

Ecofriendly synergists for insecticide formulations (EcoSyn): *in vivo* evaluation of novel synergists against resistant pests.

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In the framework of the EcoSyn project, after synthesis and *in vitro* evaluation of different novel compounds, a list of possible novel synergists was selected on the basis of the highest inhibition rate obtained in *in vitro* assays using purified esterases and recombinant P450 enzymes. Furthermore the difficulties and cost of chemical synthesis of synergistic compounds was considered. The well known synergist piperonyl-butoxide (PBO) was included as a standard reference. Laboratory bioassays were performed combining these compounds with commercial formulated insecticides (2 pyrethroids and 2 neonicotinoids) against lab reared insecticide resistant *Myzus persicae* and *Bemisia tabaci* strains. All insect strains were collected previously in Northern Italy after serious field control failures after neonicotinoid and / or pyrethroid applications.

Efficacy against Italian and Polish populations of Pollen Beetle (*Meligethes aeneus*) was also evaluated. In this case field collected insects were used, as no lab rearing protocols are currently available for this pest. As in Italy oil seed rape is not a common crop and above all it is not usually treated with insecticides, Italian populations of *M. aeneus* were considered as the susceptible reference to be compared with more resistant Polish populations.

Different performances have been observed for the various combinations of pest / synergist / insecticide / application rate / type of bioassay. In almost every case the mortality achieved applying the insecticide plus the synergist was significantly higher than the mortality produced by the insecticide alone. When used alone the synergists gave low mortality level usually not different from the level observed in the corresponding untreated control.

In several cases performance improvements, in comparison with PBO, have been recorded and highest synergistic ratio were measured.