cases because the budpatch contained the already differentiated plagiotropic meristematic bud at the time of budding. The buds subsequently developed were influenced by factors both external and internal during the successive stages of making a bud graft. The conditioning effect of age in the reversion of plagiotropy is not tenable here as the trees used as scion source are young. Factors such as vigour of the scion tree, the physiological condition of the scion, the relative position of the scion in the tree crown or the multiple nature of auxillary buds giving rise to different types of shoots (Greathouse and Laetsch, 1969) or the variability of rootstocks may be involved in this phenomenon.

The above observation is significant in the vegetative propagation of nutmeg necessitated by the dioecious nature and variability of the crop, where, to get erect growing clones budding or grafting has to be confined to the use of orthotropic scions which are limited. The possibility of physiological manipulation of the plagiotropy in nutmeg is also indicated here.

ACKNOWLEDGEMENT

The author is grateful to Dr. M. K. Nair and Dr. Josy Joseph, Joint Director and Scientist (Plant Breeding) respectively, of Central Plantation Crops Research Institute, Regional Station, Calicut for the facilities, valuable suggestions and keen interest in this investigation.

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A Simple Pressure Injection Device for the Application of Antibiotics on Coconut Palms

In the light of the reported association of mycoplasma like organisms (MLOs) with the coconut root (wilt) disease (Solomon, Govindankutty and Neinhaus, 1983), treatment with tetracycline antibiotics was attempted for its possible remission effect against the disease. Studies

undertaken at the Central Plantation Crops Research Institute, Regional Station,Kayangulam to administer chemicals into coconut palms through root feeding, ring barking, soil drench and stem injection by gravitational force as well as with pressure are in agreement with the observation made by McCoy (1974 ; 1976) and the most efficient method was injection into the trunk under pressure. Although devices like "Mouget injector" and "Air pressure injector" were suggested to be effective in injecting soluble chemicals into tissues of the coconut palms affected by 'Lethal Yellowing' in West Indies and Florida (McCoy, 1982), they are not available commercially in India. Therefore, an attempt was made to design and fabricate an indigenuous pressure injector. Description of the injector thus made and the technique employed are reported here. The established method of bio-assay for the chemicals injected was employed to find out the efficiency of the injector.

The pressure injector consists of a slender plastic cylinder (capacity : one litre), the reservoir, which can hold 10 kg/cm² pressure (Fig. 1). It has a screw cap at the top and a transparent tubing at the distal end terminating in a plastic nozzle approximately 4 cm long. A pinch-cock is attached to the tube just above the nozzle. At one side of the reservoir, there is a valve to facilitate the application of pressure.

After closing the pinch-cock, the reservoir is filled with known volume of the solution (500 ml or less) of the chemical. The apparatus is made air-tight by closing the screw cap. Initial pressure to the tune of 3.5 to 4 kg/cm² is applied into the container with the help of a foot pump having pressure guage. The pump is subsequently detached and the equipment is now ready for injection. Mature palms of atleast 2-3m trunk height were used for the study. A small hole of approximately 5 mm diameter and 6-7 cm deep at about 40° angle is

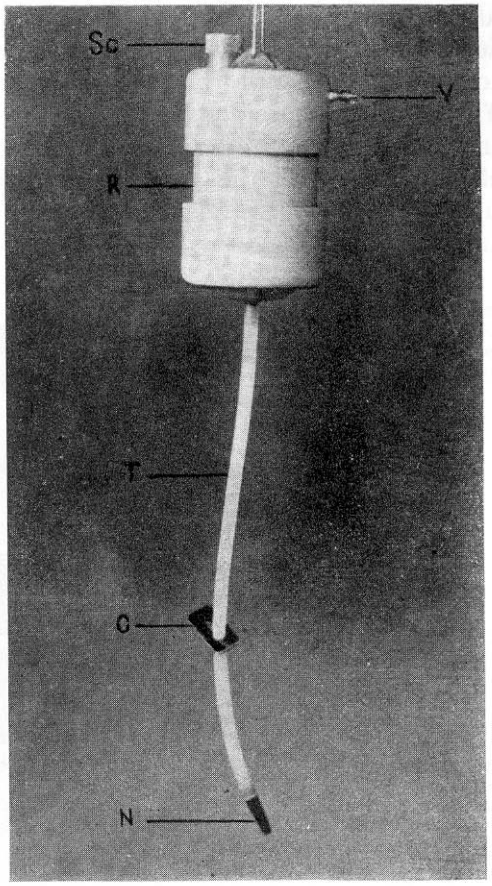

Fig. 1. Pressure injector
R. Reservoir, Sc. Screwcap, T. Tubing, N. Plastic nozzle, C. Pinch cock, V. Valve

