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INTEGRATED MANAGEMENT OF RED PALM WEEVIL (*RHYNCHOPHORUS FERRUGINEUS* F.) IN COCONUT GARDENS*

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ABSTRACT

The red palm weevil, *Rhynchophorus ferrugineus* F., is a dreaded pest of the coconut palm, capable of killing the palm outright. Though different methods of management have been recommended against this pest, any single method has not been proved to be effective in combating the pest infestation. Timely adoption of curative chemical control can protect the palms from pest infestation. But being a tissue borer, the infestation is quite often detected at later stages only and as such it would be difficult to save the palm with the curative treatment. Hence, an integrated method of pest management system was developed and tested in cultivators' gardens in Alleppey District. The schedules included adoption of plant and field sanitation, prophylactic method of filling all the leaf axils of palms with BHC + sand, curative chemical treatment, preventation of pest entry through cut ends of petioles and wounds and use of attractants. Sixty nine out of a total of 1005 young experimental palms were infested by the pest at the time of commencement of the experiment during 1970. By adoption of all the proven methods of weevil control in an integrated manner the pest infestation could be brought down near to zero level and the gardens could be maintained free of fresh infestation.

INTRODUCTION

The red palm weevil *Rhynchophorus ferrugineus* F. (Coleoptera: Curculionidae) is a dreaded tissue borer pest of the coconut palm capable of killing the palms outright. Grubs of the weevil tunnel into the palm trunk/crown and feed on the soft tissues of the growing point viz., the 'heart' or the cabbage portion, which results in death of the infested palm. Though different methods of management have been recommended against this pest, no single method has been proved to be quite effective in combating the pest infestation. Coconut being a monocot, if the growing point of the palm is damaged, curative treatment with insecticides will not be able to save the palm. Thus, an analysis of the nature of the crop and the nature of damage done by the pest (a tissue borer) would reveal that sole dependence on any single method will not be feasible for comabting this pest. Hence an integrated pest management system was developed and tested in large scale plots in farmers' fields. The results of the experiment are discussed in this paper.

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MATERIALS AND METHODS

One thousand and five coconut palms of the age group of 3 to 20 years were selected in a contiguous area of coconut gardens at Kurathicadu near Mavelikkara, Alleppey Dist., Kerala, during 1970. A thorough combing of all the palms was made for detection of red weevil infestation. Pest infested palms which were beyond the stage of recovery/ dead palms were removed and all the stages of the pest present in the palm trunks were destroyed as a measure of preventing further spread of the pest and bringing down the population. Thereafter all the proven schedules for suppressing the coconut weevil were adopted in the area in an integrated manner. These schedules included, maintaining plant and field sanitation, prophylactic method of filling all the leaf axils of palms with BHC 5 per cent dust + sand (Mathen and Kurian, 1966), dressing of wounds caused on the palm with BHC + tar for preventing egg laying by weevils on such wounds (Abraham, 1971 a, 1971 b), treating the leaf rot/bud rot disease affected palms with Dithane M-45 and insecticide to prevent pest entry through decayed tissues and preventation of pest entry through the cut ends of leaf stalks by discouraging cutting of leaf stalk near the stem (Abraham, 1971 a) and curative treatment of weevil infested palms with Pyrethrins-piperonyl butoxide/carbaryl at one per cent concentration (Nirula 1956, Mathen and Kurian, 1970). During the year 1977 trapping and killing the floating population of weevils was also introduced. The weevils were caught using traps prepared out of coconut log + toddy + yeast (Abraham and Kurian, 1975).

The palms were examined regularly at monthly intervals for the detection of fresh incidence of the pest, if any, and the curative treatment was resorted to. Those palms which received the curative treatment earlier were also examined periodically and curative treatment given as and when reinfestations detected. The experiment was continued up to 1982.

