1. **Greetings!** Subscribe to the Blog by following the instructions posted here! Receive automatic updates in your inbox through the growing season.

2. **Insect of the Week** - This year beneficial arthropods will be featured! *Field Crop and Forage Pests and their Natural Enemies in Western Canada: Identification and Field Guide* (2015) by Hugh Philip is a new publication from Agriculture and Agri-Food Canada.

This week’s Insect of the Week are the **Ladybird Beetles**. Most are familiar with the adult yet juvenile stages of the ladybird beetles might appear quite alien. Ladybird beetles or lady beetles are popular as one of the most recognizable insects yet they are voracious predators, consuming up to 100 aphids per day! Both the adult and larval stages prowl for aphids and other soft-bodied arthropods amongst the foliage. Ladybird beetle species can vary from whitish to orange to red with the number and patterning of spots varying by species. The larvae are often slate blue and possess an elongate body with varying black and yellow patterning but also have a pronounced head capsule and three pairs of legs. Find out how ladybird beetles and other predators are being investigated to develop a dynamic threshold for cereal aphids.

**Beetles, ladybird**
*Adalia* spp. *Coccinella* spp.
*Harmonia* spp. *Hippodamia* spp.
(a.k.a. ladybugs, lady beetles)

**Hosts/Prey**
- Aphids (pp. 55-65), mites (pp. 20-22), scale insects, mite eggs (p. 69), thrips (p. 104), other soft-bodied insects, and near eggs where preferred food is scarce.

**Identification**
- ADULTS: 5-7 mm long, oval, elytra black, orange, red, with or without red or black spots, depending on species.
- EGGS: yellow to orange, 0.5-1.5 mm long, elongate, and upright in clusters of 3-80 on host-industrial plant parts.
- MATURE LARVAE: Up to 11 mm long with six abdominal legs, slate-blue body with various patterns of yellow or orange markings on abdomen, depending on species; fast moving, usually found in aphid colonies or wandering in search of same.

**Life Cycle**
- Overwinter as adults outside fields in protected locations, frequently in large groups. Adults emerge in spring and search for host colonies by which to lay eggs. Larvae present in fall to early spring on leaves, 1-3 generations/year depending on species. Hosts are fed until moving to overwintering sites.

**Similar Species**
- None

**Monitoring**
- Visual inspection of plants or use sweep net to detect adults and larvae. Examine leaves for eggs and pupae.

**Conservation**
- Avoid applying pesticides toxic to adults and larva where present. Preserve a unsprayed vegetation near fields where prey populations can develop that attract females to lay eggs. Adults will later spread into nearby crops as prey population develops.

**Comments**
- Most species have consistent number of spots which are often reflected in the specific name e.g. seven-spotted lady beetle. *Coccinella septempunctata*. Lenticularia is a two-spotted lady beetle, *Adalia bipunctata* (Lencertia). However, the recent immigrant and aggressive predator, the multi-colored Asian lady beetle (*Harmonia axyridis*), can vary from solid black or red, and have various numbers of black or red spots.
3. **Weather synopsis** – The map below reflects the **7 Day cumulative precipitation map (July 26-August 1, 2016)**.

![7 Day Cumulative Precipitation Map](image)

While the map below summarizes the **cumulative precipitation for the growing season (April 1-August 1, 2016)**.

![Cumulative Precipitation Map](image)
The accumulated precipitation for the growing season (April 1-August 1, 2016) is mapped below.

The updated growing degree day map (GDD) (Base 5°C, March 1 – July 31, 2016) is below:
While the growing degree day map (GDD) (Base 10°C, March 1 – July 31, 2016) is below:

The map below shows the **Lowest Temperatures the Past 7 Days** (July 26-August 1, 2016) across the prairies:
The map below shows the **Highest Temperatures the Past 7 Days (July 26-August 1, 2016):**

![Map of Highest Temperatures](image)

While the map below reflects the **number of consecutive days above 25°C** across the prairies for the growing season **as of July 29, 2016.**

![Map of Consecutive Days above 25°C](image)

The maps above are all produced by Agriculture and Agri-Food Canada. Growers may wish to bookmark the [AAFC Drought Watch Maps](#) for the growing season.
Additional precipitation and temperature data or maps are provided by the following:

- Manitoba Agriculture’s Crop Weather Report
- Alberta Agriculture and Food’s Weather Stations
- Saskatchewan’s Cumulative Precipitation Map
- Environment Canada’s Historical Data Interface

4. Pre-Harvest Interval (PHI) – Growers with late-season insect pest problems will need to remember to factor in the PHI which is the minimum number of days between a pesticide application and swathing or straight combining of a crop.

