

## 2016 Peace River Region Annual Canola Survey

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The 2016 Annual Peace Canola Survey was completed by Agriculture & Agri-Food Canada staff based at Beaverlodge<sup>1</sup> and Saskatoon<sup>2</sup>.

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 the introduction of the cabbage seedpod weevil into the Peace River region. In 2016, a total of 156 commercial fields of *Brassica napus* (e.g., each field  $\geq 80$  acres in size) were surveyed and no *B. rapa* was encountered. Fields were spaced approximately 10 km apart and surveying was performed through the main canola production areas of the Peace River region in both British Columbia and Alberta during early- to mid-flower stages. Canola crop stages were measured using [Harper and Berkenkamp \(1975\)](#) and ranged from 4.1-4.4 although the mode stage was 4.2 for the 156 commercial fields of *B. napus* surveyed. Fields were surveyed by sweep-net using 50 - 180° sweeps on the following dates in these areas:

- **July 5** near Whitelaw, Berwyn, Grimshaw, Dixonville, Manning, Hotchkiss, Hawk Hills, Notikewin, Blue Hills, Buffalo Head, La Crete.
- **July 6** near Fort Vermilion, Blumenort, Valhalla, La Glace, Westmark, Woking, Spirit River, Blueberry Mountain, Silver Valley, Bonanza, Bay Tree, Beaverlodge, Halcourt, Wembley, Grande Prairie, Clairmont, Sexsmith, Teepee Creek, Bezanson, Dimsdale, Huallen, Fairview, Vanrena, Hines, Creek, Worsley, Eureka River,
- **July 7** near Rycroft, Webster, Hythe, Wanham, Girouxville, Watino, Eaglesham, Belloy, Dawson Creek, Rolla, Dow River, Clayhurst, Cecil Lake, Fort St. John, Farmington, Valleyview, Guy, Falher, Reno, Nampa, Peace River, Marie-Reine, McLennan, Whitemud Creek.

Sweep-net samples were frozen then processed to generate data for a total of 21,278 arthropods which were identified and categorized into 38 taxa. *Lygus* specimens were identified to all five instar stages. **The 2016 summary includes 15 economically important pests of canola reported from 156 surveyed canola fields plus data related to rotational practises in the Peace River region:**

1. **Lygus** (Miridae: *Lygus* spp.) were the most common insect pest observed in sweep-net samples collected during surveying conducted from July 5-7, 2016. *Lygus* populations of  **$\leq 10$  adults plus nymphs per 10 sweeps were observed in 51.3% of fields surveyed** (Figure 1 and Table 1; N=156 fields). Densities of  **$\geq 16$  adults plus nymphs per 10 sweeps were recorded in 48.7% of fields surveyed** (Figure 1 and Table 1). A mean of 3.91 ( $\pm 0.52$  SEM, N=156 fields) *Lygus* per 10 sweeps were observed across surveyed sites (Range=0-71.8 per 10 sweeps).

Figure 1. Contoured map reflecting *Lygus* densities (adults+nymphs) in sweep-net samples collected July 5-7, 2016, in canola (*Brassica napus*) fields grown throughout the Peace River region.

