

## Alberta Agriculture and Rural Development

### Entomology Program Annual Report 2014

The goal of the Entomology Program is to provide Alberta's agricultural industry with timely, accurate insect management information.

The program consists of four main areas: [Monitoring](#), [Surveillance](#), [Research](#) and [Communications](#).

#### Monitoring

Bertha Armyworm (*Mamestra configurata*) are monitored using pheromone baited green unitraps. The traps were set up in pairs in canola fields in mid-June (in the Peace country we set up only 1 trap per site to reduce the bumblebee catch). There was excellent support from the industry this year with 315 monitoring sites set up across Alberta. The bertha armyworm monitoring program has grown by 50% in the past two years and is our most successful survey. The growth is in response to the both the ease of participation and the value that participants feel that they get for their participation. Of the 315 locations, 25 showed an elevated level of risk above low level. The major outbreak that was centered in Minburn and Two Hills county appears to have run its course. There was some spraying in isolated fields over a wide range in the province. There were 14 locations with medium bertha armyworm risk and these often (but not always) had some spraying associated with them. Areas showing medium risk included Barrhead, Camrose, Forty Mile, Kneehill, Lac St. Anne, Lacombe, Leduc Foothills, Ponoka, Stettler, Two Hills, Vulcan, Westlock, Wheatland and Yellowhead counties. There were fields above threshold in Forty Mile, Leduc and Stettler. There was one severe risk site in Lacombe county but no spraying was required in that area.

Overall the system is working reasonably well and usually catches even smaller outbreaks. There was one area in Leduc county that didn't match up well with the local trap catch and needed spraying. More often the error is when populations are forecast and do not materialize. There are many factors that affect the populations and diseases could be taking out the worms before they get to damaging stages. Certainly when checking fields we often see evidence of feeding but sometimes very few worms are found. Next year will be interesting as the moth catches increased in many new areas, this could be the start of a build-up or just a one year blip in numbers. Monitoring will be very important again in 2015 in order to keep a handle on the population.

Diamondback Moth (*Plutella xylostella*). There were 30 trap locations established across Alberta in 2012. There were very few moths caught during the 6 week monitoring period April 27 to June 7 including the traps at Foremost. Despite this there was a very substantial outbreak and many fields needed treatment in the county of Forty Mile around Foremost. It is not clear why the traps didn't work there but perhaps the moths arrived after the traps had been taken down.

Grasshoppers ASB's – Several areas have been commenting about an increase in grasshopper numbers, especially in the traditional grasshopper territory. At the time of writing the numbers were still coming in from the Agriculture Service Boards so a complete picture is not known. The results are compiled by David Brennan who has been moved into the Pest Surveillance Branch. Jan Lepp does all the data entry. Generally grasshoppers were below problem levels in all of Alberta.

Pea Leaf Weevil (*Sitona lineatus*) – The PLW survey was completed by AARD staff in late May through early June. This survey counts the level of the characteristic feeding damage caused by PLW. There are five locations in each field where the number of notches are counted on each of 10 plants. 123 fields were surveyed in 30 counties. Spring flights were delayed due to a cool spring. PLW were found further north and in some cases in higher numbers than previous years. This may be the long expected range expansion into central Alberta. There were many reports of PLW on fababeans and some of these were fairly high in areas where PLW has not been a major concern previously. This is indicating that we will have to increase our survey to fababeans but handling it within the current survey doesn't seem to work. A complementary survey done at the same time as peas may need to be performed. PLW may be increasing in new areas due to the increase in fababean acres but the exact driver of the population is unclear.

**Wheat Midge (*Sitodiplosis mosellana*)** The survey was expanded into dryland wheat throughout southern Alberta in 2011. Wheat midge was treated in several areas and reports are coming back of midge affected wheat in several areas of the province. The sample processing is still underway at the time of writing this report but we are expecting about 300 soil samples from across the entire province, basically from anywhere wheat is grown. Soil samples will be processed from Fort Vermilion to Warner (59 counties). Soil processing should wrap up by mid-November. This year we ran a trial wheat midge pheromone trap system. We had 57 locations where cooperators checked the traps on a more or less daily basis. From this initial year it is obvious that the system would have good utility in helping producers determine the timing of wheat midge activity although it did raise many questions. Montana also had a wheat midge emergence system set up using pheromone traps.

