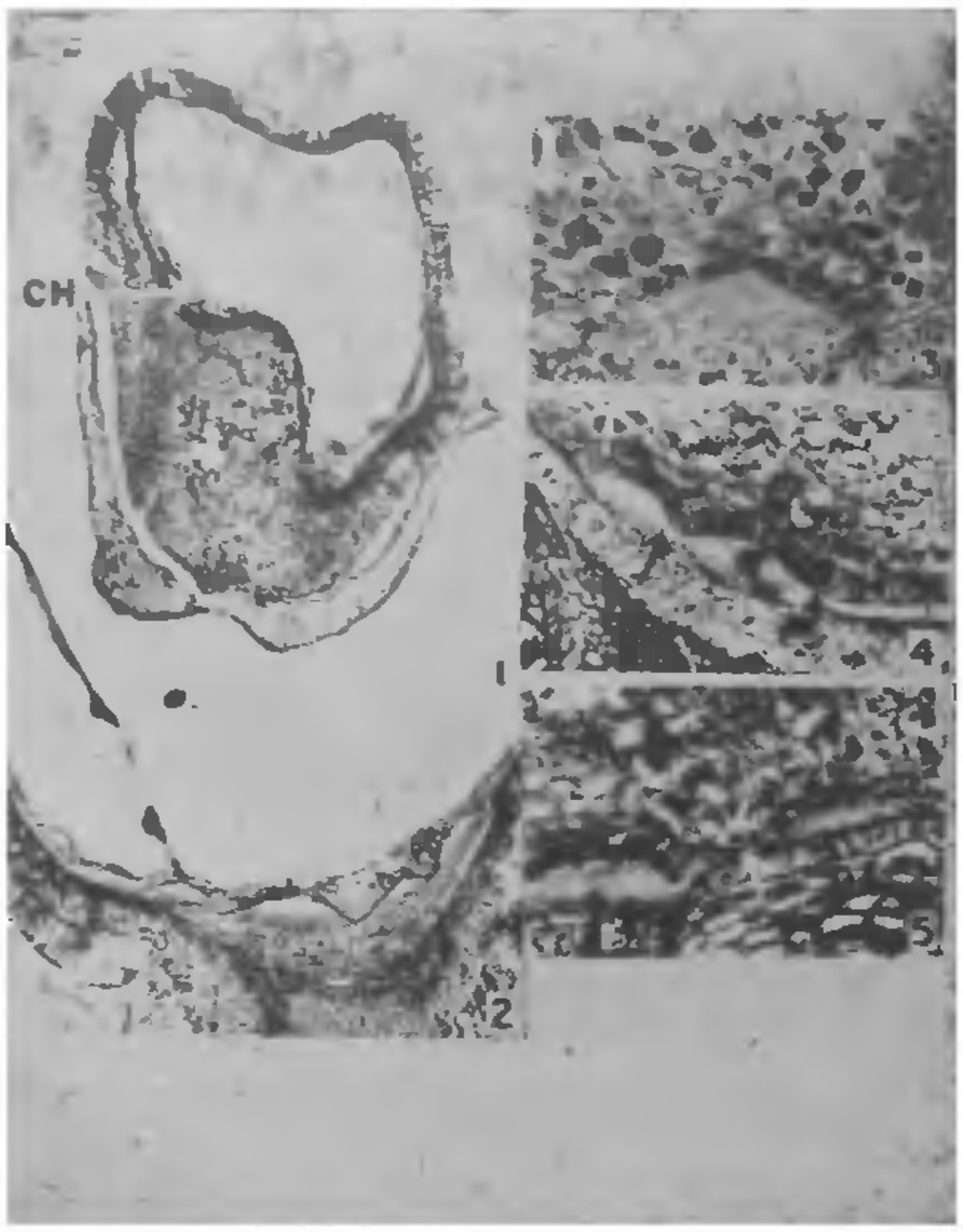

FIGS. 1-5. *Dillenia suffruticosa* (Griff.) Martelli. Fig. 1. Longisection of a seed with nuclear endosperm × 20. CH–Chalaza. Fig. 2. as above; chalazal part enlarged to show initiation of rumination at Nuclear endosperm stage × 30. Fig. 3. Chalazal part of the seed with cellular endosperm exhibiting rumination (arrow) × 95. Fig. 4. as above; cells at irregular loci (arrow) becoming meristematic × 95. Fig. 5. as above; Meristematic cells after division and pushing into the nucellar tissue (arrow) × 95.