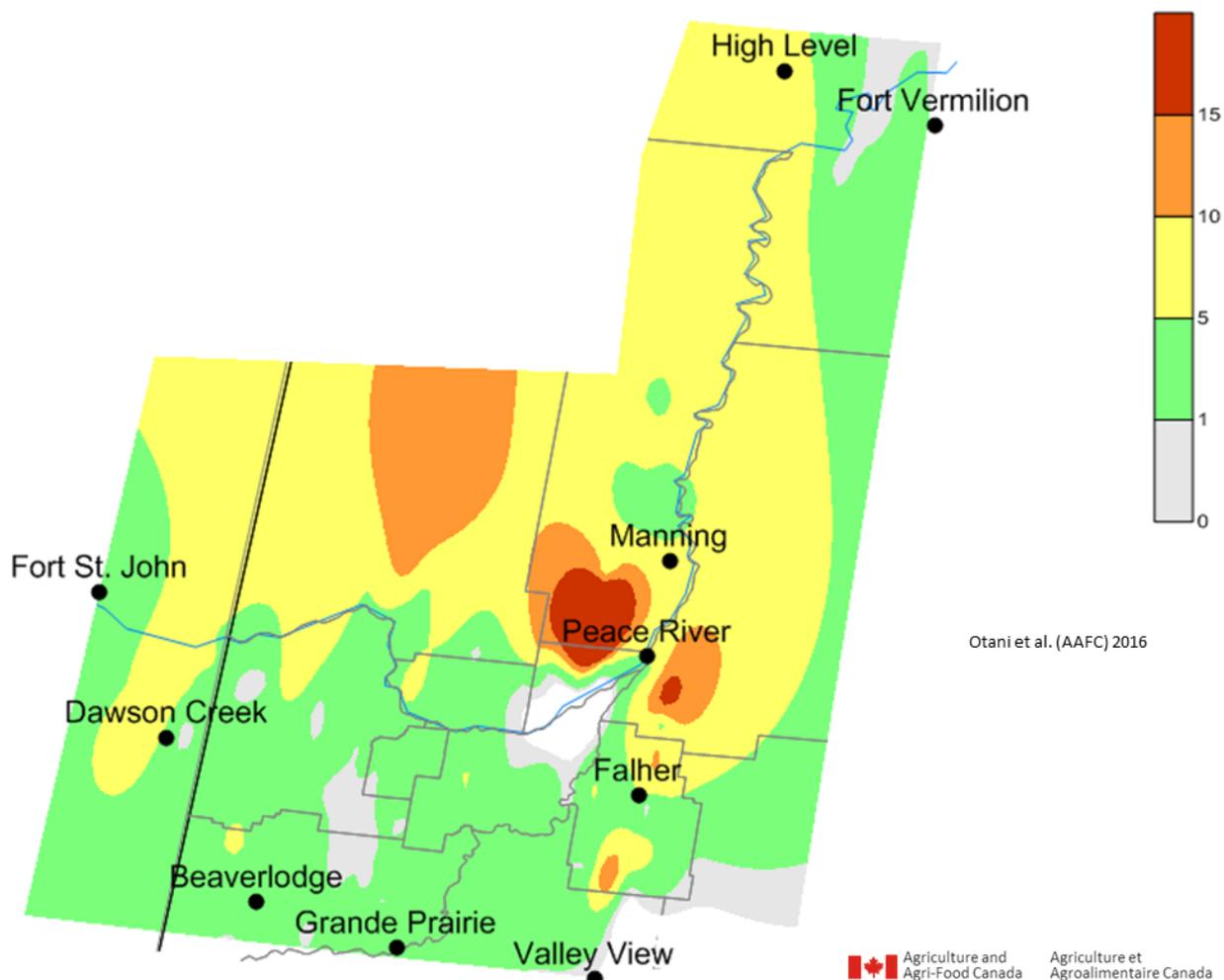


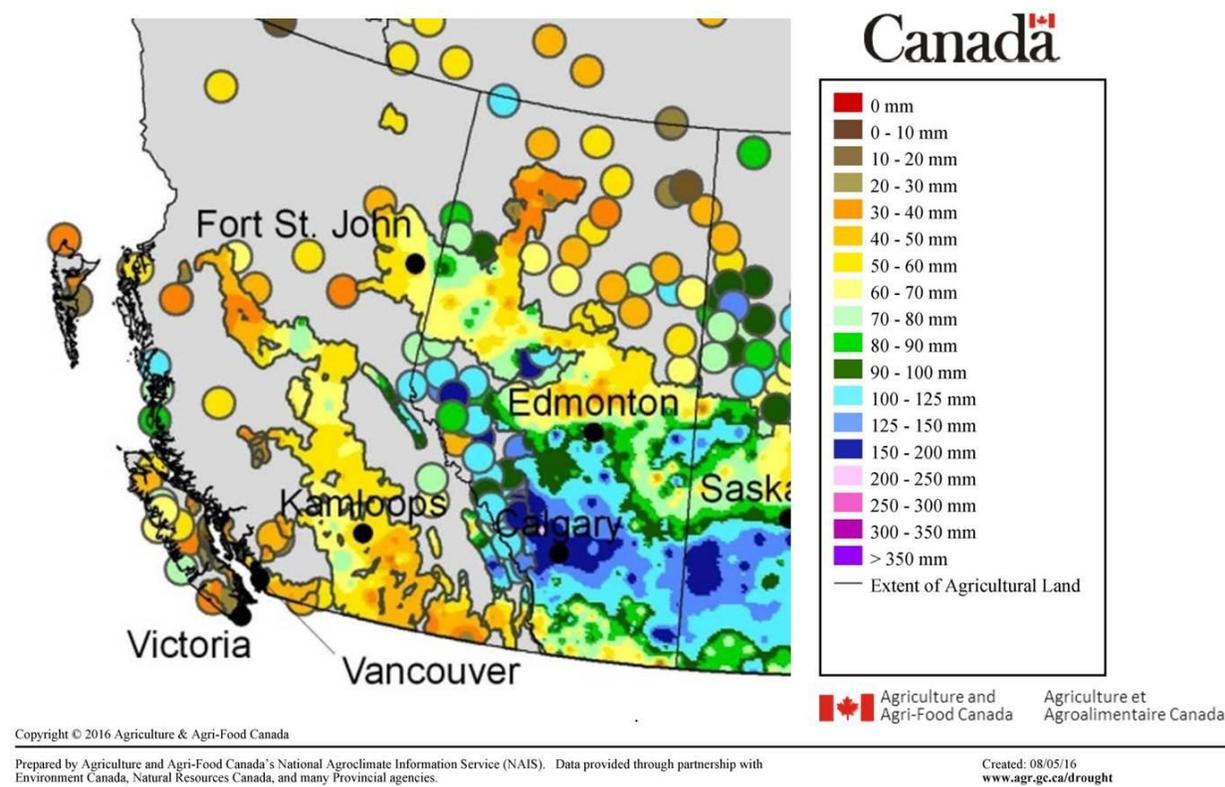
Table 1. Summary of *Lygus* densities occurring in surveyed fields in 2016.

Lygus adults + nymphs (per 10 sweeps)	Number of fields	Percent of fields sampled
≤ 5	44	28.2%
6-10	36	23.1%
11-15	17	10.9%
16-20	12	7.7%
21-25	10	6.4%
26-30	5	3.2%
31-35	5	3.2%
>35	27	17.3%
Total	156	100%

There were zero *Lygus* present in only 3.8% of fields surveyed (Table 1) whereas 3.26% of the canola fields contained only adult *Lygus* versus 89.1% of the fields that were populated by both adults and nymphs (Table 2). Note that all nymphs collected during surveying are expected to have matured into new adults by the early pod stage. **Areas highlighted yellow, orange or red in Figure 1 may contend with *Lygus* IF growing conditions remained warm and dry throughout flowering** since hot dry weather often favours nymph survival and development by early pod stages in canola grown in the Peace River region. Rain throughout June is suspected to have interrupted *Lygus* development since the surveyed population was comprised mainly of adults (47.9%) and 1-3 instar nymphs (41.2%) whereas only 11% were 4-5 instar nymphs (N=3049 individuals sampled). Historically, adults and more mature nymphs are encountered during surveying and 1-3 instar stages are rarer compared to 2016. *Additionally, intermittent rain showers throughout July falling over the south and west of the Peace River region (Figure 2) appears to have further suppressed *Lygus* adult and nymph densities PLUS most canola fields received ample (and sometimes too much) rain so canola in those areas will likely tolerate *Lygus* feeding damage.*

Read [more about \*Lygus\* in canola](#), how to monitor, and the published economic thresholds for this pest.

