

A KIT TO CONTROL COCONUT PESTS

By K. Mather and Chandrakurian

Introduction

The ravages caused by the various pests of coconut palm are serious enough to warrant prompt and effective control measures. The coconut grower has to be alert and equip himself with the essential outfits in order to tackle the problem successfully.

Crop losses

An exact assessment of the loss of crop due to pest infestation on coconut is not available yet. However, an increase in yield of five to six nuts per tree per year as a result of control measures administered against the rhinoceros beetle is on record.

The damage caused by the Red-weevil, if left untreated, is eventual death of the palm. Five per cent of the total palms are being infested by this pest; the fact that clearly shows the magnitude of Red-weevil problem. Leaf-caterpillars breaking out sporadically in certain localities under favourable conditions reduce the total functional photosynthetic area and indirectly reduce yield to a great extent.

Cockchafers feeding on roots disturb the nutritional physiology of the palm and consequently affect the yield potential. It is, therefore,

of paramount importance that effective measures are taken in order to combat these enemies as and when they attack the palm. In this article an attempt is made to provide the grower with the knowledge about an essential kit so that he could use it in his relentless war against the various pests.

Symptoms of attack and intimate knowledge of the pest

The type of pests and their association with the palms are recognised by the symptoms manifested by them.

These symptoms are briefly described here.

Rhinoceros beetle

Characteristic geometric cuts on opened leaves and chewed up fibres bundled through holes bored in the spindles indicate earlier attack by rhinoceros beetle.

Red-weevil

Small holes on stem, sometimes with a brown fluid oozing out of them, easy coming away of green leaves, longitudinal splitting of leaf base, wilting of inner leaves, presence of chewed up fibres in leaf axils and base of palm, and characteristic feeding sound of grubs are

suggestive of Red-weevil infestation.

Leaf-eating caterpillar

Defoliation of the tree brought about by Leaf-eating caterpillars and Bag-worms is too conspicuous to go unnoticed.

Cockchafer grub

Barren palms with yellow leaves are usually associated with cockchafer grubs in the soil at the base of the palms.

Intimate knowledge about the nature of damage and details of the life history of the pest is an essential pre-requisite for an effective defence. For example, the knowledge that the young stages of the rhinoceros beetle are developed in cattle dung is essential to effectively control the pest by spraying manure pits with insecticides to kill the larvae.

Warfare and weapons

The kind of war to be launched differs from pest to pest. It is spraying in some cases, injection in others. It may be again mechanical, sanitational or cultural practices, promotion of natural enemies or an integration of several of these. Regular cyclic operations are necessary as prophylactic measures

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while the detection of the pests in certain cases calls forth immediate curative control. The weapons of war also, therefore, vary considerably. They are chemicals in certain instances while parasites can do the job in yet others; or may be mechanical appliances help a lot in other cases. With this basic background knowledge and skill in the *modus operandi* of the various control measures recommended, the farmer may keep the undermentioned kit always ready for timely action.

List of equipments of the kit

a) Implements, tools, etc.

i) *Beetle hook* : Mechanical control of rhinoceros beetle is an effective method practised from early days. The weapon required for this process is simple, consisting of an



Hooked out adult beetles



Geometric cuts indicate earlier attack by rhinoceros beetle

iron rod about half a metre long with a hook at tapering end point and a ring or handle at the base (fig. 1). The adult beetles are hooked out of their abode on the crown of the palm within the innermost two or three leaf axils by thrusting the pointed end through the bore left by the feeding of the pest and pulling out the beetles individually when the hook prevents its escape from the rod. The rod can be made at a cost of Re. 1/-. The cost of operation can be minimised if hooking is combined with harvest.

ii) *Water-can, rake, water-pots etc.* : Application of suitable chemicals in the breeding sites of the rhinoceros beetle helps to control the pest in its young stage itself and reduce population of the harmful adults. Coconut logs (if not cut and removed), cattle dung heaps, compost pits, municipal dumpings and peaty hills need quarterly application of insecticide. The breeding material has to be raked well with a rake (fig. 2) and the insecticidal suspension in water mixed with it with the aid of a hand sprayer (fig. 13 a) or a water-can (fig. 3) mud-pots (fig. 5) or copper vessels and

suitable containers like buckets (fig. 4) to hold the suspension are accessory requirements. The cost of this set works out to Rs. 33/- as detailed below:-

Rake	Rs. 5
Water-can (can be made out of kerosene oil tins)	Rs. 7
Bucket large 14" (to hold suspension)	Rs. 15
Mud-pots and bucket to draw water	Rs. 6
Total	Rs. 33

iii) *Filler* : (fig 6) This is a simple appliance which can be made out of a node and internode of bamboo or of thin galvanized iron sheet with the base closed and the free end narrowing and opening slantingly to permit free flow of insecticide and sand mixture into the leaf axils to reduce weevil attack and incidence of Black-beetle. The insecticidal application, BHC/Chlordane, five per cent dust, is to be carried out three times a year, before and after the monsoons. A grower may be prepared with three or four fillers in his kit. The total cost would be about Rs. 2/-.

