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MANAGEMENT OF SLUGS AND SNAILS ON YOUNG RUBBER

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Aldicarb granules and Snailkill (2.5% metaldehyde) applied as broadcast (20g/plant) and aldicarb 0.01 per cent slurry with maida proved to be molluscicidal when applied to young rubber plants. Bordeaux paste showed repellent activity for 45 days.

Key words : *Hevea, Mariaella dussumieri, Cryptozona bistrialis*, Slugs, Snails, Molluscicides.

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INTRODUCTION

The infestation of slugs (*Mariaella dussumieri* Gray, *Semperula maculata* Templeton) and snails (*Cryptozona (Xestina) bistrialis* Beck) and their damages in rubber(*Hevea brasiliensis*) plantations have been well documented (Sharples, 1936; Edgar, 1958; Pillay, 1968; Jayarathnam and Rajendran, 1979). Mateldehyde (Edgar, 1955; Ramakrishnan and Pillay, 1962), aldicarb (Judge, 1969; Jayarathnam and Rajendran, 1979) and copper sulphate (Anderson and Taylor, 1926; Bharadwaj, 1972) are reported molluscicidal, while Bordeaux paste was reported as repellent to slugs and snails attacking rubber plants (Jose *et al.*, 1989).

The present investigations are aimed at optimising the dosage of metaldehyde and aldicarb maida slurry and comparison of the effective dose with the repellent activity of Bordeaux paste in rubber seedlings and young budded plants in nursery and field.

MATERIALS AND METHODS

Field experiments were conducted during 1988 to 1992 at four locations in Kottayam District, Kerala, India. Proprietory bait preparation of metaldehyde (Snailkill 2.5G) and aldicarb (Temik 10 G) at the required dosages incorporated into a slurry of maida (fine wheat flour) with water (700 g/l) were used for sprinkling in and around the plant bases. The aldicarb maida slurry was also used for application on the stem. Bordeaux paste (10%) was used (50 g/plant) for comparative evaluation of repellent activity. Different dosages of metaldehyde bait *viz.*, 20, 15, 10 and 5 g/plant was compared with, aldicarb maida slurry (0.01%) and Bordeaux paste (10%) in a randomized block design. For aldicarb, a band of width 2.5 cm and for Bordeaux paste 30 cm was used. Metaldehyde bait was broadcasted at the base of field planted budded stumps, polybag plants and seedling nursery (4 x 1 m area). The number of slugs on the plant during 10 pm to 12 midnight for three days from 10 plants in each plot were recorded and means worked out. Post treatment mortality counts were recorded similarly and expressed per plant per day. Infestation rate was calculated as

the mean percentage affected plants in the treatment recorded prior to treatment and after 45 days from the day of treatment.

The different dosages of aldicarb maida slurry (0.20, 0.15, 0.05, 0.01, 0.005 and 0.001 per cent) were tested on the affected budded stump plants to find out the lowest effective dose.

Finally, Bordeaux paste and the lowest effective dose of aldicarb slurry (0.01%) were tested on affected plants in large scale. Six experiments were conducted for two years in RBD design. The pretreatment population size and post treatment mortality rate were recorded for three days. Reinfestation rates were recorded in the case of repellent treated plants after 45 and 90 days from 10 plants each.

RESULTS AND DISCUSSION

The results of the experiments conducted for control of slugs and snails feeding upon tender terminal leaves of rubber plants of budded stumps in field, polybags and nursery seedlings are given in Table 1, 2, 3 and 4. Application of molluscicides (Table 1) indicated that metaldehyde (Snailkill) bait at 20 g per plant basin recorded highest mortality (3.38 no/plant/day). The reinfestation rate was significantly lower (43.72%). The bait applied at the rate of 15 g per plant also significantly increased the mortality rate. Aldicarb (Temik) 0.01 per cent slurry applied on the stem above the bud union recorded high rate of mortality (9.27 no/plant/day). The reinfestation rate was reduced to 6.36 per cent. Bordeaux paste applied on the stem to a height of 30 cm from the base kept away the slugs from climbing by repellent action. The reinfestation rate was reduced to 17.98 per cent. The application of aldicarb 0.01 per cent and swabbing of Bordeaux paste on stem have given adequate control of slugs and snails for a period of 45 days. Broadcasting of 20 g proprietory metaldehyde bait near the base of the field planted budded stumps, polybags and seedlings recorded higher mortality of slugs and lower reinfestation rates (46.96, 44.52, 42.15 per cent) (Table 2). Metaldehyde baits prepared out of rice bran or wheat bran, lime and cement, were used earlier against slug and snails (Edgar, 1958; Ramakrishnan and Pillay, 1962; Rao, 1965).