**Figure 2. Accumulated precipitation the past 30 days (i.e., July 5-August 3, 2016).**



**Table 2. Proportion of fields surveyed containing zero *Lygus*, only adults, only nymphs or adults plus nymphs in commercial fields of canola in 2016.**

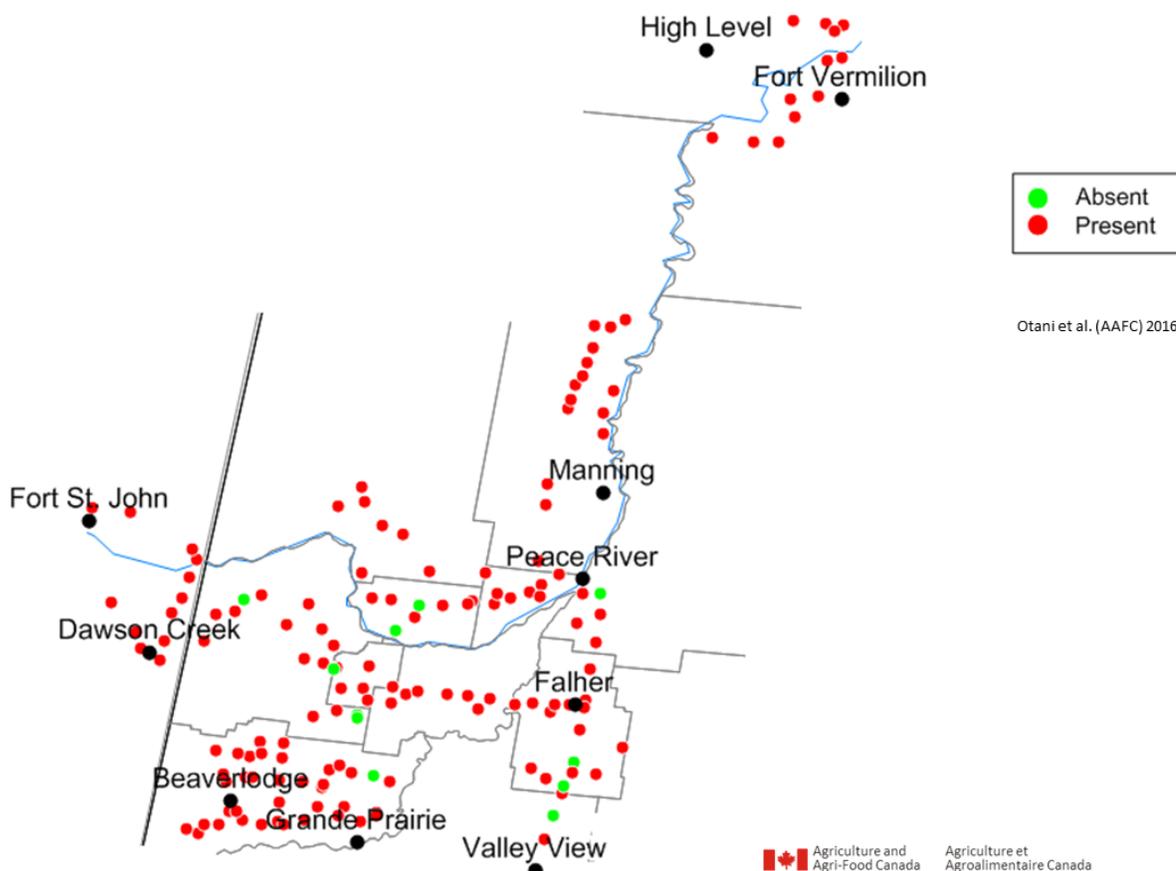
<i>Lygus</i> stages collected	Number of fields	Percent of fields sampled
No <i>Lygus</i>	6	3.8%
Adults only	5	3.2%
Nymphs only	6	3.8%
Adults + Nymphs	139	89.1%
Total	156	100%

