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Research Note

# Relative safety of combination products of insecticides to *Tytthus parviceps* (Reuter), a predator of planthoppers and leafhoppers in rice

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**ABSTRACT:** **Safety of four combination products of insecticides and two single compound insecticides to adults of brown mirid bug *Tytthus parviceps*, a predator of rice planthoppers was assessed under greenhouse conditions. Two combination products *viz* chlorpyriphos (50%) + cypermethrin (5%) (at 344 ppm.) and acephate (45%) + cypermethrin (5%) (at 500 ppm) were relatively safer than other two combination products, but less safe than acephate (750 ppm) or monocrotophos (500 ppm). In general, all the products were safer to nymphs of *T. parviceps* than to adults.**

**KEY WORDS:** Insecticides, leafhoppers, planthoppers, predator, relative safety, rice, *Tytthus parviceps*

The brown mirid bug, *Tytthus parviceps* (Reuter) is an important predator which feeds on the eggs and to a lesser extent on the nymphs of rice brown planthopper, *Nilaparvata lugens* (Stål), white backed planthopper, *Sogatella furcifera* (Horvath) and green leafhopper, *Nephottetix virescens* (Distant) (Pathak and Saha, 1976; Manjunath *et al.*, 1978; Alam, 1984; Basilio and Heong, 1990). As the spectrum of effectiveness of single compound insecticides cannot meet the requirements of different insect pest complexes present in the rice ecosystem, the combination products containing chemicals with diverse spectrum of efficacy are being evaluated against rice pests (DRR, 2001; 2002). The information available in literature on the safety of combination products to the natural enemies is scarce and completely lacking with regard to the brown mirid bug, *T. parviceps*. So the present studies were conducted under greenhouse conditions at the Directorate of Rice Research during 2002 to assess the initial and residual safety of these insecticides as spray to the nymphs and adults of the brown mirid bug, *T. parviceps*.

Brown planthopper (BPH) and mirid bugs were reared on rice plants in the greenhouse. The insecticide treatments (Table 1) were replicated four times in a Randomized Complete Block Design. The insecticides at specified concentrations were sprayed up to run-off stage on 40-day-old potted rice plants of TN 1 variety. The insects were confined on TN1 plants at 1, 7, 14, 21 and 28 days after spraying and separate sets were maintained for each

**Table 1. Relative safety of combination products to nymphs and adults of *T. parviceps* under greenhouse conditions**

| Treatment | Conc. a. i. (ppm) | Per cent mortality after 24 h exposure at different days after treatment and persistent toxicity | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nymphs | | | | | | Adults | | | | | |
| | | 1 | 7 | 14 | 21 | 28 | Persistent toxicity | 1 | 7 | 14 | 21 | 26 | Persistent toxicity |
| Chlorpyriphos + cypermethrin (Nurelle 505) | 344 | 100a | 60b | 2.5bc | 0d | 2.5c | 613d | 100a | 100a | 17.5c | 5d | 5d | 1067c |
| Betacyfluthrin + Chlorpyriphos (Bulldock star 262.5 EC) | 393 | 100a | 95a | 58a | 78b | 28b | 2002b | 100a | 92.5a | 100a | 100a | 57.5b | 2478a |
| Acephate + Cypermethrin (Upacy 50DF) | 500 | 100a | 0c | 0c | 0d | 0c | 100e | 100a | 52.5b | 57.5b | 27.5c | 2.5d | 1280c |
| Imidacloprid + Betacyfluthrin (Confidar Ultra 100 EC) | 30 | 100a | 100a | 65a | 100a | 68a | 2590a | 100a | 92.5a | 97.5a | 90a | 77.5a | 2562a |
| Betacyfluthrin (Bulldock 25 EC) | 12.5 | 100a | 100a | 42.5a | 42.5c | 5c | 1510c | 100a | 82.5a | 100a | 85ab | 32.5bc | 2268ab |
| Thiacloprid (Calypso 240 SC) | 120 | 100a | 2.5c | 18b | 13d | 7.5c | 171e | 97.5a | 67.5b | 80b | 67.5b | 35c | 1920b |
| Monocrotophos (Nuvacron 36 WSC) | 500 | 30b | 0c | 0c | 0d | 0c | 30f | 17.5b | 7.5c | 7.5cd | 5d | 2.5d | 199e |
| Acephate (Starthene 75 WP) | 750 | 100a | 5c | 0c | 0d | 0c | 180e | 100a | 10c | 7.5cd | 2.5d | 2.5d | 572d |
| Untreated control | | 0c | 0c | 0c | 0d | 0c | 0g | 2.5c | 2.5c | 2.5d | 0d | 0d | 35f |

Note: Figures in a column followed by the same letter are not significantly different at P=0.05 by DMRT.

day of confinement. Ten mirid bug nymphs or adults were confined each time with the help of suitable Mylar cages and observations on mortality were recorded after 24 hours of exposure. Separate experiments were conducted with nymphs and adults. Persistent toxicity (PT) values were calculated for 24 hours exposure period according to Pradhan (1967). The mortality percentages were worked out and transformed into angular values for statistical analysis. PT values were subjected to square root transformation. The data were analyzed in Randomized Block Design and the means were separated by Duncan's Multiple Range Test (DMRT).

The combination product chlorpyriphos (50%) + cypermethrin (5%) (344 ppm of a. i.) exhibited better safety from 14th day onwards (17.5% mortality) and also recorded relatively lower PT values (1067) as compared to other combination products (57.5 to 100 % mortality and PT values of 1280 to 2562). However, these products were less safe than the standard checks monocrotophos (500 ppm) and acephate (750 ppm), which recorded 7.5 per cent mortality after 14 days of exposure along with low PT values (199-572). The two single insecticides *viz.* betacyfluthrin (12.5 ppm), and thiacloprid (120 ppm) also exhibited less safety (PT values of 1920 to 2268) to adults of *T. parviceps* than the check insecticides, monocrotophos and acephate (Table 1).

With regard to safety of the test products to nymphs of *T. parviceps* also, chlorpyriphos (50%) + cypermethrin (5%) (at 344 ppm) and acephate (45 %) + cypermethrin (5%) (500 ppm) showed better safety recording PT values of 100 to 613 as compared to other two combination products (PT values of 2002 to 2590), but less safer than standard checks, monocrotophos and acephate (PT values of 30 to 180). Between the two single compound insecticides, betacyfluthrin was less safe (PT value of 1510) than thiacloprid (PT value of 171) (Table 1). A comparison of safety of different products to nymphs *vis-à-vis* adults revealed that all the insecticides including standard checks were safer to nymphs than to adults of brown mirid bug, *T. parviceps* under greenhouse conditions, except imidacloprid 50g + betacyfluthrin 50g (30 ppm) which exhibited very poor safety to both nymphs and adults (Table 1).

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