

- maize, sorghum and pearl millet with short duration grain legumes. *Indian J. agric. Sci.* 48: 132-137.
- GARDENER, B.R., B.I. BLAD, R.E. MAURER and D.G. WATTS, 1981. Relationship between crop temperature and the physiological and phenological development of differentially irrigated corn. *Agron. J.* 73, 743-747.
- KUNASEKARAN, V. 1978. Effect of intercrops and nitrogen on cotton under paired row system, M.Sc. (Ag). dissert. Tamil Nadu Agril. University, Coimbatore, India.
- MURALIDARAN, C. 1987. Effect of spacing time of nitrogen application and land shaping methods on rainfed cotton. M.sc. (Ag.) dissert, Tamil Nadu Agril. University, Coimbatore, India.
- PALANIAPPAN, SP 1985. Cropping systems in the tropics. Principles and Management. Wiley Eastern Limited, New Delhi. p 215.
- ROBINSON, L. 1973. Study on the feasibility of growing other crops in association with cotton MCU.5 under varying levels of nitrogen, M.Sc. (Ag). dissert., Tamil Nadu Agril. University, coimbatore, India.

Madras Agric. J. 79 (7) : 369 to 373 July 1992

<https://doi.org/10.29321/MAJ.10.A01768>

GERMINATION AND SEEDLING VIGOUR OF COCONUT CULTIVARS UNDER OPEN AND PARTIAL SHADE

A.S. Anil Kumar and S.J. Pillai

ABSTRACT

A trial was conducted to evaluate the rate of germination, vigour and recovery of quality seedlings with two cultivars of coconut, West Coast Tall and Komadan under open and partial shade in the Instructional farm attached to the College of Agriculture, Vellayani during 1986-87. Rate of germination of Komadan seednuts under open conditions was found to be significantly higher upto five months though West Coast Tall seednut registered the maximum germination percentage at eight months after sowing. More than 50 per cent of Komadan seednuts germinated within the first four months of sowing indicating its ability for early germination which revealed that Komadan cultivars of coconut possessed desirable economic characters such as precocity in flowering and higher nut production potential. Seedling characters such as height, girth at collar, number of leaves, plant spread and weight were found to be higher under open conditions irrespective of cultivars. The study also revealed that direct sunlight was essential for expressing seedling vigour. Though significant difference could not be observed between treatments with regard to recovery of quality seedlings, komadan cultivar produced the maximum number.

The seedlings in coconut nursery will vary in vigour and other growth characters. Careful selection of seedlings on the basis of certain recognised standards is necessary to ensure their

better future performance (Thampan, 1982). Early germination and vigour of seedlings are the two main factors that are considered for selection. Menon and pandala (1957) reported that early

sprouted nuts gave rise to palms that flowered in a shorter period and were more productive than those sprouted later. Liyanage (1953) revealed that the vigour of seedlings was judged by different vegetative characteristic such as girth at collar, size, spread, rapidity of growth and sturdiness of the seedlings. Rate of germination and vigour of seedlings vary with coconut cultivars and nursery sites. Hence a trial was conducted to evaluate the rate of germination, vigour and recovery of quality seedlings with two cultivars of coconut, West Coast Tall and Komadan under open and partial shade in the Instructional Farm, attached to the College of Agriculture, Vellayani during 1986-87.

MATERIALS AND METHODS

Well drained soil with adequate facilities for irrigation and drainage was selected as the site for the nursery. T₂ and T₄ treatments were laid out in the interspaces of 40 to 45 year old coconut palms. The soils of the experimental field was red loam with pH 5.1, total nitrogen 0.079 per cent, available P₂O₅ 45.43 kg/ha and available K₂O 45.00 Kg/ha. The treatment details are furnished below.

T₁ - West Coast Tall under open conditions

T₂ - West Coast Tall under partial shade

T₃ - Komadan under open conditions

T₄ - Komadan under partial shade

The seednuts were sown at a spacing of 30 x 30 mm with the onset of south

west monsoon in June 1986. 120 nuts were sown in each plot. Nuts were planted vertically with stalk end up in the beds in trenches 25 to 30 cm deep and covered with sand and soil so that top portion of the husk alone was visible. B.H.C. @ 120 kg/ha was applied to prevent termite attack.

Germination counts were recorded after third, fourth, fifth, sixth and eighth months after sowing. Seeding characteristics such as height, girth at collar, number of leaves, plant spread, number of roots and weight were recorded after 12 months of sowing. Total and quality seedlings produced were counted separately at the time of uprooting of seedlings in June 1987.

(a) Rate of Germination :

Data relating to the number of nuts germinated after three, five, six and eight months of sowing were recorded and the mean values are presented in Table - 1.

T₃ showed maximum germination percentage after third, fourth and fifth month of sowing and it was found to be significantly higher than that of all other treatments. T₂, T₁ and T₃ showed higher values than T₄ after six months of sowing and the first two treatments are found to be significantly higher than that of T₄. The treatment T₂ showed the maximum germination percent and was on par with T₁ and both the treatments differed significantly from T₄ and T₃ after eight months of sowing.

