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**Observations on the Effect of Some Insects on
Germination of Teak Seeds**

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Abstract

Of the teak fruit sampled in various localities, 10-30 percent were found to be totally destroyed by fruit borers and 4-73 percent possibly rendered unviable due to attack by an unidentified sap sucking insect. Investigations showed that germination could be as low as 52-6.6 percent in fruits attacked by the sap sucking insect.

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1. Introduction

Fruit production and germination of teak (*Tectona grandis*) has generally been known to be extremely poor (Gartner, 1956; Maung Gale (2), 1958, Kermode, 1964, White and Cameron, 1965; Bryndum 1966). In Burma, low fruit production coupled with poor germination rates in teak seed have long plagued plantation developers, and 5 to 9 teak fruits have been the common quantities used to assure development of a single tree in all plantations where direct sowing method is used.

An immense amount of literature has been published on possible relationships of fruit production and seed viability to many and various factors. Fruit production has been considered to have relationships with the age of seed bearing trees (Gartner 1956, Kermode 1964, White and Cameron 1965, Cameron 1968) and locality (Kadambi 1972, Gyi 1972); seed viability has been linked to provenance (Anon, 1956; Kermode, 1957; Wijesinghe, 1963; Maung Gale (2) and Nyunt Naing, 1967; Gyi, 1972; Kadambi, 1972), seed pretreatment (Blanford 1921; Bryndum, 1966; Gyi, 1972; Letourneux, 1957; Wijesinghe, 1963; Anon, 1956; Thein Pe, 1968; Hedegart, 1957), seed size 1* 2* 3* Gartner, 1956, combinations of seed coat formation, conditions in the embryo and structural immaturity (Joshi and Kelker, 1971), time of seed collection (Gartner, 1965; Kermode, 1964), and storage or ageing 4* (Troup, 1921; Anon, 1956).

In 1971, Joshi and Kelker using a method devised by Flemion and Poole (1948) tested the viability of a sample of well-developed teak seeds from a single source in India, and reported that 20 percent of the sample were positive, 40 percent gave feeble reaction and the remaining 40 percent did not show any response at all to the test. The test involved use of 2,3,5 - Triphenyl Tetrazolium Chloride which is colourless in its oxidised form, but turns intense red or orange when reduced as by viable embryos. The test led the authors to assume that the physiological condition of the embryos alone was responsible for 80 percent reduction in germination of the sample of teak seeds.

During investigations on the possible relationship between teak fruit borers and teak seed viability, a large number of an unidentified Hymenopterous insect, was found sucking the sap of the succulent teak fruits during their early developmental stages; fungal growth was also observed on fruits where these insects occurred. This suggested a possible effect on the physiological functions of normal fruit formation (Zeya, 1982). Therefore, in view of the economic importance of teak and the need for production of large quantities of seeds with high germination rates and desirable genetic characters for the development of extensive plantations of this valuable tree species, the present study has been made to investigate the possible relationship between insects and seed viability.

This paper is a report on insects damaging teak seeds, and the investigation is a part of the research objective to identify and evaluate control alternatives for insects damaging economically important forest tree species.

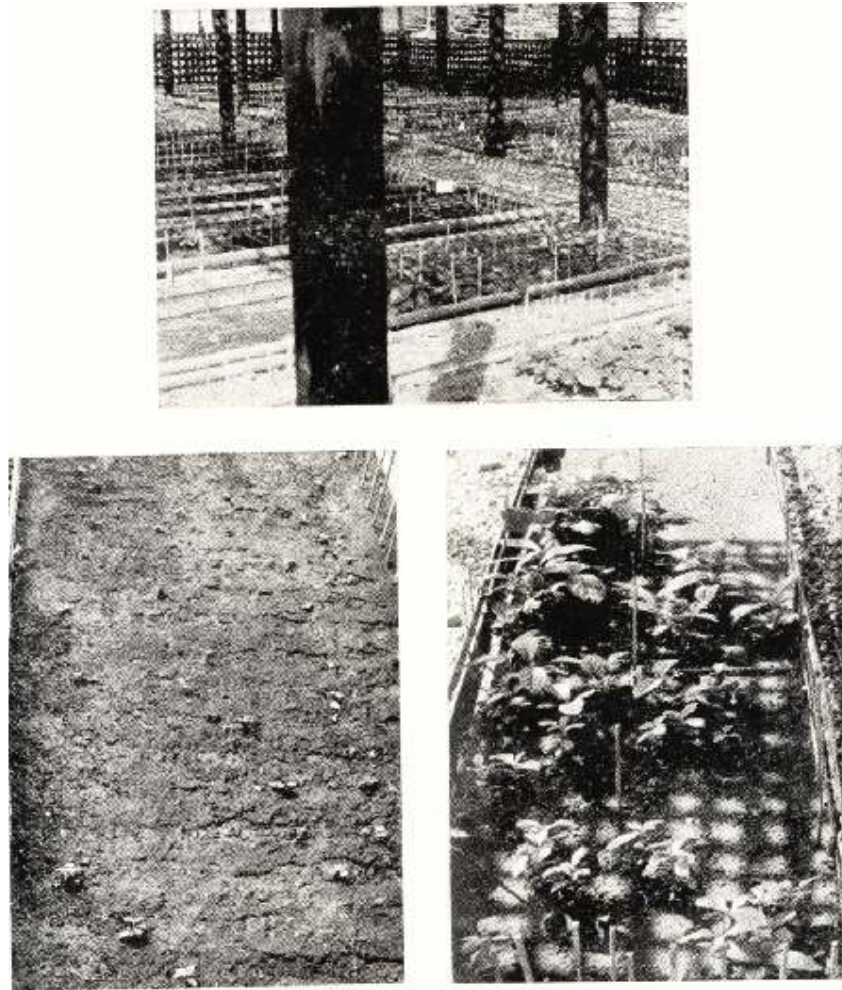
1* Silvicult. Res. Rept., Madras, 1939-40.

