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Evaluation of Some Newer Insecticidal Formulations and Botanicals Against Whitegrub Beetles

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Whitegrubs are the polyphagous larvae of scarabaeid beetles. The beetles emerge from soil after onset of monsoon, congregate on host trees at night and feed and mate there. Heavy incidence results in complete defoliation of preferred host trees like ber retarding growth and vigour ultimately reducing the fruit yield. *Holotrichia consanguinea.* Blanchard is the most important species damaging Zizyphus foliage in North Gujarat. Several insecticides have been tested against whitegrub beetle in other part of country (e.g. Brar and Sandhu, 1980; Shah and Garg, 1987 and Mishra and Singh, 1991). However, in recent years new formulations viz., quinalphos 20 Af (Ekalux 20 AF) and carbosulfan 25 EC (Marshal 25 EC) have been introduced. Therefore these new formulations were evaluated alongwith some conventional insecticides and botanical products against whitegrub beetle in ber orchard during 1998 at Arid Fruit Research Station, GAU, Sardar Krushinagar.

Total 30 ber trees of gola variety were randomly selected. One tree was assigned for each treatment and replicated thrice. Insecticidal spray fluid was sprayed on ber trees during evening hours one day after first satisfactory monsoon rain. Total number of whitegrub beetles present on each tree was counted and recorded between 9.00 and 11.00 p.m. on the same day of spraying and subsequently on second and third day during same period. The number of beetles died and fallen under each tree was counted in the next morning till three days between 5.00 and 6.00 A.M. From these data per cent beetles mortality was computed.

Perusal of results revealed significantly higher beetle mortality in all the treatments barring azadirachtin 0.05 per cent and tobacco snuf decoction (13.33 g/l) than control. The new formulation of quinalphos i.e. Ekalux 20 AF 0.05 per cent registered the highest beetle mortality (82.78%) followed by carbaryl 0.2 per cent (73.73%) and carbosulfan 0.05 per cent (58.42%) when observed 12 hours after treatment. The remaining conventional and synthetic pyrethroid compounds were less effective against whitegrub beetles.

The trend of effectiveness of insecticides changed drastically 36 and 60 hours after spraying. Carbaryl 0.2 per cent proved as the most effective insecticide causing the highest beetle mortality (63.04%). The remaining insecticides lost their toxicity

TABLE 1

Efficacy of different insecticides against whitegrub beetles damaging ber leaves.

Sr. No.	Treatments	Concentration	Dose (ml of g/lit.)	Beetle mortality (%)hours after spray						Mean Mortality
				12 hrs.		36 hrs		60 hrs.		
1.	Monocrotophos 36 SL	0.04	1.0	49.23	(44.56)*	36.68	(37.28)	29.95	(33.18)	38.62
2.	Fenvalerate 20 EC	0.01	0.5	39.33	(38.84)	18.35	(25.37)	8.37	(16.82)	22.02
3.	Quinalphos 20 AF	0.05	2.5	82.78	(65.49)	40.47	(39.51)	29.88	(33.14)	51.04
4.	Chlorpyriphos 20 EC	0.05	2.5	28.03	(31.97)	12.86	(21.02)	5.18	(13.16)	15.36
5.	Deltamethrin 2.8 EC	0.015	0.5	42.55	(40.72)	18.71	(25.63)	10.84	(19.23)	24.03
6.	Carbosulfan 25 EC	0.05	2.5	58.42	(49.85)	38.58	(38.40)	29.44	(32.86)	42.15
7.	Azadirachtin 0.3% EC	0.50	5.0	00.49	(4.05)	00.49	(4.05)	00.49	(4.05)	00.49
8.	Carbaryl 50 WP	0.20	4.0	73.73	(59.17)	63.04	(52.56)	39.31	(38.83)	58.69
9.	Tobacco snuf decoction	—	13.33	00.49	(4.05)	00.49	(4.05)	00.49	(4.05)	00.49
10.	Control (Untreated)	—	—	00.49	(4.05)	00.49	(4.05)	00.49	(4.05)	00.49
	S. Em. ± :				1.63		1.47		1.19	
	C. D. at 5% :				4.85		4.37		3.55	
	C. V. % :				8.25		10.12		10.37	

* Figures in parenthesis are arcsin $\sqrt{\text{per cent} + 0.5}$ values.

quickly in just 36 hours after spraying. The beetle mortality decreased further and as such carbaryl recorded the highest efficacy (39.31%) 60 hours after spraying. The mean of three observations revealed the highest beetle mortality by carbaryl 0.2 per cent (58.69%) followed by quinalphos 20 AF 0.05 (51.04%) carbosulfan 0.05 (42.15%) and monocrotophos 0.04 per cent (38.62%).

Thus, from the overall results it can be inferred that carbaryl was the most effective insecticide followed by the new formulation i.e. quinalphos 20 AF against whitegrub beetles when sprayed on ber trees. Earlier to this, Brar and Sandhu (1980) and Shah and Garg (1987) also reported carbaryl and quinalphos as the most effective insecticides against whitegrub beetles.

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