Proceedings of Placrosym XV (2002): 617-619

EFFICACY OF SELECTED CHEMICALS AND BOTANICALS AGAINST COCONUT RHINOCEROS BEETLE *ORYCTES RHINOCEROS* L.

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ABSTRACT

Studies were conducted at Coconut Research Station, (TNAU), Aliyarnagar during 2000-2001 to find out the efficacy of selected chemicals and botanicals against coconut rhinoceros beetle in young coconut palms. The results revealed that placement of phorate 10G @ 5gm in two perforated sachets in two inner most leaf axils for 2 times at 6 months interval significantly reduced the leaf damage from 28.18 per cent to 2.10 percent at 12 months after treatment. This was followed by placement of 3 naphthalene balls in 3 perforated sachets and leaf axil filling of Neem seed kernel powder + sand @ 100 + 100 gm reduced the leaf damage upto 4.66 and 4.78 per cent respectively. Leaf axil filling of Sevidol 8G + sand @ 25 + 200gm and placement of carbofuran 3G @ 10gm in 2 perforated sachets were on par in reducing the leaf damage. Application of Lindane +1.3% dust, Endosulfan dust and Pungam seed powder proved to be the least effective in containing the leaf damage. Leaf axil filling of common salt + sand did not have any influence on reducing the leaf damage caused by rhinoceros beetle.

INTRODUCTION

The rhinoceros beetle, *Oryctes rhinoceros* L. is one of the ubiquitous pests of the coconut palm. It infests coconut palms at all stages of its growth causing direct and indirect crop loss. The beetle bores through the unopened fronds and inflorescences causing severe damage resulting in substantial reduction in the yield of palms (Ramachandran *et al.*, 1963; Bedford, 1980). Filling the leaf axil with a mixture of 5% carbaryl dust and sand in equal propositions is an effective prophylactic measure (Divakaran Pillai, 1982). Over dependence on synthetic insecticide will lead to disastrous consequences. Few botanicals were used for rhinoceros beetle management (Rajamanickam *et al.*, 1992; Annon, 1998; Chandrika Mohan and C.P.R.Nair. 2000; Saradamma, 2000,). Only few reports are available on the use of eco-friendly component in coconut IPM programmes. Hence, the present study was carried out at Coconut Research Station, Aliyarnagar to find out the efficacy of selected chemicals and botanicals against coconut rhinoceros beetle in young coconut palms.

MATERIALS AND METHODS

Studies on the efficacy of selected chemicals (dust and granular formulations) and botanicals as leaf axil filling / placement of perforated sachets in leaf axils against coconut rhinoceros beetle in young palms (1-2 years) was undertaken at Coconut Research Station, Aliyarnagar during the year 2000-2001. The following eleven treatments containing chemicals and botanicals were imposed after recording pre treatment observations on per cent leaf damage on young palms in two phases at 6 months interval. The intensity of damage was assessed in terms of per cent leaf damage caused by rhinoceros beetle according to Pillai *et al.*, 1993. Post treatment observations at every 3 months interval for four times were also recorded. The experimental trial was conducted in randomized block design, with three replications. The data on per cent leaf damage were converted into transformed value by using Arcsine transformation and analyzed statistically by Duncan Multiple Range Test.

The following were the treatments

- T1 - Leaf axil filling of carbaryl 10% dust + sand @ 50gm + 10gm / palm
- T2 - Leaf axil filling of Endosulfan dust + sand (50gm + 100gm / palm
- T3 - Leaf axil filling of Lindane dust + sand (50gm + 100gm / palm)
- T4 - Leaf axil filling of Sevidol 8G + sand (25gm + 200gm)
- T5 - Neem seed kernel powder + sand (100gm + 100gm / palm)
- T6 - Pungam seed powder + sand (100gm + 100gm / palm)
- T7 - Placement of carbofuran 3G granules @ 10gym (in 2 sachets/palm)
- T8 - Placement of phorate 10G granules @ 5gm (in 2 sachets / palm)
- T9 - Placement of naphthalene balls @ 3 balls (in 3 sachets / palm)
- T10 - Leaf axil filling of common salt + sand (200gm + 100gm)
- T11 - Untreated control

RESULTS AND DISCUSSION

The results of efficacy of selected chemicals and botanicals against coconut rhinoceros beetle are given in the table 1. It is evident from the

table 1 that six months after 1st phase of treatments, there was a declining trend in per cent leaf damage caused by rhinoceros beetle in all the treatments. But placement of phorate 10G @ 5gm in 2 perforated sachets in two innermost leaf whorls significantly reduced leaf damage from 28.68 per cent to 7.25 per cent after first treatment followed by placement of three naphthalene balls, leaf axil application of Carbofuran 3G, Neem seed kernel powder and Sevidol 8G which reduced the leaf damage from 29.50 per cent, to 10.65 per cent from 24.25 percent to 12.00 per cent, from 26.60 per cent to 13.30 percent and from 23.00 per cent to 14.00 per cent respectively. Leaf axil filling of Neem seed kernel powder and Sevidol were on par in reducing leaf damage at 6 months after imposing the 1st phase of treatments. Application of carbaryl 10% dust reduced leaf damage up to 16.25 percent only. Leaf axil filling of Pungam seed powder, Lindane dust, endosulfan dust showed very less reduction of leaf damage up to only 21.75, 17.60, 16.25 per cent respectively.