of the mature endosperm. Interestingly enough in *Dillenia suffruticosa*, the rumination is due to the behaviour of the endosperm originating at an early stage of its development from the chalazal region of the embryo sac. The configuration of the seed coat remains unaffected by the activity of the endosperm.

One of the authors (J.D) is thankful to the UGC, New Delhi, for the financial assistance (FIP) and to the Management, St. Mary's College, Tuticorin, for deputing to undergo higher studies.

May 21, 1981.

1. Hegelmaier, F., *Bot. Ztg.*, 1886, **44**, 585.
2. Voigt, A., *Ann. Jard. bot. Buitenz.*, 1888. **7**, 150.
3. Periasamy, K., *Plant Embryology, Symposium*, CSIR, New Delhi, 1962, 62.
4. Johri, B. M. and Singh, H., *Bot. Notiser*, 1959, **112**, 227.
5. Mohanram, H. Y. and Pushpa Masand., *Phytomorphology*, 1963, **13**, 82.
6. Phatak, V. G. and K. B. Ambegaokar., *J. Indian bot. Soc.*, 1961, **40**, 525.
7. Fagerlind, F., *Acta Hort. berg.*, 1937, **11**, 195.

INTERACTIONS BETWEEN SOIL FUSARIA AND THERMOPHILIC FUNGI

KIRAN JOHRI

Microbiology Division, School of Biological Sciences Bhopal University, Bhopal 462 026, India

THE concept of biological control has come to forefront again due to recalcitrant nature of the pesticides and their possible biomagnification in the ecosystem[1–3]. The reasons for attempting this study were: (i) at least some thermophiles, *viz.*, *Malbranchea pulchella* var. *sulfurea* produce an extra-cellular antibiotic, (ii) the colonising capacity of the thermophiles is generally good, and (iii) the minima for spore germination and mycelial growth of thermophiles[4] falls below the optima for most species of *Fusarium*.

Five species of *Fusarium* were recovered from cultivated soil (wheat-linseed cropping in the previous two years) using PCNB medium and were maintained on PDA[5]. Thermophilic fungi were isolated and maintained on YpSs medium[6]. Conidial germination of *Fusarium* was tested using a cellophane agar disc[7] and direct cellophane techniques[8]. Ten and 15-day old culture filtrates, staled agar circles[9] or soil culture of thermophiles were used for germination tests. Since starch served as the carbon source, levels of reducing sugar in the liquid medium were tested by dinitrosalicylic acid reagent.

Eleven thermophilic strains were used which included, *Absidia* sp., *Aspergillus* sp., *Chaetomium thermophile*, *Humicola grisea*, *H. lanuginosa*, *Malbranchea pulchella* var. *sulfurea*, *Papulaspora thermophila*, *Penicillium* sp., *Sporotrichum. thermophile*, and *Thermoascus aurantiacus* (conidial and cleistothecial isolates). Among these, only thermotolerant *Aspergillus* and *Penicillium* were able to inhibit conidial germination of *Fusarium culmorum*, *F. dimerum*, *F. nivale*, *F. oxysporum*, and *F. solani* (20 to 50%). The fungistatic influence of these two general differed in extent depending upon the technique employed; conidia of *F. nivale* and *F. oxysporum* were more sensitive to *Penicillium* sp. while species of *Aspergillus* was more effective against *F. dimerum*. A considerable stimulation of germ tube length (40–100 μm over 10–40 μm in control) was noted when filtrates from thermophilic *Absidia*, *Malbranchea*, *Papulaspora*, and *Sporotrichum* were used; part of this stimulation was at least attributable to residual glucose released from

