

Clover insect pests – European flare for damage?

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Problem

Fields of second year red clover in the Peace River region were severely affected by unidentified insect pests in 2005. Fields in apparently healthy condition failed to produce their expected seed and suspicious insect larvae were present within flower heads.

Larval descriptions resembled *Coleophora deauratella*, the red clover casebearer, an insect pest of red and alsike clover originating from Europe. Past introductions of *C. deauratella* to Quebec in 1983 (Landry 1991) and Ontario in 1991 (Landry 1991; Landry and Wright 1993) were documented by later seed yield losses in both red and alsike clover grown in Ontario (Ellis and Bjornson 1996).



Figure 1. Insect feeding damage to individual florets within red clover flower heads (left), damaged floret with an insect larva feeding in adjacent floret (upper right), and a third-instar *C. deauratella* larva or 'red clover casebearer' with case which was feeding within the floret (lower right).

Study Objectives

- To obtain specimens and identify the pest insect(s) in red clover.
- To obtain biological data on pest(s) lifecycle and host plant utilization.
- To investigate control methods that protect yield losses and minimize impact on honeybee and leafcutter bee activities (e.g., foraging, pollination).



Figure 2. Common pests of clover include lesser clover weevils (photos clockwise from upper left) as green adult, brown adult, and later larvae plus pupae developing within silken cocoons, or clover seed chalcid (*Bruchophagus gibbus*) feeding damage by larvae, and the small chalcid wasp laying eggs on seed.

Study Methods

Crop residue sampling. Field trash was collected from stands suffering damage in 2005 (i.e., second-year seed fields). The crop residues were isolated in cages and monitored for adult emergence.

Sweep-net sampling. Starting in May, bi-monthly seasonal monitoring was performed within fields located near Girouxville and Falher, Alberta.

Emergence cages. Screened cages measuring 1m x 2m x 1m were placed in second-year red clover prior to flowering in an attempt to collect newly emerging moths.

Floret sampling. Flowering heads were sampled in each field and dissected in order to assess (i) larval feeding damage, (ii) larval instar stages, (iii) the presence of mites, and (iv) the presence of thrips.

Small plot trial. Plots measuring 2m x 10m were set up in a second year red clover field in a RCBD with four replicates and the following treatments were applied to plots:

- 1) Decis™ at 100 ml/ac applied at 5% flower,
- 2) Success 480™ at 182 ml/ha applied at 5% flower,
- 3) Success 480 at 91 ml/ha applied at 5% flower,
- 4) Decis at 100 ml/ac applied at 50% flower,
- 5) Success 480 at 182 ml/ha applied at 50% flower,
- 6) Success 480 at 92 ml/ha applied at 50% flower,
- 7) Decis at 100 ml/ac at 5% and 50% flower,
- 8) Success 480 at 182 ml/ha at 5% and 50% flower,
- 9) Untreated control.

Flower/seed heads will be collected from plots in August to determine floret and seed damage. Yield data will be obtained from plots.

Results to Date

Adult *Coleophora deauratella* moths were collected in both red and alsike fields near Girouxville and Falher in June 2006. Higher numbers of moths were flying in red compared to alsike clover, however, **no economic threshold is available for control nor is spraying insecticide recommended at this time** since there is:

- (i) no registered insecticide for moth control in clover,
- (ii) no efficacy information available for this insect, and
- (iii) little biological information available to identify an efficacious crop or insect stage to target for insecticide application.