The PHI recommends sufficient time for a pesticide to break down and a PHI-value is both crop- and pesticide-specific. Adhering to the PHI is important for a number of health-related reasons but also because Canada’s export customers strictly regulate and test for the presence of trace residues of pesticides.

An excellent summary of PHI for various pesticides in their various crops was posted by Saskatchewan Agriculture this week within their Crop Production News.

In 2013, the Canola Council of Canada created and circulated their “Spray to Swath Interval Calculator” which was intended to help canola growers accurately estimate their PHI. Other PHI are described in your provincial crop protection guides and remember that specific crop x pesticide combinations will mean different PHIs. More information about PHI and Maximum Residue Limits (MRL) is available on the Canola Council of Canada’s website.

5. Lygus bugs (\textit{Lygus} spp.) - The economic threshold for Lygus in canola is applied at late flower and early pod stages.

Damage: Lygus bugs have piercing-sucking mouthparts and physically damage the plant by puncturing the tissue and sucking plant juices. The plants also react to the toxic saliva that the insects inject when they feed. Lygus bug infestations can cause alfalfa to have short stem internodes, excessive branching, and small, distorted leaves. They feed on buds and blossoms and cause them to drop. They also puncture seed pods and feed on the developing seeds causing them to turn brown and shrivel.
Begin monitoring canola when it bolts and continue until seeds within the pods are firm. Since adults can move into canola from alfalfa, check lygus bug numbers in canola when nearby alfalfa crops are cut.

Sample the crop for lygus bugs on a sunny day when the temperature is above 20°C and the crop canopy is dry. With a standard insect net (38 cm diameter), take ten 180° sweeps. Count the number of lygus bugs in the net.

Repeat the sampling in another 14 locations. Samples can be taken along or near the field margins. Calculate the cumulative total number of lygus bugs and then consult the sequential sampling chart (Figure C). If the total number is below the lower threshold line, no treatment is needed. If the total is below the upper threshold line, take more samples. If the total is on or above the upper threshold line, calculate the average number of lygus bugs per 10-sweep sample and consult the economic threshold table.

Sequential sampling for lygus bugs at late flowering stage in canola.

The economic threshold for lygus bugs in canola covers the end of the flowering (Table 1) and the early pod ripening stages (Table 2). Once the seeds have ripened to yellow or brown, the cost of controlling lygus bugs may exceed the damage they will cause prior to harvest, so insecticide application is not warranted. Consider the estimated cost of spraying and expected return prior to making a decision to treat a crop.

Remember that insecticide applications at bud stage in canola have not been proven to result in an economic benefit in production. The exception to this is in the Peace River region where early, dry springs and unusually high densities of lygus bug adults can occasionally occur at bud stage. In this situation, high numbers of lygus bugs feeding on moisture-stressed canola at bud stage is suspected to result in delay of flowering so producers in that region must monitor in fields that fail to flower as expected.

Table 1. Economic thresholds for lygus bugs in canola at late flowering and early pod stages (Wise and Lamb 1998).

<table>
<thead>
<tr>
<th>Control costs</th>
<th>Late flower to early pod (Canola crop stages 4.4-5.1)</th>
<th>Economic Injury Level²</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/ac</td>
<td>$/ha</td>
<td>8</td>
</tr>
<tr>
<td>$8.00</td>
<td>$19.77</td>
<td>10</td>
</tr>
<tr>
<td>$10.00</td>
<td>$24.71</td>
<td>12</td>
</tr>
<tr>
<td>$12.00</td>
<td>$29.65</td>
<td>14</td>
</tr>
<tr>
<td>$14.00</td>
<td>$34.59</td>
<td>16</td>
</tr>
<tr>
<td>$16.00</td>
<td>$39.54</td>
<td>18</td>
</tr>
<tr>
<td>$18.00</td>
<td>$44.48</td>
<td>20</td>
</tr>
<tr>
<td>$20.00</td>
<td>$49.42</td>
<td>20</td>
</tr>
<tr>
<td>Canola value</td>
<td>$/bu</td>
<td>$8.00</td>
</tr>
<tr>
<td></td>
<td>$/tonne</td>
<td>$352.42</td>
</tr>
</tbody>
</table>

