

Weird Seedlings in Coconut Nursery

M. Shareefa and Regi Jacob Thomas

ICAR - CPCRI, Regional Station, Kayamkulam, Alappuzha

Coconut palm (*Cocos nucifera* L.) is one of the valuable gifts of nature to mankind. It is considered as the tree of life and is eulogised as Kalpa Vriksha, the all giving tree or the 'Tree of Heaven'. Coconut is unique among all horticultural crops as a source of food, drink, shelter, fibre, medicine and a variety of raw materials for industrial exploitation. The crop assumes considerable significance in the national economy on account of its contribution to the rural economy and employment generation. The coconut palm grows even in marginal coastal conditions, tolerating drought and poor soils. It is very resilient to typhoons and flooding and several small coral islets often continue to exist mainly because of the palms' fibrous root systems which prevent coastal erosion.

Success with regard to establishment of coconut plantation starts with production of good quality planting materials. In big nurseries and seed gardens where large number of seednuts of different varieties are sown, rarely few abnormalities in the seedlings are being reported. This article describes some of weird or unusual coconut seedlings observed in the coconut nursery.

Polyembryony

Usually a seednut of coconut on germination gives rise to one shoot. But rarely more than one shoot is seen emerging through a single eye. This phenomenon of producing more than one seedling from a single nut is known as Polyembryony, ie. development of two or more embryos from a

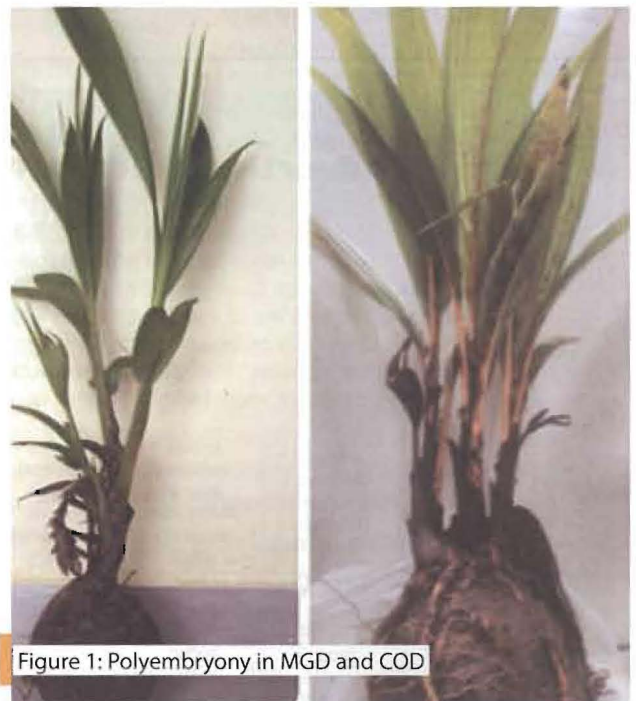


Figure 1: Polyembryony in MGD and COD

single fertilized egg. The ovary of coconut is three carpellary and corresponding to the three carpels of the ovary, there are three markings, known as eye on the endocarp. Of which two usually become abortive at an early stage of development and only one attains maturity and remain comparatively soft. The viable embryo is located beneath the soft eye. In polyembryonic seedlings, two or more



Figure 2: Albino seedlings in CGD

shoots develop from a single soft eye and grow as distinct shoots. These shoots squeeze their way out through the single soft eye, all the while maintaining themselves as separate individuals. The multiple embryos were found clustered together under the 'soft eye' of the nut but they do not share any tissue. There is variation in the growth and vigour of these seedlings. The number of shoots developed in these cases may be two, three or four.

A case of polyembryony noticed in Malayan Green Dwarf and Chowghat Orange Dwarf is shown in figure 1. In Malayan Green Dwarf, four shoots emerged from a single seednut whereas in COD, three shoots were observed. The frequency of occurrence of polyembryony was less than 0.01% in dwarf seedling and this phenomenon has not yet been observed in seedlings of West Coast Tall (WCT). However, occurrence of twin seedlings i.e., two shoots from a single nut was observed both in tall and dwarfs seedlings and this was more frequently noticed in seedlings of dwarf varieties.

Albino seedling

Occurrence of albino seedling is frequently noticed mostly in Chowghat Green Dwarf seedlings (Figure 2). In albino seedlings, the colour of leaves was white or yellowish white instead of dark green and devoid of chlorophyll. These seedlings do not respond to manurial treatments and generally dies after producing 4 to 6 leaves. The frequency of albino seedlings was 0.05 %. Patel (1938) opined that albinism is due to genetic factors, while Furtado (1926-29) believed that this occurred as a result of chlorosis due to absence of ferruginous substances in the endosperm of coconut. Pandalai and Pillai (1959) reported that albinism is the result of inadequate availability of iron and probably due to

the inability of the plant to utilize the iron already present in the leaves. The requisite mobilization of iron appears to be a factor controlled by recessive genes, since albinism is an inherited character. In our observation, the frequency of albino seedlings were more in dwarf seedlings compared to seedlings of tall varieties.

