

Clover insect pest-an European flare for damage?

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The casebearer larva was back with a vengeance this past summer causing damage not only in second year red clover seed fields but first-year fields as well. This is not good news for red clover seed growers and honey bee producers who rely on red clover fields for honey production.

In 2005, seed yields of second year red clover seed fields were severely reduced by an insect that was suspected to be *Coleophora deauratella* or more commonly called “red clover casebearer larva”. Fields looked to be in good condition until harvest when it was discovered that there was virtually no seed present. When seed was present, most had been damaged with obvious chewing sites or holes chewed completely through it.

Extensive field surveys conducted by Jennifer Otani and her staff this past summer confirmed the insect causing damage was indeed the red clover casebearer. Results from field surveys using emergence cages, sweep-nets and flower head collections performed every two weeks throughout the summer have provided detailed information on the life cycle of the insect and how it causes damage. The following comments will help answer some of the questions you may have.

**Where does the casebearer larva originate from and was it present in the Peace Region prior to 2005?** The red clover casebearer larva originates from Europe and initially was introduced to Canada in Quebec in 1970. It was then observed in red clover fields in Ontario in 1985. The Canadian National Collection housed at the Eastern Cereal and Oilseed Centre of Agriculture and Agri-Food Canada in Ottawa has samples of this species collected from Falher in 2001 and Dunvegan in 2003 yet the first seed yield damage from this insect occurred in 2005 from western Canada.

**Does the casebearer larva affect all species of clovers?** Research papers report that both red and alsike clover fields are hosts for the casebearer larva. Red clover casebearer moths were collected in both red and alsike clover seed fields this past summer. The numbers of moths flying in red clover seed fields were higher than in alsike clover fields. Interestingly, there have been no reports of damage from alsike clover seed fields to date.

**Was the casebearer larva found only in the Falher and Girouxville areas in 2006?**  
No. Damage to red clover seed fields was evident throughout most of the Peace Region.

**How exactly does this insect cause damage to red clover seed fields and what should I be looking for?** The adult red clover casebearer is a moth that flies from approximately mid-June to July. The adults feed on nectar only and do not damage the plant, however, they lay eggs on the florets as clover fields begin to flower. The adult moths are bronzy-metallic green in colour and are 7-8 mm long. They are easily collected using sweep-nets but their colour scales rub off easily when bumped so also watch for grey moths matching the above size in sweep-nets. Larvae hatch then chew into unopened florets to

feed. A larva continues to feed, chewing into adjacent florets and damaging the flower's reproductive structures and available nectary. Look for damage by pulling apart flower heads and examining individual florets for a small hole (2-3 mm in diameter) at the base or calyx of individual florets. These small holes are a good indication the insect is present since the larvae are small (2-4 mm in length) and feed within the florets. The larvae are quite small at this time and are concealed within the floret. Holes at the base of the floret serve as entry and exit points allowing the movement of larvae between florets while remaining relatively protected. As the larvae mature, they will also feed on developing seed. Larvae are present within fields from bud to harvest and will feed upon florets and developing seed from mid-June until late September. The figure on the following page demonstrates the life cycle of the red clover casebearer.

**Why is it called a casebearer?** The mature larva builds and carries a 'case'. A larva extends its body from the case to feed but will retreat inside when disturbed. The case is cigar-shaped, brown in colour, and about 6 mm long. In the late summer or early fall, the mature larva carries itself and its case to ground level to seek out overwintering sites. It then retracts within its case, and seals it closed with silk to overwinter. Early the following spring, the larva pupates within its case and the adult emerges which is why second-year seed fields can suffer higher levels of damage. Unfortunately, in 2006 several first-year fields were also affected and seed yields were drastically reduced.

**Will the application of insecticides help?** At this time, there are no insecticides registered for control of casebearers on clover. Natural predation and parasitism account for some mortality. This past summer insecticides were applied in a small experimental field trial at the bud stage and 50-60% flowering stage of red clover. Applying the insecticides at the mid-flower stage improved yields over the check but the quality and germination of the seed was very poor. There was no benefit to applying an insecticide at the early flowering stage which corresponded to the adult flight period. These initial field results confirmed that one spray over a 3-6 week adult flight period does little to protect red clover seed production. Control with insecticides at the larval stage is also proving to be very difficult since immature larvae reside deep within the floret and this offers them protection from foliar applications. Additionally, any applications of insecticides to established red clover seed fields is cause for concern since honey bees and bumble bees contributing to pollination and seed production plus beneficial insects that can have an ameliorating effect on various pest species are also present and can be affected.

**Are there other options available for controlling this insect?** There has been success in New Zealand using an insect for biological control of *Coleophora deauratella*. Of course New Zealand has a completely different environment than the Peace Region so it is not known whether the beneficial insect would be useful in our area. Biological control would be a logical choice since we are dealing with a crop that requires pollination by bees and insecticides may have limited effects on controlling this pest species. Two different larval parasitoids were found in flowers collected from fields this past summer. That is promising news.

**If the casebearer larva overwinter in the stubble would burning in the spring eliminate the problem?** It does not appear burning is effective at reducing the larva present in the stubble. This past spring, samples of clover residue were collected from a second year red clover seed field that had been burned in the spring. Samples were taken back to the lab and a few weeks later casebearer moths emerged. The larva overwinter in residue very close to the soil surface. In most instances a fire moves quickly across the field but does not burn the residue at the soil surface. The field that was burned this spring was worked under later in the summer since it was evident that no seed would be present at harvest.

**What work will be conducted in 2007 to learn more about the insect and potential control methods?** Jennifer Otani has received funding from the Peace Region Forage Seed Association and Agriculture and Agri-Food Canada to continue with surveys and field trials in 2007. Field surveys will be repeated in the Falher area and extended to other parts of the Peace Region. This will provide additional information on the distribution and life cycle of the insect. Trials will be conducted again in 2007 within commercial fields to investigate the potential for using insecticides to control this pest. A larger focus may be on finding research options dealing with biological control of the casebearer.

**Is the red clover seed industry in jeopardy in the Peace?** It's too early to make a statement like that but there are definite concerns attached to the red clover casebearer. This insect not only affects red clover seed but it also may have a serious impact on honey production. It is too early to tell if this insect pest is experiencing a cycle or whether it will be a problem every year. One current control recommendation is to avoid leaving fields in for second-year seed crops since older stands suffered the greatest damage. In 2006 several first-year fields were affected but there were also a number of fields that had fairly decent yields.

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