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STUDIFS ON THE CHEMICAL CONTROL OF THE RICE LEAF ROLLER, *CNAPHALOCROCIS MEDINALIS* GUENEE

Contact toxicity of different insecticides to the moths

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The rice leaf roller *Cnaphalocrocis medinalis* Guenee has become a major pest in all the rice growing tracts of India in recent years (Usman and Patturudriah, 1955; Abraham 1958; Rajamma and Das, 1969; Dorge *et al*, 1971; Anon. 1971 and 1972.) Results of experiments reported so far on the control of this pest are limited to the evaluation of insecticides applied in field in regular schedules. Though a wide range of inseticides has evaluated in different parts of India, the results reported are highly variable and often inconclusive. This may be on account of the diversified factors operating such as the stage specificity of insecticides habit of the larvae remaining in the leaf folds and the effect of residual toxicity of the different toxicants. Objective studies were hence undertaken to assess the effect of different insecticides on the control of *C. medinalis* with reference to these and other related factors. The present contribution reports the relative toxicity of the newer insecticides to the moths C. *medinalis* under laboratory conditions.

Materials and Methods

The insecticides used in this experiment were BHC, endrin, diazinon, acephate, fenitrothion, demethoate (supplied by Tata Fison, Bombay), endosulfan (Supplied by Hoescht Pharmaceuticals, Bombay), ethyl parathion, methyl parathion, fenthion, trichlorfon, methyl demeton (supplied by Bayer India Ltd., Bombay), dichlorvos, phssphamidon, monocrotophos (supplied by Ciba of India Ltd., Bombay), carbophenothion, leptophos (supplied by Mysore Insecticides, Bombay) elsan (supplied by Bharat Pulverising Mills, Madras), malathion, thimet (supplied by Cynamid India, Ltd., Bombay) quinalphos, thiometon, formothion (supplied by Sandoz India Ltd., Bombay) and carbaryl (supplied by Union Carbide India, Ltd , Bombay. Log-dose-probit mortality relations between these insecticides and the moths were worked for which the moths were sprayed under a Potter's tower with graded concentrations of the insecticides in emulsions. To prepare the emulsions benzene (chloroform in the case of carbaryal) was used as solvent and Triton x 100 as

Table

Contact [illegible]xicity of various insecticides to the [illegible]oths of C. medinalis

Sl. No.	Name of insecticide	[illegible]nity =X²	Regression equation	Re-[illegible]arks	L[illegible]	F[illegible]ial l[illegible]ts	Order of Relative toxicity
1	2	3	[illegible]	5	6	7	8
1	B.[illegible]C.	[illegible].010	Y=1.343X+[illegible].[illegible]29	10[illegible]	0.0[illegible]084	0.0[illegible]019 0.01432	[illegible]
[illegible]	End[illegible]	0.850	Y=[illegible].884X+ 1.605	1[illegible]	0.0[illegible]655	0.[illegible]494 0.[illegible]017	[illegible]
[illegible]	End[illegible]fan	0.8[illegible]0	Y=4.8[illegible]4X- [illegible].645	10	0.007418	0.[illegible]9107 0.[illegible]616[illegible]	1[illegible]
4	[illegible] pa[illegible]on	1.010	Y=1.[illegible]23X+3.6[illegible]1	10	0.0001607	0.00[illegible]11[illegible]5 0.00[illegible] 2275	1
5	M[illegible] P[illegible]ion	1.0[illegible]0	Y=[illegible]X+0.[illegible]61	10	0.000[illegible] 6[illegible]	0.00[illegible]604[illegible] 0.007 5255	[illegible]
6	[illegible]ch[illegible]vos	1.3[illegible]9	Y=2.42 X+0.[illegible] 4	10	0.00537[illegible]0	0.00 922 0.002 99	16
7	Carbophenothion	4.[illegible]2	Y=[illegible].454X+1.7[illegible]6	10	0.00[illegible]7[illegible]	0.00[illegible]671 0.00[illegible]775	[illegible]
[illegible]	D[illegible]in[illegible]n	0.[illegible]14	Y=[illegible].7[illegible]X–1.7[illegible]	10	0.0000669[illegible]7	0.00007447 0.00005[illegible]72	[illegible]
9	[illegible]	0.9[illegible]0	Y=1.8[illegible]X+[illegible]04	10	0.00[illegible]1057	0.00141[illegible] 0.00074[illegible]	4
1[illegible]	[illegible]ent[illegible]n	0.165	Y=[illegible]7X+0.57[illegible]	10	0.00[illegible]169	0.001[illegible]41 0.0009[illegible]4	[illegible]
1[illegible]	Malat[illegible]on	0.[illegible]27	Y=1.05[illegible]X+[illegible].497	10	0.00[illegible]667	0.003[illegible]2[illegible] 0.002280	1[illegible]

emulsifier. These were maintained in the final spray fluid at 5 and 0.625 per cent respectively. In the case of diazinon and elsan proprietory emulsion concentrates were diluted with the required quantity of water.

