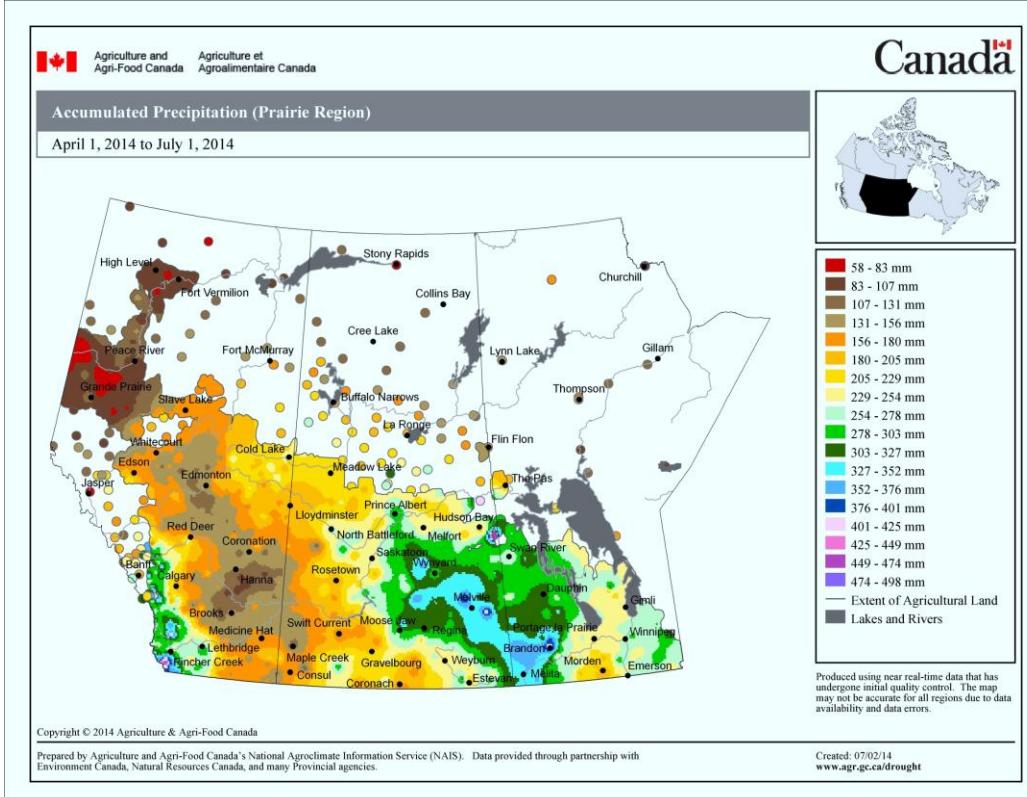


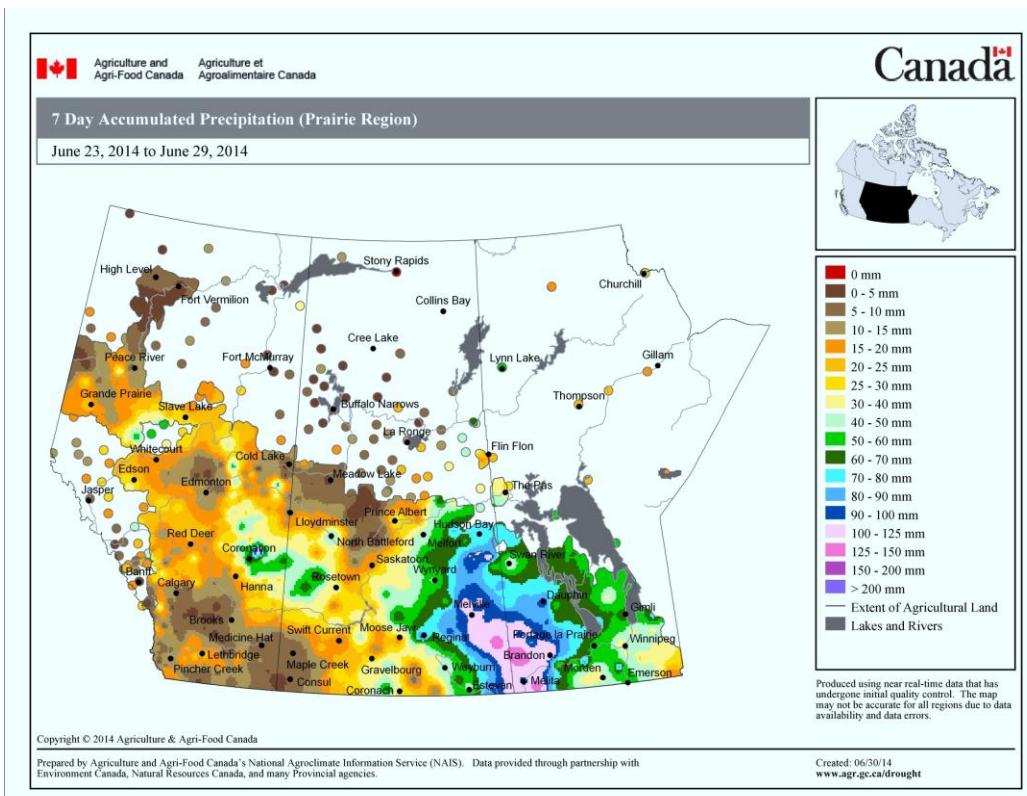


**Prairie Pest Monitoring Network Weekly Updates – July 2, 2014**  
**Otani, Giffen, Weiss, Olfert**

- 1. Abbreviated Weekly Update** – Staff are busy performing surveys this week.
  - 2. Weather synopsis** – Below is the **Accumulated Precipitation for the Growing Season** (i.e., April 1-July 1, 2014):

