EPICOTYL GRAFTING IN JACKFRUIT (*ARTOCARPUS HETEROPHYLLUS* LAM.)

JACKFRUIT (*Artocarpus heterophyllus* Lam.) though an important fruit crop of the tropics and subtropics has not been exploited fully. Being cross pollinated plant, the scedlings show lot of variation and most of them are of poor quality. It is mainly because of the lack of easy, cheap and rapid method of vegetative propagation of selected superior types. Vegetative methods like inarching though successful is very cumbersome, costly and laborious and is impracticable in jackfruit where trees are very tall and scattered. The air layers, though root successfully, suffer heavy mortality in the field. Though budding methods sometimes give high success, the results are not consistent (Rowe-Dutton[3]). Epicotyl grafting, a scion detached method, is very easy, simple and rapid (Majumder and Rathore[1]). This method is being employed for massive production of mango grafts in the Konkan region of Maharashtra (Gunjate and Limaye[2]). However, it has not been tried with jackfruit so far.

Freshly extracted seeds of jackfruit were sown in polybags filled with potting mixture of soil and F.Y.M. (1 : 1). Germinated seedlings of about 10 to 15 days old in polybags were used as rootstocks. The terminal mature shoots 10 cm in length having dark green colour with plumpy and dormant apical buds from selected mother trees were used as scion sticks. The rootstock in polybag was beheaded 5 to 6 cm above soil surface. A vertical slit of about 5 to 6 cm long was given in the centre of the epicotyl. The lower portion of the selected scion was prepared to form a wedge by giving slanting cuts on opposite sides. This wedge shaped scion was inserted in the vertical slit of epicotyl and then tightly wrapped with polythene tape. The grafts were kept in nursery shed and watered regularly. Ten grafts were prepared on 1st and 15th of every month from April, 1978 to December, 1978. The success as judged by the sprouted and survived grafts was recorded after 60 days of grafting.

The data showed that the success ranging from 50 to 90% was obtained during Apirl, to mid-June. The maximum success was observed on 1st April. The warm and humid climate during this period is congenial for the better cambial activity leading to better success in epicotyl grafting. There is also abundant availability of matured scion sticks which are essential for success in this method. The results of this trial showed for the first time a great potential of this method for commercial propagation of jackfruit on a large scale at a low cost. Further studies on standardization of this potential technique are in progress.

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PERMEABILITY ALTERATIONS IN MODERATELY RESISTANT AND SUSCEPTIBLE VARIETY OF GREENGRAM INFECTED BY *XANTHOMONAS PHASEOLI*

ALTERED cell permeability was shown to be a characteristic early host response to a variety of plant pathogens[1]. The recent development on this subject seems to have derived inspiration from the work of Wheeler and Black[2] who worked on pathotoxin victorin and found permeability alteration in the early stages of infection. In the present investigation the permeability alterations in a moderately resistant, susceptible and highly susceptible varieties of greengram due to *X. phaseoli* inoculation has been studied.

Greengram varieities, CO 2, CO 3 and CO 1, which are respectively moderately resistant, susceptible and highly susceptible ones[3], were inoculated with *X. phaseoli* as per the methods described by Király[4]. Two grams of leaves each from control and inoculated plants were collected. Each leaf was divided into three equal sections, washed, evacuated and transferred to Erlenmeyer flasks containing 50 ml of deionized water. The flasks with the tissues were incubated on a gyrotary shaker (80 strokes/min) at 28° C. The conductance of the bathing solution was determined after 4 h of incubation with an Elico conductivity bridge (Type CM–82) with a cell constant of 0·95[5]. Leaf samples were collected at 0, 12 h, 1, 3, 5 and 10 days after inoculation. The bathing solutions were concentrated to 10 ml and quantitative determination of amino acids and sugars were carried out as per the methods of Moore and Stein[6] and Nelson[7] respectively.

The results show that pathogenic inoculation has increased the permeability of the cell membrane and caused leakage of ions, amino acids and sugars. The highly susceptible CO 1 showed more leakage of ions, amino acids and sugars than the susceptible CO 3 and moderately resistant CO 2 respectively (Fig. 1).

Wheeler and Hanchey[8] have reviewed the involvement of transport and permeability phenomenon in host-parasite interaction. The increased loss of ions, sugars and amino acids from the infected tissues might reflect the higher permeability of biological membrane whose functions as diffusion barriers are altered as a result of infection[8]. Membrane permeability undoub-

