Is the Red Clover Casebearer Moth Decreasing Seed Yields in Eastern Oregon?

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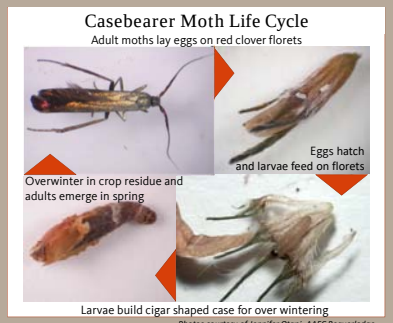
Introduction

- The red clover casebearer moth, *Coleophora deauratella* (Lepidoptera: Coleophoridae), was introduced to north America from Europe[1].
- Red clover is the preferred host of casebearer moths, but they can also feed on other clover species[1].
- Casebearer moths were reported as a pest of red clover in Eastern Canada in 1989 and were detected in Western Oregon in 2012[2].
- In Eastern Oregon, red clover seed yields are notably lower in the second year of production than the first, and it was hypothesized that the casebearer moth was to blame.
- Field studies were conducted to determine if the casebearer moth is present in Eastern Oregon red clover seed fields and to estimate its potential to decrease seed yield.



Methods

Map of Field Sites

Table 1. Fields studied, identifying name and color, stand age, years and extent of monitoring.

Field ID	First Production Year	2018	2019
Union-1	2018	Partial	Full
Union-2	2018	Full	Full
Union-3	2017	Full	-
Baker-1	2018	Partial	Full
Malheur-1	2018	-	Full
Malheur-2	2018	-	Full
Malheur-3	2019	-	Full
Malheur-4	2018	-	Partial

Pheromone Trap

Head Evaluation

- Two fields in 2018 and five fields in 2019 were fully monitored throughout the growing season
  - Sex-pheromone-bated traps were placed in fields and emptied weekly during the bloom period[3].
  - Each week, 25 red (newly set) flower heads were destructively sampled to determine if larvae, eggs, or feeding damage were present.
  - At harvest samples of 100 mature heads were evaluated for damage, eggs or larvae.
- Head sampling only was conducted in two additional fields in 2018 and one field in 2019.
- Beginning in 2019, weekly results were emailed to the growers whose fields were included in the study as part of a pilot casebearer moth alert program.

References:

Landry, J. 1991. ColeophoradeauratellaLienigand Zellar(Lepidoptera: Coleophoridae) in North America: an introduced newly detected European moth injurious to red clover seeds. Can. Ento123:1125-1133.

Anderson, N.P., MacPherran, R., and Gingrich, G. 2014. Identification and monitoring of the red clover casebearermoth (Coleophoradeauratella) in clover seed crops in western Oregon. Abstract. Entom. Soc. Am. 62nd Annual Meeting, Portland, OR.

Evenden, M.L., Mori, B.A., Gries, R. and Otani, J. 2010. Sex pheromone of the red clover casebearermoth, Coleophoradeauratella, an invasive pest of clover in Canada. Entomol. Exp. App. 137: 255-261.

Anderson, N. P., T. G. Chastain, and C. J. Garbacik. 2016. Irrigation and Trinexapac-Ethyl Effects on Seed Yield in First- and Second-Year Red Clover Stands. Agron. J. 108:1116-1123. doi:10.2134/agronj2015.051

Results

- Moths were captured in every field with a pheromone trap, totaling 8447 moths across all fields.
- Thousands of moths were captured in second-year fields in Union County.
- In all other fields, less than 100 moths were captured per field.
- In 2450 heads evaluated for damage, there were:
  - 44 larvae (0.017 larvae per head)
  - 420 damaged florets (0.16 damaged florets per head)
  - No eggs were found. Due to the small size of the eggs it is possible that they were present but undetected.
- Red clover flower heads have around 120 florets and produce 50-75 seeds[4], so the damage documented here is less than 1% yield loss.
- Three species of weevils (Sitona cylindricollis, Hypera nigrirostris, and Tychius picirostris) were also found during the study.

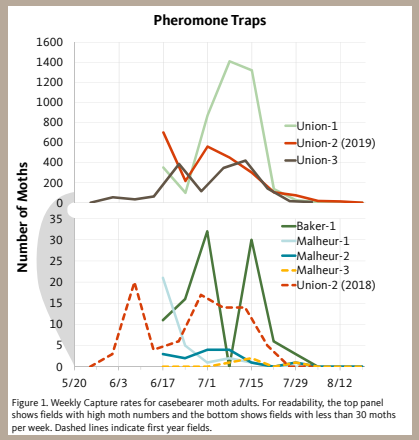


Figure 1. Weekly Capture rates for casebearer moth adults. For readability, the top panel shows fields with high moth numbers and the bottom shows fields with less than 30 moths per week. Dashed lines indicate first year fields.

Table 2. Summary of flower head evaluations and total moths captured.

Field	Study Year	Stand Age	Heads Evaluated	Damaged Florets Per Head	Larvae Per Head	Moths Captured
Union-1	2018	1	76	0.04	0	-
	2019	2	325	0.44	0.003	4210
Union-2	2018	1	154	0	0	83
	2019	2	300	0.14	0.073	2432
Union-3	2018	2	333	0.29	0.009	1575
Baker-1	2018	1	60	0.03	0	-
	2019	2	275	0.004	0	98
Malheur-1	2019	2	324	0.15	0.025	30
Malheur-2	2019	2	280	0.24	0.018	15
Malheur-3	2019	1	350	0.05	0.014	4
Malheur-4	2019	2	100	0	0	-

Caseberer moths were found in large numbers, but there was little evidence of yield loss.

Summary

The damage documented in this study should not amount to a significant yield loss. The discrepancy between moth counts and damage in Union County suggests unidentified biological control may be limiting damage to the crop.

Acknowledgements

This project was funded by the Oregon Clover Commission. The authors greatly appreciate collaboration with the growers and their families to conduct preliminary CBM monitoring. We also thank Jennifer Otani, Beaverlodge Research Farm, Agriculture and Agri-Food Canada, Alberta, Canada for specimen identification and pest biology technical support; and Sarah Rasmussen and Kacie Melville , UnionCo. Extension Agronomy Technician for contributions to the project.