degradation of starch in YpSs broth. Based on other observations (Satyanarayana and Johri, *Curr. Sci.*, in press), the role of volatile substances can also not be ruled out. While inhibition by thermophilic mycoflora in arable soil would appear to be of little consequence, an interesting possibility does, however, exist; it is the stimulation of conidial germination of fusaria by the degradation products of thermophiles which in the absence of a suitable host will result in lysis and concomitant death of the pathogen. Such a possibility has recently been exploited in biological control of *Gauemannomyces*[10] and *Rhizoctonia*[11].

The author is thankful to the CSIR, New Delhi, for the award of a Post-Doctoral Fellowship and to Prof. S. B. Saksena, F.N.A., for helpful suggestions.

May 30, 1981.

1. Zakaria, M. A. and Lockwood, J. L., *Phytopath.*, 1980, 70, 240.
2. —, — and Filonow, A. B., *Ibid.*, 1980, 70, 495.
3. Papavizas, G. C. and Lumsden, R. W., *Ann. Rev. Phytopath.*, 1980, 18, 389.
4. Satyanarayana, T., *Ph.D. Thesis*, University of Saugar, 1979.
5. Booth, C., The Genus *Fusarium*, C.M.I. Publ., Kew, Surrey, 1971, pp. 237.
6. Johri, B. N. and Thakre, R. P., *Proc. Indian Nat. Sci. Acad.*, 1975, 41B, 564.
7. Johri, Kiran, Saksena, S. B. and Johri, B. N., *Curr. Sci.*, 1975, 44, 605.
8. —, —, — and —, *Proc. Indian Nat. Sci., Acad.*, 1975, 41B, 148.
9. —, —, — and —, *Plant and Soil.*, 1975, 43, 347.
10. Deacon, J. W., *Soil Biol. Biochem.*, 1976, 8, 275.
11. Halder, Y., Chet, I. and Henis, Y., *Phytopath.*, 1979, 69, 64.

FIRST RECORD OF LEAF GALLS ON *LITSEA STOCKSII* (MEISSN.) HOOK. F. (LAURACEAE) CAUSED BY A PSYLLID

C. KANDASAMY
Division of Entomology
UPASI Tea Research Institute
Cinchona 642 106, Coimbatore District, India
AND
B. HARI KRISHNAN
Division of Botany
UPASI Tea Research Institute
Cinchona 642 106, Coimbatore District, India

OUT of the 43 species of *Litsea* Lam. (Lauraceae) recorded from Indian subcontinent, occurrence of galls is reported only on 4 species, *viz.*, *L. glabrata* Hook. f., *L. ligustrina* Hook. f., *L. polyantha* Juss., and *L. wightiana* Hook. f.[1]. Gall formations in these species are restricted to leaves, induced mostly by mites and insects. *Eriophyes* spp. (Acarina) cause leaf galls on these plants except on *L. polyantha* in which the galls are induced by an insect *Pauropsylla beesoni* Laing (Homoptera : Psyllidae).

The leaf galls reported here were collected from the Annamallai Hills at an elevation of 1380 m. The host plant was identified as *Litsea stocksii* Hook. f., by the Botanical Survey of India, Coimbatore. The identity of the gall maker was confirmed as *Pauropsylla beesoni*[2], after comparing it with the paratype of the same deposited at the Forest Research Institute, Dehra Dun. The occurrence of these leaf galls on (Fig. 1) *L. stocksii* induced by *P. beesoni* is a new record to cecidology.

