

**Ecofriendly synergists for insecticide formulations (EcoSyn): Improvements in the efficacy of pyrethroids in controlling pyrethroid-resistant pollen beetles, *Meligethes aeneus*, in spring oilseed rape**

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Insecticide synergists increase the efficacy of insecticides by inhibiting the metabolic systems that would otherwise break them down. They have been frequently used in controlling insects of public health concern, e.g. houseflies and mosquitoes, but have not been used widely in agriculture to date.

One pest of concern in oilseed rape is the pollen beetle, *Meligethes aeneus*, which can cause serious damage to developing flower buds, but which has developed widespread metabolic resistance across Europe, principally to many of the pyrethroids used to control them. Most pyrethroids (with the exception of tau-fluvalinate), are now ineffective against this pest in the UK, and growers have been obliged to use alternative, more expensive insecticides, such as pymetrozine, thiacloprid and indoxacarb, to obtain satisfactory control.

However recent studies within the Ecosyn project have shown that the addition of a synergist to pyrethroid insecticides can overcome this metabolic resistance. In 2014 Piperonyl butoxide (PBO) and another synergist in development, (EN126), when tank-mixed with alpha-cypermethrin, gave as good control of pollen beetles in spring-sown oilseed rape as tau-fluvalinate and pymetrozine before flowering. In 2015, PBO, as a formulation optimised for uptake by the target pest, when mixed with alpha-cypermethrin or lambda-cyhalothrin, gave as good control as pymetrozine when applied at the green bud stage, allowing buds to flower normally. This resulted in significantly higher yields at harvest.

Use of synergists with currently ineffective insecticides would broaden grower choice of insecticide products, reducing the pressure for further selection of resistance to the few remaining active ingredients available.