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CAVENDISH BANANA SEEDLING ACCLIMATIZATION AND ENLARGEMENT ON SOME MEDIA PLANTING COMBINATIONS

Ferziana[1], Lisa Erfa[2] and Desi Maulida[3]

[1,2] Horticulture Study Program, Politeknik Negeri Lampung, Indonesia

ferziana@polinela.ac.id[1]

Abstract

Growing media is one of the important factors that determine the success of the acclimatization of plantlets from in vitro culture. Several media combinations were tried in this study with the aim of 1) Knowing the effect of media combinations on the success of plantlet acclimatization and seedling growth at the enlargement stage, 2) Getting the best media combination for the successful acclimation and enlargement of banana seedlings, and 3) Seeing the possible use of media husk in acclimatization and enlargement of banana seedlings as a result of tissue culture. The study was conducted at the Lampung State Polytechnic net home from May to August 2019. The research was carried out in a Randomized Block Design. Six media combinations were tried, namely: P1: Topsoil + Husk (1: 1); P2: Top Soil + husk (1: 2); P3: Topsoil + husk charcoal (1: 1); P4: Topsoil + Husk charcoal (1: 2); P5: Top Soil + compost (1: 1); P6: Topsoil + compost (1: 2). In acclimatization (planting until the plantlet is 4 weeks old) each treatment planted 30 plantlets, each with 5 replications, while on the enlargement of the seeds each treatment was tried with 15 replications. Observed variables included: Seed height, leaf width, number of leaves, and wet weight. Data were analyzed by analysis of variance and continued with the BNJ test at a 5% level. The results showed: 1) the combination treatment of media had no effect on the percentage of plantlets that grew, and the growth of the number of seedling leaves at the enlargement stage, but markedly affected the growth of seedling height, leaf width, and seedling wet weight, 2) the best combination of media for success plantlet acclimatization and seedling growth rate (seedling height and wet weight) at the enlargement stage are P5 media (Topsoil + 1: 1 compost), then followed by P6 media (Topsoil + Compost 1: 2), and 3). Use of husk media for additional acclimatization media, it can still be used with the success rate of plantlets still reaching 70%, but it is not good to be used at the stage of seedling enlargement until it is ready for planting into the field

Keywords: acclimation, bananas, media

1.1 Background

The multiplication of banana seedlings conventionally using seedlings or tubers obstacles are not able to meet the needs of quality seeds in a scale much (Sulistiani and Yani, 2012). Tissue culture is a method that can be applied to produce banana seedlings on the scale of many in a quick time. Besides the seedlings produced by tissue culture uniform and free from disease.

The final stage in the process of plant propagation by tissue culture is acclimatization. Plantlet-tissue culture plantlets were removed from the bottles need to adjust to changes in their environment. Acclimatization is the process of adapting the plantlets (either physiology or morphology) of the environment in vitro to ex vitro environment.

Acclimatization is one critical step that is often an obstacle to mass-produce seeds with tissue culture (Yusnita, 2003). There are weaknesses shown plantlet produced through tissue cultures such as

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wax coating / thin cuticle and fewer lignifikasi stems, vascular tissue from roots to shoots poorly developed, or stomata often do not close when evaporation is causing plantlets hight. very sensitive to transpiration, fungal, and bacterial attacks and sensitive to high light intensity and high temperature. Therefore, tissue culture plantlets acclimatization needs special handling. Necessary modifications to the environmental conditions to grow, especially concerning temperature, humidity, and light intensity (Hidayat, 2012).

In addition to the humidity, the accuracy of the media will affect the acclimatization phase (Slamet et. Al., 2011 on Hidayat, 2012). The good medium should have the ability to hold water and supply nutrients needed by plants, have good aeration and drainage to keep moisture around the roots (Prayugo 2007 in Riyanti, 2009). This will affect the success of acclimatization (percentage of plantlets life) and enlargement until ready for planting seedlings to the field. According to Danial (2012), mix/combination of acclimatization media significantly influences the growth of banana plantlets 100 % Ambon Kuning dan Raja Bulu. Therefore it is necessary to find the best combination of media for the success of acclimatization and enlargement of Cavendish banana seeds from tissue culture.

II. Methode of Research

The experiment was conducted in Lampung State Polytechnic net home from May to August 2019. The tools used include plastic tubs measuring 25x30 cm, plastic lid, home nets, sprayer, and the hype, and others. Planting material used in this study include plantlets (complete plant cultures in vitro) Cavendish banana cv. Grand Nain. Rice husk, rice husk charcoal, compost, pearl NPK fertilizer, fungicides, bactericides, insecticides, polybag, plastic, and shading house. The research will be conducted using a randomized block design. There are six treatment combinations will be tested. On acclimatization (planting until plantlets are 4 weeks old) each treatment was planted 30 plantlets, each with 5 replicates, being the enlargement of seedlings each treatment tested with 15 replicates. P1: Topsoil + husk (1: 1), P2: Top Soil + husk (1: 2), P3: Topsoil + husk (1: 1), P4: Topsoil + Charcoal husk (1: 2), P5: Top Soil + compost (1: 1), P6: Topsoil + compost (1: 2). The data obtained do the analysis of variance followed by a Least Significant Difference test (HSD 5%).