Chimera



Figure 3: Chimera in WCT

Chimera is a plant or plant part that is a mixture of two or more genetically different types of cells. Usually in albino seedlings the entire leaf exhibits white or yellowish-white colouration, whereas in chimera a portion of leaf alone was observed to be albino and remaining portion was green in colour. This is due to somatic or bud mutation and has been reported from India and Sri Lanka (Satyabalan, 1997). A case of chimera noticed in WCT seedling is shown in figure 3.

Midget

Rarely certain coconut palms flowered at the early infant stage referred as 'midget' palms. Davis (1955)



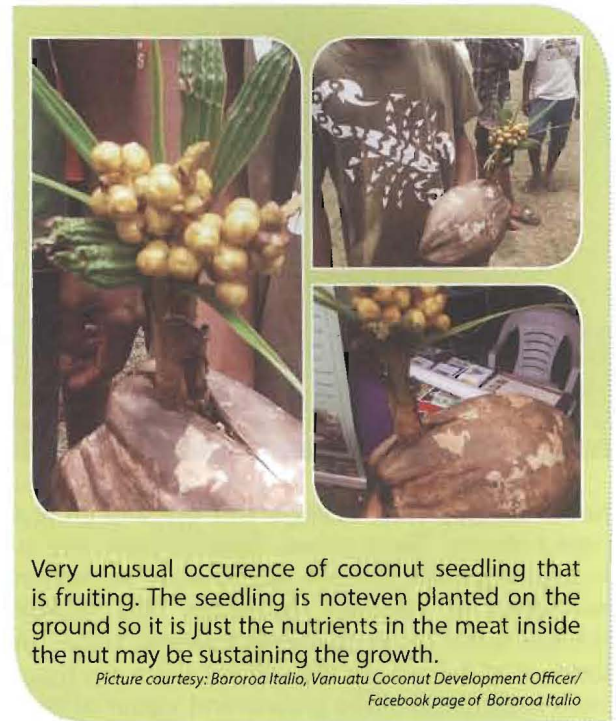
Fig 4: Midget palm in CGD

first reported the curious phenomenon of coconut seedlings producing inflorescences within 12 months of sowing and referred to them as 'midget palms'. The inflorescence bearing is terminal and they die soon after producing the first inflorescence. The inflorescence was conspicuous for the absence of the spathe. They bear only female flowers and these ranged upto thirty five in an inflorescence. These seedlings are normal in their habit with adventitious root system. Breathing pores are present on the main roots and in some rootlets. Generally in midgets, the number of main roots (only 7) is less than the normal seedlings (about 10). The inflorescence appeared at the terminal portion of the short regular stem. Presence of unsplit leaflets in midget palm is a remarkable feature and the leaves have narrow stipular sheaths. Decrease in the size of subsequent leaves was noticed and the last two leaves appeared at the base of the inflorescence resembles bracts which enclose the young spadix. This decreasing size of leaves and terminal inflorescence are rare occurrence among coconut palms which usually bear axillary inflorescence. However, this is generally observed in some members of monocot family where the terminal bud transforms into an inflorescence or flower.

In midget palm, the inflorescence is a simple spadix without a regular spathe but the two bracts found just below this terminal inflorescence serves the function of spathes. Midget palm dies or withers

Reference

- Davis, T A. (1955). Meet the smallest member of the family. *Cocon Bull.* 8:244-246
- Furtado, C. X (1926-1929). Teratological notes. *Abnormalities in coconut palms.* *Gdns.' Bull. Singapore,* 4:78-84
- Morris, D. 1892. On the phenomenon concerned in the production of forked and branched palms. *J. Linn. Soc. Bot.* 25: 281-98
- Pandalai, K M and Pillai, R V. (1959) Albinism in coconut seedlings. *Nature* 184:1163
- Patel, J. S. (1938). *The coconut: a monograph.* Government Press, Madras, p 311
- Satyabalan, K (1997). *Coconut varieties and cultivars-their classification.* Asian pacific Coconut Community, Jakarta, p 105



Very unusual occurrence of coconut seedling that is fruiting. The seedling is not even planted on the ground so it is just the nutrients in the meat inside the nut may be sustaining the growth.

Picture courtesy: Bororoa Itallo, Vanuatu Coconut Development Officer/
Facebook page of Bororoa Itallo

after flowering and this palm is monocarpic instead of polycarpic coconut palms (Morris, 1892). Hence, this phenomenon of early flowering in seedling stage has no significant utility to the farmers since the palm dies before producing any nut. Immature flowering noticed in midget palm may be due to some photoperiodic induction which occurred in the unsplit immature leaves of the seedling as these leaves are highly sensitive and capable of initiating flowering through photoperiodic response.

The variants observed in coconut seedlings could be either genetic or physiological in nature. Most of the abnormalities are due to mutations or expression of lethal genes. A recessive gene is only expressed when an organism has two recessive alleles for that gene. Expression of recessive lethal genes is more noticed in autogamous types which promotes homozygosity. Hence, these weirdness or unusual seedlings are frequently observed in dwarf varieties due to their homozygous nature. Although these unusual traits may not have practical relevance, such occurrence stimulates curiosity to everyone. ■