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

| Control costs $/ac | $/ha | Early pod (Canola crop stages 5.2)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$8.00</td>
<td>$19.77</td>
<td>11  9  7  6  5  5  4</td>
</tr>
<tr>
<td>$10.00</td>
<td>$24.71</td>
<td>14  11  9  8  7  6  5</td>
</tr>
<tr>
<td>$12.00</td>
<td>$29.65</td>
<td>16  13  11  9  8  7  6</td>
</tr>
<tr>
<td>$14.00</td>
<td>$34.59</td>
<td>19  15  13  11  10  9  8</td>
</tr>
<tr>
<td>$16.00</td>
<td>$39.54</td>
<td>22  18  15  13  11  10  9</td>
</tr>
<tr>
<td>$18.00</td>
<td>$44.48</td>
<td>25  20  16  14  12  11  10</td>
</tr>
<tr>
<td>$20.00</td>
<td>$49.42</td>
<td>27  22  18  16  14  12  11</td>
</tr>
<tr>
<td>Canola value $/bu</td>
<td>$8.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>value $/tonne</td>
<td>$352.42</td>
<td>$440.53</td>
</tr>
</tbody>
</table>

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).

Biological and monitoring information related to Lygus in field crops is posted by the provinces of Manitoba or Alberta fact sheets or the Prairie Pest Monitoring Network’s monitoring protocol. Also refer to the Lygus pages within the new “Field Crop and Forage Pests and their Natural Enemies in Western Canada: Identification and management field guide” - both English-enhanced or French-enhanced versions are available.

6. Bertha armyworm (Lepidoptera: Mamestra configurata) - Reporting sites across the prairies have generally reported lower cumulative interceptions but moderate numbers have been intercepted a few sites within Manitoba and Saskatchewan. Cumulative counts from pheromone traps are summarized and mapped by provincial staff in Manitoba, Saskatchewan and Alberta. Screen shots of the three maps are provided below:

Manitoba map (screenshot retrieved August 3, 2016):
Saskatchewan map (screenshot retrieved August 3, 2016):

Alberta map (screenshot retrieved August 3, 2016):
Reminder - In-field monitoring for egg masses and newly emerged larvae (photo below) 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 so the whole plant should be examined. Watch for the following life stages:

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. Photo: AAFC-Saskatoon

Newly emerged BAW larvae are 0.3 cm long, pale green with pale yellowish stripe along each side. Photo: AAFC-Saskatoon

The BAW 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. Photo: AAFC-Saskatoon

Scouting tips:
● 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 m2 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:
Biological and monitoring information related to bertha armyworm in field crops is posted by the provinces of Manitoba, Saskatchewan, Alberta and the Prairie Pest Monitoring Network. Also refer to the bertha armyworm pages within the new "Field Crop and Forage Pests and their Natural Enemies in Western Canada: Identification and management field guide" - both English-enhanced or French-enhanced versions are available.

### 7. Cabbage seedpod weevil (Ceutorhynchus obstrictus) - Reminder

- There is one generation of CSPW per year and the overwintering stage is the adult which is an ash-grey weevil measuring 3-4mm long (Refer to lower left photo). Adults typically overwinter in soil beneath leaf litter within shelter belts and roadside ditches.

**Monitoring:**
- Begin sampling when the crop first enters the bud stage and continue through the flowering.
- 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.
- An insecticide application is recommended when three to four weevils per sweep are collected and has been shown to be the most effective when canola is in the 10 to 20% bloom stage (2-4 days after flowering starts).
- Consider making insecticide applications late in the day to reduce the impact on pollinators. Whenever possible, provide advanced warning of intended insecticide applications to commercial beekeepers operating in the vicinity to help protect foraging pollinators.
- High numbers of adults in the fall may indicate the potential for economic infestations the following spring.

