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Floral Abnormalities in Jack

By

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The Jack tree *(Artocarpus integrifolia, L.)* is monoecious, bearing spikes of male and female flowers. The spikes are enclosed in stipules when young. Numerous male spikes are produced and within three weeks of its emergence from the stipule the male spike drops off, while the female develops into the so-called jack fruit. The latter as is well known, is a large multiple fruit with a spinescent appearance. Each spine represents the hardened apex of a perianth. These apices fuse together and form the spiny rind of the fruit. The female inflorescence has a number of fertile flowers and numerous sterile ones surrounding the fertile ones. The stigmas appear at the end of each spine. In a fertile flower the perianth enlarges, becoming succulent and enclosing a pericarp with a single seed. The unfertilised ones thicken out into flat ribbons and are often edible. An aborted seed and pericarp are found in these. The steriles develop into the whitish flakes filling up the intervening space. The colour of the edible flakes varies from pale yellow to reddish orange. At the Agricultural Research Station, Pattambi, a study is being conducted on this fruit plant, maintaining a collection of about 160 trees. The number of female spikes in a tree may vary from 3 to 40 per cent of all the spikes produced and they take 90 to 110 days to mature. A few abnormalities noted during the study are reported below.

1. **Spikes heterogamous:** The peduncle is thick as in the female spike. A portion of the spike towards the base bears female flowers and the rest towards the apex are male. Three such spikes were noted and all of them dropped off the tree within three weeks of their emergence. In rare cases they have grown larger, the female part developing the characteristic spines while the male portion of the spike is arrested in further growth (Figs. 1 and 2.)

2. **Malformed female spikes:** In a normally developed fruit the steriles form the highest percentage followed by the abortives while the edibles are below 25 per cent of all the flowers produced. The typical configuration of the jack fruit is more or less oval. The normal development of the fruit depends to a large extent on the proportion of male and female spikes in a tree, the extent of their fertility and environmental factors. Very often distortions in the development of the fruit, cracking of the rind of the mature fruit and fruits without any edible flakes are observed. What proved to be a rare abnormality is shown in figs. 3 and 4. Three such fruits were noted in one particular tree out of the entire

population of 160 trees. The fruits appear warty and tubercled, presenting a very ungainly appearance. This condition was found to be due to a partial arrest in the formation of the rind resulting in the exposure of the flakes and perianth. The inflorescence was found to produce numerous sterile flowers (87·9%) a smaller number of abortives (11·0%) and very few fertile flowers (1·1%). Compared to the normal ones the flowers are rather poorly developed. On fertilization the few fertile flowers enlarge fast while the abortives and sterile flowers hardly grow. Owing to the poor development of the rind the perianth is visible. A few of the sterile flakes enclosing the fertile perianth grow along with it. This causes the warty growth of the fruit. The seeds from this fruit are well-formed and viviparous as in the normal.

Paucity of male spikes often results in the production of distorted fruits but the rind will be normal. The very low percentage of fertilized flowers could not have been due to this cause since a large number of male spikes were formed. It may also be caused by partial sterility of flowers in either male or female or both spikes. Absence of the pollinating agent may result in improper development of the female flowers. Further investigations as to (1) whether the arrest of the rind formation is found in pre-fertilization stages or whether it is only a post-fertilization effect (2) whether there is partial sterility in this tree and (3) whether it is due to paucity of pollen, are being carried out at this station.

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EXPLANATION OF FIGURES.

Fig. 1. A heterogamous spike with female portion at the base and male towards the apex.

Fig. 2. A heterogamous spike as in 1. but with considerable development of the female flowers.

Fig. 3. An abnormal fruit showing incomplete formation of rind resulting in warty appearance and exposure of flakes and perianth.

Fig. 4. An enlarged view of the specimen in fig. 3.