significant effect (P ≥0.05) on all variables observed except for fruit weight and oven and stem dry weight, while the administration of rabbit urine (U) had a significant effect (P<0.05) on all variables observed except for maximum plant height had no significant effect (P ≥0.05).

Table 2. The average setting of budding pruning time (P) and provision of rabbit urine (K) to growth and yield of melon plant.

| Treatment | Plant height (cm) | Number of leaves (strands) | Number of shoots (pcs) | Leaf area (cm^2) | Leaves wet weight (g) | Stems and leaves wet weight (g) | Root wet weight (g) |
|-----------|------------------|--------------------------|-----------------------|-----------------|----------------------|---------------------------------|--------------------|
| P1        | 256.75 a         | 80.42 a                  | 16.92 a               | 14,242.72 a     | 376.29 a             | 190.22 a                        | 19.89 a            |
| P2        | 249.03 a         | 82.42 a                  | 16.92 a               | 14,915.45 a     | 378.77 a             | 188.85 a                        | 20.16 a            |
| P3        | 261.03 a         | 76.58 a                  | 16.58 a               | 13,639.42 a     | 373.86 a             | 195.11 a                        | 19.76 a            |
| LSD5 % U0 | -                | -                        | -                     | -               | -                    | -                              | -                  |
| U1        | 265.17 a         | 87.78 a                  | 17.44 b               | 15,590.13 b     | 399.11 b             | 201.71 b                        | 21.66 b            |
| U2        | 255.41 a         | 76.89 a                  | 17.00 b               | 14,154.53 b     | 380.49 b             | 191.29 bc                       | 20.20 bc           |
| U3        | 256.07 a         | 81.00 a                  | 17.00 b               | 14,627.14 b     | 379.50 b             | 189.34 c                        | 19.65 ac           |
| LSD 5%    | -                | 0.93                     | -                     | 1,695.51 b      | 30.74 b              | 10.55 a                         | 1.70               |

Table 3. The average setting of budding pruning time (P) and provision of rabbit urine (K) to growth and yield of melon plant.

| Treatment | Fruit weight (g) | Oven dry weight leaves (g) | Oven Dry weight stems and leaves (g) | Oven dry weight root (g) | Oven-dried fruit weight (g) | Total dissolved solids (%Brix) |
|-----------|-----------------|----------------------------|-------------------------------------|--------------------------|----------------------------|-------------------------------|
| P1        | 1,555.21 a      | 133.03 a                   | 101.24 ab                           | 15.36 a                  | 298.03 a                   | 16.54 a                       |
| P2        | 1,452.81 ab     | 126.53 a                   | 89.29 a                             | 15.29 a                  | 287.60 a                   | 16.17 a                       |
| P3        | 1,412.34 b      | 119.51 a                   | 107.15 b                            | 15.19 a                  | 273.19 a                   | 16.42 a                       |
| LSD 5 % U0| -                | -                         | -                                   | -                        | -                          | -                              |
| U1        | 1,368.17 a      | 101.79 a                   | 90.97 a                             | 14.38 a                  | 252.45 a                   | 15.81 a                       |
| U2        | 1,568.88 b      | 134.60 b                   | 106.18 b                            | 16.02 c                  | 322.28 b                   | 16.60 b                       |
| U3        | 1,482.42 b      | 137.54 b                   | 106.61 b                            | 15.52 bc                 | 286.12 a                   | 16.54 b                       |
| LSD 5 %   | 97.29           | 16.07                      | 11.93 b                             | 0.93                     | 30.74 b                    | 0.45                          |
4. Discussion

The results of the analysis revealed that the interaction of PxU between the setting of shoot trimming time (P) and the administration of rabbit urine (U) had no significant effect on all observed variables. The highest fruit weight per plant was obtained from shoots pruning 7 days after planting (P1) of 1,555.21 g which was not significantly different from the shoot trimming treatment 14 days after planting (P2) of 1,452.81 g. P1 was significantly different from the treatment of shoot trimming 21 days after planting (P3) of 1,412.34 g and increased fruit weight by 10.12%. From the results of the study due to pruning pruning earlier (P1) on the weight of the fruit per plant obtained the heaviest fruit due to the presence of lateral buds formed on the armpit on the main stem segment above lateral trimmed shoots has the potential to produce fruit that is faster and has a quality well. From the results of the research on cucumber plants, shoot topping was obtained after the third section of all lateral branches gave the best response in the increase in the number of female flowers per plant and the number of fruit plants [6].