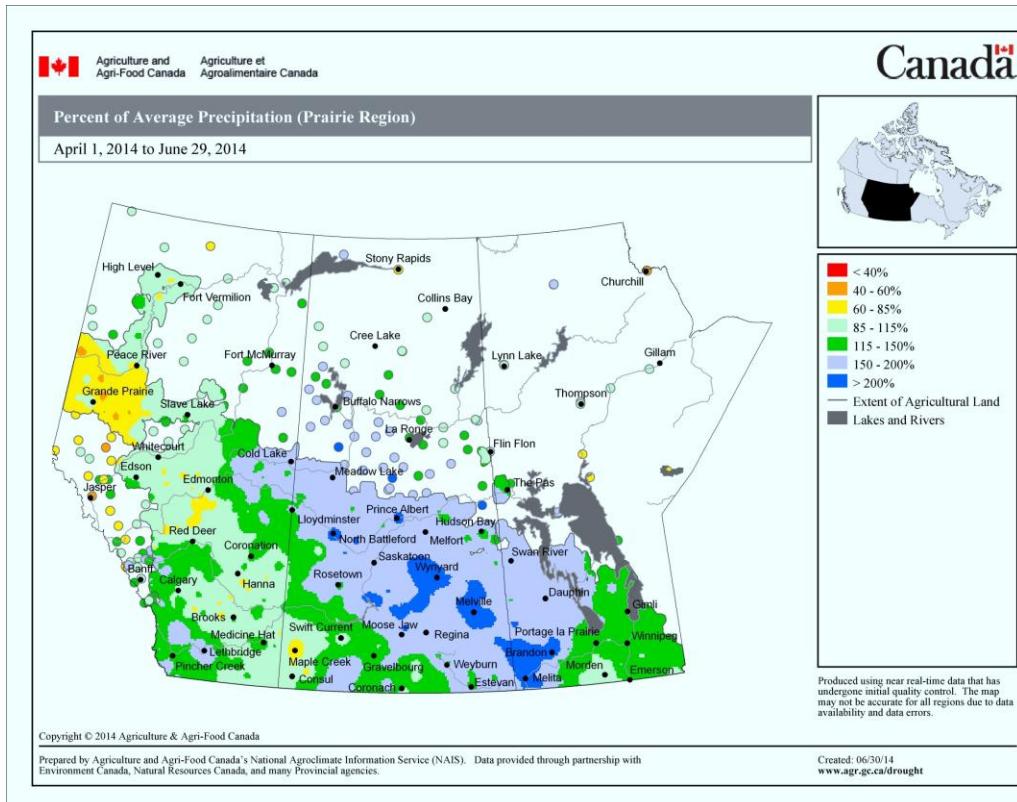


Incredible rainfall!! Below is the **Accumulated Precipitation the Past 7 Days** (i.e., June 23-29, 2014):

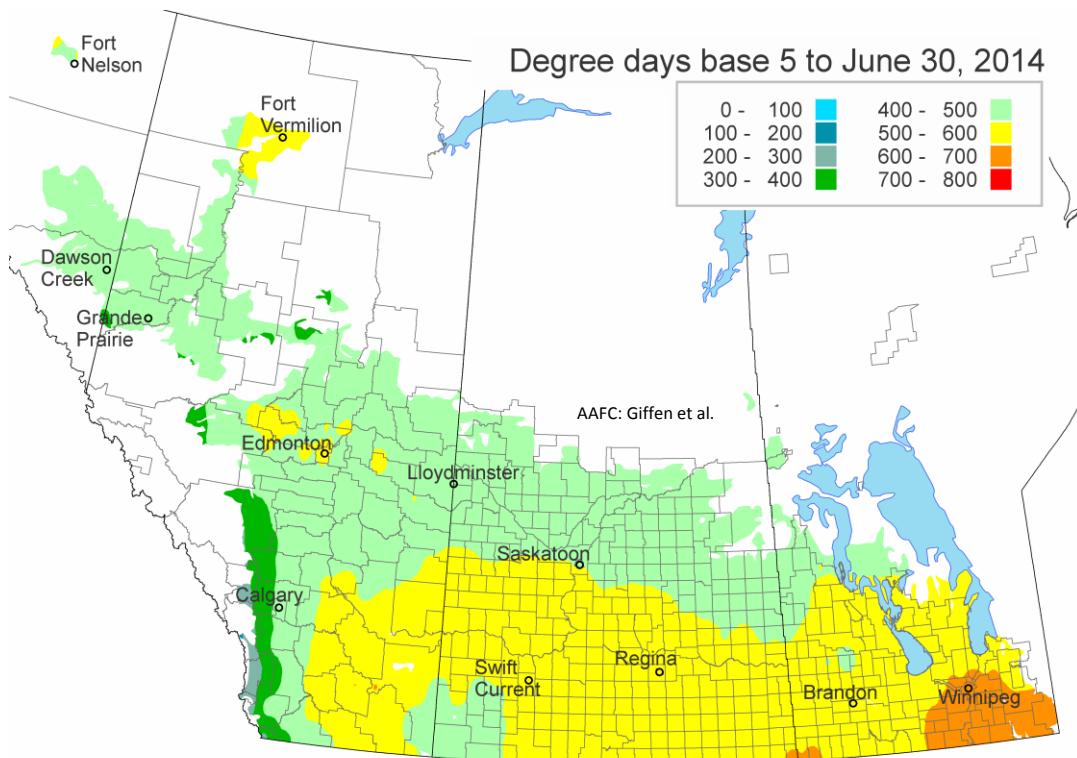




The map below shows the **Percent of Average Precipitation** for the growing season (April 1-June 29, 2014):