Pyrocon injector and accessories: To carry out skilful injection of a suitable insecticide (for details of description, volume, dose etc. please look under b) against Red-weevil infestation, the crown should first be "dressed" by cutting the leaves at the region of attack with a sharp billhook (fig 7). The holes on the stem, if any, have to be closed with cement or sticky mud with the aid of a trowel (fig. 8). An artificial hole is to be tunnelled with an auger (fig 9) above the top-most hole observed (which indicates the level up to which the pest has progressed). About 1,000-1,500 ml. suspension of the insecticide in water contained in a Winchester bottle (fig. 10) is to be administered through a funnel (fig. 11) inserted through the newly bored hole and permitted to percolate gradually by gravitational force

into the palm and come in contact with the grubs within. An injector working on pressure can, no doubt, accelerate the speed of the injection. Otherwise the funnel fabricated from thin galvanized iron sheet should have a capacity of 1,000-1,500 ml. so that the funnel can be tied up and left in the hole and the insecticide percolate slowly through the hole.

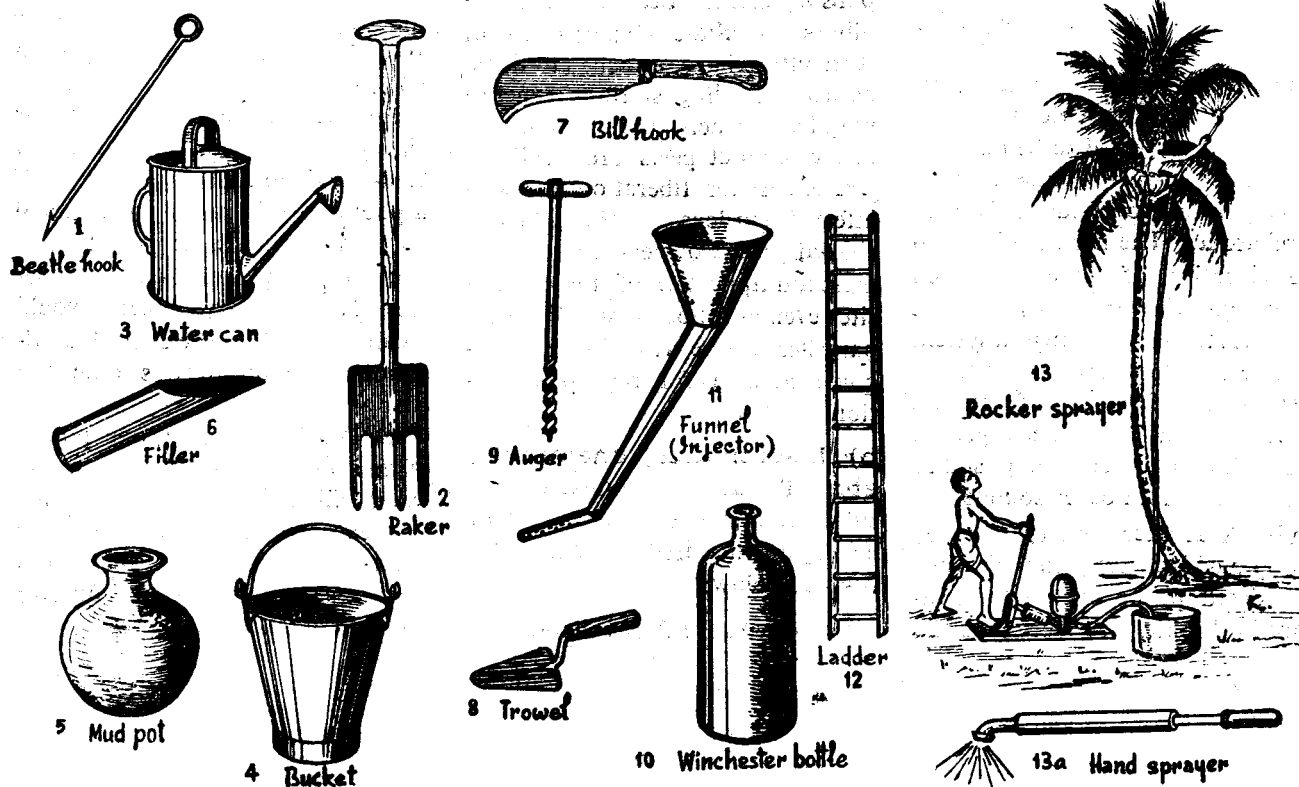
In order to ensure contact of the chemical with all the grubs present within, it becomes necessary at times to inject in two or three phases, at different points around the stem. Since infestation occurs usually in young palms within the age group of 5-20 years, a ladder (fig. 12) may also be kept ready at hand.