Research on eggplant plants from the results of pruning 14 days after planting and producing two times gave relatively light plants which were 66.05 g per plant but produced relatively high productivity of 217.68 g fresh weight per plant [7]. Pruning has no significant effect on flowering age and fruiting age of melon plants but has a significant effect on crop diameter and production [8]. The pruning to remove potential shoots (branches), especially those that appear on the armpit leaves [3]. Branch pruning is carried out from the first segment to the 8th segment. Furthermore, it is mentioned that the fruits of melon plants are economical to be cultivated to come from perfect flowers that emerge from the leaf armpit section 9-12 where the flowers in the segment have higher fruit quality with optimum fruit size.

The response of plants to pruning is due to changes in the relationship between the parts of the plant that are left behind and the disruption of the formation pattern of auxin [9]. In fact, the first leaf axillary fruit can appear, but the size of fruit produced in the first armpit branch until the eighth is not optimum [10]. This is likely to occur because the plants have not enough leaves, to produce good fruit. The results of this study showed that the highest fruit weight was obtained at the time of pruning 7 days after planting (P1) supported by 256.75 cm plant height, 16.92 lateral shoots, 80.42 leaves, 14,242.72 cm2 leaf area, leaf wet weight 376.29 g, stem and lateral shoots wet weight 190.22 g, root wet weight 19.89 g, leaf dry weight 133.03 g, root dry weight 15.36 g, fruit dry weight 298.03 g.

The highest weight of melon from this study was obtained at the interval of giving rabbit urine once every 3 days (U1) of 1,568.88 g which was not significantly different from U2 and U3 of 1482.42 g and 1474.36 g. The U1 treatment, when compared with U0 without urine, was significantly different with a value of 1368.17 g which increased by 14.67%. The role of nutrients is to help stimulate the development of all parts of the plant so that the plants will grow faster, the absorption of nutrients is relatively large [11]. The manure can add plant food ingredients in the soil [12]. Furthermore, it is stated that even though manure has less nutrient content than artificial fertilizers, manure besides being able to add nutrients to the soil can also enhance humus, improve soil structure and encourage the life of soil microorganisms. The results of his research that 50% rabbit urine + 25% coconut water produced plant height, number of leaves, stem diameter, number of tillers, and higher dry weight of red ginger rhizome than other treatments at the age of 20 MST [13]. The results of the study of administration of urine and KNO₃ gave a growth response and yield on the number of leaves, total flowers, number of fruits, fruit length, fruit diameter, fruit sugar content and fruit yield in strawberry plants [14]. With the better soil conditions and the availability of nutrients due to the provision of manure in the form of rabbit urine will have an impact on the response of all observed variables. The high weight of the fruit of treatment when giving urine every 3 days (U1) is supported by a variable plant height of 265.17 cm, number of lateral shoots of 17.44 pieces, number of leaves 87.88 strands, leaf area of 15,590.13 cm², leaf wet weight 399.11 g, stem weight and lateral shoots 201.71 g, root wet weight 21.66 g, root dry weight 16.02 g, fruit dry weight 322.28 g in treatment U1 and all significantly affected the maximum value. Giving rabbit urine at a faster interval will be able to provide nutrients needed by plants quickly and can meet the needs in accordance with the stages of plant growth and development.
5. Conclusions

The interaction of regulation of shoot trimming and rabbit urine treatment did not significantly influence all observed variables. The treatment of pruning time had no significant effect on all plant variables except for fruit weight and oven dry weight of stems and shoots. The highest fruit weight per plant was obtained from shoots pruning 7 days after planting of 1,555.21 g which was not significantly different from the shoot trimming treatment 14 days after planting of 1,452.81 g. The pruning shoots 7 days after planting was significantly different from the treatment of shoot pruning 21 days after planting of 1,412.34 g having increased fruit weight by 10.12%.

Treatment of giving rabbit urine had a significant effect on all observed variables except the maximum plant height had no significant effect. The highest weight of melon from this study was obtained on the interval of giving rabbit urine once every 3 days of 1568.88 g which was not significantly different from giving urine 6 and 9 days of 1482.42 g and 1474.36 g. The giving urine 3 days treatment, when compared with without urine, was significantly different with a value of 1368.17 g which increased by 14.67%.

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