2. **Grasshoppers were present in only five canola fields** surveyed for a total of 6 individuals which appear to be *Camnula pellucida* adults and fifth instar nymphs. Additional sweeps were performed in grassy ditches adjacent to canola fields and those specimens will be identified to species and instar stages. Read [more about grasshoppers](#) and follow the hyperlinks to review images of this group of economically important pests.
3. **Leafhoppers** were observed in 12.2% of canola fields surveyed but, more specifically, Aster leafhoppers were present in 7.7% of fields surveyed. A mean of 0.04 ( $\pm 0.01$  SEM, N=156 fields) leafhoppers per 10 sweeps were observed across surveyed sites (Range=0-1.4 per 10 sweeps). The highest density of leafhoppers observed was 1.4 per 10 sweeps so [Aster yellows](#) are not anticipated to be an economic issue in the Peace River region in 2016. More information related to leafhopper biology and monitoring can be found by [linking here](#).
4. **Flea beetles** were present in 41.7% of canola fields surveyed in 2016. Of the 212 specimens retrieved, 38.2% were *Phyllotreta striolata*. A mean of 0.27 ( $\pm 0.07$  SEM, N=156 fields) flea beetles per 10 sweeps were observed across surveyed sites (Range=0-7.8 per 10 sweeps). Find [more information about flea beetles](#) on canola.
5. **Alfalfa plant bugs** were present in 18.6% of canola fields surveyed and vouchers have been retained to confirm the species of *Adelphocoris*. A total of 68 specimens were obtained and 22.1% were adults whereas 77.9% were nymphs ranging from 3-5 instar stages. Find more information about [alfalfa plant bug](#) and the [superb plant bug](#) here.
6. We are again pleased to report that **zero cabbage seedpod weevil** (Curculionidae: *Ceutorhynchus obstrictus*) were observed in the 156 fields sampled in the Peace River region in 2016. A total of 11 weevils were observed in survey samples; four were *Tychius* spp. while the remaining 7 specimens will be forwarded to the National Identification System (AAFC-Ottawa) for species confirmation. Find out [more about cabbage seedpod weevil](#) here.
7. Sweep-net monitoring is an efficient method to monitor several economic pests of canola but even this method has limitations. It will not provide a complete census for all arthropods occurring in field crops. The following survey data should be carefully weighed since neither density or diversity is accurately assessed from sweep-net samples for these arthropods:
  - **Diamondback moth** (Plutellidae: *Plutella xylostella*) were present in **92.3% of canola fields sampled throughout the region but were represented by low numbers (1.82 $\pm$ 0.17 SEM; N=156 fields) of DBM per 10 sweeps in 2016**. It's important to note that parasitoid wasps (e.g., *Diadegma insulare*, *Diadromus subtilicornis*, and *Microplitis plutellae*) were observed throughout the region and the presence of these natural enemies of DBM is strongly suspected to be keeping DBM densities relatively low.

Sweep-net monitoring is **NOT** recommended for this insect pest yet we collected a total of 1416 specimens from 156 fields in 2016 compared to a total of 672 specimens from 162 fields in 2015 and 230 specimens from 206 fields in 2014. Sites with >5 DBM per 10 sweeps included Grimshaw, Tompkins Landing, Silver Valley, Sexsmith, Eureka River, Doe Creek, Clayhurst, Peace River. Growers in these areas should follow up with in-field monitoring of whole plants as their canola enters the early pod stages. Find [more information on Diamondback moth](#) including images of all stages, monitoring information and the economic threshold.

**Figure 3. Presence/absence map reflecting distribution of diamondback moth (adults, larvae, pupae) occurring in sweep-net samples collected in canola from July 5-7, 2016.**

### Diamondback Moth (Presence/Absence) - 2016



- **Root maggot (*Delia* sp.) adults** were again prevalent in fields and were collected from 151 of the 156 sites surveyed throughout the Peace River region in 2016. A mean of 2.64 ( $\pm 0.25$  SEM, N=156 fields) *Delia* spp. per 10 sweeps were observed across surveyed sites. Numbers collected by sweep-net surveying ranged from 0.0-27.0 *Delia* spp. flies per 10 sweeps in 2016 compared to 0.2-5.6 *Delia* sp. flies per 10 sweeps in 2015 or 0.2-10 flies per 10 sweeps in 2014 but growers should note – **root assessments, rather than sweep-net monitoring, is recommended to accurately assess densities of root maggots.** More information related to root maggots in canola can be found by [linking here](#). Also read [more about Rove beetles](#) and *Aleochoa bilineata*, an important predator and parasitoid that attacks *Delia* species on the Canadian prairies.

