2014 Peace River Region Annual Canola Survey

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The 2014 Annual Peace Canola Survey was completed by Agriculture & Agri-Food Canada staff based at Beaverlodge[1], Saskatoon[2], and Lethbridge[3]. Samples were also kindly collected by the BC Pest Monitoring Contractor, Arlan Benn[4], and staff from the Smoky Applied Research and Demonstration Association[4] (SARDA).

Since 2003, the annual survey has been performed with the main objectives of (i) collecting insect pest data throughout the region and (ii) to detect introduction of the Cabbage seedpod weevil into the Peace River region. In 2014, a total of 206 canola fields were randomly selected. Fields were approximately 10km apart and surveying was performed through the main canola producing areas of the BC and Alberta Peace during early- to mid-flower stages. In 2014, sweep-net monitoring was performed in 205 *Brassica napus* fields plus one *B. rapa* field (e.g., each field ≥80 acres in size) using 50 - 180° sweeps on the following dates in these areas:

- July 3-5 near Manning, Hawk Hills, LaCrete, High Level, Fort Vermilion.
- July 7 near Dunvegan, Fairview, Royce, Hines Creek, Whitelaw.
- July 8 near Bezanson, Debolt, Whitemud Creek, Valleyview, Little Smoky, Hythe, Valhalla, Beaverlodge, Elmworth.
- July 9 near Grimshaw, Peace River, Watino, Eaglesham, Rycroft, LaGlace, Valhalla, Spirit River, Bonanza, Silver Valley, Blueberry Mountain, Woking.
- July 11 near Sexsmith, Woking, Teepee Creek, Girouxville, Valleyview, High Prairie, McLennan, Guy, Valleyview.
- July 14 near Fort St. John, Rose Prairie, Prespatou, Montney, Dawson Creek, Rolla, Dow River, Clayhurst, Cecil Lake, Baldonnel.
- July 16 near Farmington, Dawson Creek, Watino, Girouxville, Jean Cote, St. Isidore, Nampa, Falher.

Sweep-net samples were frozen then processed to generate data for 16 species of arthropods. *Lygus* specimens were identified to all five instar stages. **The 2014 summary includes seven economically important pests of canola reported from 206 surveyed canola fields:**

1. Lygus (Miridae: *Lygus* spp.) were the most common insect pest observed in sweep-net samples collected in our 2014 surveying. *Lygus* populations of **≥5 adults plus nymphs per 10 sweeps were observed in 32.5% of fields surveyed** (Figures 1 and 2; N=206 fields). Densities of **≥15 adults plus nymphs per 10 sweeps were recorded in 6.3% of fields surveyed** (Figures 1 and 2).

Figure 1. *Lygus* densities (adults+nymphs per 10 sweeps) observed in sweep-net samples collected between July 3-16, 2014, from throughout the Peace River region.