**Damage:** Adult feeding damage to buds is more evident in dry years when canola is unable to compensate for bud loss. Adults mate following a pollen meal then the female will deposit a single egg through the wall of a developing pod or adjacent to a developing seed within the pod (refer to lower right photo). Eggs are oval and an opaque white, each measuring ~1mm long. Typically a single egg is laid per pod although, when CSPW densities are high, two or more eggs may be laid per pod.
There are four larval instar stages of the CSPW and each stage is white and grub-like in appearance ranging up to 5-6mm in length (refer to lower left photo). The first instar larva feeds on the cuticle on the outside of the pod while the second instar larva bores into the pod, feeding on the developing seeds. A single larva consumes about 5 canola seeds. The mature larva chews a small, circular exit hole from which it drops to the soil surface and pupation takes place in the soil within an earthen cell. Approximately 10 days later, the new adult emerges to feed on maturing canola pods. Later in the season these new adults migrate to overwintering sites beyond the field.

Please find additional detailed information for CSPW in fact sheets posted by Alberta Agriculture and Forestry, Saskatchewan Agriculture, or the Prairie Pest Monitoring Network.

Also watch provincial reports for updates on surveying underway now. Alberta Agriculture & Forestry has released a new live CSPW map and online reporting tool for growers. A screenshot (retrieved August 3, 2016) is included below.
Cabbage Seedpod Weevil Survey Results

Legend

Percentage of Sweeps below Economic Threshold

- 0%
- >25%
- >50%
- >75%

All samples are below an economic threshold of 0 per sweep.
Less than 25% of samples are above an Economic Threshold of 0 per sweep.
25% or greater of samples are above an Economic Threshold of 0 per sweep.
8. Wheat Midge (Sitodiplosis mosellana) – Predictive modelling will be used again to help forecast wheat midge emergence across the Canadian 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.

Monitoring:
When monitoring wheat fields, pay attention to the synchrony between flying midge and anthesis.

In-field monitoring for wheat midge should be carried out in the evening (preferably after 8:30 pm or later) when the female midges are most active. On warm (at least 15°C), calm evenings, the midge can be observed in the field, laying their eggs on the wheat heads (photographed by AAFC-Beav-S. Dufton & A. Jorgensen below). Midge populations can be estimated by counting the number of adults present on 4 or 5 wheat heads. Inspect the field daily in at least 3 or 4 locations during the evening.
REMEMBER that in-field counts of wheat midge per head remain the basis of economic threshold decision. Also remember that the parasitoid, *Macroglenes penetrans* (photographed by AAFC-Beav-S. Dufton below), is actively searching for wheat midge at the same time. Preserve this parasitoid whenever possible and remember your insecticide control options for wheat midge also kill these beneficial insects which help reduce midge populations.

![Photo of wheat midge and parasitoid](image)

**Economic Thresholds for Wheat Midge:**

a) To maintain optimum grade: 1 adult midge per 8 to 10 wheat heads during the susceptible stage.

b) For yield only: 1 adult midge per 4 to 5 heads. At this level of infestation, wheat yields will be reduced by approximately 15% if the midge is not controlled.

Inspect the developing kernels for the presence of larvae and the larval damage.
Wheat growers in Alberta can access mapped cumulative counts from wheat midge pheromone traps. A screen shot of the map is provided below (retrieved August 3, 2016).

![Map of Wheat Midge Survey Results](image)

Additional information related to wheat midge biology and monitoring can be accessed by linking to your provincial fact sheet (Saskatchewan Agriculture or Alberta Agriculture & Forestry). A review of wheat midge on the Canadian prairies was published by Elliott, Olfert, and Hartley in 2011.

More information about Wheat midge can be found by accessing the pages from the new "Field Crop and Forage Pests and their Natural Enemies in Western Canada: Identification and Field Guide". View ONLY the Wheat midge pages but remember the guide is available as a free downloadable document as both an English-enhanced or French-enhanced version.