- Normally the annual canola survey is conducted during the initial weeks of the **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. *Very low numbers of early instar lepidopteran larvae were observed in sweep-net samples in 2016!* **Bertha armyworm** were tentatively identified in 11 of 156 fields surveyed (i.e., near Blumenort, La Crete, Halcourt, Rio Grande, Rycroft, Watino, Codesa, Wanham, Forest View, Bezanson, Grande Prairie). Read [more about Bertha armyworm](#) this season including pheromone trapping results across the prairies in 2016.

- **Clover cutworm larvae** were observed at 16 sites (i.e., near Codesa, Valhalla x2, Wembley, Woking, Dimsdale, Spirit River, Silver Valley, La Crete, Blumenort, Fort Vermilion, Child Lake, Buffalo Head,

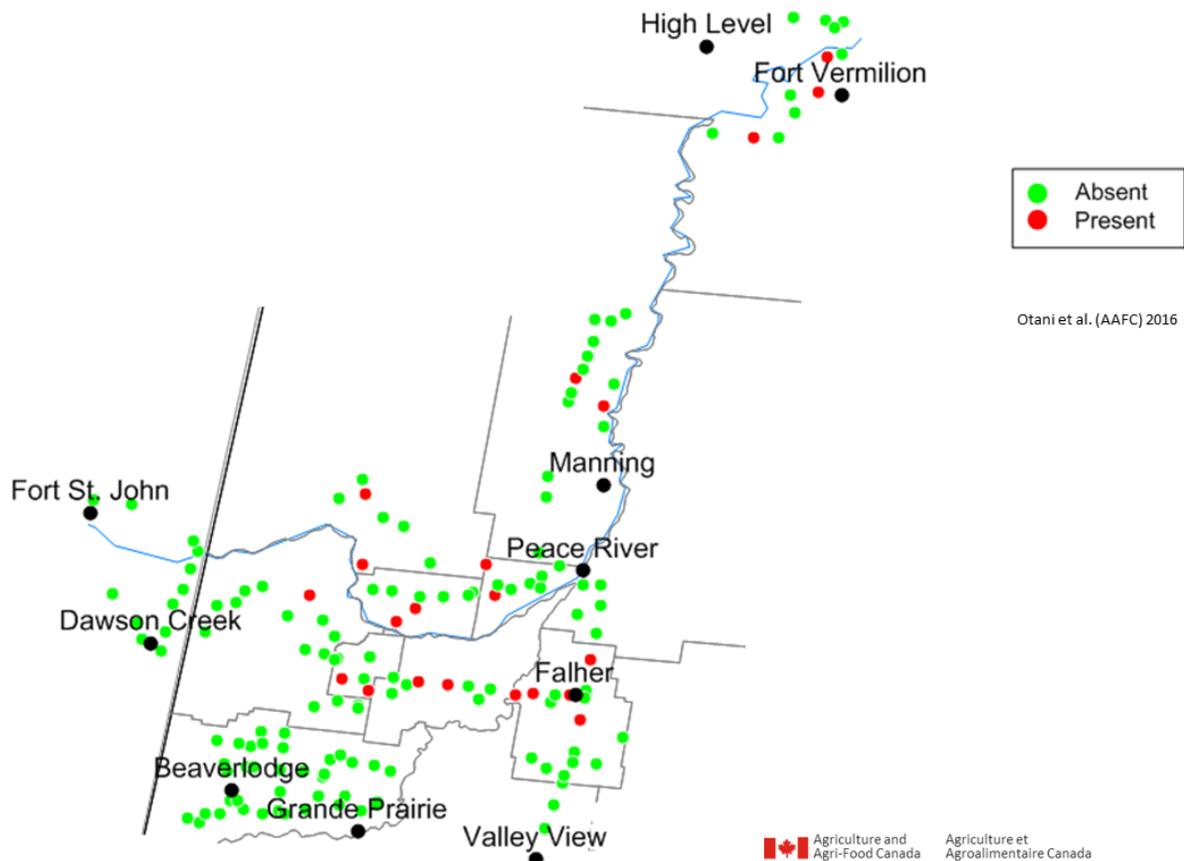
Tompkins Landing, Notikewin). A brief [description of clover cutworms](#) is included within the Bertha armyworm section of the new Insect Pest Field Guide.