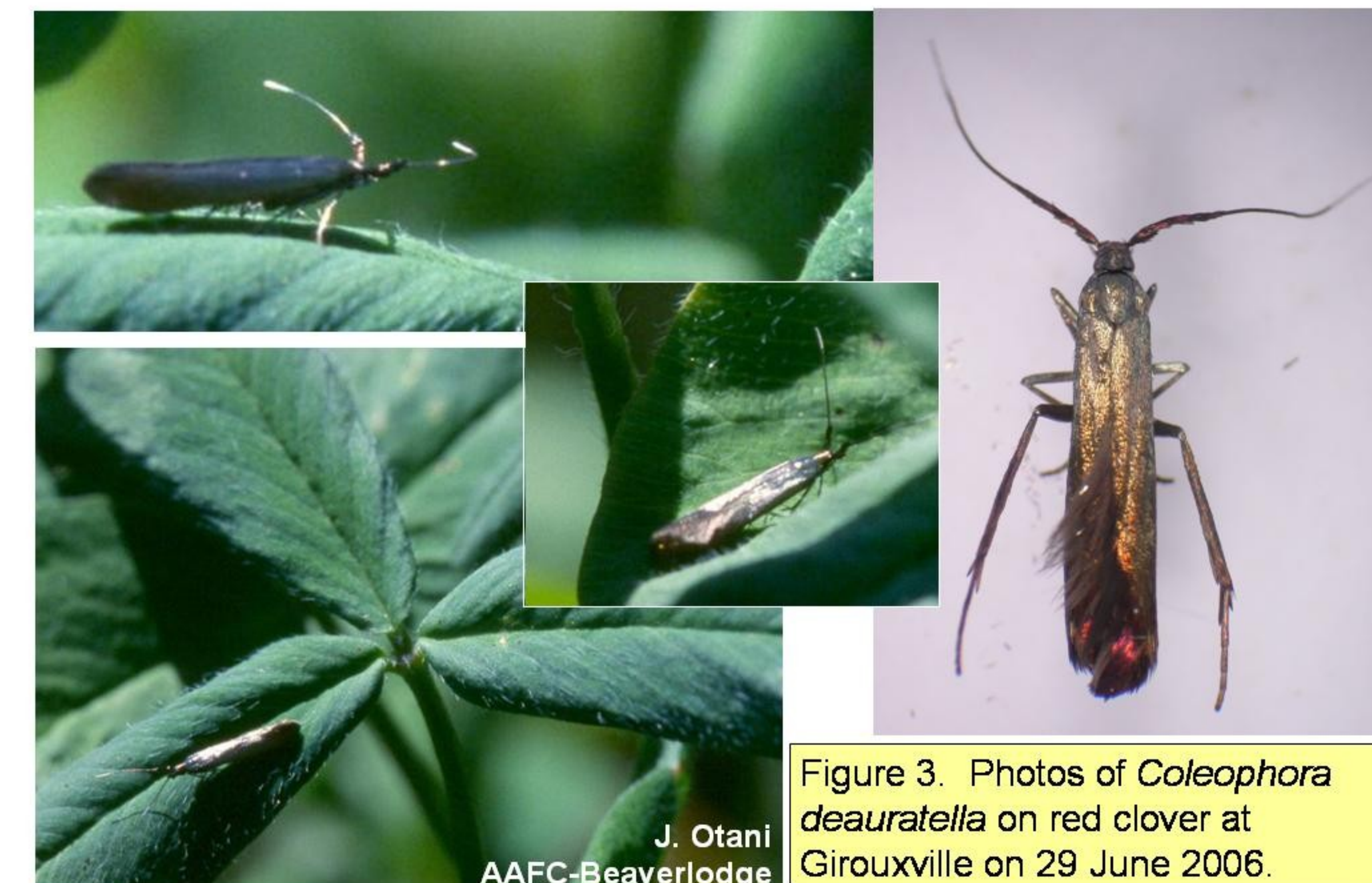
Crop residue sampling. Crop residues were collected from the field on 18 May 2006 and small metallic-bronze moths emerged on 27 June 2006. These specimens were positively confirmed as *Coleophora deauratella*, the red clover casebearer.

Sweep-net sampling. Two pest species were found in red and alsike fields that were monitored using sweep-net sampling. **Lesser clover weevil** adults were observed starting on 14 June 2006 in both red and alsike clover fields. ***Coleophora deauratella* moths** were collected on 22 June 2006 in first- and second-year red clover fields. On 29 June 2006, moths were observed in both red (N=6) and alsike clover fields (N=2).

By late August 2006, preliminary dissections of flower and seed heads from surveyed fields of commercial red clover yielded low levels of seed and heavily damaged florets on most flower heads. Additionally, honey production in these same fields has been lower than expected.

Emergence cages. Small numbers of newly emerging adults were present in cages on 29 June 2006.

Floret sampling. If Matching Investment Initiative (MII) funding is obtained through AAFC, collected flower heads will be processed in the fall to determine (i) when larvae are first present in flower heads, (ii) feeding patterns within/between florets, and (iii) how long the damaging larval stage occurs within Peace River region fields.



Small plot trial. Continual rain showers interfered with application of treatments targeting 5% flower stage. Instead, red clover plants were at 20-30% flowering stage when Decis™ was applied and Success™ treatments could not be made due to continuing rain showers. Small plot treatments targeting the 50% flower stage were applied on 21 July 2006 (i.e., 50-60% flowering stage). The entire plot area was sprayed with Round-Up™ on 22 August 2006 to desiccate then an area of 1m x 1m was hand-harvested from each plot on 31 August 2006 for yield and seed damage analysis later this fall.

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