Wheat midge parasitoids were collected using sweep net for a group out of Montana looking to relocate them to several sites in that state. The locations for collections were selected based on the survey the previous fall. It is interesting how many parasitoids we found based on only one or two in the soil samples.

**Wheat Stem Sawfly (*Cephus cinctus*)** A survey of 70 fields from 16 counties in southern Alberta was conducted after harvest. The WSS survey was expanded in 2012 as a way of watching for emerging populations now that the problem has reduced to only a few hot spots. There still remains small populations in Forty Mile, Acadia, Taber, Lethbridge, Cypress and Willow Creek. The vast majority of sites had very low or no sawfly present in cut stems.

**Cabbage Seedpod Weevil (*Ceutorhynchus obstrictus*)** survey was carried out again through southern and central Alberta. The numbers from this survey are augmented by reports from agrologists as they scout fields for their customers. 41 fields were monitored using the on line reporting system.

Emergence traps were maintained at CDC South looking for leafhopper emergence. Any leafhopper found were sent to Chrystel Olivier for identification and presence of aster yellows. We also pull out leafhoppers from everything we sample and send them to Chrystel.

**Cereal Leaf Beetle** has not been part of our monitoring efforts. The range of this insect continues to expand but at this point there have been very few economic issues with this pest as natural enemies appear to be keeping the population in check.

We have also been a collaborator with Dr. Dan Johnson on the potato psyllid monitoring system.

## **Surveillance**

**Suction Trap** continues to operate at Brooks. It is run from April to June and is used to watch for new insects that might migrate into our area. It is also useful to pick up migrations of aphids, aster leaf hoppers and diamond back moths in the spring.

**Lessor grain borer surveillance** was done in a pilot project in cooperation with the Canadian Grain Commission. This involved the use of a pheromone baited trap at a couple of major grain terminals. Samples were sent to the grain commission for analysis. As a side to this project gain samples were collected and sent to the grain commission where they would test any insects found for insecticide resistance.

**Swede Midge** Through excellent cooperation of industry partners we also set up a surveillance network of 15 pheromone traps for swede midge. Several around Edmonton, rest along Saskatchewan/ Alberta border. All traps were sent to Saskatoon for assessment and no swede midge were found in any Alberta locations.

**Western Bean Cutworm Traps** were set up in 4 locations on corn or dry beans. No WBC moths were found. Traps were in Taber county (3) and Newell county (1).

## **Report from the Rearing Room**

We started in May with field dug pupae of Bertha armyworm, root maggot and *Banchus* sp. We were about 85 percent successful in getting adults out of the pupae. They are waiting to be curated and added to the insect collections.

From the alfalfa survey, caterpillars were taken from some of the sample bags and we tried to rear them. Most of these were grass feeders so the artificial diet provided was not successful in bringing them through to pupae and adults. The few that were far enough along in their life cycle and did manage to pupae and they too are waiting to be curated and added to the insect collections.

We collected and reared under 20 cutworms this year. A fine crop of polyembryonic wasps did emerge from about one third of the collected individuals. We also collected and reared some European skippers from a wheat field in Lac St Anne County. Three adult skippers emerged and 5 Tachinid flies, the flies have been sent to Ottawa for identification.

In August as part of a research project, Bertha army worm larvae were collected and reared through. Of the larvae collected, 24 percent were parasitized by wasps and 11 percent by Tachinid flies. All of these pupae will go into a cooler until spring. Also while in the fields, we collected woolly bear caterpillars (Arctiidae) and cabbage butterfly larvae. These too will join the other insects in the cooler. Bertha armworm eggs were collected from the County of Stettler and these were successfully reared through to pupae.

In mid September, 72 larvae of wheat head armyworm were collected from a field in Kneehill County. Thirty four have pupated, 27 were parasitized by Banchus wasps, 7 by diptera, and 1 by Cotesia wasps and 3 larvae died.

## Research

**Alfalfa Weevil study** by Julie Soroka. We collected, rated and sent data to Julie Soroka on a study on alfalfa weevil development across the prairies. The data included the alfalfa weevil numbers and the larval stage by collection date. It will be used to help improve the alfalfa weevil development model for the Canadian prairies. This was a major time commitment.

**CFIA Lure Study** was carried out near Stettler. The study was to determine if adding gypsy moth lures to bertha armyworm traps would impact the catch of BAW moths. This is initial research that would enable us to take advantage of current insect monitoring efforts to extend the reach of surveillance by incorporating other surveys at the same time. The study was 3 treatments: no lure, gypsy + bertha and bertha alone with 10 replicates. This meant there was 30 traps to service on a weekly basis. Many thanks to the County of Stettler for their help.

