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Pest Management Facts

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Bees on Canola – What are the Benefits?

A close look through a canola field that is flowering will reveal many insects that have come to collect the nectar and pollen from the flowers, including many species of bees. Even if there are no bee hives near the canola field, there will likely still be honey bees in the field, sometimes at quite high levels, and at least several species of wild bees. Many species of flies will feed on the nectar as well. But is there any benefit to having these pollinators in the field? And what is at risk if insecticide applications reduce their abundance in the field? There are several benefits that honey bees and other pollinators can produce in canola, and these benefits need to be considered when deciding if and how other insects are going to be managed in canola that is flowering.

Effect on yield

The effect of pollinators on yield of canola will likely depend on the density of the pollinators in the field, the weather conditions during the blooming period of canola, and possibly the type of canola that is grown. As might be expected, the results of studies looking at the effect of bees on the yield of canola are quite variable. Research in Quebec showed an improvement in seed yield of 46% in the presence of three honey bee hives per hectar, compared with the absence of hives (Sabbahi et al. 2005). This is a fairly high density of bees that was used in the study, but does show the potential yield improvements that can exist when there is good pollination. In an earlier study on oilseed rape (*B. napus*) there was a13% seed yield increase in plots with bees compared to those without bees, although the authors did state that oilseed rape gives good yields without insect pollination (Free & Nuttall, 1968).

A study in Australia looked at the effect that distance from an apiary can have on pod yield in canola. The number of pods/plant decreased as distance from the apiary increased (Manning & Boland, 2000). Their regression analysis predicted a pod loss of about 15.3 pods/plant over a distance of 1000 m from an apiary. This was equivalent to a 16% loss.

Reduced time in bloom

In addition to potentially enhancing yield of canola, pollinators can also contribute to uniform and early pod setting (Abrol 2007). Research in Quebec found that three honeybee colonies per hectare reduced the blooming period of Argentine canola (*B. napus*) by 3.8 days, or 17% compared to the absence of pollinators. Because of the efficient pollen transfer, the honeybees resulted in the flowers living for a shorter period of time, and also reduced the number of flowers the plant had to produce to reach its carrying capacity (Sabbahi et al., 2006).

The reduced flowering period and fewer flowers the plant needs to produce to reach its carrying capacity could have implications for disease management. For example, the risk of sclerotinia may theoretically be reduced by a

shorter flowering period and fewer petals being produced. This association between increased pollination and decreased risk of sclerotinia has never been directly tested however, and there would be other factors such as weather conditions that would also factor in.

Germination of the seeds

The presence of pollinators can increase the germination of canola seed. A study from the University of Guelph found that the presence of pollinators on *B. napus* (cv. O.A.C. Triton) increased the germination of resulting seeds from 83% to 96%, compared to where pollinators were excluded from plants using either tents or sleeves (Kevan and Eisikowitch, 1990).

Spreading biological controls?

Researchers in Ontario looked at using honey bees to spread the fungus *Beauveria bassiana* , which can help reduce the level of Lygus bugs (Al Mazra'awi et al. 2006). In studies in 2002 and 2003, honey bees were used to spread the fungus into canola fields, which resulted in increased kill of Lygus bugs. The highest level of *Lygus* mortality was 56%. So this would not be a means of totally eliminating a *Lygus* population, but if the technology gets registration and is affordable it could be a means to help keep *Lygus* populations under the economic threshold. The researchers noted in their paper that "the benefits are better pollination, reduction in pest pressure of *Lygus lineolaris*, and reduced reliance on insecticides".

What about the effect of wild bees and other pollinators?

Although honey bees can be an abundant pollinator in canola field, there are also many species of wild bees that can be present. A study in Manitoba found that 15 species of bumble bees were inadvertently captured in traps baited with a bertha armyworm (*Mamestra configurata*) attractant and placed in canola fields (Turnock et al., 2006). Many species of wild bees will live in uncultivated land, and a study by researchers from Simon Fraser University in British Columbia found that bee abundance was greatest in canola fields that had more uncultivated land within 750 m of field edges and seed set was greater in fields with higher bee abundance (Morandin & Winston, 2006). Some species of hover flies (Syrphidae) may also significantly increase seed set and yield in canola (Jauker & Wolters 2008).

Conclusions

Although canola may still produce good yields in the absence of pollinators, the impact of pollinators on maximizing yields and the economic value of this should not be ignored. Canola growers do gain from having bees pollinating canola, and this gain needs to be factored in when making management decisions in canola that may have potential negative impacts on bees. Efforts should be made to avoid using insecticides in canola when it is flowering. Should insecticide use be deemed necessary during the flowering period of canola, it is in the economic interest of canola growers, as well as apiarists, to ensure that insecticides and timing of applications are chosen to minimize losses to bees. If possible, spray as late in the day as possible, or very early in the morning, when bees will not be foraging in the canola, and communicate with nearby beekeepers so that harm to the bees can be minimized.

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