Moths used in the experiment were reared out of grown up caterpillars collected from field. Moths kept fed on diluted honey (1:1) for 48 hours were used for the experiments. They were put in petri dishes (9 cm diameter) at the rate of 10 moths in each dish and closed with wire gauze covers and sprayed under potter's tower using 1 ml of spray fluid for each dish. The sprayed dishes were dried under an electric fan for five minutes and the moths transferred to 500 ml glass beakers and closed with muslin cloth. Honey on cotton swab was provided as food for the moths in each beaker. Mortality counts were taken at the end of 24 hours. LC_{50} values were calculated from the data by probit analysis (Finnty 1952).

Results

The results are presented in Table 1. Ethyl parathion was far more toxic to the moths than the rest of the 24 insecticides, its LC_{50} value being 0.00001607. Mythyl parathion, diazion, elsan, fenitrothion and carbaryl also showed remarkably high toxicity to the moths. The order of toxicity of the remaining insecticides was acephate > fenthion > carbophenothion > methyl demeton > malathion thiometon > phorate > phosphamidon > dichlorvos > leptophos > endosulfan dimethoate > formothion > monocrotophos > BHC > endrin > trichlorfon. The organochlorine insecticides (BHC, endrin) known as efficient contact poisons showed low toxicity to moths of C. *medinalis*. Among the organiphosphates, systemics were not effective.

Summary

The log dose-probit mortality relationships between 24 newer insecticides and moths of C. *medinalis* was ascertained for the first time adopting standard bioassay techniques. Ethyl parathion was the most toxic and methyl parathion, diazinon, elsan, fenitrothion, carbaryl and acephate also showed appreciable toxicity. The other insecticides gave toxicities of varying magnitudes.

സംഗ്രഹം

നെല്ലിന്റെ ഓലചുരുട്ടി പുഴുക്കളുടെ ശലഭങ്ങൾക്കെതിരെ കീടനാശിനികളുടെ സ്പർശ വിഷാക്തത ലാബറട്ടറി പരീക്ഷണങ്ങൾക്ക വിധേയമാക്കിയതിൽ ഏററവും കൂടുതൽ വിഷാക്തതയുള്ളതു് ഫോളിഡോൾ (ഈതയിൽ പാരത്തയോൺ) ആണെന്നു കണ്ടു. മെററാസിഡ് (മീതയിൽ പാരത്തയോൺ), ഡയാസിനോൺ, എൽസാൻ, ഫെനിട്രോത്തയോൺ, കാർബാറിൽ, അസിഫേററ് എന്നീ കീടനാശിനികൾക്കും ഗണ്യമായ വിഷാക്തതയുണ്ടെന്നു തെളിഞ്ഞു. സസ്യാന്തരവ്യാപക കീടനാശിനികൾക്കും, ക്ലോറിനേററിയ ഹൈഡ്രോകാർബൺ കീടനാശിനികൾക്കും ഈ ശലഭങ്ങളിലുള്ള വിഷാക്തത താരതമ്യേന കുറവാണ്.

1	2	3	4	5	6	7	8
12	Leptophos	4.122	Y=1.516X + 3.777	10^3	0.006407	0.008760 0.004687	17
13	Acephate	1.404	Y=1.127X + 4.191	10^4	0.0005274	0.0006269 0.0004353	7
14	Quinalphos	9.87	Y=2.630X+1.544	10^4	0.002061	0.002582 0.001644	9
15	Carbaryl	1.92	Y=2.703X+1.0616	10^5	0.0002767	0.0003304 0.0002317	6
16	Fanitrothion	0.573	Y = 1.619X + 1.607	10^4	0.0001245	0.0001683 0.00008204	5
17	Trichlorfon	1.592	Y=1.037X + 4.0721	10-	0.08337	0.1077 0.06451	24
18	Thiometon	5.586	Y= 1.940X+2.185	10^4	0.002825	0.003634 0.002196	13
19	Phosphamidon	0.495	Y = 1.368X+2.67	10^4	0.005014	0.007519 0.003344	15
20	Dimethoate	0.210	Y=0.529X+4.404	10^3	0.01279	0.03206 0.005093	19
21	Monocrotophos	0.808	Y=2.268X—0.160	10^4	0.01884	0.02375 0.01494	21
22	Formothion	0.554	Y=1.109X+2.638	10^4	0.01355	0.01717 0.01070	20
23	Phorate	0.397	Y=0.852X + 3.612	10^5	0.004440	0.008678 0.001975	14
24	Methyldemeton	1.336	Y=1.310X+3.130	10^3	0.002635	0.004504 0.001539	11

Data were not heterogeneous in these cases

Data were homogeneous in all cases at P = 0.05; Y = Profit kill; LC_{50} = Concentration Calculated to give 50 Per cent mortality.

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