Discussion

Generally, the sugar levels in the healthy and inoculated plants are correlated with resistance (Horsfall land Dimond[5]). In the present study, the levels of both reducing and non-reducing sugars increased in both Kannagi and Bhavani due to increased N application. The quantity of reducing and non-reducing sugars was higher in Kannagi than in Bhavani. High amounts of reducing and non-reducing sugars have been recorded in many plants susceptible to several pathogens (Otani[11], Ohata *et al.*[10]; Jayapal and Mahadevan[7]). Inoculation with the pathogen showed a reduction in reducing and non-reducing sugar levels in both Kannagi and Bhavani. Ranga Reddy and Sridhar[13] reported a same trend in rice plants infected with *Xanthomonas oryzae*.

The presence of more sugars in the tissue tends to increase susceptibility to invading pathogens as they serve sources of energy to the pathogen. So *A. oryzae* may be considered to be a "high sugar" disease. In several host parasite interactions, the levels of tissue sugars decrease following infection (Asada[1], Dayal and Joshi[4]). The reduction of sugars in the infected sheaths might be due to the utilization of these compounds by the pathogen and to the decreased synthetic ability of the severely infected leaves (Ranga Reddy and Sridhar[13]).

Department of Plant Pathology,
Tamil Nadu Agricultural
University,
Madurai 625 104,
June 2, 1977.

R. MOHAN.
C. L. SUBRAMANIAN.

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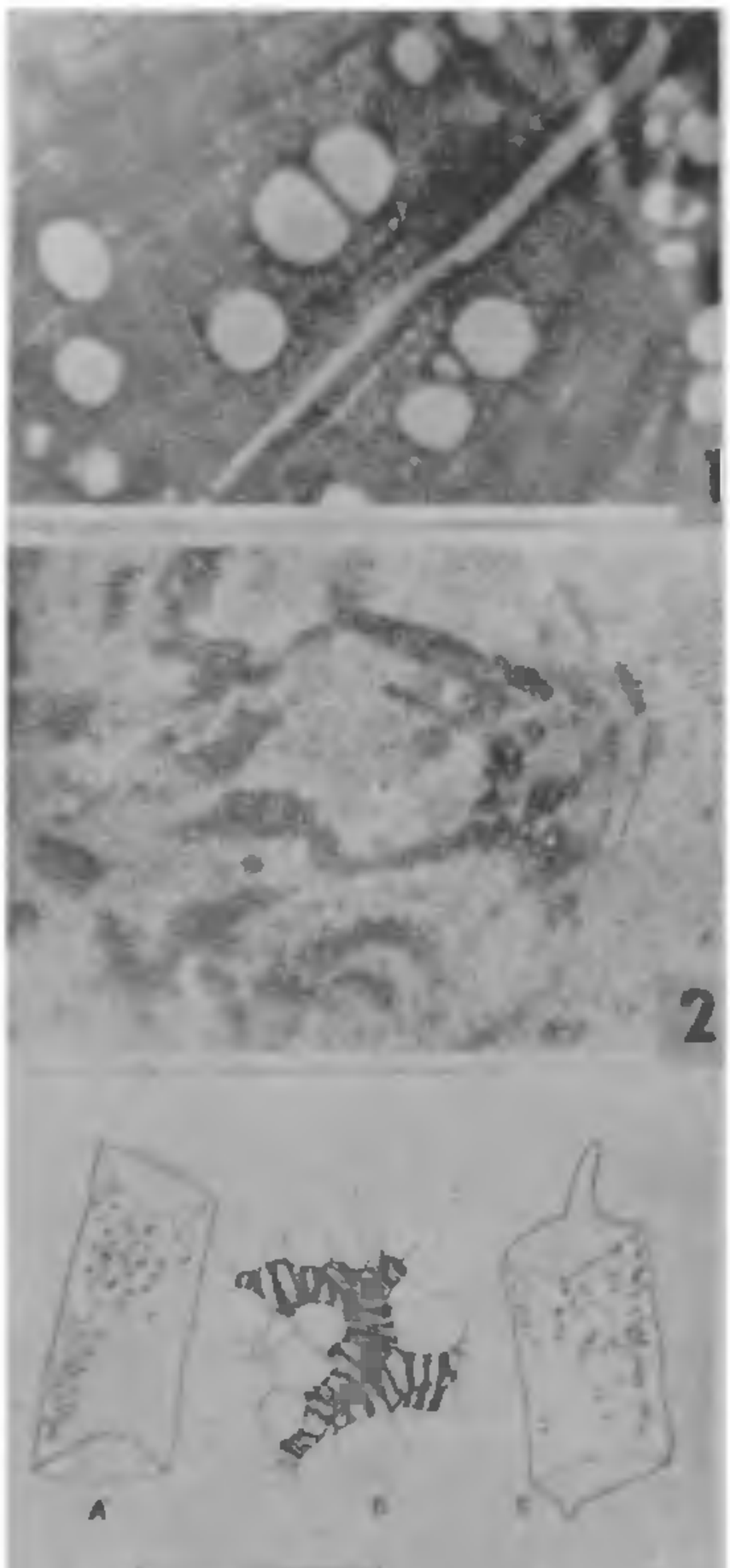
ON THE ATYPICAL TRACHEARY ELEMENTS OF *ACACIA LEUCOPHLOEA* GALLS