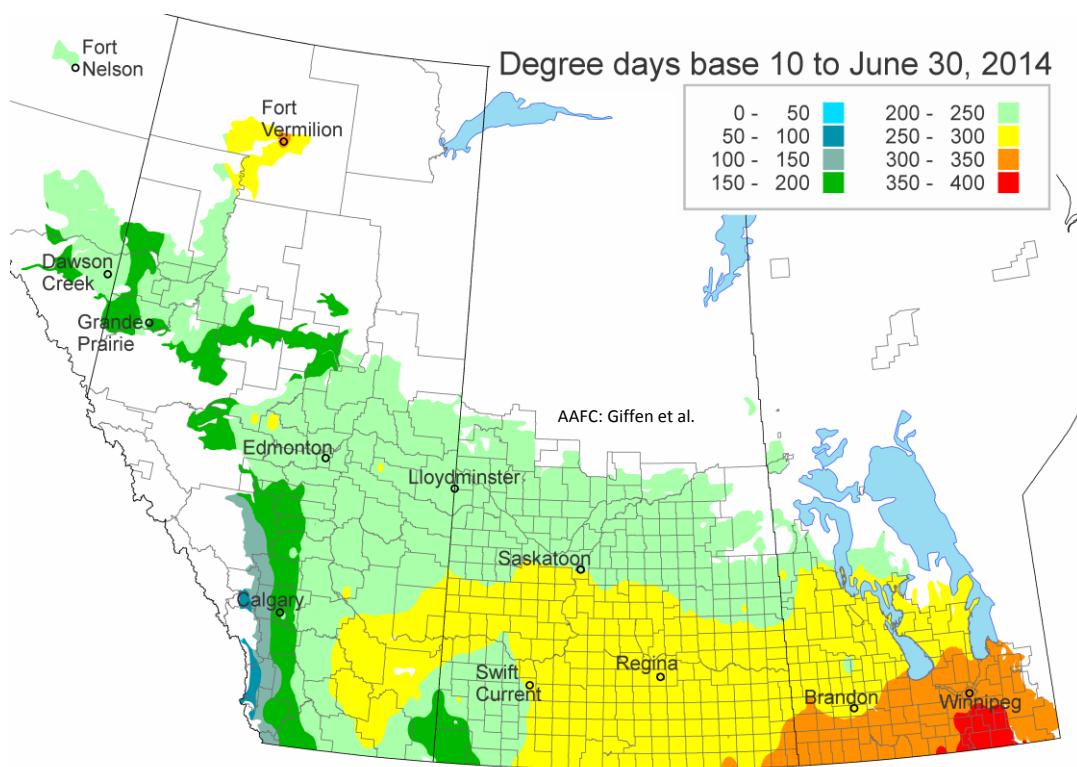


Growing degree day (GDD) estimates reflect the growing season, in terms of heat accumulation, across the prairies. Below is the **GDD (Base 5°C) for the Growing Season** (April 1-June 30, 2014):