2.1. Implementation Phase Of Research

The research will be carried out in two stages, namely acclimatization and acclimatization stage seeds. enlargement is done by first setting up treatment media.

Media materials such as topsoil, chaff, and compost sterilized by steaming in a drum filled with water that is heated using a stove for 6 hours. While husk because of the manufacturing process (burned) it does not need to be sterilized back. Media that has been chilled included in the 10 cm high plastic tub, doused with a liquid fungicide and bactericide 2 gl-1, then allowed to stand overnight.

Acclimatized plantlets will be removed from the culture bottle, then washed clean plantlets (plantlets are not slippery anymore). Plantlets soaked in a solution of 2 gl Fungicide-1for 10 minutes, then drained and dried. Plantlets are grouped into three groups according to the amount of seed. Each group was implanted plantlets (which are relatively the same) on the whole media treatment (so grouping treatment based on the size of the plantlets). Plantlets were planted in plastic tubs which already contains the media (according to treatment) at regular intervals as much as 30 plantlets per tub. Bak who has been implanted plantlet close with plastic and tied with rubber during 15 days, labeled, and placed in the s for 4 weeks. After 4 weeks of observation the percentage of plantlet were alive and growing.

Plantlets grow after 4 weeks of enlargement seedlings by means move the plant into the polybag (15x15), which has filled the media according to treatment (together with a combination of media acclimatization). Mixed media treatment has been made homogeneous (mixed well) filled into polybags as high as 3 cm from the top surface of the polybag. Seedlings acclimatization is implanted 1 seed per polybag. The whole polybag already planted placed under the plastic lid 2 weeks and under paranet 6 weeks, then moved to an open area up to 8 weeks.

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Maintenance plantlets/ seed do Fertilization with NPK fertilizer given to the acclimatization phase, namely the acclimatized plantlets after 2 weeks. Urea is given in the form of a solution of 1 gl-1, which is supplied by spraying. For enlargement fertilizing seedlings in polybag done a week after the seedlings were moved to a polybag, a solution of 2 gl-1 with an interval of 1 week.

Watering acclimatized plantlets in bathtub is done by spraying water with a hand sprayer on plantlets have been acclimatized 2-3 weeks (depending on moisture conditions media). While on watering seedlings in polybag 1 or 2 days (depending on weather). It also carried out spraying fungicide on seed enlargement stages at intervals of 2 weeks or depending on the circumstances. The provision of 3G furadan done at this stage of enlargement which granted 2 ½ g per polybags, ie at the age of 2 and 6 weeks after the seeds are transferred to polybags.

2.2. Observation

The parameters observed in this study include the percentage of plantlets that life into seeds. Being on stage seed magnification observation: seedling height increment, increment in the number of leaves and leaf width on seedlings. Observation is done by:

Plantlets percent live. Observed at the end of the acclimatization (4 weeks after planting / MST) by counting the number of plantlets was living divided by the number of plantlets were planted/acclimatized and multiplied by 100%.

High Added Seeds (Cm). By measuring the height of seedlings at the end of the experiment (8 MST polybag). Measurements were made of the media surface to the tip of the highest leaf, subtract the initial height when moving to a polybag.

Added Number of Leaves. By counting the number of whole leaves that have opened a full trial, reduced the number of early leaves when moved into a polybag.

Added width leaves (cm). By measuring the width of the leaves on the widest reduced initial leaf width when transferred to polybags.

Seed Wet weight (grams). By weighing the wet seeds (shoots and roots) at the end of the experiment.**III.**

Result and Discussion

The results culture vitro plantlets acclimatized (adapt) to the new environment so that the resulting seedlings can grow into seedlings ready to be planted into the field. Mada adaptation of plantlets for 4 weeks since the launch of the bottle. Subsequently transferred to polybags to do enlargement seedlings up to 8 weeks old. Results of acclimatization of plantlets in some combination treatment media acclimatization gained success (percentage of plantlets life) on any media treatment as follows:

Table 2. Percentage of plantlets alive when acclimatized on some combination growing media

No.	Treatment combination Media	Mean Percentage plantlets Life
1	P1: Top soil + husk (1: 1)	70.0
2	P2: Top soil + husk (1: 2)	74.4
3	P3: Top soil + Charcoal husk (1: 1)	84.4
4	P4: Top soil + Charcoal husk (1: 2)	74.4
5	P5: Top soil + compost (1: 1)	87.8
6	Q6: Top soil + compost (1: 2)	73.3

The mean percentage of plantlet biggest live there on a mixture of treatment 5 (topsoil + compost 1: 1) amounted to 87.8%. This is in line with the Princess (2014) that the use of the planting medium with the addition of compost is good for the growth of K.Parviflora. In Siburian and Damayanti (2016) use the

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growing media mix soil: compost with a ratio of 1: 1 provides the results of outcomes on the best life for sugarcane (sugarcane plantlets) PS 864.