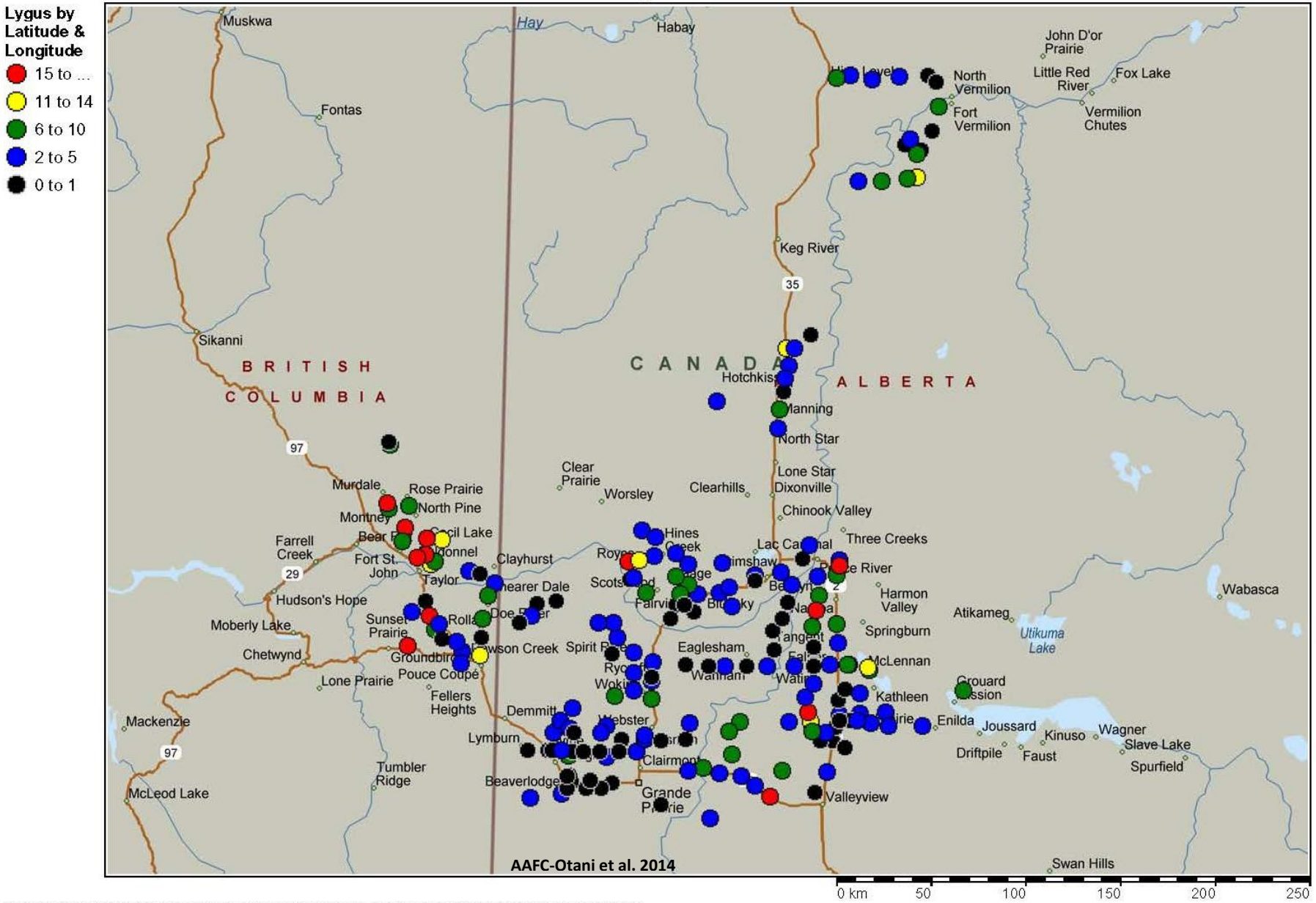
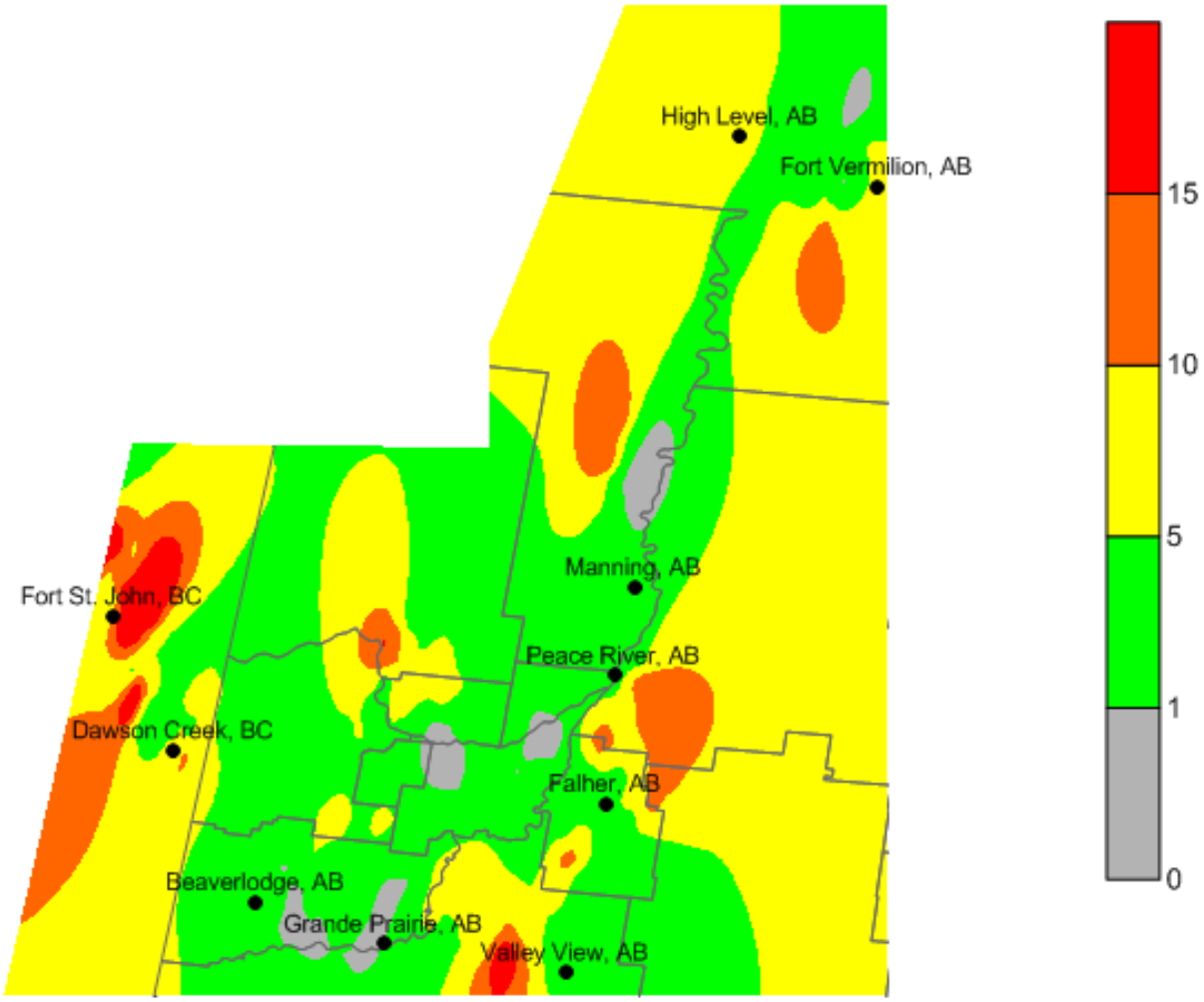