Among the different concentrations of aldicarb maida slurry applied on one year old stem of budded plants 0.2 per cent aldicarb slurry gave maximum kill of slugs (21 nos/day/plant) (Table 3). The mortality rate decreased when the concentration was lowered. However, after 45 days, it was

Table 1. Effect of molluscicides for control of slugs and snails

Treatment	Dosage (g/plant)	Pre-treatment population (mean no/plant/day)	Post-treatment mortality rate (mean no/plant/day)	Post-treatment reinfestation (%)
Untreated	–	11.21	0.00	68.38
Metaldehyde bait	20	7.66	3.38	43.72
Metaldehyde bait	15	6.00	2.13	51.18
Metaldehyde bait	10	5.82	1.70	58.12
Metaldehyde bait	5	9.00	1.07	63.22
Aldicarb 0.01%	–	8.45	9.27	6.36
Bordeaux paste 10%	–	10.27	0.00	17.98
CD (P=0.05)			2.00	7.52

Table 2. **Evaluation of different dosages of metaldehyde against slugs and snails**

Treatment	Budded stumps			Polybag plants		Seedling nurery	
	Dosage* (g/plant)	Post treatment mortality** (mean no/ plant/day)	Rein-festation rate***(%)	Post-treatment mortality (mean no/ plant/day)	Reinfe-station rate***(%)	Post-treatment mortality (mean no/ plant/day **)	Reinfest-ation rate***(%)
Untreated	-	0.00	65.26	0.00	57.10	0.00	66.49
Metaldehyde bait	20	3.95	46.96	3.45	44.52	4.10	42.15
Metaldehyde bait	15	3.55	53.42	2.30	49.83	3.62	42.83
Metaldehyde bait	10	2.32	56.17	2.07	49.35	3.00	46.45
Metaldehyde bait	5	1.10	65.50	1.10	57.58	2.02	49.73
CD (P=0.05)		1.02	5.73	0.74	4.22	0.80	3.14

* g per plant in case of budded stump and polybag plants and per m^2 in case of seedling nursery

** mean of three days after treatment

*** after 45 days

observed that there was no reinfestation even in plants treated with 0.01 per cent aldicarb slurry. Since there was no reinfestation at this lower concentration it can be recommended for control of slugs and snails in rubber plantations.

Broadcasting of aldicarb granules at the base of the affected plants has been reported to kill slugs and snails (Judge, 1969; Jayarathnam and Rajendran, 1979). However, the present experiments have indicated that aldicarb can be used in low concentration (0.01 %) along with maida and water in slurry form for painting on the stem. Thus the overall quantity of aldicarb used in slug control can be minimised.

The molluscicidal activity of aldicarb and repellent activity of Bordeaux paste when tested separately revealed that both the treatments controlled the infestation of slug and snail in the field for 45 days (Table 4). The reinfestation started only after 90 days from treatment. Copper sulphate was earlier reported as molluscicide (Anderson and Taylor, 1926; Henderson, 1969; Bharadwaj, 1972; Bali *et al.*, 1984). Jose *et al.* (1989) have reported the repellence of Bordeaux paste to slugs and snails when

Table 3. **Evaluation of different dosage of aldicarb against slugs and snails**

Treatment	Pretreatment population size (mean no/plant/day)	Pretreatment infestation rate (%)	Post-treatment mortality rate (mean no/plant/day)	Post-treatment reinfestation (%)
Untreated	12.28	88.67	0.00	67.14
Aldicarb 0.20%	18.67	72.80	21.00	0.00
Aldicarb 0.15%	16.50	92.10	12.67	0.00
Aldicarb 0.10%	10.38	96.75	10.33	0.00
Aldicarb 0.05%	7.14	86.28	8.67	0.00
Aldicarb 0.01%	5.00	80.15	6.00	0.00
Aldicarb 0.005%	11.12	78.90	5.00	19.91
Aldicarb 0.001%	9.80	84.50	4.33	28.03
CD (P=0.05)	-	-	3.60	4.62

Table 4. **Effect of repellents and molluscicides in control of slugs and snails**

Treatment	Pre-treatment infestation rate (%)	Post-treatment infestation after 45 days	Reinfestation rate after 90 days
Untreated	92.10	60.00	58.01
Bordeaux paste 10%	96.86	0.00	6.88
Aldicarb 0.01%	88.50	0.00	4.23
CD (P=0.05)	-	3.60	4.62

applied on the stem of rubber plants. The relatively less toxic Bordeaux paste used as a repellent can substitute aldicarb which is extremely toxic to human beings also.

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