The mean percentage of plantlets' second-largest live there on a mixture of 3 treatment media (soil + husk 1: 1) amounted to 84.4%. This is in line with a mixture of soil and growing media husk charcoal gives the best results for growing strawberries and vertical plants (Pratiwi, Simanjuntak, and Banjarnahor 2017). The use of rice husk in plantlets growing media mix N.raflessiana Jack gives the best results for the growth of seedlings (Sukmadijaya, Dinarti, and Isnaini, 2013).

Results of variance analysis of observational data on the seedling growth stage of enlargement showed that the combination treatment did not media on the growth of the number of leaves of seedlings, but the real affect the growth of seedling height, leaf width and fresh weight of seedlings (Table 3).

Table 3. Results of variance analysis of the combined effect of high media seeds, leaf width, and fresh weight Cavendish banana seedlings

sources Diversity	**Non-degree**	**F Count**				**F Table**	
		High-Seed (Cm)	**Leaf width (cm)**	**Weight of plant (g)**	**Num-ber of Leaves (Cm)**	**5%**	**1%**
Group	14						
Treat-ment	5	42.60 **	69.33 **	33.67 **	0.89 tn	2.3456	3.2907
error	70						
Total	89						

In Table 4, results of further testing with LSD at 5% level are obtained that the height of the breed and weight of wet seeds obtained from treatment 5 (Topsoil + compost 1: 1) and treated P6 (topsoil + compost 1: 2). Treatment 1 (topsoil + husk 1: 2) and treatment 2 (Topsoil + husk 1: 2) resulted in high growth seed, wet weight, and width of the lowest leaves. In the leaf width, the leaf growth widest obtained from treatment 6 (Topsoil + husk 1: 2). Growing media combination treatment did not show the real effect of the variable number of leaves.

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Table 4. Mean seedling height, leaf width, number of leaves and seeds on a wet weight some combination of planting medium

Treatment	Variables Observed			
	High-Seed (Cm)	Width daunCm)	Number of Leaves (Cm)	Wet Weight (g)
P1: TS + husk (1: 1)	24.90 c	4.45 d	2.6667 a	77.94 c
P2: TS + husk (1: 2)	21.70 c	3.64 d	2.8000 a	64.73 c
P3: TS + A. husk (1: 1)	35.87 b	7.35 b	3.1333 a	154.05 b
P4: TS + A. husk (1: 2)	36.57 b	7.83 b	3.2667 a	159.31 b
P5: TS + compost (1: 1)	44.10 a	5.67 c	2.8667 a	208.79 a
P6: TS + compost (1: 2)	44.13 a	9.05 a	3.4000 a	209.10 a

Description: TS = Top soil
A = Charcoal
(Figures average followed by the same letter pointed-kan not significantly different from HSD test at 5% level)

The addition of compost at planting media (P5 and P6), provides the best results for the variable seedling height and fresh weight compared to other treatments. At Princess (2014), the addition of compost media for the growth of K. parviflora provides better against variables plant height, length and width of leaves compared to composting. Widodo and Kusuma (2018) informs that the addition of compost at planting medium can enlarge the pore and cause loose soil structure so that it will be easy growing plant roots. This gives a real effect on seedling height and weight variables wet.
The addition of rice husk in treatment 5 (topsoil + A.sekam 1: 2) provides the best results for the variable width of leaves. In Gustia (2013) the addition of rice husk provides the best results for the variable width of leaves in mustard. Juniati, Adam, and Patang (2016) adding, provision of rice husk to the growing media kankung land gives the best results to the variable number of leaves.

3. Conclusion

With the effects of some of the compositions of planting media to the success of acclimatization and enlargement seed Cavendish bananas can be concluded that the combination treatment of the media did not affect the percentage of plantlets grow, and growth in the number of leaves of seedlings at the stage of enlargement, but significantly affect the growth of seedling height, leaf width, and wet weight of the seeds. Medium combination is best for the success of acclimatization of plantlets and speed of seedling growth (height and weight of wet seeds) at this stage of enlargement is the medium P5 (Topsoil + compost 1: 1), followed by media P6 (Topsoil + Compost 1: 2), The use of additional media for media acclimatization husk can still be used with a success percentage of plantlets life still reached 70%,

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