

Effect of Different Methods of Seednut Planting in *Cocos nucifera* L.

by

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Introduction: While supplying quality seedlings under the coconut nursery scheme in Madras, the fixation of criteria for both seednuts and seedlings was considered essential. Seednut weight, mode of planting and seedling characters were empirically evaluated by quite a few workers. A detailed study was undertaken to fix certain limits.

Material and Methods: (i) *Selection of seednuts and preservation:* One thousand seednuts from Nanjundapuram area in Coimbatore district, Madras State harvested in May, 1964 from 35-year old healthy mother palms were employed for this study. Ten seednuts leaving one-third at the top and one-third at the bottom per bunch were selected judged by the degree of ripeness and yellowish brown colour and production of metallic sound. The nuts were embedded in five layers in dry sand under shade providing periodic sprinkling of water to prevent drying up. After a month of storage, the yellow colouration turned ashy-grey, when they were fit for planting.

(ii) *Preparation of bed:* Oblong beds 42' × 6' were formed with a depth of 18" of carted sand. With a normal vertical method of planting, an inter-distance of one foot was maintained, between rows and lines. In all, a bed of 200 seednuts was arranged in five rows of 40 each. Seednuts were drenched with one per cent Bordeaux mixture an hour before planting.

Experimental: (a) *Choice of seednut:* Two hundred seednuts were selected from a population of 1000. Weight, length and maximum breadth between ridges were estimated. The normal distribution curve was drawn and 'Z' test for the three attributes of criteria was significant at one per cent level. A weight range of 768.36 – 769.64 g and length range of 20.24 – 20.44 cm and breadth 13.51 – 13.71 cm formed the indices in the choice of seednut.

(b) *Efficient method of planting:* Forty of the chosen seednuts were used in each of the three methods of planting, viz., "vertical" (stalk end upwards), "horizontal" and "inverted" (stalk end downwards) in a study on the effect of positioning of nuts during planting. The time of emergence of the plumule, the progress of germination and the date of cessation of germination were observed. The seedlings were gently uprooted ten months

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after planting when growth attributes of the seedlings comprising, height of seedlings, number of leaves, number of leaves split, girth at collar and number of roots were assessed. The studies showed the horizontal method of planting was superior. The data are presented in Table 1. Chemical analysis of plant tissue was done for nitrogen, phosphorus, potassium and calcium of composite samples of foliage drawn from 20 leaves adopting the conventional method of analysis (Table 2):

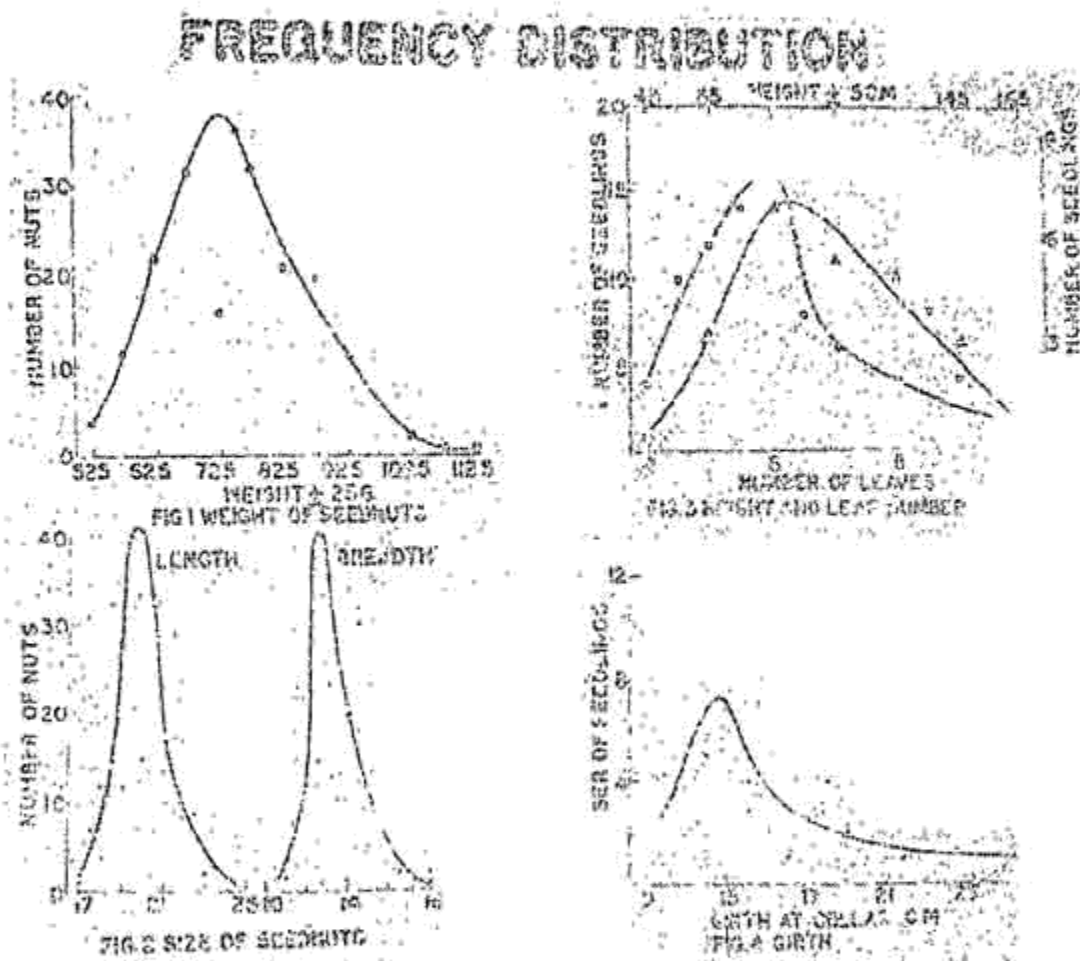
TABLE 1. Data on germination of seedlings and comparison of seedlings characters.

