

Abstract

Pyrethroid resistance levels in *Helicoverpa armigera* have continued to escalate slowly to around 80-90% but endosulfan resistance has stabilised at about half that level. Resistance to the partial resistance breaking pyrethroid bifenthrin has increased slightly but on average, resistance levels to this product are about half those to the other conventional synthetic pyrethroids. Profenofos resistance is still low in all areas except for an incipient problem in central Queensland. Via tolerance curve analyses indicate the emergence of elevated levels of pyrethroid resistance mechanisms. These are synergisable by alternative mfo (mixed function oxidase) inhibitors to Pbo (piperonyl butoxide) and are overcome by synergophore pyrethroid analogues such as Series Two and prallethrin but not by esterase inhibitors nor by a non-ester pyrethroid analogue (silaflofen). This indicates the possible development of new isomorphs of P450 monooxygenases (mfos) synergised by alternate chemical classes of mfo inhibitors such as the propynyl ethers but not fully synergisable by Pbo. Laboratory studies indicated some potential synergists for field evaluation (ethion, malathion, phosmet) but most compounds tested were ineffective, including profenofos, trichlorfon, phoxim, azamethiphos and other esterase and glutathione inhibitors. Cyclodiene resistance did not give cross resistance to the avermectins. Baseline susceptible data and discriminating doses were evaluated for three classes of new insecticides; spinosad, the pyrrole chlorfenapyr and the avermectins (abamectin and emamectin benzoate). Abamectin was identified as a potential new replacement for endosulfan for early season *Helicoverpa punctigera* control. *Helicoverpa punctigera* resistance levels to both endosulfan and pyrethroids have remained low.