A Shrub to Combat the Rhinoceros Beetle

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The coconut palm *Cocos mucifera* L. is prone to infestation by numerous insect and non-insect pests. Considering the geographic distribution and infestation severity of various pests on coconut, the rhinoceros beetle, *Oryctes rhinoceros* L. (*Fig 1*) is considered as one of the major pests of coconut. This pest causes damage by boring into the unopened fronds and inflorescence. The affected spindles present characteristic 'V' shaped geometric cuts when fully open. (*Fig. 2*). The damage to the leaf leads to poor photosynthetic efficiency and also renders the leaves unsuitable for thatching. Damage to the unopened inflorescence results in direct yield loss. The entry points of this pest on the palm crown paves way for fungal infection leading to diseases like bud rot and also infestation by the lethal pest, red palm weevil, and this indirect damage is often more serious.

The beetle breeds in decaying organic debris like cow dung and compost pits, dead and decaying coconut trunks, coir waste etc. Grubs are creamy white with a dark brown head and light brownish hairs on the body. The beetles are nocturnal fliers and hide during the day time in the breeding sites or feeding points on the palm crown.

The Integrated Pest Management (IPM) technology currently practised for controlling this pest involves many techniques. Mechanical extraction of beetle using a beetle hook during peak periods of pest abundance (June-September) from the crown of the palm is one of them. Feeding points can be well identified by the presence of a hole