Figure 2. Contoured map reflecting *Lygus* densities (adults+nymphs) observed in sweep-net samples collected between July 3-16, 2014, from throughout the Peace River region.



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There were zero *Lygus* present in only 2.4% of surveyed fields whereas 28.2% of the surveyed fields contained only adult *Lygus* but 67.5% of the fields were populated by both adults and nymphs (N=206 fields). **Note that all nymphs collected during our survey are now expected to have matured into new adults.** This means points highlighted green, yellow, and red in Figure 1 are worth monitoring in order to confirm *Lygus* densities during the early pod stages. Similarly the contoured map in Figure 2 includes areas highlighted orange and red may warrant close monitoring for *Lygus* during the early pod stages.

Table 1. Summary of *Lygus* densities occurring in surveyed fields in 2014.

Lygus bugs per 10 sweeps	Number of fields	Percent of fields sampled
≥15.0	13	6.3%
10.1-15.0	8	3.9%
5.1-10.0	46	22.3%
0.1-5.0	73	35.4%
0	66	32.0%
Sum	206	100%

Table 2. Proportion of surveyed fields with containing zero *Lygus*, only adults, only nymphs or adults plus nymphs in commercial fields of canola in 2014.

Lygus stages collected	Number of fields	Percent of fields sampled
No *Lygus*	5	2.4%
Adults only	58	28.2%
Nymphs only	4	1.9%
Adults + Nymphs	139	67.5%
Totals	206	100%

The economic threshold for *Lygus* is applicable at the late flower and early pod stages but varies according to current crop value and control costs.

Table 3. Economic thresholds for *Lygus* in canola **at late flowering and early pod stages** (Wise and Lamb 1998).

Control costs		**Late flower to early pod (Canola crop stages 4.4-5.1[1])**						
$/ac	**$/ha**	**Economic Injury Level[2]**						
$8.00	$19.77	8	6	5	4	4	3	3
$10.00	$24.71	10	8	7	6	5	4	4
$12.00	$29.65	12	9	8	7	6	5	5
$14.00	$34.59	14	11	9	8	7	6	5
$16.00	$39.54	16	13	10	9	8	7	6
$18.00	$44.48	18	14	12	10	9	8	7
$20.00	$49.42	20	16	13	11	10	9	8
Canola	**$/bu**	$8.00	$10.00	$12.00	$14.00	$16.00	$18.00	$20.00
value	**$/tonne**	$352.42	$440.53	$528.63	$616.74	$704.85	$792.95	$881.06

[1] Canola crop stage estimated using Harper and Berkenkamp 1975).
[2] Economic thresholds are based on an assumed loss of 0.1235 bu/ac per lygus bug caught in 10 sweeps (Wise and Lamb. 1998. The Canadian Entomologist. 130: 825-836).

Table 4. Economic thresholds for lygus bugs in canola **at pod stage** (Wise and Lamb 1998).