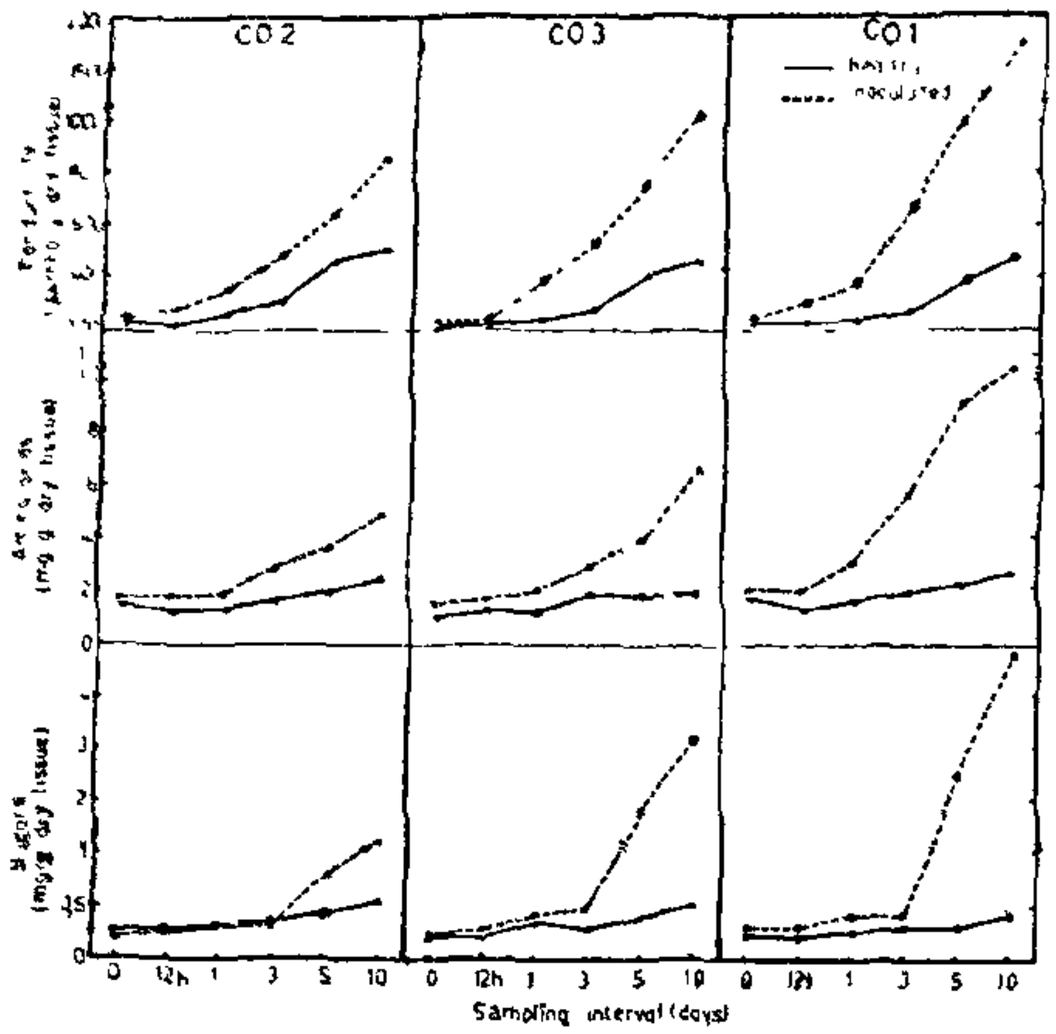

FIG. 1. Changes in permeability alterations due to X-phaseoli inoculation.

tedly plays a role in the supply of nutrients to the invading pathogen ; besides, these changes can bring about an alteration in cell compartmentation or in the cell bound enzymes[9]. Such changes could be responsible for the different metabolic events in host-parasite relationship[10]. The present study clearly shows that the host membrane as barrier has been altered and it is in agreement with the findings of Hoppe and Heitefuss[5]. It is clear that the loss of materials is high in the most susceptible CO 1 and the least in CO 2.

It is of relevence to quote the findings of Keen and Kennedy[11] who found that the electrolyte loss was much pronounced in a compatible soybean *Pseudomonas glycinea* race combination rather than in an incompatible combination. Further, concomitant to the appearance of lesion there has been an increase in the loss of electrolytes, sugars and amino acids (5th day of inoculation). Williams and Keen[12] and Cook and Stall[13] also found that these increases corresponded to the appearance of disease symptoms in susceptible reactions and were likely of significance in the multiplication of pathogen and their movement through intercellular space of the leaves.

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APHIS CITRICOLA VAN DER GOOT— A NEW VECTOR OF CITRUS TRISTEZA VIRUS IN INDIA

IN India, *Aphis citricola* van der Goot (*spiraecola* Patch) has been recorded as a pest of citrus and also found feeding on *Tridax procumbens*, a weed commonly found in citrus orchards in Kodagu, Karnataka State[5]. During the survey of citrus orchards in Karnataka and Kerala, the author also observed the occurrence of this aphid as a pest on various citrus species, Barbodos Cherry (*Malphighia glabra* L.) and also on Gandhigulabi (*Euphatorium odoratom* L.) in the months of April to August. The colour of the aphid varies from yellowish-green to green and found feeding on tender flushes. Infestation of this aphid could be identified from a distance by the appearance of downward curling and crinkling of attacked leaves. No information about the transmission of citrus tristeza virus (CTV) by *A. citricola* in India is available, hence transmission studies were conducted at Citrus Experiment Station, Gonicoppal, during 1979 and the results are reported in this paper.

The aphids were reared on *Citrus sinensis* Osbeck CV. Sathgudi seedlings in the screened cages from naturally infested mandarin plants (*C. reticulata* Blanco) through single apterous aphid. The source of the virus was a severe isolate of citrus tristeza virus (CTV) which induced cupping, vein-clearings and stempittings on acid lime [*C. aurantifolia* (Christm.) Swing.] originated from naturally infected field grown Coorg mandarin plant. Seedlings of Sathgudi were