

THE BLACK-BEETLE

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THE ragged appearance of mature coconut leaves as if cut by a pair of scissors, the irregular apertures towards the leaf bases, the holes in the stem, just below the crown, and the partly-damaged inflorescences that emerge from the spathe are all due to the beetle *Oryctes rhinoceros* which is called the Rhinoceros beetle owing to the "horn" situated on its head. Patel reports, in extreme cases, beetle attack even on nuts which are 4-5 months old. Beetle damage is, however, usually limited to the "cabbage" of the palm where the tissue is young and soft and which the insect chisels out in the act of sucking the plant sap, thereby effecting the growth and yield of the plant.

The black beetle is seldom known to kill the palm directly but an attacked palm can subsequently be destroyed either by :—

- (1) the Red Weevil which takes advantage of the wounds, created by the black beetle, to enter and lay its eggs. The larvae that emerge from these eggs then channel through the leaf bases and stem until the palm is ultimately killed ;
- (2) the putrefaction of the damaged tissue by fungi and bacteria and by the collection of rain water in the wounds. The rot will gradually extend down to the other tissues and finally attack the bud. This type of bud-rot is often mistaken for that caused by the fungus *Phytophthora palmivora* which is an infectious and highly dangerous form of bud-rot.

Young palms between the ages of 2-10 years and the dwarf variety are particularly liable to attack. The reason is probably because the beetle either relishes the sap of such plants more or because the crowns of these palms are nearer the ground than those of mature tall palms. The suggestion is based on the belief that the insect does not as a rule fly very far, possibly owing to its large size. This may also be the reason why the extent of beetle damage depends on the proximity of coconut palms to compost pits, farmyard manure heaps, decaying stumps and trunks. The beetle is never known to breed or lay eggs in its own burrows in the palm, except in very rare instances where larvae have been reported within decaying tissue (caused by other factors like lightning, etc.). On the other hand, the black beetle usually breeds in :—

- (a) Decaying farmyard manure,
- (b) Compost pits and refuse heaps ;
- (c) Fallen trunks and the decaying stumps of coconut, arecanut, rubber, banana, palmyrah and the like. (Vide *C.C.Q.* 1953, No. 1, page 17).
- (d) Standing, dead or dying palms (e.g. palms killed by lightning).
- (e) Coconut stumps used as fence posts.

Oryctes rhinoceros has never been known to breed in coconut husks or coir dust heaps but larvae have sometimes been found in the edges of coir dust heaps in well-decomposed material that is not too thick. Coconut husk which is a valuable by-product in coconut cultivation, can therefore be safely used in husk pits or as a mulch in coconut cultivation.



Coconut trunks wrongly used as fence posts round a coconut seedling.



Beetle-larvae or grubs found in a single post.



Beetle-catcher at work on young palm.

The Habits and Life History of *Oryctes rhinoceros*

During its life cycle from egg to adult the insect passes through a larval and pupal stage while in the breeding ground, where the eggs are laid. The duration of these various forms differ greatly even under equatorial conditions and the length of its life-cycle cannot therefore be definitely determined. The winged adult is brownish black in colour, the male being usually larger in size than the female and having a longer frontal horn. In addition to this, there is also a pair of short "teeth-like horns" on either side of the head, with which the insect either chisels into plant tissues or burrows into its breeding ground.

The beetle is nocturnal in its habits, appearing by night; during the day it shuns light and remains hidden in its breeding ground or else in its burrows in the palm. The female lays its eggs in the breeding ground and the larvae or worms that emerge from the eggs gradually grow in size feeding on the decayed material which is masticated by the "teeth" or mandibles situated in the head of the grub. During growth, the larva sheds its skin a number of times before it becomes an adult larva or grub. When full-grown, the grub is of a dirty light ochre, the body being covered with numerous small hairs. At this stage the larva descends into the ground, begins to get sluggish and stops feeding, in order to construct its pupal "cell" or cocoon out of the materials in which it lives. Within this cell the larva changes colour, moulting for the last time (shedding the skin). The pupa remains inactive within the cocoon for some time before it emerges as an adult winged black-beetle. From the above description it is clear that the greater portion of the life of the insect is spent within its breeding ground. Breeding grounds are therefore the best places to attack the pest rather than use preventive measures on the palm alone.

