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The non target action of two microbial pesticides – delfin, a commercial preparation of a bacterium, *Bacillus thuringiensis* Kurstaki strain and ecocill, of a fungus *Verticillium lecanii* on an assassin bug, *Rhynocoris longifrons* has been extensively studied.

The toxicity of the microbial pesticides was studied on the first, second, third, fourth and fifth instar nymphs and adults bugs. The two microbial pesticides were sprayed in different concentrations on the life stages of *R. longifrons* and nhrLC$_{50}$ values were found out using probit analysis. The 96hLC$_{50}$ of delfin for first, second, third, fourth and fifth instar nymphs and adult bugs were and ecocill respectively.

The toxicity study was repeated by feeding *R. longifrons* life stages with *Corcyra cephalonica* caterpillars exposed to different concentrations of the two microbial pesticides. The caterpillars were sprayed with different concentrations of the microbial pesticides and allowed an incubation period of two days. Based on the concentration of the spray, *C. cephalonica* caterpillars accumulated the microbial toxicants and these caterpillars were supplied as feed material to the nymphal instars and adults of *R. longifrons*.

The 96hLC$_{50}$ of delfin to first, second, third, fourth and fifth instar nymphs and adult *R. longifrons* were 0.101, 0.211, 0.368, 0.619,
1.076 and 4.997 mg/l (topical spray) 0.077, 0.323, 0.689, 1.289, 3.204 and 7.295 mg/g (larval feeding) and that of ecocill, 0.499, 1.304, 2.283, 3.199, 5.621 and 10.937 mg/l (topical spray) and 1.567, 2.12, 3.456, 5.093, 8.607 and 10.598 mg/g (larval feeding respectively.

The different instars were sprayed with 1/4th and 1/10 96hLC$_{50}$ of delfin and ecocill respectively. The first instar nymphs were sprayed on the second day of emergence. The second, third, fourth and fifth instar nymphs and adult bugs were sprayed on the second day after moulting. The spraying process involved drenching in the toxicant for a brief period of 15 seconds and allowing them to move after drying them in absorbent paper for another 15 seconds. The first instar nymphs further received a spray as they moulted into second instar nymphs which were again sprayed at the third, fourth and fifth instar levels and as adult bugs. The repeated spraying was tolerated by the bugs as the concentration at which the spraying was done was the incipient lethal level which is much below the sublethal level of toxicity.

The life stages of *R. longifrons* sprayed with delfin and ecocill were analysed for morphometric changes. Almost all the major morphometric measurements were modified in the treatment groups. Head length, head width, antennal length, tibial length, thoracic and abdominal measurements were significantly lower in the bugs and their life stages that were treated with the microbial pesticides. The
morphometric changes were due to internal physiological changes in the treated *R. longifrons*.

The biology of the treated bugs was modified. The total development period increased to 85.6 ± 7.2 days in bugs treated with 1/4\(^{th}\) 96h LC\(_{50}\) ecocill compared to control (67.75 ± 4.1 days). Similar changes were observed in the stadial periods, fecundity, longevity and a variety of other biological indicators.

Changes were noticed in the mating behaviour of adult *R. longifrons* raised from treated nymphs. The adults showed restricted mating response. The treated bugs took more time to get aroused 42 ± 3.5 min in control, 76 ± 5.2 and 90 ± 8.6 min in 1/4\(^{th}\) 96LC\(_{50}\) delfin and ecocill respectively. Each of the mating components was much slower in the treated males and females. The time taken for ejecting the spermatophore capsule also increased.

The predatory behaviour was modified in the treated bugs. The treatment resulted in bugs with slower predatory response presumed to be due to the impact of the pesticide on the nervous system of the bug. *R. longifrons* is an efficient predator and any bull in its predatory potential results in an increase in pest population under field conditions.

The functional response of the treated bugs indicated a decline in their vicarious feeding spree. The number of prey (*C. cephalonica*) that
could be handled decreased to 71.4 and 101.2, in 1/4th and 1/10th 96h
delphi and 61.2 and 98.2 in 1/4th and 1/10th 96h ecocill respectively
compared to control value of 105.2. Changes in functional response
indicated decrease in the predatory efficiency of the treated bugs.

The treated bugs were examined histologically. The two microbial
pesticides inflicted cellular damages in the treated bugs. Cellular
necrosis, pycnotic nuclei, haemolymph occlusion, vacuolation and a
variety of other damages were noticed in the midgut and other regions.
The diploid chromosome counts varied from 42 to 52, the actual diploid
number being 48. Among the 24 chromosomes forming the genome of
R. longifrons, 9 were metacentric, 1- sub metacentric, 1- sub tolocentric
and 13- acro or telo centric.