THOUGH normality in form and structure is known to be a consequence of regular expression of morphogenetic phenomena controlled by genic or cytoplasmic factors (with an environmental impetus as well) involving a systematic transformation of meristematic cells into specialised cells of the plant body, occurrence of anomalous cell types especially in abnormal growth conditions such as those of galls induced by various organisms[1] and aseptic culture of tissue[2] appears to be of interest. Küster[1] and Mani[3] have elaborately reviewed the morphology and the possible functions of such anomalous cell types occurring in the instances of galls. Present investigation includes a comparative study of the tracheary elements of normal and galled shoot regions of *Acacia leucophloea* Willd. (Leguminosae).

Temporary preparations of serial transverse sections and macerations (by Jeffrey's method[4]) of the normal secondary tissues and woody galls of *A. leucophloea* were obtained, and were stained with aqueous toluidine blue. Diffuse porous normal wood of *Acacia* (Fig. 1) exhibited vessel elements of varied dimensions (120–150 × 40–50 μ) with dense alternate pitting, inclined or horizontal end plates (Fig. 3A) and occasionally a tail could be observed (Fig. 3C). The amorphous galls induced by *Haplophragmium ponderosum* Syd., on *A. leucophloea*[5] in transections revealed radiating, horizontally differentiating vascular system (Fig. 2), composed of shorter and thinner elements (80–90 × 20–30 μ) with annular or reticulate wall thickening (Fig. 3B) with the perforation generally occurring in one or both the terminals along the tangential wall (see also Refs. 6, 7) in addition to various other abnormal cell types. Anomalous tracheary cells have beeno bserved in the early stages of gall development, and they, with the ageing of the gall constitute an anastomosing network. Further, along the peripheral region of the galls, characteristic concentric rings of parenchyma cells were evident, which were gradually transformed into tracheary elements of earlier stated morphology, constituting vascular nests as observed in bacterial galls[8].

Distinctness in the morphology of the atypical xylem elements in galls compared with the normal ones of *A. leucophloea* appears significant. Although Wardlaw[9] attributes the induction of the new tissue to the diffusion of an 'exogenous substance', the reorientation

of the morphogenetic process in a parenchyma cell to differentiate into a tracheary element completely differing from the characteristic morphology of the vessel element *of that species* indicates that, possibly the exogenous substance is able to relieve the cells from the correlation-factors of cells. Also, the incidence of isolated tracheary elements in an atmosphere of parenchyma cells recalls the suggestion of Wright[10] and Wareing[11] proposing the possible action of certain cytoplasmic determinants for such differential action.



FIGS. 1–3. Fig. 1. Transverse section of normal wood of *A. leucophloea* (× 230). Fig. 2. Transverse section of the gall of *Acacia* induced by *Haplophragmium* (× 70). Fig. 3. A and C: Vessel elements of normal wood. B: Atypical elements of the gall.

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Department of Botany, Loyola College, Madras 600 034, and
77, Ponniamman Koil Street, Karthikeyapuram, Madras 600 091,
July 8, 1977.

A. RAMAN.
G. SURESH.

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SURFACE IMPRINTING BY COMMERCIAL PLASTIC

THE use of transparent replicas has long been a convenient method for the study of plant surfaces. Imprints of fossil petrifications have often been prepared with different imprinting materials[2]. The use of such techniques has provided an additional visual aid in epidermal studies too. For the study of epidermal cell development, stomatal behaviour, and the structural details of the cuticle, epidermis, and petrified surfaces different chemicals, mucilage from fruits, latex from the stems, and recently some domestic adhesives have been tried[1,3–8].

The present report describes another simple, cheap and quick method for epidermal imprinting. Photographs are given to elucidate the usefulness and versatility of the method.

Commercial plastic is being used as the imprinting material. The procedure can be described as follows:

1. Commercial plastic (2%) solution is prepared in toluene at room temperature.