**Weather and Insects** A new study was initiated that will tie the development of insects into the weather system as provided by AARD. Our role is to ground truth the development models by collecting insects at the appropriate stages to track their development. Three insects are the focus of this study: alfalfa weevil, wheat midge and bertha armyworm. Samples were collected and are awaiting assessment during the winter.

Fieldwork for our ongoing study with funding from the Canola Agronomic Research Program (CARP): Improving Crop Risk Assessment Tools for Bertha Armyworm field work was completed this summer. The study was to look at trapping and forecasting using our pheromone monitoring system. Canola stubble from the 2011, 2012 and 2013 crop was mapped in 35 townships in Lamont, Two Hills, and Minburn counties. Traps were then set up in those same 35 townships and moths counted on a weekly basis. In 2012 six townships were then selected and larval counts were carried out (10 fields per township). In 2013 and 2014 10 fields per trap site were sampled for bertha armworm larvae in each of 10 locations. These locations were not restricted to the initial study area in 2013 and 2014. Additional work on trap location was carried out (which side of the field) and trap height as well. Also preliminary work on a trap system to exclude bumblebees was initiated with the traps evaluated for the first time in 2014.

**Insects in Alfalfa** A new project was initiated on the insects that are found in alfalfa fields. Samples were taken from over 150 fields across Alberta and the samples are being processed this winter. The intent of this study is to track alfalfa weevil, alfalfa leaf blotch miner and alfalfa plant bug. In addition other insects found in alfalfa will be tracked over the three year period. Sampling is done by sweep net and plant collections. In the initial results to date we have been surprised by the number and range of alfalfa weevil. As an adjunct to this study we are looking at paired fields of alfalfa and lygus to determine if lygus move from alfalfa to canola when the field is cut for hay. This involved weekly sweep net samples from both the canola and alfalfa.

## Communications

Forecast maps have been set up on Roping the Web and the system has been working well.

Alberta Insect Monitoring Network started a new web page in January 2012. It serves as a focal point to access current insect information. Response has been very positive. Bookmark our page: [agriculture.alberta.ca/bugs-pest](http://agriculture.alberta.ca/bugs-pest)  
The website is the center of our communication efforts and all roads lead back to it. Every effort is made to make it dynamic and seasonally topical.

Call of the Land was a major part of the communication plan and will continue to be in the future. In the growing season weekly COTL presentations were made on the current issues in the crop insect world. The insect updates are recorded on Wednesday and go to the air on Thursdays.

You tube videos are now available for: *Assembling a Bertha Armyworm trap; Assembling the Diamondback Moth Trap; Field Scouting for Bertha Armyworm; Proper Sweepnet Technique for Cabbage Seed Pod Weevil; Sweeping Canola for Lygus Bugs; Assembling a Wheat Midge Trap and Assembling a Swede Midge Trap.*

Email lists The email list has continued to grow with more agrologists, researchers, AARD staff and farmers signing on to receive weekly email updates from the Pest Surveillance Branch. This will continue to be an important part of the communications plan in the coming year. New changes to the website and the weekly Call of the Land are sent out weekly via this email list.

Twitter An account was set up on Twitter to communicate with the industry about insect issues. Response has been very good to this point. Currently with over 1900 followers, the conversation around crop insects is robust and very productive. We have added a weekly Tweetchat to the communication plan and it has proven to be very effective in concentrating the topic and delivering messages. This summer the conversation was involved 512 tweets between April 1 and the end of September. This is a very effective communication tool and also provides a valuable surveillance tool. Over 300 of the tweets were about insect identifications. By encouraging this type of question it increases the likelihood that we will find new insect invasions through what agrologists and farmers find and ask about via Twitter.

Meetings We always go out of our way to resource meetings, workshops and field days of our cooperators. It is a good way of building a positive working relationship.

### Staff:

Scott Meers, Insect Management Specialist  
Shelley Barkley, Insect Technologist  
Heather Leibel, Technologist (10 months)  
Margo Unruh, Technologist (3 months - fall)  
Jennifer Todd (4 months - summer)  
Danika Bonowicz (4 months - summer)  
Justina Nibourg (2 months - summer)