Nevertheless, at 12 months after 2nd phase of treatments, it is observed that placement of phorate 10G @ 5gm in perforated sachets significantly reduced the leaf damage from 28.68 per cent to 2.10 per cent followed by placement of 3 Naphthalene balls in 3 perforated sachets and leaf axil filling of Neem seed kernel powder + sand @ 100gm + 100gm reduced the leaf damage up to 4.66 and 4.78 per cent respectively. Leaf axil filling of carbaryl dust @ 50+100gm could reduce leaf damage up to 10.20 per cent. Application of Sevidol 8G + sand @ 25+200gm and placement of Carbofuran 3G @ 10gm in 2 sachets were on par in reducing the leaf damage up to 8.75 and 8.40 per cent respectively. Other treatments viz., Lindane 1.3 dust and Pungam seed powder showed least reduction of leaf damage up to 16.00 and 19.25 per cent respectively. Application of common salt + sand did not have any influence on reducing the leaf damage caused by rhinoceros beetle.

After 2 rounds of treatments at 12 months after treatments, the order of toxicity against coconut rhinoceros beetle was; Phorate > Naphthalene > Neem seed kernel > Carbofuran > Sevidol > Carbaryl > Endosulfan ? Lindane > Pungam seed powder > Common salt.

The results of the present investigation indicated the superiority of phorate, Naphthalene balls, Neem seed kernel powder application either as leaf axil filling or placement in perforated sachets for effective control against coconut rhinoceros beetle are in conformity with reports made by earlier workers (Annon, 1998, *et al.*, 2000;). Neem seed kernel powder can very well be utilized under field condition as ideal component in IPM programmes.

REFERENCES

Annonymus, 1999. CPCRI, Annual Report. 1999

Bedford,G.O., 1980. Biology ecology and control of palm rhinoceros beetles. *Annu. Rev. Entomol.*, 25: 309:339

Chandrika Mohan and Radhakrishnan Nair, C.P. 2000. Effect of *Clerodendran infortunnatum* on grubs of coconut rhinoceros beetle. pp. 297-299. In: Recent Advances in Plantation Crops Research (Ed: N.Muralidharan, R.Rajakumar), Allied Publishers, Chennai. P.470

Ramachandran,C.P., Kurian,C., and Meathew,J. 1963. Assessment of damage to coconut due to *Oryctes rhinoceros* L., Nature and damage caused by beetle and factors involved in the estimation of loss. *Indian.Cocon.J.* 17: 3-12

Pillai,G.B., Sathiamma,B. and Dangar,T.K. 1993. Integrated control of Rhinoceros beetle, pp. 455-464 In: *Advances In Coconut Research and Development* (Ed: M.K.Nair, H.H.Khan, P.Gopalasundaram, E.V.V.Baskara Rao). Oxford and FBH publishing Co. Pvt. Ltd., New Delhi. 755 p

Rajamanickam,K., Kennedy, F.J.S., Christopher,L.A and Raveendran,T.S. 1992. Attractants – An aid in rhinoceros beetle management. *Indian Cocon. J.* XXIII. I pp 6-7

Saradamma,K., Hebsy Bai,S., Naseema Beevi and thomas,B.M. 2000. Botanical, Pesticides for integrated pest management in coconut. Pp. 18-22. Paper presented in RAMCOP. 2000 during May 24-25. At CPCRI, Kayankulam, Kerala

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Table 1. Efficacy of selected chemicals and botanicals against coconut rhinoceros beetle Oryctes rhinoceros

Sl. No.	Treatments	Dose/ Palm	Per cent leaf damage by *O.rhinoceros*				
				* Post treatment			
			Pre.Treat	3 MAT	6 MAT	9 MAT	12 MAT
1	Leaf axil filling of carbaryl 10% dust + sand	50 + 100gm	24.50(29.67)	22.00(27.97)e	16.25(23.81)d	12.00(20.27)f	10.20(18.63)d
2	Leaf axil filling of endosulfan 4% dust + sand	50 + 100gm	22.75(28.53)	21.25(27.49)e	17.60(25.10)e	15.00(22.79)g	14.25(22.22)e
3	Leaf axil filling of Lindane 1.3% dust + sand	50 + 100gm	24.65(29.80)	22.17(28.11)ef	20.00(26.57)f	18.25(25.35)h	16.00(23.58)f
4	Leaf axil filling of savidol 8G + sand	25 + 200gm	23.00(28.66)	19.24(25.99)c	14.00(21.97)c	10.30(18.72)e	8.75(17.26)c
5	Neem seed kernel powder + sand	100 + 100gm	26.60(31.05)	17.29(24.58)b	13.30(21.39)c	8.50(16.95)c	4.78(12.66)b
6	Pungam seed powder + sand	100 + 100gm	24.47(29.67)	23.24(28.86)g	21.75(27.83)g	19.60(26.28)i	19.25(26.06)g
7	Placement of Carbofuran 3G in 2 perforated sachets	10gm	24.25(29.53)	20.38(26.85)d	12.00(20.27)bc	9.69(18.15)d	8.40(16.85)c
8	Placement of Phorate 10G in 2 perforated sachets	5gm	28.68(32.39)	15.26(23.03)a	7.25(15.68)a	5.15(13.18)a	2.10(8.33)a
9	Placement of 3 naphthalene balls in 3 sachets	3 balls	29.50(32.90)	18.60(25.55)c	10.65(19.09)b	7.20(15.56)b	4.66(12.52)b
10	Common salt + sand	200 + 100gm	30.95(33.83)	31.25(34.02)h	33.25(35.24)h	34.00(35.67)j	34.50(35.97)h
11	Untreated check	-	27.65(31.76)	33.25(35.24)i	37.21(37.58)i	37.50(37.76)k	38.00(38.06)I
	SE		NS	1.32	1.24	0.92	0.73
	CD			2.80	2.57	1.96	1.58

* Mean of 3 replications

Transformed values in parenthesis (arcsine)

In a column, means with the same letter are not significantly different at 5% level by DMRT.

MAT : Months after treatment