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RESIDUAL TOXICITY OF GRANULAR INSECTICIDES TO FISHES AND PRAWNS IN THE POKKALI FIELDS

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The 'pokkali' varieties of rice, which are well suited for growing in the saline situations in Kerala, are subject to infestation by the stem borer *(Tryporyzaeincertulas)* and the leaf roller *(Cnaphalocrosismedinalis)*. The farmers seldom resort to pest control due to fear of insecticidal toxicity to fish and prawns, which form a substantial subsidiary income to them as components in the integrated production system. The identification of insecticides which are effective against these pests and at the same relatively safer to the fishes and prawns is therefore of considerable importance in the pokkali system of cultivation.

Tomy *et al* (1981) conducted a screening trial with the seven insecticides carbaryl, quinalphos, monocrotophos, fenitrothion, phosphamidon, fenthion and methyl parathion and it was found that all except quinalphos were safer for use in pokkali fields at recommended doses with a minimum 15 cm of standing water. In the pokkali system, the fields are continuously flooded and spray applications are almost impossible unless one could reach all over the field in a country boat. The present study was taken up to assess the toxic effect of application of granular insecticides on the mounds as an alternative to foliar sprays on the fish/prawn population and thus to identify a relatively safer insecticide for use in the pokkali system.

Materials and Methods

The experiment was conducted for three years from 1982-83 to 1984-85 in a randomised block design. In the first two years, ie., 1982-83 and 1983-84, the experiment was conducted at the Rice Research Station, Vyttila and in a farmer's field at Kannamali, Cochin. The granular insecticides lindane+carbaryl 8% (Sevidol) at 1.25 kg ai/ha, carbofuran (Furadan 3% G) at 0.75 kg ai/ha, phorate (Thimet 10%G) at 1.5 kg ai/ha were evaluated against a control which received no granular insecticides.

As severe toxic effects to fishes were manifested from phorate application in the first two years, this was deleted and the trial was continued with three treatments and seven replications in the third year namely 1984-85.

Rice was cultivated under pokkali system using Vyttila 1 seeds at 100 kg/ha. Sprouted seeds were sown in the mounds. The following three types of fishes each at five numbers were released per plot at 10-15 days after sowing.

1. Air breathing fish fingerlings of species *Anabas, Channa* and *Gabbies*
2. Gill breathing fish fingerlings of species *Tilapia mosambica, Etroplus suretenses* and *Etroplus maculatus*.

3. Prawns of species *Penaeus indicus* and *Penaeus dobsoni*

Granular insecticides were applied as per treatments on the top of mounds about 10-20 days after sowing. After application of insecticides mortality of fishes was recorded for 24 hours.

The mounds were dismantled and seedlings were spread over the entire field. After spreading of seedlings fishes were again released in the plots and mortality observations made. In no case, mortality was noticed at this stage.

Scorings for stem borer (white ear head) and leaf roller attack were made. The data transformed to percentage values and statistically analysed.

Other field operations continued uniformly in all plots. The crop was harvested and yield per plot recorded separately and statistically analysed.

Results and Discussion

Data on mortality of fishes, scoring for stem borer and leaf roller incidence and yield are presented in Tables 1 to 4. There was no significant difference between treatments in mortality, pest attacks and yield. During 1984-85, mortality of fishes and prawns was not found. It may be due to the high water level in the field *which* might have diluted the concentration of the insecticides.

Highest mortality of fishes was recorded in plots treated with phorate in both the years (Table 1). Mortality of fishes was also noted in control plots adjacement to plots treated with phorate. Phorate was therefore clearly found to be unsuitable for use in pokkali rice cultivation in view of hazards to fishes.

Table 1

Scoring for mortality of fishes and prawns (%)

Treatments	1982-83	1983-84	Total	Means of means
Sevidol	24.09	11.74	35.83	17.91
Carbofuran	23.37	23.05	46.42	23.21
Phorate	70.57	53.79	124.36	62.18
Control	18.58	13.83	32.41	16.21
CD (0.05)	NS	NS		

Table 2

Scoring for pest attack in 1984-85 (%)

Treatments	Stem borer (white ear heads)	Leaf roller
Sevidol	2.76	1.80
Carbofuran	2.38	1.49
Control	1.99	1.75
CD (0.05)	NS	NS

Table 3

Mean consolidated yield (kg/ha)

Treatments	1982-83	1983-84	Total	Means of means
Sevidol	3348	2608	5956	2978
Carbofuran	3324	2832	6156	3078
Phorate	3364	2710	6074	3037
Control	3392	2664	6056	3028
CD (0.05)	NS	NS		

Table 4

Mean yield for 1984-85 (kg/ha)

Treatments	Yield kg/ha
Sevidol	3038
Carbofuran	3193
Control	2979
CD (0.05)	NS

Summary

Among the granular insecticides tested, none of the insecticides was found to be completely safe for use in pokkali fields.

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Reference

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