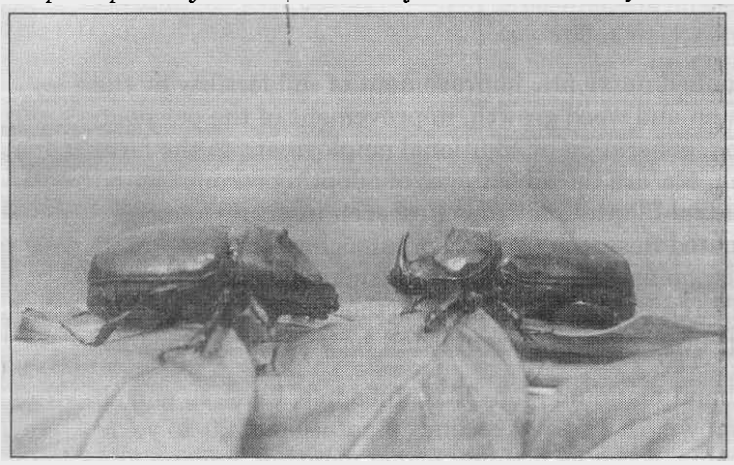

Fig 1. The rhinoceros beetle

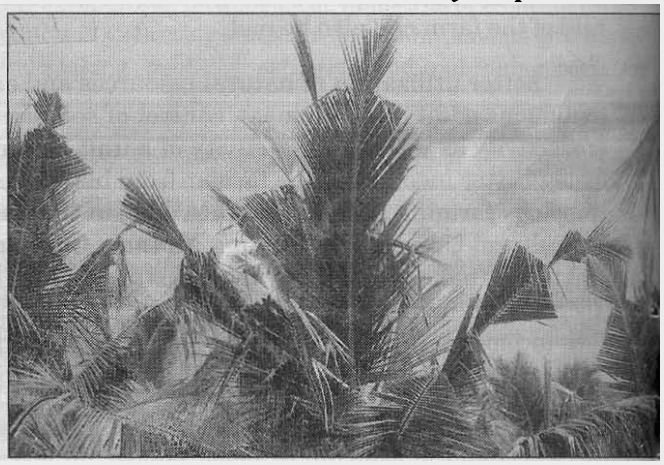

Fig 2. Oryctes damaged coconut leaf

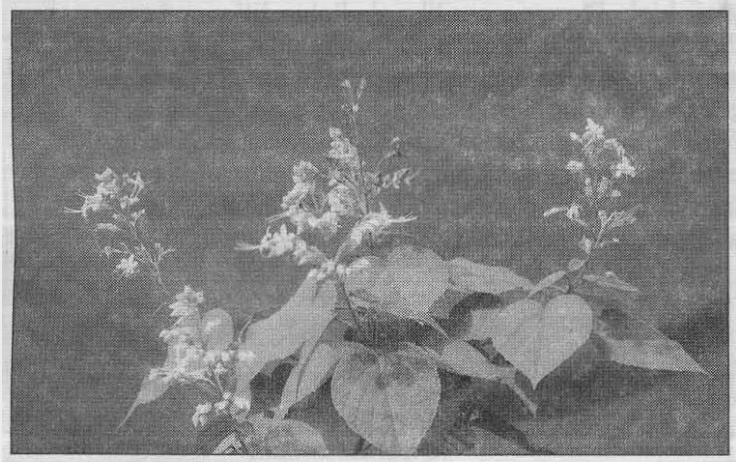

Fig 3. Clerodendron infortunatum *plant*

Fig 4. Adultoid of Oryctes *with adult head and pupal abdomen*

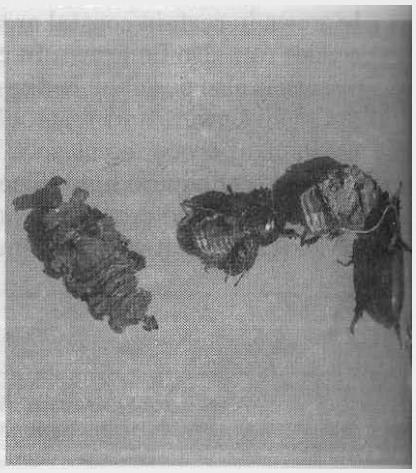

Fig5. Malformed adult beetle with crumpled wings

extrusion of chewed up fibres from biological control using the fungus rhizium *anisopliae* (Metrch.) kin and the virus, *Oryctes* lovirus (OBV) are other important nponents of IPM. Prophylactic tment is effected by leaf axil filling g Sevidol 8G @25 g + 200 g river or Naphthalene balls @ 12 g/palm. ontrolling the grubs in the ding sites is a major and effective nponent of IPM of this pest. aying Carbaryl 0.1% is mmended for this in case where ntrol is not practised. Although nical pesticides today constitute a or and critical input in the duction of agricultural crops, its rse effects such as high oral and mal toxicity, development of ticide resistance in insects, ondary pest outbreaks and terious effects on beneficial fauna the environment are well known. ecially in a perennial crop like nut where dietary consumption rs at different stages of nut as nut water, kernel and oil, use of insecticides in coconut ecosystem for pest control should be restricted. In this context, experiments were conducted at CPCRI, Kayangulam to investigate the insecticidal potential of the local weed plant, *Clerodendron infortunatum* Linn. (Family Verbenaceae) (*Fig 3*) which is abundantly available in the locality throughout the year. It is known as 'Peruvalam' / 'Oruveran' in vernacular. This plant bears cordate to mentose leaves and an inflorescence bunch with white flowers. Shade dried leaf powder of this plant was mixed with the natural food of the grub (cow dung) at different concentrations. The results revealed that at higher concentration (10%$^{w/w}$) the plant caused mortality of the full-grown grubs within 10 days. At less than 10% concentrations, different degrees of Insect Growth Regulatory activity was expressed. The grubs were unable to moult to the pupal stage and larval-pupal intermediates were formed. The adults formed showed different degrees of malformation like adultoids with adult head, thorax, wing pads and pupal abdomen (*Fig 4*) or with fully crumbled or partially formed wings (*Fig 5*). The malformed adults were unable to fly and survived for only 6-8 days where as normal adult longevity is 2-3 months. The results suggest that the plant. *C. infortunatum* influences the hormone regulation during development of *Oryctes rhinoceros*. This clearly opened the possibility of utilizing *C. infortunatum* as a potential biopesticide for ecologically and economically sound and farmer-friendly pest management. Field experiments conducted in farmers' garden by incorporating *Clerodendron* plant in the cow dung pits also yielded encouraging results and reduced the grub population significantly. This method can very well be incorporated in IPM of the *Oryctes rhinoceros*. The plant, which is available in plenty, can be incorporated into the cow dung pit or composting materials, which are the main breeding sites of *Oryctes rhinoceros*.

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