

Effect of Seed Treatment on Seed Germination Areca nut (*Areca catechu* Linnaeus) Palm

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Introduction

Areca nut (*Areca catechu*) palm is an evergreen plant which is highly restricted to the warmer regions of the world. There are numerous uses of Areca nut palm as food, fuel, timber, boundary plant (George et al., 2006) and landscaping palm (Orwa et al., 2009). As an ornamental palm, currently, Sri Lanka has great demand in export market because of their aesthetic and enormous tropical appearance, especially from Middle- East countries. Also it has higher local demand as landscaping plant and a boundary plant in agricultural fields. Ornamental palm exporters export 100,000 to 150,000 areca nut seedlings in one consignment. Seed germination is not uniform in large scale production of areca nut seedlings. Normally, it takes five to six months to germinate and inherently these palms have low germination percentage which is around 25% to 30%. Because of the low germination percentage of areca nut palm, growers have to sow at least 250,000 to 300,000 areca nut seeds to get 100,000 seedlings. Therefore, growers confronted many difficulties in nursery management of areca nut palm. By using proper treatments for seeds and controlling the temperature and moisture of the planting media, germination percentage can be significantly increased up to 80% to 90% and time taken to germinate can be reduced up to 3 to 4 weeks. As a result, seed requirement and cost of production can be significantly reduced. This will be a massive assistance for the palm growers of ornamental palm industry in Sri Lanka. Therefore, in this study, it attempts to find out the effect of seed treatment on seed germination in seed propagation of areca nut palms.

Methodology

In the experiment, 576 areca nut seeds were taken. As seed treatments, three different soaking times: 24 hrs, 48 hrs and 72 hrs without soaking as control treatment were used. Black polythene, straw and paddy husk were used as mulching materials and control experiment kept without mulch. Coir dust and sand were taken as growing media in 1:1 ratio. Twelve seeds were sown in vertical position with calyx end covered in each plastic tray (Sheshagiri et al., 2004) for each treatment with different seed treatments and three replicates. All trays were kept in shade house. Temperature and Relative Humidity in shade house and temperature under mulching materials were measured in two days intervals. Rooting was observed daily and first sight of root emerging was taken as start of seed germination.

Results and Discussion

Average temperature of the shade house Recorded was 34 C. Average of the relative humidity recorded was 55%. The highest temperature 37 C and the highest relative humidity 60% recorded in 6th week after sowing. Average temperature in growing condition 1 without mulching was 28 C, in growing condition 2 mulching with black polythene was 36 C, in growing condition 3 mulching with straw was 32 C, and in growing condition 4 mulching with paddy husk was 30 C. The results revealed that the lowest temperature 28 C was recorded in growing condition 1 without mulching 1 and the highest temperature 36 C was recorded in growing condition 2 mulching with black polythene. Germination percentages and number of days to get more than 75% of germination are shown in Table 1.

Table 1. Germination percentages and number of days to get more than 75% of germination.

Treatment number	Average germination Percentage %(within 78 days)	Number of days to get more than 75% germination
T1	75	74
T2	89	63
T3	80	76
T4	42	-
T5	58	-
T6	89	56
T7	72	-
T8	53	-
T9	61	-
T10	97	42
T11	75	70
T12	53	-
T13	58	-
T14	89	42
T15	72	-
T16	47	-

All the treatments and interaction effect between mulching and soaking time are significantly different at $p > 0.05$. As indicated in the Table.1, more than 50% germination was achieved by almost all the treatments except T16 treatment within 78 days. Treatment number 1, 3 and 11 obtained more than 75% of germination percentage after 70 days of sowing as a result of low temperature in growing media. Treatment number 2, 6, 10 and 14 got more than 75% of germination percentage within 42 to 63 days due to the high temperature in growing media. Treatment number 10 and 14 had taken lesser time period to get more than 75% of germination. Treatment number 10 seed soaking in 48 hours and cover with black polythene had the highest germination percentage of 97% within minimum number of 42 days. The root appearing time of the areca nut seed in seed germination had been depended on the soaking time and mulching condition.

Table 2. Means of number of days taken to 75% germination in different mulching types and soaking times.

Mulching Type	No. of Days for 75% Germination	Soaking Time	No. of Days for 75% Germination
Without mulch / Control	77	Without soaking / Control	52
Black Polythene	52	For 24 hrs	72
Straw	73	For 48 hrs	68
Paddy husk	77	For 72 hrs	68

When considered mulching type in growing conditions, the lowest number of days taken to 75% germination was 52 days recorded in growing condition 2 mulching with black polythene. Growing condition 1 without mulching and 4 mulching with paddy husks had the highest number of days taken to 75% germination (77 days). When considered the soaking time, soaking time 1 without soaking had the highest number of days taken to 75% germination (73 days). Soaking time 3 soaking for 48 hours and 4 soaking for 72 hours had the lowest number of days taken to 75% germination (63 days).

Conclusions

Root appearing time of the areca nut seeds highly depended on the soaking time and mulching condition. Germination percentage can be increased by increasing soaking time. The best soaking time is 48 hours. Similarly germination percentage can be increased by providing high temperature (30 °C to 35 °C) and high humidity (80% to 90%). These conditions can be provided by using black polythene as mulch in seed germination in the nursery.

References

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