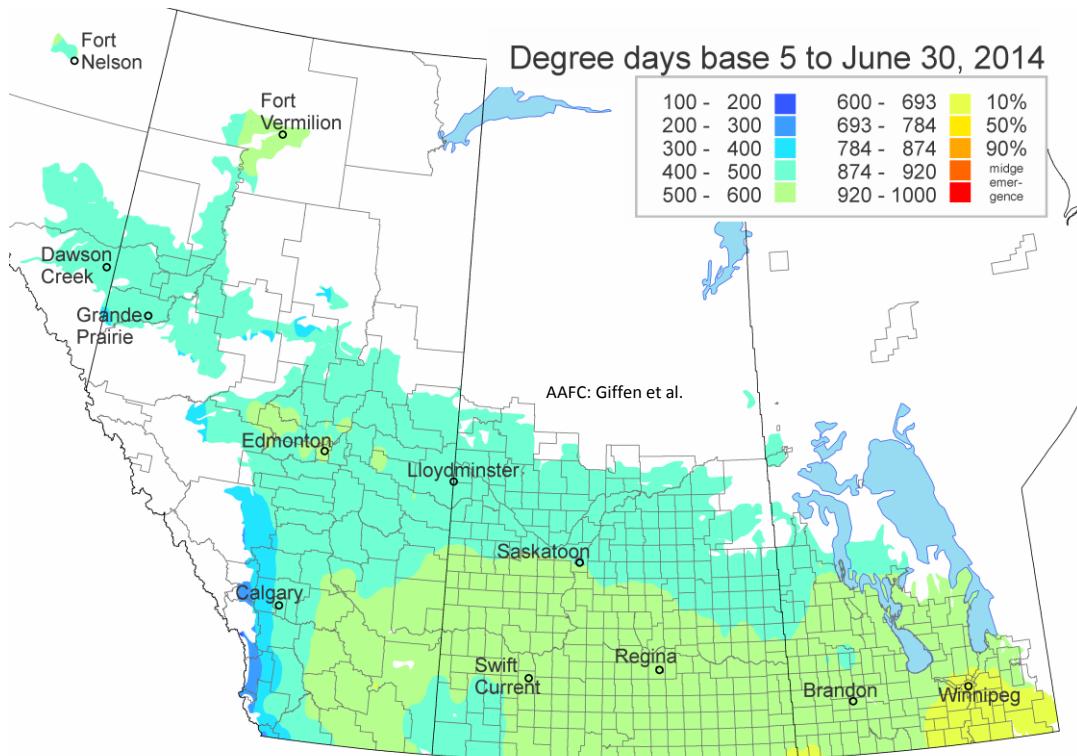
While below is the **GDD (Base 10°C) for the Growing Season** (April 1-June 30, 2014):



**3. Wheat Midge (*Sitodiplosis mosellana*)** – This week modelling includes wheat midge in order to facilitate monitoring across the prairies. The map below predicts the geographic distribution and corresponding accumulation of heat units necessary for wheat midge to emerge from puparia developing in the soil.

When monitoring wheat fields, be particularly watchful for the synchrony between flying midge and anthesis. Additional wheat midge biology and monitoring information can be located by clicking [here](#) or linking to your provincial fact sheet ([Saskatchewan Agriculture, Alberta Agriculture and Rural Development](#)). More information related to wheat midge on the Canadian prairies was published by [Elliott, Olfert, and Hartley](#) in 2011.

As the growing season progresses, areas highlighted yellow, orange, then red predict regions which have accumulated sufficient heat units for wheat midge adults to begin to emerge (Fig. 1) based modelling. Those of you monitoring wheat midge using pheromone traps will need to have traps in place within areas of the map highlighted green (i.e., 500-600 DD) and turquoise (i.e., 400-500) in the map below.

**Fig. 1.**

Over the weekend, pheromone traps collected wheat midge in the north of the Peace River region near Manning, Peace River, and Falher AB.

**4. Diamondback Moth (*Plutella xylostella*)** – Remember, the **Action Threshold for DBM in canola is applicable at pod stage and is 200-300 larvae/m<sup>2</sup> or 20-30 larvae per 0.1 m<sup>2</sup>**. Be mindful that beneficial insects targeting DBM larvae are already in fields.



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**Fig. 2. Diamondback larva (upper left) and pupal silk cocoon (upper right), *Diadegma insulare* adult and early instar Diamondback moth larvae on canola leaf (lower left) and *D. insulare* pupae (N=2) within Diamondback moth pupal silk cocoons (lower right).** Photos were courtesy of Dr. Lloyd Dosdall.



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L. Dosdall



L. Dosdall



Please also refer to fact sheets for DBM posted by [Manitoba Agriculture, Food and Rural Development](#), [Saskatchewan Agriculture](#), [Alberta Agriculture and Rural Development](#), and the [Prairie Pest Monitoring Network](#).

**5. Bertha Armyworm** – For those of you kindly monitoring pheromone traps across the prairies, the photo below is kindly supplied by Saskatchewan Agriculture and shows a **BAW moth** in situ.

