Vivipary like phenomenon in rubber

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Introduction

In India, rubber tree (*Hevea brasiliensis*) flowers during January - March along with new flushes coming out after defoliation, and the fruits mature from July onwards for about three months. Seed production and availability depends mainly on clone and climate. Irrespective of the clone, rubber seed availability in India is confined predominantly to one season i.e., after monsoon, while two seed falling seasons are available in countries like Malaysia where rainfall is more or less distributed throughout the year. Freshly collected seeds are commercially important both for raising seedlings for budding or as a valuable industrial raw material which yields rubber seed oil (RSO), seed cake

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Fig 1 – Plumule and roots coiled around the seed

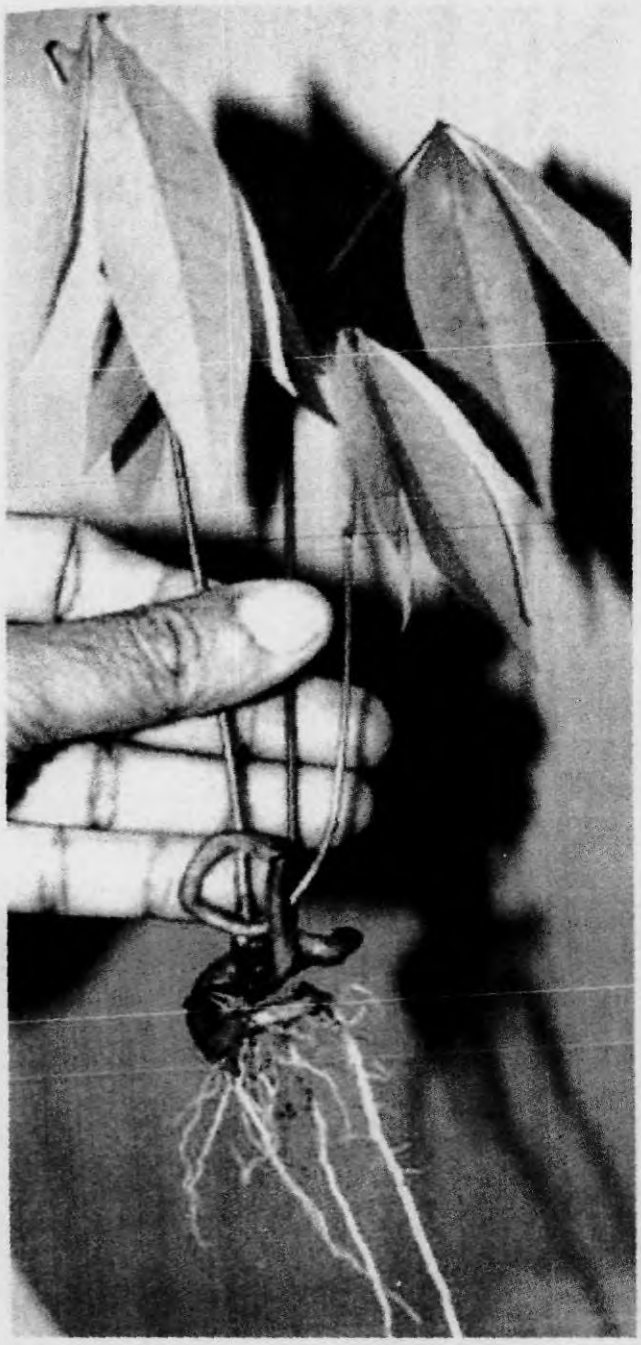

Fig 2 – Weak seedling developed from viviparous seeds

etc. (Thomas *et al.*,1996) Every year in India, rubber cultivation is being carried out on an average of 5000 ha. of land and for which large quantity of viable seeds are needed for raising the planting materials.

Major chunk of good quality seeds required for rubber nurseries in Kerala is routed from Marthandam, Kaliyil and Kulasekharam regions of Kanyakumari District in Tamilnadu. The factors congenial for centralizing the market for rubber seed in this locality are the distributed rain fall, better seed set due to less incidence of diseases, labours available for seed picking, availability of seeds of different clones from large estates etc. (Mercykutty *et al.*, 1996).

Fruit of rubber is dry- dehiscent and trilocular with one seed in each locule. The pericarp (fruit wall) is thick and hard which breaks open at maturity with a cracking sound and throw away the seeds violently to long distantances. One or two sunny days intermittent to the monsoon is enough to break the ripened fruits.

As the seeds are recalcitrant in nature, the seeds have to be collected soon after it falls on the ground, so that they can be put in the germination bed before loosing viability, and getting better germination success (Thomas *et al.*, 1998).

The monsoon of 2013 received in Kerala was heavy and most importantly continuous, extending from mid of May to the last of August. The rainfall data showed that during the month of June and July there were only three days without rain (Table 1). Even on those days the weather was overcast and cloudy. Due to the lack of one or two consecutive sunny days during monsoon, the ripened rubber fruits failed to dehisce and the intact seeds started to

Fig 3 – vivipary in yellow pod stage

germinate while the fruits were attached to the mother tree. Many such unopened fruits bearing germinated seeds could be collect from the Central Experiment Station of RRII at Chethackal, near Ranny, Pathanamthitta.. Both plumule and roots that came out were coiled around the seed (Fig.1) contrary to their phototropical and geotropical successions respectively.

Germination of seeds when it is attached to the mother plant is termed 'vivipary' which is common in mangrove plants, where only the germinated seeds can survive in its habitat with marshy land, is an ecological adaptation mechanism of the plant. In rubber the viviparylike situation arose due to the continuous heavy downpour during the seed fall season and hence it is not an adaptive mechanism, and do not hold any ecological significance.

The 'viviparous' seeds of rubber were kept in the germination bed to observe its further growth. Most of these seeds developed 2-3 weak shoots and remained unhealthy (Fig 2) compared to the seedlings developed from normal seeds.

The seedlings developed from these seeds are weak and unsuitable for propagation by budding. Continuous rainfall during the seed maturation makes hindrance for fruit dehiscence, and can produce viviparous seeds without any commercial importance.

Vivipary of *Hevea* was also noticed in the yellow pod stage itself (Fig 3) in dry subhumid climate conditions also, where wintering, refoliation, flowering and fruit development is delayed compared to traditional rubber areas

Table 13 - Total monthly rain fall and number of rainy days during the monsoon in 2013

Month	Rainfall (mm)	Rainy days
June (2013)	962.4	27
July	673.2	28
August	443.2	21

References

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