Methods Employed in the Control of *Oryctes rhinoceros*

(a) Using the green muscardine fungus (*Metarrhizium anisophae*)—Trap nests are prepared with decaying organic matter, leaves, branches, etc. A decoction of the fungus is then evenly spread, at various levels, within the heap where the fungus is allowed to multiply and spread and when grubs which live in the decaying matter feed on it, they are killed by the fungus. But in practice the fungus has not been found to be very satisfactory and hence this method of control is not in common use.

(b) Painting the leaf-bases or the "matalu" (Sinhalese) of young palms with Mason's Mixture is a common practice in Ceylon. This brownish black tar-like liquid acts as a repellent and remains effective on the palms for some time. Before applying the chemical, the beetle-catcher, as he is called, removes any beetles, detected within the crown, by means of a long steel skewer which has a fish hook at one end in order to pierce and remove the insect. At the other end of the hook is a ring which facilitates pulling. If there is no visible wound, the beetle-catcher can detect the presence of a beetle by striking the young plant and listening for the buzzing of the insect. Once the beetle is removed the wound is plugged with fibre, soaked in Mason's Mixture or tar, to prevent any further attack by the black-beetle as well as to stop secondary infection by Red-weevil, fungi, etc. The application of this chemical should be done regularly, as it does not give a lasting effect. Its use is therefore expensive considering the cost of material and labour.

In Ceylon the beetle pest population does not seem to have increased appreciably with time, although it was recorded as a serious pest in 1923. The reason for this may probably be that an

undiscovered parasite or predator is living on the adult beetle or its larva. In Zanzibar, consideration has been given to the control of the pest by the *Scolia* wasp which lays its eggs in the grubs of the beetle. It is believed by a certain section of people in Ceylon that the braying of donkeys keeps away the black-beetle. We do not know how far this is correct but there may be a possibility that the donkeys perhaps feed on the grubs just like crows, poultry and pigs which are known to relish the grubs or larvae of black-beetle.

Very little literature is available on the use of poisons or repellants against this insect either in its breeding grounds or on the palms. It is reported that work with B.H.C. (Benzene hexachloride) is being done at the Coconut Research Station at Kayangulum, South India.

Regular inspections of compost pits, farmyard manure heaps and destruction of coconut stumps and trunks are at present recommended as measures to minimise the incidence of beetle damage to palms. This should be included as a regular routine by every planter, and felled or dead palms should be burnt or converted into rafters. It is very necessary that every coconut planter should attend to the cleanliness of his estate if his plantation is to be free of the pest.

Summary

1. The black-beetle does not usually kill the palm.
2. Young and dwarf palms are more liable than the tall ones.
3. Palms in the vicinity of black-beetle breeding grounds are more frequently attacked than those further away.
4. Estates should be kept clean, and compost and farmyard manure heaps should regularly be inspected for grubs.
5. Coconut planters should not be satisfied merely with the routine inspection of palms. They must also practise estate hygiene.

THE CAUSE OF THE PRESENT BOOM PRICES

A DESICCATED coconut manufacturer and a coconut grower were discussing the recent sharp rise in coconut prices. "Coconuts certainly cost more than they used to," remarked the buyer.

"That's right," agreed the grower. "You see at one time all we had to do was to wait for the nuts to drop; now we've got to know the botanical name of the palm¹, the entomological name of the beetle² which attacks it, the name of the fungus³ which rots the bud, and the chemical names of all the various fungicides and insecticides⁴, and somebody's certainly got to pay for all that!"

Key :—

1. *Cocos nucifera*.
2. *Oryctes rhinoceros*.
3. *Phytophthora palmivora*.
4. For example, paradichloro benzene, the insecticide for termites.