**Fig. 3.**

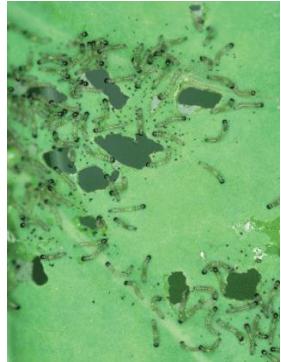


Saskatchewan Agriculture

In-field monitoring for egg masses (Fig. 4) and newly emerged larvae (Fig. 5) should initially focus on the undersides of leaves plus watch the margins of leaves for feeding. Bertha armyworm larvae will also feed on newly developing pods (Fig. 6) so the whole plant should be examined. Watch for the following life stages:



**Fig. 4:** Bertha armyworm eggs laid on the underside of a canola leaf. Note that eggs are laid in batches, eggs are deposited in a single layer, each round egg measures ~1 mm in dia., creamy-white egg colour will change as the embryo develops, dark eggs are often parasitized by beneficial wasp species.



**Fig. 5:** Newly emerged larvae are 0.3 cm long, pale green with pale yellowish stripe along each side.



**Fig. 6:** The larva has six instar stages and passes through color phases of green and pale brown before becoming a large black caterpillar measuring 4-5 cm long.

**Reminder:** Some bertha armyworm larvae remain green or pale brown throughout their larval life. Large larvae may drop off the plants and curl up when disturbed, a defensive behavior typical of cutworms and armyworms. Young larvae chew irregular holes in leaves, but normally cause little damage. The fifth and sixth instars cause the most damage by defoliation and seed pod consumption. Crop losses due to pod feeding will be most severe if there are few leaves. Larvae eat the outer green layer of the stems and pods exposing the white tissue. At maturity, in late summer or early fall, larvae burrow into the ground and form pupae.

#### Monitoring:

Larval sampling should commence once the adult moths are noted. **Sample at least three locations**, a minimum of 50 m apart. At each location, **mark an area of 1 m<sup>2</sup> and beat the plants growing within that area to dislodge the larvae. Count them and compare the average against the values in the economic threshold table below:**

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

Spraying cost - \$ / acre	Expected Seed Value - \$ / bushel*										
	6	7	8	9	10	11	12	13	14	15	16
Number of Larvae / metre <sup>2</sup> *											
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<sup>2</sup> (Bracken and Bucher. 1977. Journal of Economic Entomology. 70: 701-705).

**6. Cabbage seedpod weevil (*Ceutorhynchus obstrictus*) – Reminder:** Correct sampling methods by clicking [here](#) or you can link to either the [Alberta](#) or [Saskatchewan](#) fact sheets for detailed biological and pest management information including the economic threshold. Another excellent YouTube video describing sweep-net sampling in canola is available courtesy of Real Agriculture and Manitoba Agriculture's [Dr. John Gavloski](#).

The following general descriptions of adult and larval stages of the cabbage seed weevil have been included below to aid in-field monitoring.



**Adult:** Adults overwinter in soil beneath leaf litter in shelter belts and roadside ditches and emerge from these sites in spring when soil temperatures warm to approximately 15°C. Adult weevils are ash-grey and approximately 3 to 4 mm long (Fig. 7). They have a prominent curved snout that is typical of most weevils. Adults can be found on early flowering hosts (wild mustard, flixweed, hoary cress, stinkweed, and volunteer canola). **Weevils move to canola fields when the crop is in the bud to early flower stage and feed on pollen and buds**, causing the flowers to die. Yield loss due to this feeding is more evident in dry years when the canola crop can't compensate for the loss. After a pollen meal, mating occurs on the plant. When small pods develop, the female will deposit an egg through the pod wall onto, or adjacent to a developing seed.

**Eggs:** Eggs are very small, oval, and opaque white (Fig. 8). Most often, only a single egg is deposited per pod; however, two or more eggs can be laid per pod when cabbage seedpod weevil densities are high.