RESULTS AND DISCUSSION

Pretreatment observations of the experimental palms (1005 nos.) enabled detection of 69 palms harbouring red palm weevil in varying degrees of intensity (Table I). Thus the initial pre-treatment incidence was 6.86 per cent. Out of these, 36 palms were either dead or at a stage beyond recovery even before the commencement of the trial. These palms were cut open and all the stages of the pest destroyed. The stem and other

Table I. *Red weevil infestation in the integrated pest management garden at Kurathicadu.*

Year	Palms infested by red weevil	Palms died
1970	69	36*
1971	43	4
1972	14	2
1973	13	–
1974	12	–
1975	8	–
1976	8	–
1977	3	–
1978	1	–
1979	0	–
1980	1	–
1981	1	–
1982	0	–
Total	173	42

*Died before the commencemnt of the experiment

parts were burnt. This operation helped in reducing the pest population in the field. If these palms were not removed they would have served as natural reservoirs for multiplication of the pest in the field. Remaining 33 palms were given curative injection treatment with pyrethrins-piperonyl butoxide/carbaryl 1 per cent suspension. These palms recovered from the infestation. During 1971, there were 43 fresh incidence and after treatment 39 were cured and four died. From 1972 onwards there was considerable decline in fresh infestation. There were only 14 fresh infestation of which two palms died in spite of the curative treatment. During 1973 and 1974 also the infestation remained almost at the small level with 13 and 12 palms, respectively, showing fresh infestation. All of them were cured after treatment. The infestation came down to eight during 1975 and the same trend continued during the subsequent year also. The results of these two years indicated that it was rather difficult to bring down the infestation any further with the treatment schedules adopted. This could perhaps be due to the migration of the floating population of weevils from the adjoining gardens. Hence, the trapping of floating population of weevils was also incorporated as an additional tool.

Coconut log splits treated with toddy and yeast were maintained in the gardens. These traps attracted 18 weevils during 1976. In subsequent years also trapping helped in catching the weevils. During 1977 the infestation has come down to three while duirng 1978 and 1979 the infestation was one and nil, respectively. The experiment continued for another period of three years and the infestation was one or nil. Thus, by adoption of the integrated management practices the gardens could be maintained at a very low level of red weevil infestation.

The total expenditure for carrying out the above operations worked out to Rs.22,315/- towards the cost of insecticides, fungicides etc. and labour charges for 13 years. Thus the average expenditure per palm per year worked out to Rs. 1.72. With this expenditure a total of 131 palms could be saved from the red weevil infestation. Only six palms which received treatments could not be saved. This treatment also drastically reduced the population of red palm weevil in the field.

The above results clearly proved that integration of the different methods of red palm weevil management was quite successful in coconut gardens. The coconut log traps helped to bring down the pest population to a very negligible level. This is because the floating population of weevils migrating from the adjoining gardens of the experimental area could also be trapped, thus denying chances for their multiplication in the gardens.

REFERENCES

ABRAHAM, V.A. 1971 a. Note on an effective method of preventing entry by red weevil *Rhynchophorus ferrugineus* into the stem of coconut palm through cut petioles. *Indian J. Agric. Sci.* **41**(2): 1130-1131.

ABRAHAM, V.A. 1971 b. Prevention of red palm weevil entry into coconut palm through wounds. *Mysore J. agric. Sci.* **5**(1): 12-22.

ABRAHAM, V.A. and KURIAN, C. 1975. An integrated approach to the control of

Rhynchophorus ferrugineus F. the red weevil of coconut palm. 4th session of FAO Technical Working Party on Coconut Prod., Prot. and Processg., Kingston, Jamaica.

METHEN, K. and KURIAN, C. 1966. Prophylactic control of *R. ferrugineus* F. *Indian J. Agric. Sci.* **36**(6): 285-286.

MATHEN, K. and KURIAN, C. 1970. Sevin controls red palm weevil at low cost. *Cocon. Bull.* **1**(5): 7-8.

NIRULA, K.K. 1956. Investigations on the pests of coconut palm Part IV: *Rhynchophorus ferrugineus* F. *Indian Cocon. J.* **10(1): 28-44.**