- A single **beet webworm larva** was observed in a field near Grimshaw. Read [more about beet webworms](#) and how they can occasionally turn up in canola.
- **Early instar larvae** (1-2 instar stages; N=149 individuals) were collected from 39 fields in very low numbers (i.e., near Hawk Hills, Buffalo Head, Fort Vermilion, Valhalla, Spirit River, Blueberry Mountain, Bonanza, Happy Valley, Elmworth, La Glace, Grande Prairie, Clairmont, Teepee Creek, Wembley, Fairview, Beaverlodge, Scotswood, Woking, Sexsmith, Dow River Clayhurst, Farmington). Some of these specimens may be [Checked white butterfly larvae](#).
- **Wheat midge** is monitored at dusk using in-field counts of adults per wheat heads in order to apply the economic threshold. A total of 68 individuals were obtained in the sweep-net samples. Wheat midge adults were present in 14.1% of the canola fields surveyed in 2016 and absent from the remaining 85.9% fields. Review the predictive model outputs for wheat midge [during the week of July 5<sup>th</sup>](#). Also know that Alberta Agriculture & Forestry and our IPM Program will be randomly surveying 2016 wheat fields throughout the Peace River region following harvest. The soil core surveying provides insight into the densities of wheat midge overwintering and that data is used to produce a prairie-wide forecast map in January 2017!
- ***Macroglanes penetrans*** is a hymenopteran parasitoid that overwinters within wheat midge cocoons and emerges to fly over the same period as its host, the wheat midge. A total of 3027 individuals were retrieved from sweep-net samples in 2016! This biological control agent showed excellent synchrony with its host since it was recovered in exactly the same fields (i.e., it was present in 14.1% of canola field surveyed and absent from the remaining 85.9%). A mean of 0.09 ( $\pm 0.04$  SEM, N=156 fields) *M. penetrans* adults per 10 sweeps were observed across surveyed sites but ranged up to 5.4 per 10 sweeps in 2016.

This biological control agent attacking wheat midge has been collected annually throughout the Peace River region in canola fields grown on wheat stubble since 2012! Growers are urged to preserve the parasitoid by avoiding prophylactic tank mixes of fungicides and insecticides during flowering in canola and especially if the previous crop was wheat! Read [more about \*M. penetrans\*](#) and find out what the mighty wasp looks like!

**Figure 4. Presence/absence map reflecting distribution of *Macroglenes penetrans* occurring in sweep-net samples collected in canola from July 5-7, 2016.**