In case infestation takes place from the crown consequent to rhinoceros beetle attack, Bud-rot

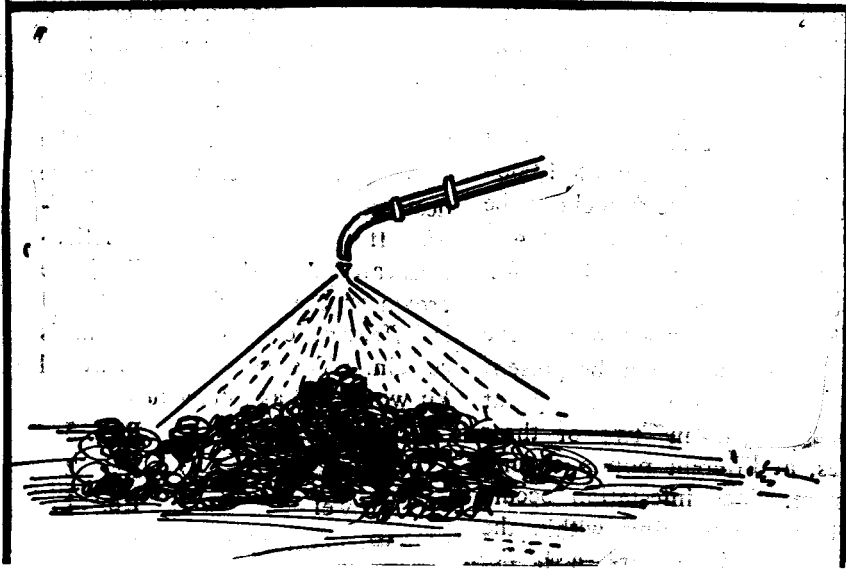
or any mechanical injury, the process of administration consists of cutting the crown across as deep as the infestation has progressed, and by hand remove all stages of the pest present, and pouring the insecticide on the crown to ensure destruction of any pest left unnoticed. If this is done with meticulous care before the "heart" of the crown or the growing apical bud is affected, cure of the palm is certain. The cost of Red-weevil kit works out as follows:

Injector funnel	Rs. 5
Auger	Rs. 2
Trowel	Re. 1
Winchester bottle	Rs. 3
Bill hook	Rs. 7
Ladder	Rs. 9
Total	Rs. 27

v) *Electronic device:* The failure



Equipment of the kit



Application of insecticides to dung heaps

n detecting infestation by Red-weevil (sometimes no visible symptoms are left on the palms) renders it difficult to resort to curative measures. Efforts to overcome this led to the designing of a prototype "detector" consisting of a 'probe' in the form of a needle which can be thrust into the stem of the tree suspected to be infested. The device is worth possessing by every grower if one can afford to purchase it. The needle picks up the vibration of sound produced by the gnawing grubs within and amplifies the same through a system of electronic apparatus. Within limitations of error of human judgement, an experienced person can differentiate the feeding sound of the grubs from other sounds.

vi) A Rocker sprayer (fig. 13) and ploughing set, though not considered to be essential inclusions in the kit, are better to be

possessed in case of infestation by Leaf-caterpillars or Bag-worms and cockchafers respectively.

vii) Parasites are efficient weapons against the Leaf-eating caterpillars. The State Departments of Agriculture have, attached to them, parasite breeding stations functioning from where natural enemies of the coconut pests are available free of cost for liberation in pest-infested gardens. Nevertheless, coastal garden owners can take up mass multiplication of these parasites even as a hobby, so that these parasites will be available in adequate number for regular liberation.

b) Insecticides, chemicals, etc. The average annual insecticidal requirement of a cultivator having one hundred coconut palms is given below:

i) Pyrocon-E 2/20, available from

M/s. Bombay Chemicals, 129, Mahatma Gandhi Road, Bombay-4, or through their sales representatives or through NES Blocks, about 200 ml. 10-15 ml. to be diluted in 1,000-1,500 ml. water for injection against one infestation, costing at the present market rate 55-83 paise or Sevin-50 per cent wettable powder, available from M/s. Union Carbide Ltd., Agrochemical Division, Chordia Mansion, Calcutta say 400 grams, 20 grams of which are to be suspended in 1,000-1,500 ml. water to give the recommended dilution viz., one per cent, costing 28 paise per injection.

ii) BHC 50 per cent wettable powder for spraying breeding places of rhinoceros beetle. The quantity to be stocked depends upon the amount of breeding material available in the vicinity. The recommended dose is 1.25 oz. of the insecticide suspended in sufficient quantity of water to wet every 10 c. ft of cowdung weighing about 400 lb.

iii) BHC five per cent dust for filling the leaf axils to keep off Red-weevil and Black-beetle. Half a pound of this mixed with equal volume of fine sand is sufficient for three applications a year per tree. The total requirement would be about 150 lb. The cost of application works out to less than the cost of a nut.

iv) DDT 50 per cent, one pound of this suspended in 25 gallons of water will suffice spraying against Leaf-eating caterpillar on fifty palms. Alternatively, Malathion can serve the purpose at quarter strength of DDT.