

Short Scientific Reports

Incidence and Intensity of Rhinoceros Beetle Infestation in Oil Palm Plantations in India*

The rhinoceros beetle, *Oryctes rhinoceros* (L) (Coleoptera : Dynastidae) is a major pest of coconut palm causing severe damage to the unopened fronds and spathes. It breeds in the manure pits, compost heaps, dead coconut logs, coir dust and other organic debris (Menon and Pandalai, 1958; Anon., 1969; Bedford, 1980; Thampan, 1981). *O. rhinoceros* is also a major pest of oil palm in Malaysia and Indonesia, causing characteristic wedge-shaped cuts in the emerging fronds which are less distinct than those in the coconut palm (Wood, 1968, 1976; Hartley, 1977). The beetle breeds in decayed oil palm trunks, decayed oil palm bunch heaps, etc., available within the oil palm plantations (Wood, 1968, 1976; Hartley, 1977; Anon., 1981; Turner, 1981). In the present study incidence of *O. rhinoceros* as a major pest of oil palm in India is reported for the first time, along with its nature and intensity of damage and population of immature stages of the pest in different types of breeding sites.

Survey of oil palm plantations in Kerala at Palode (15 ha), Chithara (1018 ha), Yeroor (1750 ha), Kulathupuzha (1000 ha) and Thodupuzha (40 ha) during June-August, 1985 and January 1986 to December 1987, revealed that *O. rhinoceros* is the major pest in India,

causing severe damage to emerged fronds and spindles. The adult beetles feed on the softer tissues of the rachis of the younger fronds and petioles of the unopened spears resulting in snapping off the fronds and spears at the feeding site (Fig. 1). Among the fronds beetle bores into the rachis, 1 to 2.5 m away from the leaf base; and in the spindle it tunnels into the petiole at the base of the spear cluster. In oil palm, unlike in coconut palm, incidence of wedge-



Fig. 1. Typical symptom of beetle damage in five year old oil palm

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shaped cuts in the emerging fronds due to *O. rhinoceros* infestation is very rare and damage to spathe was not evident. Adult beetles also feed on the soft fibrous peduncle of the post-anthesing male inflorescences.

Incidence of infestation by *O. rhinoceros* was evident throughout the year. A survey of 10-year-old plantation at

Palode, Kerala during 1985-86 revealed that the intensity of damage by rhinoceros beetle was more during May-July (6 to 8.5%) than in other months (3.5 to 4.3%). Infestation by *O. rhinoceros* was more pronounced in the mature plantation, than in the young plantation. Observations on 1 to 15 year-old plantations during June-August indicated that the intensity of damage by