Wide range of variations observed on the rate of germination of west Coast,

Table - 1: Rate of germination of Seed Coconuts under open and partial shade.

Treatments	Rate of Germination				
	3 MAS	4 MAS	5 MAS	6 MAS	8 MAS
T ₁	16.20	41.00	76.40	95.60	108.00
T ₂	18.40	33.60	68.80	96.80	111.40
T ₃	67.80	81.20	88.00	92.40	101.20
T ₄	25.00	54.60	74.20	89.00	102.60
S.E.	6.62	2.93	2.83	1.66	1.89
CD(P=0.05)	21.01	9.03	8.71	5.12	5.85

MAS - Months After Sowing

Tall and Komadan seed coconuts under open and partial shade might be due to cultivar characteristics and microclimatic parameters resultant of variations in incident sunlight. White head (1965) reported that the speed of germination was influenced by varietal characteristics. He indicated that 'Malayan Dwarf' and 'San Blas' seednuts germinated rapidly and took only 30 to 140 days for 80 per cent germination whereas the speed of germination was very low in 'Jamaica Tall' and it took 60 to 220 days.

(b) Seedling Vigour and recovery of quality seedlings

Observations on height, girth and collar, number of leaves, plant spread, number of roots, weight and production of quality and total seedlings were recorded and the mean values are presented in Table - 2.

There was no significant difference between treatments with regard to the height of seedlings at the time of uprooting. Girth at collar and number of leaves were found to be influenced by treatment effects. T₃ which was on par with T₁ recorded the maximum collar girth and was found to be significantly different from that of T₂ and T₄. The same trend was observed for number of leaves as well. Though plant spread was not influenced by treatments T₁ recorded the highest value. T₂, T₁ and T₄ were found to be on par and differed significantly from T₃ with regard to the number of roots. All the four treatments were on par with regard to the weight of seedlings.

The vigour of seedling is indicated by different vegetative characteristics as mentioned above. Variations observed in these characters might be due to cultivar characteristics and microclimatic

Table 2 : Seedling Vigour and Seedling Production of Coconut Cultivars Under open and partial shade.

Treatments	Seedling Characteristics						Production	
	Height (cm)	Collar girth (cm)	No. of leaves	Plant spread (cm)	No. of roots	Weight (kg).	Total Seedlings	Quality Seedlings
T ₁	162.00	15.00	8.20	88.80	14.60	2.96	94.60	78.20
T ₂	145.60	13.80	7.00	75.00	17.00	2.84	103.20	77.40
T ₃	156.40	15.80	9.80	82.00	8.20	3.14	83.40	81.20
T ₄	133.80	13.40	7.00	71.40	14.00	2.80	90.00	80.80
S.E.	7.61	0.57	0.61	4.65	1.12	0.12	3.79	3.48
CD(P=0.05)	-	1.75	1.87	-	3.45	-	11.70	-

factors resultant of variations in incident sunlight. Seednuts sown under open conditions showed higher values and height, girth at collar, number of leaves, plant spread and weight of the seedling when compared to those sown under partial shade indicating that direct sunlight was essential for expressing seedling vigour.

Though significant difference was observed between treatments with regard to the production of total seedlings, quality seedling production was not significantly influenced by treatments. T₂ registered the maximum value and it was found to be on par with T₁ and differed significantly from T₄ and T₃ with regard to total seedling production. However, T₃ produced the maximum number of quality seedlings followed by T₄.

The treatment T₂, produced the maximum number of total seedlings because it registered the maximum germination percentage (Table - 1). Though the total germination percentage of T₃ and T₄ were found to be lower than T₂ and T₁, T₃ produced maximum

number of quality seedlings which possessed desirable characters for rigorous selection. It is seen from Table - 1 that the speed of germination of Komadan seednuts in T₃ was very high during the early stages. Girth at collar, number of leaves and weight of seedlings were also found to be higher in T₃. Early germinated nuts might have grown faster and produced the desired characters for rigorous selection of good quality seedlings. Similar results were reported by Patel (1938). He revealed that early germinated nuts grew faster and a negative correlation had been obtained between the number of leaves produced and the time taken for germination. More than 50 per cent of Komadan seednut germinated within the first four months of sowing. Menon and Pandala (1957) revealed that early germinated seedlings flowered earlier and were more productive than those sprouted later which clearly indicated that Komadan cultivars of coconut possessed desirable economic characters such as precocity in flowering and higher nut production potential.

REFERENCES

- LIYANAGE, D.V. 1953. Selection of Coconut Seednuts and seedlings. *Cay. Coco. Quart.* 4, 127-9.
- MENON, K.P.V. and PANDALA K.M. 1957. *The Coconut Palm. A Monograph.* Indian Central Coconut Committee, Ernakulam 134-135.
- PATEL, J.S. 1938. *The Coconut - A Monograph.* Government Press, Madras.
- THAMPAN P.K. 1982. *Hand Book on Coconut Palm.* Oxford and IBH Publishing Co. 66 Janpath, New Delhi - 76.
- WHITEHEAD, R.A. 1965. Speed of germination. A characteristic of possible Taxonomic significance in *Cocos nucifera* Linn. *Trop. Agriculture.* Trin. 42: 369-72.