Control costs		**Late Pod (Canola crop stages 5.2[1])**						
$/ac	**$/ha**	**Economic Injury Level[3]**						
$8.00	$19.77	11	9	7	6	5	5	4
$10.00	$24.71	14	11	9	8	7	6	5
$12.00	$29.65	16	13	11	9	8	7	7
$14.00	$34.59	19	15	13	11	10	9	8
$16.00	$39.54	22	18	15	13	11	10	9
$18.00	$44.48	25	20	16	14	12	11	10
$20.00	$49.42	27	22	18	16	14	12	11
Canola	**$/bu**	$8.00	$10.00	$12.00	$14.00	$16.00	$18.00	$20.00
value	**$/tonne**	$352.42	$440.53	$528.63	$616.74	$704.85	$792.95	$881.06

[3] Economic thresholds are based on an assumed loss of 0.0882 bu/ac per lygus bug caught in 10 sweeps (Wise and Lamb. 1998. The Canadian Entomologist. 130: 825-836).

2. Root maggot (*Delia* sp.) adults were present at 98 of the 206 sites surveyed throughout the Peace River region in 2014. Numbers collected by sweep-net surveying ranged from 0.2-10 *Delia* sp. flies per 10 sweeps but growers should note **– root assessments rather than sweep-net monitoring is recommended to accurately assess densities of root maggots**. Densities of 3-5 root maggots per root were observed at mid-rosette stages near Beaverlodge and Valhalla earlier this season so growers will likely see canola tipping over, increased heat stress and potentially increased root disease pressure which is all associated with these early season, high densities of root maggot for the 2014 growing season. More information related to root maggots in canola can be found by linking here.

3. Diamondback moth (Plutellidae: *Plutella xylostella*) **were generally present in low numbers in the sweep-net samples** (N=206 fields) **in 2014**. Sweep-net monitoring is **NOT** recommended for this insect pest yet we collected a total of 230 specimens in the 206 fields surveyed (i.e., 96% of DBM were larvae compared to 4% adults). Sites with higher numbers of DBM included Fort Vermilion, Hawk Hills, Hotchkiss, Rose Prairie, Montney, St. Isidore, Fairview, Marie-Reine, Girouxville, McLennan, Guy, High Prairie, Debolt and Valleyview.

It's important to note that parasitoid wasps (e.g., *Diadegma* sp. and *Microplitis* sp.) were observed throughout the region and the presence of these natural enemies of DBM is strongly suspected to be keeping DBM densities relatively low.

Remember: Diamondback moth larvae will feed on the exterior of canola pods during the early pod stage. Damaged pods are prone to shattering, particularly under dry, hot, windy conditions. **The action threshold for DBM larvae is 20-30 larvae per 1/10m^2 (approximately 2-3 larvae per plant) and should be applied at early pod stages.**

4. Normally, the annual canola survey is conducted during the initial weeks of **Bertha armyworm** adult flight period so larval stages, if present, are typically very small and difficult to accurately detect and identify within the sweep-net samples. Even so, we have tentatively identified very early instar stages of **Bertha armyworm larvae** in samples collected near Hawk Hills, LaCrete, Manning, Fort Vermilion, High Level, Donnelly, Valleyview, Peace River, Buffalo Head, and Baldonnel.

Remember: Producers should continue to monitor for larvae within individual fields now and be ready to compare densities per m^2 to the economic threshold table below.

Table 1. **Economic thresholds for Bertha armyworm in canola** (courtesy Manitoba Agriculture, Food and Rural Initiatives).

	Expected Seed Value - $ / bushel*										
Spraying Cost ($ / acre)	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
	Number of Larvae / metre^2 *										
7	20	17	15	13	12	11	10	9	9	8	8
8	23	20	17	15	14	13	11	11	10	9	9
9	26	22	19	17	16	14	13	12	11	10	10
10	29	25	22	19	17	16	14	13	12	11	11
11	32	27	24	21	19	17	16	15	14	13	12
12	34	30	26	23	21	19	17	16	15	14	13
13	37	32	28	25	22	20	19	17	16	15	14
14	40	35	31	27	24	22	20	19	17	16	15
15	43	37	32	29	26	23	22	20	19	17	16

***** Economic thresholds for bertha armyworm are based on an assumed yield loss of 0.058 bu/acre for each larva/metre^2 (Bracken and Bucher. 1977. Journal of Economic Entomology. 70: 701-705).

5. Grasshoppers were present in only 16 canola fields surveyed. Low numbers of late-instar to adult stages of two-striped, lesser migratory, and red legged grasshoppers were present in the sweep-net samples (listed from most numerous to least) in canola growing near Montney, Westmark, Bonanza, Dawson Creek, Fort Vermilion, Buffalo Head, High Level, Grimshaw, Bluesky, Dawson Creek, Farmington, Baldonnel, and Fort St. John .