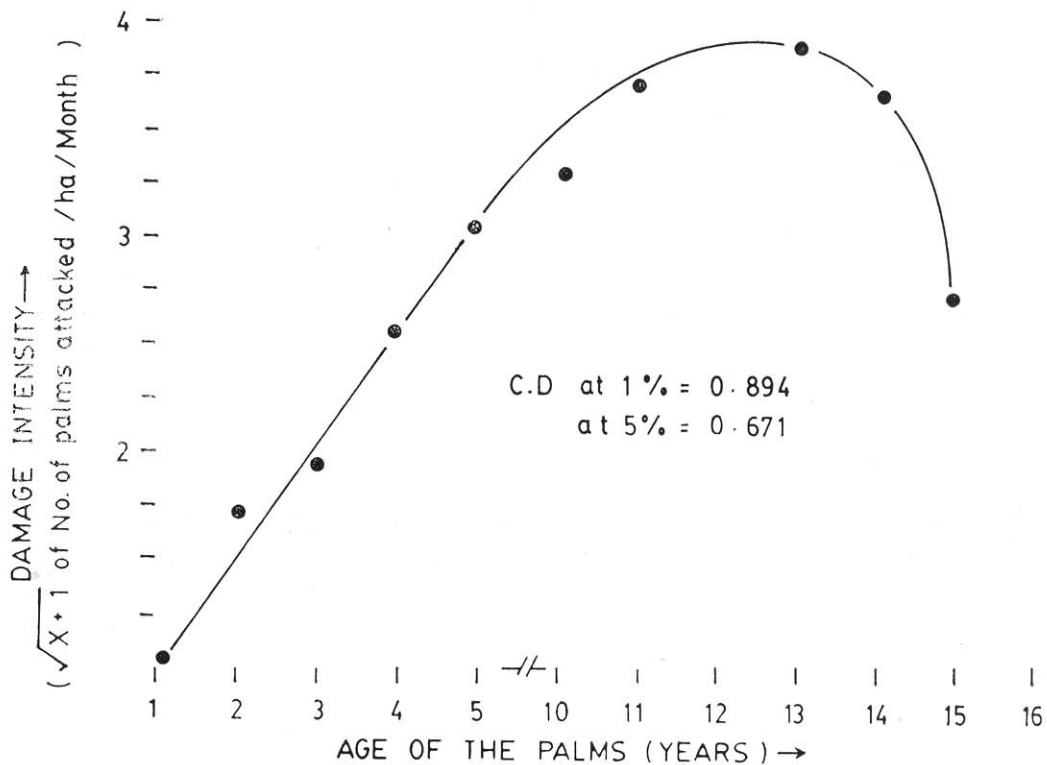


Fig. 2. Intensity of damage by rhinoceros beetle in relation to age of the oil palm

O. rhinoceros was low in 2 to 4 year-old plantations, higher in five-year-old plantations and was the highest in 10 to 15-year-old plantations (Fig. 2). Pest incidence was not noticed in one-year-old plantations. Higher incidence of *O. rhinoceros* infestation in mature plantation than in young plantations is possibly due to the thicker rachis/petiole, through which the beetle can tunnel, as well as due to increased availability of breeding sites. But in oil palm plantations of Malaysia, damage by *O. rhinoceros* was higher in the young palms than in the older palms and palms of one-year-old were also often infested (Wood, 1968; Turner, 1981).

The beetles have been observed to multiply in persistent leaf axils filled with humid organic waste, failed female inflorescences and organic wastes accumulated in the palm crown, in addition to the oil palm bunch heaps and dead trunks. Grubs of different instars, pupae and just emerged adults were collected consistently from these breeding sites. To ascertain the ability of the developing grubs to complete their development in different types of breeding sites, the field collected grubs

were reared in various breeding materials (failed female inflorescences/dead palm trunks/empty bunch heaps) in the laboratory till the adult emergence. In failed female inflorescences as well as in decaying oil palm bunch heaps, the developing grubs feed on the decomposing peduncle and utilise the fibrous material for making pupal cases. In the persisting leaf axils and palm crown, the developing grubs feed on the organic wastes accumulated there. Among the breeding sites, higher number of grubs were collected from the failed female inflorescences (9 to 23 grubs/inflorescence) and dead oil palm trunks (3 to 24 grubs/trunk), than in others (Table I). These breeding sites which are available within the plantation provide ample breeding ground for the pest.

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Table I. *Breeding sites of O. rhinoceros in oil palm plantations and population of immature stages of the pest in different breeding sites during 1986*

Breeding sites	No. of sites available/Ha	No. of sites with grubs/Ha	Average no. of grubs/site
Failed female inflorescences	120 ± 32.4	10 ± 6.3	15 ± 11.8
Persistent leaf axils	234 ± 134.4*	2 ± 1.7	3 ± 2.1
Decaying oil palm bunch heaps	4 ± 4.7	1 ± 0.4	7 ± 5.7
Dead oil palm trunks	2 ± 1.6	2 ± 1.2	26 ± 16.2
Mean of five replications			
Mean ± S.D.			* Number of leaf axils per palm

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Soil Moisture Regimes on Rooting and Growth of Tea Cuttings (*Camellia sinensis* (L.) O. Kuntze)

The success of vegetative propagation in tea by single leaf internode cuttings is dependent on a number of factors both environmental and physiological. Many investigations have been made about the factors affecting rooting of cuttings, but information of soil moisture effects are very limited. Although irrigation in nursery beds is a common practice, but faulty irrigation could be disastrous resulting in the total or partial failure of vegetative

propagation (Wight, 1955; Eden, 1958). But at present there is no definite mechanism to regulate the frequency of irrigation in nursery beds though irrigation is an important factor governing the success of vegetative propagation.

In the present study, the soil moisture regimes were maintained with tensiometers, buried at a depth of 15 cm in the middle of each bed. The