made at the bole region of the palm with a drill. The plastic nozzle of the injector is tightly introduced into the hole and the pinch cock gradually opened. Air bubbles entering the transparent tube are pushed into the container by gently pressing the tube. Leakage, if any, from the point of injection is rectified by thrusting the plastic nozzle further into the hole (Fig. 2). In most cases the entire aqueous solution was absorbed in 6 hr and the device detached from the trunk after that. The hole left behind is sealed with cement and Dithane-M45 to prevent infection by other agents. The fall in pressure due to the reduction in volume of the fluid did not adversely affect the flow of the solution. Also uptake of the chemical determined by measuring the quantity of the solution left behind in the reservoir of the injector after 6 hr. showed the absorption ranged from 380 to 500 ml out of 500 ml injected (76-100%). Translocation of the chemical was studied by applying a tracer dye, rhodamine-B (0.1%) and terramycin tree formulations (6g active ingredient diluted with 1000 ml distilled water and administered through a pair of applicators). In the former case, the presence of dye could be detected in the vascular strands of the stem and petioles of the inner, middle and outer whorls of leaves within 24 hr after injection. In the spear leaf, however, the presence of the dye was rather minimal. With terramycin, the residues of the chemical in the tissues of the foliage were

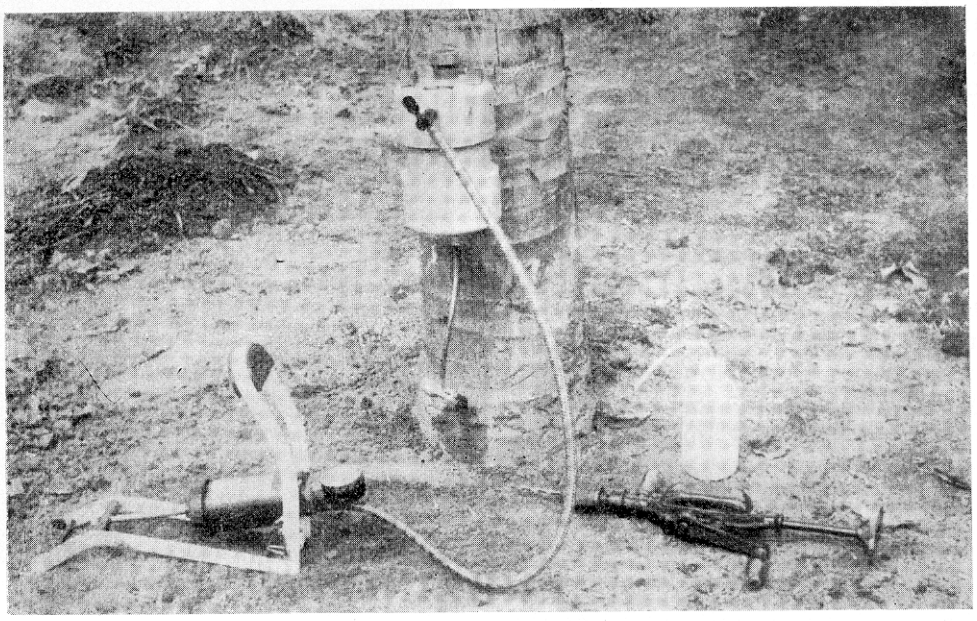

Fig. 2. Injector in position on coconut trunk

determined by a bio-assay test using *Bacillus cereus* var. *mycoides* as the test organism as employed by McCoy (1974 and 1976). Tissues of the palms treated with distilled water were maintained as control. Distinct inhibition zones could be detected when tissues of outer and middle whorls of leaves collected 24 hr after injection, were plated in agar media seeded with the bacterium. This indicated the general distribution of the chemical in the crown. Only traces of antibiotic activity could be noticed in the tissues of the spear leaf.

The efficacy of this injector was tested against 130 diseased palms of different age groups. The overall distribution of the chemical in the foliage of the crown within 24 hr as indicated by bio-assay tests, suggests the effectiveness of the method. This method could be employed for injecting chemicals in other palms also.

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Variability in Black Pepper Cultivar 'Karimunda'*

Among more than 70 pepper cultivars cultivated in Kerala, 'Karimunda' is the most popular one. The cultivar probably originated in the traditional pepper growing areas of erstwhile central Travancore region from where the settlers carried the material to the northern parts of Kerala. At present, this cultivar is grown throughout Kerala because of its prolific and regular bearing habit and capacity to yield uniformly well under plain as well as submountainous regions. The cultivar is characterised by small or more or less oval and slightly ovate leaves short to medium size and closely set spikes. Comparatively short spike length is compensated by the high spike/node ratio resulting in high yield. The term 'Karimunda' has probably originated from the short dark green spikes.

* *Contribution No. 494, Central Plantation Crops Research Institute, Kasaragod*