Remember: The following pest management recommendation for an **Action Threshold for grasshoppers** is copied below from the Prairie Pest Monitoring protocol:

0-2 / m^2 = None to Very Light	8-12 / m^2 = Moderate (action threshold)
2-4 / m^2 = Very Light	12-24 / m^2 = Severe
4-8 / m^2 = Light	> 24 / m^2=Very Severe

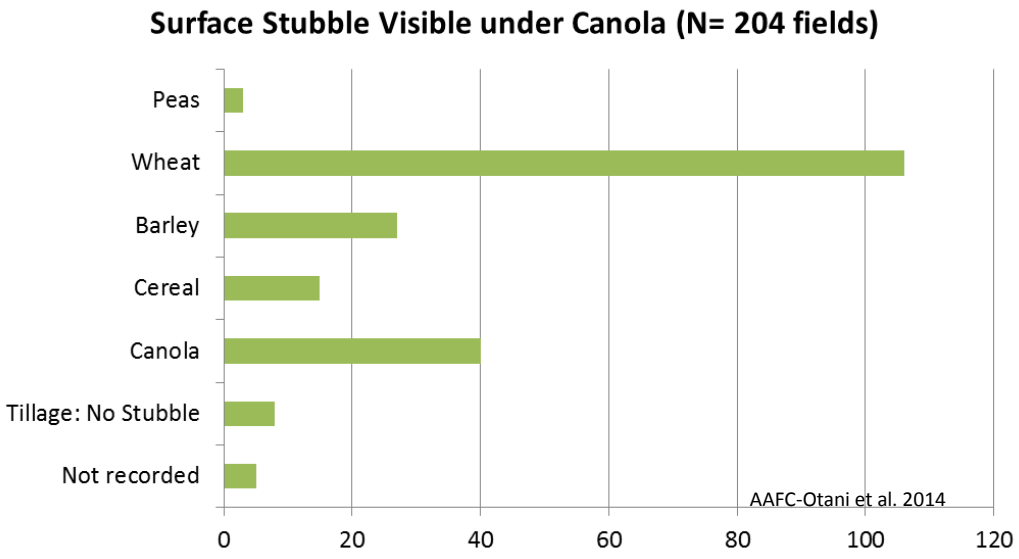
Click here to review the entire grasshopper protocol and biological descriptions. Additional information related to grasshoppers can be located on Alberta Agriculture and Rural Development's webpage located here or the BC Ministry of Agriculture's webpage located here.

6. Low densities of leafhoppers were observed in our canola sweep-net samples in 2014, however, they were prevalent across the region. Of the 69 canola fields where leafhoppers were present, the highest density was six per 50 sweeps in a canola field near Fort Vermilion and near Bezanson. More information related to leafhopper biology and monitoring can be found by linking here.

7. We are again happy to report that **zero cabbage seedpod weevil** (Curculionidae: *Ceutorhynchus obstrictus*) were observed in the 206 fields sampled in the Peace River region in 2014. Approximately nine small weevils measuring <4mm in length and <20 beetles measuring <5mm in length were retained from the survey samples for forwarding to the National Identification System (AAFC-Ottawa) for species confirmation.

8. Previous cropping data was recorded by visually inspecting the soil surface **in 204 surveyed canola fields**. Surface field trash was categorized then summarized in the figure below (Note: category "cereal-type straw" was used to describe fields where the previous crop was either barley or wheat yet no seed was readily observed nor was the straw sufficiently intact to determine the presence/absence of auricles).

The most frequently observed stubble encountered in canola during our 2014 surveying was wheat stubble, followed field surface residues left behind by canola, barley, cereal-type straw, tillage, then peas (N=204 fields).



THANK YOU to the following hard working AAFC staff who surveyed[†], processed[‡], and mapped[∞] this data: Owen Olfert[2†∞], Holly Spence[1†‡], Kevin Floate[3†], Kayleigh Loberg[1†‡], Amanda Jorgensen[1†‡], Sara Stagg[1†‡], Shelby Dufton[1†‡], Jadin Chahade[1†‡], Graham Fonseca[1†‡], Kaitlin Freeman[1†‡], Ross Weiss[2∞], Trina Drummund[1‡], and Hannah Senft [1‡]. Thank you also to the BC Pest Monitoring Contractor, Arlan Benn[4†‡], for collecting and processing samples collected in the BC Peace and to SARDA's Sam White[4†] and Erin Chaibos[4†] for collecting samples near Falher.

Finally, and MOST IMPORTANTLY, *Thank you* to our canola producers for allowing us to sample in their fields! Good luck with the rest of your field season!