9. West Nile Virus and Culex tarsalis – The regions most advanced in degree-day accumulations for Culex tarsalis, the vector for West Nile Virus, are shown in the map below. As of July 31, 2016, areas highlighted in yellow, orange, or red on the map below have accumulated sufficient heat for C. tarsalis to fly so wear your DEET to stay protected!
The Public Health Agency of Canada posts information related to West Nile Virus in Canada. The map of clinical cases of West Nile Virus in Canada in 2016 is posted (as of July 23, 2016) while a screen shot is provided below (retrieved August 3, 2016).

The Canadian Wildlife Health Cooperative compiles and posts information related to their disease surveillance for West Nile Virus. As of August 3, 2016, 27 birds were submitted for testing yet none have tested positive for West Nile virus.
10. **Provincial entomologists** provide insect pest updates throughout the growing season so we have attempted to link to their most recent information:

- Manitoba's Insect and Disease Update which includes lygus in canola, wheat midge, and a few sites showing moderate risk levels for bertha armyworm based on phermone trap interceptions (July 27, 2016, prepared by John Gavloski and Pratisara Bajracharya).

- Saskatchewan's Crop Production News includes pre-harvest intervals (PHI) for a long list of field crop pesticides in Issue 6, prepared by Danielle Stephens. As the report notes, "all pesticides have a PHI" specific for product and crop type. The PHI prevents crops exceeding Maximum Residue Levels (MRL) that will affect the quality of seed in terms of export.

- Watch for Alberta Agriculture and Forestry's Call of the Land for updates from Scott Meers who recently provided an update (posted on July 28, 2016) noting completion of Bertha armyworm pheromone trap monitoring and lower numbers throughout Alberta, low numbers of the orange-morph of English grain aphids, and swede midge in the northeast of Alberta.

11. **Crop reports are produced by:**
- Manitoba Agriculture, Rural Development (August 2, 2016).

- Saskatchewan Agriculture Crop Report (July 25, 2016) which is also posted in a printer-friendly version.

- Alberta Agriculture and Forestry (for July 26, 2016).

- This week, the USDA's Crop Progress Report (posted August 1, 2016) which includes harvest and condition ratings for winter wheat, spring wheat, oat, barley, plus range and pasture conditions is available.

- The USDA also produces a World Agricultural Production Report (July 2016) which estimates production across the globe for corn, cotton, rapeseed, and wheat but also includes tabular data for other grains.
12. **Time of Swathing** - The Canola Council of Canada created a guide to help growers estimate swathing time in canola. A screen shot of the downloadable [Canola Swathing Guide](#) has been included below for reference.
13. Harvest Sample Program - The Canadian Grain Commission is ready and willing to grade grain samples harvested in 2016. Samples are accepted up to November but send samples as soon a harvest is complete.

This is a FREE opportunity for growers to gain unofficial insight into the quality of their grain and to obtain valuable dockage information and details associated with damage or quality issues. The data collected also helps Canada market its grain to the world!

More information on the Harvest Sample Program is available at the Canadian Grain Commission’s website where growers can register online to receive a kit to submit their grain.

In exchange for your samples, the CGC assesses and provides the following unofficial results FOR FREE:

- dockage assessment on canola
- unofficial grade
- protein content on barley, beans, chick peas, lentils, oats, peas and wheat
- oil, protein and chlorophyll content for canola
• oil and protein content and iodine value for flaxseed
• oil and protein for mustard seed and soybeans

Many producers find having both grade and quality information on their samples before delivering their grain to be helpful.

14. The following is a list of previous 2016 Posts – click the hyperlink to review:

Alfalfa weevil
Aphids in canola

Bertha armyworm development and flight

Cabbage root maggot
Canola scouting chart
Cereal leaf beetle
Crop protection guides
Cutworms

Diamondback moth

Environment Canada’s radar maps to follow precipitation events

Flea beetles in canola

Grasshoppers

Iceburg reports
Insects in our diet

Monarch migration
Multitude of mayflies

Pea leaf weevil monitoring
Predicted cereal leaf beetle development
Predicted lygus bug development
Predicted wheat midge development

Swede midge

Thrips in canola

Weather Synopsis (Week 12)
Wind trajectories

15. Questions or problems accessing the contents of this Weekly Update? Please e-mail either Dr. Owen Olbert or Jennifer Otani. Past “Weekly Updates” are very kindly archived to the Western Forum website by webmaster, Dr. Kelly Turkington. Please click here to link to that webpage.