Fig. 7. Adult- 16 days



Fig. 8. Eggs: 6-7 days

**Larva:** Larvae are white and grub-like and consist of four larval instars. They can reach 5 to 6 mm in length (Fig. 9). The first instar larva feeds on the cuticle on the outside of the pod. The second instar bores into the pod and feeds on the developing seeds. A single larva consumes about five canola seeds. Larval feeding on the seeds is the most severe type of injury and infested pods are more prone to shattering that causes seeds to be un-harvestable. Infested pods are often misshapen as a result of the larval feeding. An indirect form of damage can occur when fungus enters the pod through the larval exit hole and infects the pod.



Fig. 9: Larva- 6 weeks

#### Timing of monitoring:

The risk of infestation can be predicted based on the size of the adult population. **Begin sampling when the crop first enters the bud stage and continue through the flowering.**

#### Sweep net sampling for comparison to the economic threshold:



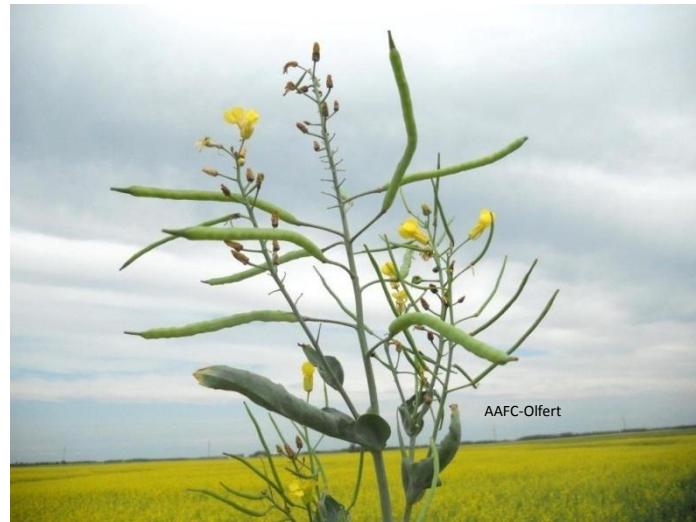
Sweep net samples should be taken at ten locations within the field with ten 180° sweeps per location. Count the number of weevils at each location. **Samples should be taken in the field perimeter as well as throughout the field. Adults will invade fields from the margins and if infestations are high in the borders**, application of an insecticide to the field margins may be effective in reducing the population to levels below which economic injury will occur.

## 7. Swede Midge (*Contarinia nasturtii*) – We again include scouting tips for in-field monitoring:

- Watch for unusual plant structures and plant discolourations then follow-up by closely scrutinizing the plant for larvae (Fig. 10).
- The growing tip may become distorted and produce several growing tips or none at all, young leaves may become swollen, crinkled or crumpled and brown scarring caused by larval feeding may be seen on the leaf petioles and stems.
- Flowers may fail to open.
- **Young plants that show unusual growth habits should be examined carefully for damage and larvae**, especially if the sticky liners have many flies resembling midges (swede midges are about the size of orange blossom wheat midge but are not orange).
- **Larvae can be seen with a hand lens.**



**Fig. 10:** Swede midge larvae inside canola flower (Upper) and canola damage observed in a field in Northeast Saskatchewan (Right; Photos: AAFC)



Canola School has posted a swede midge update entitled "[Swede midge a pest on the rise](#)", featuring Dr. Julie Soroka (AAFC-Saskatoon). The Ontario Canola Growers post swede midge information posted [here](#). Dr. Rebecca Hallett has posted a very helpful [swede midge identification guide](#) for those performing in-field monitoring and pheromone trapping. Also, current Ontario swede midge populations are mapped at the above website. Finally, canola management recommendations for swede midge in Ontario are posted by [Rebecca Hallett and Brian Hall](#).

## 8. Cereal Leaf Beetles (*Oulema melanopus*) – Fact sheets for CLB are posted by [Alberta Agriculture, Food and Rural Development](#), and [BC Ministry of Agriculture](#), and the [Prairie Pest Monitoring Network](#). Descriptions of the various CLB stages and some monitoring tips are included below. We also include updated photos of adult (Fig. 11) and larval (Fig. 12) stages of cereal leaf beetle.