### *M. penetrans* (Presence/Absence) - 2016

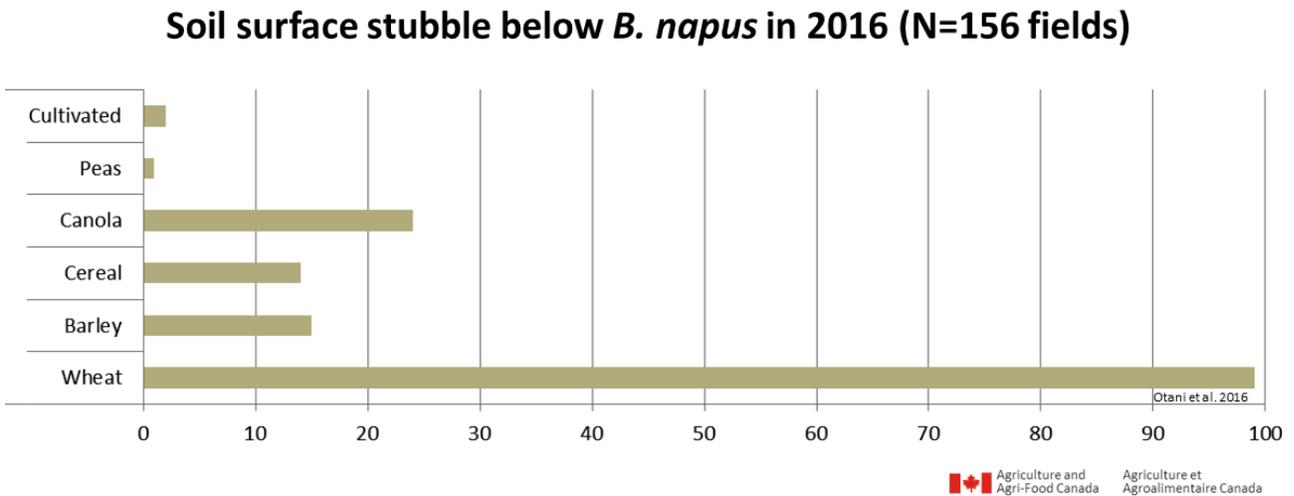


- **Spiders** were represented by crab, wolf and jumping spiders which were retrieved from 60.9% of the 2016 canola fields sampled. One canola field provided 7 spiders in 50 sweeps! Read [more about spiders](#) and how they function as an important natural enemy in field crops.
- **Aphids** were collected from 60.9% of canola fields but numbers greater than 50 individuals per 50 sweeps were only observed in two fields in 2016. Relatively low numbers of aphids, plus consistent rain events throughout July, will hopefully keep this insect pest's numbers low. Find additional information and links to learn more about [aphids in canola](#).
- **Thrips** were collected from 91.7% of canola field surveyed. Pest and predatory species of thrips were not differentiated amongst while processing but growers may notice pod curling since 39.7% of fields surveyed had greater than 50 thrips per 50 sweeps. Read more about [thrips in canola](#) and how pod curling has been observed in some areas of the prairies in 2016.
- **Bees** are definitely not monitored accurately using a sweep-net. Even so, 47 specimens were obtained while surveying the 156 canola fields in 2016 and 17.0% were honeybees whereas the remaining 83.0% were native bees. Specimen vouchers were pinned from selected sites and can hopefully be identified to genus level.

8. **Previous cropping data** was recorded by visually inspecting the soil surface of surveyed canola fields. Surface field trash was categorized then summarized in the figure below (Note: category “cereal” 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 soil surface stubble encountered beneath the 156 canola fields surveyed in 2016 was wheat stubble (63.9%), followed by canola (15.5%), barley (9.7%), residue that was characterized as “cereal” (9.0%), fields that were cultivated (1.3%), or pea stubble (0.1%).

**Figure 5. Field surface condition or stubble type observed in canola fields surveyed in the Peace River region in 2016.**



**THANK YOU** to the following hard working AAFC staff who surveyed<sup>†</sup>, processed<sup>‡</sup>, and mapped<sup>∞</sup> this data: Jadin Chahade<sup>1†‡</sup>, Kaitlin Freeman<sup>1†‡</sup>, Holly Spence<sup>1†‡</sup>, Hannah Avenant<sup>1†‡</sup>, Laura Stewart<sup>1†‡</sup>, Celine Coschizza<sup>1†‡</sup>, Emily Lemke<sup>1†‡</sup>, Owen Olfert<sup>2†∞</sup>, Taylor Kaye<sup>2†∞</sup>, Shelby Dufton<sup>1‡</sup>, and Amanda Jorgensen<sup>1‡</sup>.

**Finally, and MOST IMPORTANTLY, Thank you to our canola producers** for allowing us to sample in their fields!