	Vertical	Inverted	Horizontal
Number of nuts planted	40	40	40
Percentage of germination	95	50	100
Number of quality seedlings	30	25	36
Percentage of quality seedlings	75	63	90
Number of days required for germination from planting (first germination)	131	185	104
Number of days taken for completing germination (last germination)	188	226	188
Number of days taken to complete germination	57	41	84
Height of seedlings (cm)	45.0±1.84	46.3±3.42	62.7±2.32
Number of leaves	7.7±0.42	6.7±0.42	9.8±0.13
Girth at collar (cm)	13.8±0.33	13.8±1.00	24.1±1.87
Number of roots produced	10.3±0.61	18.3±4.00	21.7±2.48
Number of leaves split	0.2	...	5.3±0.52

TABLE 2. Chemical analysis of the foliage (%)

	N	P ₂ O ₅	K ₂ O	Ca O
(150 days after planting)				
Vertical	1.470	1.086	1.491	0.787
Inverted	1.530	0.077	0.918	3.147
Horizontal	1.530	1.201	1.646	3.589
(180 days after planting)				
Vertical	1.850	0.350	0.290	0.840
Inverted	1.890	0.350	0.959	1.080
Horizontal	1.930	0.374	0.998	2.080

(c) *Selection of seedlings*: A random sample of 200 seednuts was planted adopting vertical method in the oblong seed beds. Germination was 95 per cent. Fifty seedlings were sampled from the population and growth characteristics of plant height, number of leaves, number of leaves split, girth at collar and number of roots were assessed. The normal distribution curves for various characteristics were drawn and the significance of distribution was realised at one per cent level. A range of 91.48 to 101.32 cm in height, 5.71 to 7.09 number of leaves, 0.77 to 1.03 number of leaves split, 12.59 to 13.81 cm girth at collar and 5.25 to 6.75 number of roots was associated with quality seedling.



Results and Discussion: The choice of seednut constitutes the primary stage for screening especially when the source of healthy mother palms from well-maintained garden is assured. Medium-size seednuts nearly round or spherical are believed to be best suited for selection, in terms of yield of seednuts and copra content (Lacson, 1921 and Novero, 1922 cited by Maceda, 1933; Patel, 1938). A great number of nuts from heavy bunches rather than light bunches germinated quicker and a threshold value of 680 g per nut was fixed by Patel (Umali, 1940). These empirical observations have however, been found to be justified by the present investigation on a sound

statistical base. 769 g seed weight, 20.5 length and 13.5 breadth in cm may from the guiding criteria for a good seednut.

Among the three modes of planting, the 'inverted' is distinctly undesirable whereas the 'horizontal' is superior to vertical, judged by the progress of germination and also the production of quality seedlings (Espino, 1922; Ambrose, 1951; Anon, 1951). Horizontal planting results in early decay of the shell instead of four months in vertical planting and hence the former's superiority. Again the presence of coconut milk at close proximity to embryo is another contributing factor for satisfactory development. The vertical planting suffers delayed establishment entailing risk of lodging during heavy wind (Joseph, 1963). Nuts planted horizontally give rise to better seedlings than those planted vertically. The physiological explanation is probably that nuts planted upright suffer more from drought as the nut water does not remain in close contact with the embryo (Piggott, 1964).

Other characters such as height of the seedling, number of leaves, number of leaves split, girth at collar and number of roots are also seen associated with the best method of planting (Menon and Pandalai, 1858). The advantages and disadvantages between the 'horizontal' and 'vertical' have been evaluated. Huggins (1930) who traced the acute or severe insect and fungal incidence to the vertical positioning of the nuts, with the sprout^s harbouring fungi and insects. In practice however, in many places horizontal planting is not adopted. Though slightly inferior, the vertical planting is continued probably because of the ease of planting nuts at required distance and accommodation of larger population in a nursery bed. With a precautionary drenching of Bordeaux mixture eliminating insect infestation, the vertical planting continued to be followed. The intensity of nutrition judged by the tissue content is of a higher order in the seedlings raised from 'horizontal' method of planting compared to the 'vertical' and inverted methods.

The importance of selection of seedlings in increasing crop by 10 per cent is brought out by Liyanage (1933). Early germination, rapid growth, early splitting of leaves, vigour, sturdiness and freedom from pests and diseases are associated with good yield in the adult palm (Menon and Pandalai, 1958). Some of these criteria *viz.*, plant height, number of leaves, number of leaves split, girth at collar and number of roots produced are the factors examined in assessing the vigour of seedling in these studies. Statistical evaluation of the sample seedlings revealed that a good seedling might have particular values. The chemical analysis of the tissue also lends support to the choice of seedling as shown in the earlier experiment. The initial vigour associated with horizontal planting should commend itself for adoption whenever practicable.

Summary and Conclusion: From a random sample of 200, out of a population of 1000 seednuts, frequency distribution was drawn for assessing the weight and size (length and breadth) in the choice of a good seednut. Criteria for selection of good seedling were arrived at in a similar manner in the matter of height, number of leaves, number of leaves split, girth at collar and number of roots and also the nutrient content of the foliar tissue. "Horizontal", "Vertical" and "Inverted" mode of planting seednuts were compared and judged by the established criteria. The horizontal method proved superior.

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