2* Burma Forest Bulletin, 24, 1931.

3* Silvicult. Res. Rept., Uttar Pradesh, 1929-30.

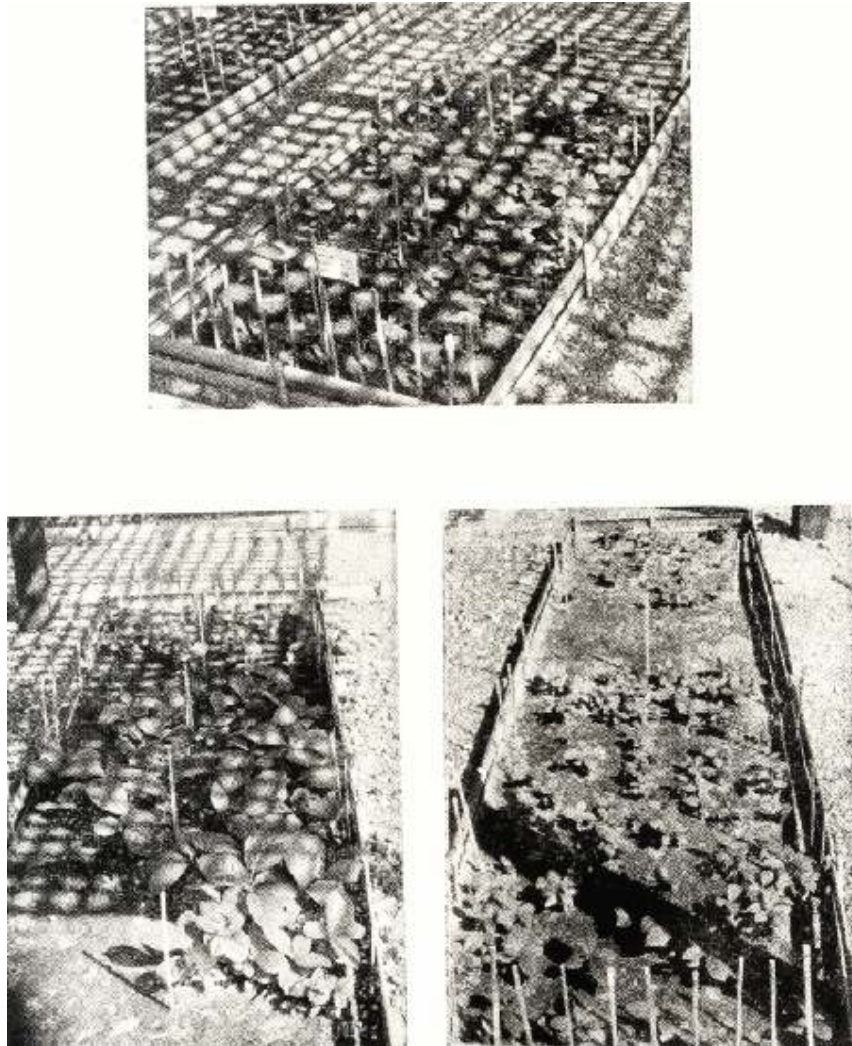
4* Indian Forester, 1907, p.409.

PLATE I



Figs 1-3 Anti-clockwise from top
(1) Seed beds and nursery where germination tests were made.
(2) Germinating seeds.
(3) Seedlings 45 days after sowing.

PLATE II



Figs. 4-6. Seedlings of various ages in test seed beds

2. Materials and Methods

All teak fruits used for germination tests were collected from Thandaung, Sein Ye, forests around Pyinmana Golf Course, Agriculture college and Agriculture Research Institute complex grounds and Pyinza. Thandaung is situated at about latitude 19°01' E and longitude 96°35' N, Sein Ye at about latitude 18°52' E and longitude 96°12' N, Pyinmana Golf course, Agriculture college and Agriculture Research Institute around latitude 96°16' E and longitude 19° 51' N and Pyinza at about latitude 46°24' E and longitude 21°54' N. Fruits from five flower heads each from six randomly selected teak trees in each locality were sampled. The flower heads were removed intact from observation trees for sampling. The samples were tested for germination on 2' x 10' forest top-soil beds under half-shade which were watered twice daily. Three replicates of 100 fruits each of insect damaged fruits were tested for each location. Three replicates of 100 fruits each of fruits with no apparent damage from each location were used as control (p1. I, II). The tests began in October, 1982 and ended in December of the same year.

3. Results and Discussions

Table 1. Comparison of percent germination of teak fruits on which fungal growth was observed and teak fruits with no apparent damage from various locations

Location	% average germination of fruits with fungal growth on surface	% average germination of fruits with no apparent damage	significance at 1% level
Thandaung	42.2	82	7.49
Sein Ye	52.0	74	3.19
Agri. College	19.56	69	3.50
Agri Res. Inst.	6.67	56	0.82
Pyinmana Golf Course	19.0	73	8.00
Pyinsa	8.0	56.33	10.80

The results appear to indicate that there is a reduction in germination in fruits on which fungal growth was observed. In the case of fruits collected from Agriculture Research Institute, the significance level is low for reasons of smallness of sample size.

Although viability tests were conducted using 2,3,5 – Triphenyl Tetrazolium Chloride (Flemion and Poole, 1948), the results cannot be presented due to technical errors in the conduct of the tests.

However, more elaborate experiments will have to be carried out before stronger conclusions can be drawn and precise advice given to seed producers, collectors and plantations developers for best results in germination of teak seeds.

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