**Fig. 11. Adult****Fig. 12. Larva**

### **Monitoring:**

Give priority to following factors when selecting monitoring sites:

- Choose fields and sections of the fields with past or present damage symptoms.
- Choose fields that are well irrigated (leaves are dark green in color), including young, lush crops. Areas of a field that are under stress and not as lush (yellow) are less likely to support CLB.
- Monitor fields that are located along riparian corridors, roads and railroads.
- Survey field areas that are close to brush cover or weeds, easy to access, or are nearby sheltered areas such as hedge rows, forest edges, fence lines, etc.

Focus your site selection on the following host plant priorities:

- **First** - winter wheat. If no winter wheat is present then;
- **Second** - other cereal crops (barley, wheat, oats, and rye). If no cereal crops are present then;
- **Third** - hay crops. If no hay crops or cereal crops are present then;
- **Fourth** - ditches and water corridors

### **9. Crop Reports** - The following provincial websites now have their Crop Reports posted so click the links to find their weekly updates:

- Manitoba's Crop Report: <http://www.gov.mb.ca/agriculture/crops/seasonal-reports/crop-report-archive/index.html>
- Saskatchewan's Crop Report: <http://www.agriculture.gov.sk.ca/crop-report>
- Alberta's Crop Report: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/sdd4191](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sdd4191)

Link here to access the USDA's [Weekly Weather and Crop Bulletin](#).

### **10. Questions or problems accessing the contents of this Weekly Update?** Please e-mail or call either [Owen.Olfert@agr.gc.ca](mailto:Owen.Olfert@agr.gc.ca) (tel. 306-385-9355) or [Jennifer.Otani@agr.gc.ca](mailto:Jennifer.Otani@agr.gc.ca) (tel. 780-354-5132). Past and present "Weekly Updates" are kindly posted to the Western Forum website by webmaster, Dr. Kelly Turkington. Please [click here](#) to link to that webpage.

### **11. Previous topics:**

- a. **Flea Beetles** (Chrysomelidae: *Phyllotreta* species) – Fact sheets for flea beetles in canola are posted by [Manitoba Agriculture, Food and Rural Development](#), and [Saskatchewan Agriculture](#). Helpful images produced by Dr. Julie Soroka (AAFC-Saskatoon) exemplifying percent of cotyledon leaf area consumed by flea beetles are posted at [Canola Watch](#).
- b. **Cutworms** (Noctuidae) – **Cutworm reports came out of central Alberta and Manitoba this past week.** Cutworm biology, species information, plus monitoring recommendations are available at the Prairie Pest Monitoring Network's [Cutworm Monitoring Protocol](#). Also refer to these cutworm-specific fact sheets



([Manitoba Agriculture, Food and Rural Initiatives](#), [Alberta Agriculture, Food and Rural Development](#)).

Please also consider using the Alberta Pest Surveillance Network's "2014 Cutworm Reporting Tool" for online reporting located by clicking [here](#). Data entered at that website uploads to a live online "[Cutworm Map](#)".

- c. **Wind trajectories Related to Diamondback Moth (DBM) and Aster Leafhopper Introductions –** Completed for the season. Please refer to earlier [Weekly Updates](#) for details related to backward and forward trajectories associated with air parcels moving over western Canadian locations.
- d. **Diamondback Moth (*Plutella xylostella*) –** Producers in Manitoba can find weekly DBM pheromone reports within Manitoba Agriculture and Rural Development's "Insect and Disease Updates" which can be accessed by [linking here](#). Producers in Alberta can access Alberta Agriculture and Rural Development's DBM pheromone monitoring map which can be accessed by [linking here](#).
- e. **Pea Leaf Weevil (*Sitona lineatus*) –** Link here for the [Pea leaf weevil monitoring protocol](#) with photos of related weevils).