The hypophyllous, simple, pouch galls occur along the lateral veins of the laminar region of the leaf. Interestingly, the galls occurring on the mid veins agglomerate, resulting in the crinkling of the leaves. The galls were confined to the veins, unlike in most of the other pouch galls of psyllids, where the galls occur throughout the laminar surface. The number of

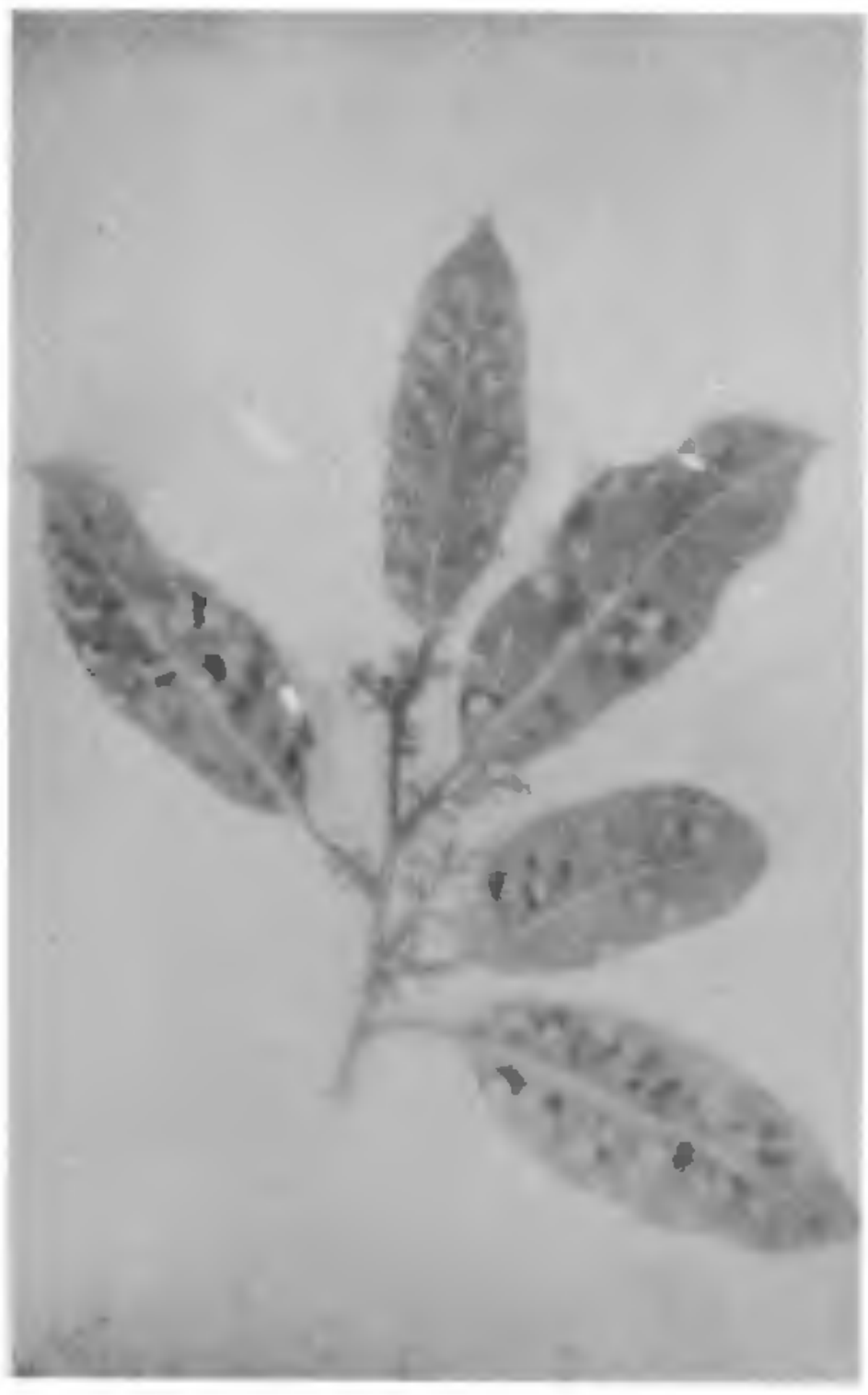

FIG. 1. Leaf galls of *Litsea stocksii* by *Pauropsylla beesoni*.