

Research Paper :

Joint toxicity of organophosphates resistance along with the synthetic pyrethroids in *Helicoverpa armigera*



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SUMMARY

The study was conducted to find out a possible synergistic action by joint toxicity of organophosphate resistance with synthetic pyrethroids in *H.armigera*. The result indicated that profenofos with pyrethroids seemed to be very promising which could be well explored in the management of *H.armigera*, while chlorpyrifos and quinalphos with pyrethroids showed meagre level of resistance. The experimental data showed a very high level of resistance by monocrotophos with pyrethroids throughout the season.

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Key words :

Helicoverpa armigera,

Organophosphate, Resistance, Joint toxicity, Synthetic pyrethroids

H.armigera is polyphagous and cosmopolitan pest found to infest several economically important agricultural crops like cotton, sorghum, tomato, pigeonpea and chickpea, besides infesting other oil seeds, cereals and vegetable crops (Sachan, 1990). Kranthi *et al.* (1997) reported that the annual losses due to *H.armigera* inflicted to cotton and pulses in India alone were estimated to be of the order of US\$ 300-500 million per annum.

In India, an intensive country wide resistance monitoring programme has demonstrated that pyrethroid resistance is now wide spread across the country showing significant levels of organophosphate resistance present in most of the population. (Kranthi *et al.*, 1996)

In the light of the above, the present study was undertaken to investigate the resistance effect of joint toxicity by using organophosphate compounds along with synthetic pyrethroids in *H.armigera* larvae.

MATERIALS AND METHODS

The laboratory study was carried out in the Department of Entomology during the academic year 2005-06 in Randomized Block Design. The eggs and larvae of *H.armigera*

were collected weekly from various host plants from nearby farmer's field and the College farm. The collected eggs were disinfected with 0.02% sodium hypochlorite solution and then transferred into multicellular tray having chickpea based semi synthetic diet (Armes *et al.*, 1992). Later, the third instar larvae gaining weight of 30-40mg were individually placed in multicellular trays to avoid cannibalism. Such larvae at 1ul dose were treated on the dorsal prothorax region with Hamilton micro-applicator under a non-replicated trial using synthetic pyrethroids such as Cypermethrin 0.1ug were applied 15-20 minutes prior to different organophosphate insecticides as Quinalphos 0.75ug, Profenofos 0.1ug, Monocrotophos 1.0ug and Chlorpyrifos 1.0ug to obtain joint toxicity effect. Control treatment was carried out by applying larvae with acetone only. Relative humidity of 78±2 per cent, temperature of 27 ± 2°C and photoperiod of approximately 13:11 Light : Dark hours regime was maintained throughout the rearing procedure. Mortality of larvae was observed after every 24 hrs upto 7 days. Corrected mortality was calculated by using Abbotts (1925) formula. Later on using the per cent resistance formula, the joint toxicity effect of organophosphate resistance along with

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