ALFALFA SEED INSECT PEST MANAGEMENT - 2013

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The major insect pests of alfalfa seed in Saskatchewan are *Lygus* bug, alfalfa plant bug, and alfalfa weevil. Pea aphids and grasshoppers are occasional pests. The following table gives an indication of the life cycles of *Lygus* bug and alfalfa plant bug in parkland Saskatchewan. The accompanying notes outline the optimum insect pest management program to follow for alfalfa seed production, followed by a list of insecticides currently registered for control of insect pests in alfalfa seed production.

TIME	*LYGUS* BUG	ALFALFA PLANT BUG
Winter	Winters as adults in headlands and tree rows.	Winters as eggs in alfalfa straw and stubble.
Crop is approximately 6" in height - late May, early June.	Adults migrate into fields, first around edges and gradually into the center. They feed on rapidly growing alfalfa, and the females begin laying eggs into the alfalfa stems.	The eggs hatch and first instar nymphs begin feeding on new alfalfa growth. Young nymphs are orange-green and have "clubbed" antennae.
Crop is actively growing - late May to mid June.	The eggs hatch, and first and second instars develop. They are very small, active, and bright green.	The population grows in size and number, and second and third instars develop. Third instar nymphs have small wing pads. Nymphs become bright green.
Mid June - crop is actively growing and first bud clusters are apparent.	Second and third instars develop. The third instars have wing pads and black spots on their backs.	

NOTE: When third instar nymphs of *Lygus* bug, along with third and a few fourth instar nymphs of alfalfa plant bug, are present, the hatch is well underway. Insecticide application should be timed at this stage so that you are not spraying when there are still a large number of eggs present. Eggs are well protected and will not be affected by insecticides.

TIME	*LYGUS* BUG	ALFALFA PLANT BUG
Mid to late June - buds and early flowers are present.	Third, fourth and fifth instars are present in increasing numbers and the old adults decrease in number.	Fourth and fifth instars and new adults are present in increasing numbers.
Early July	New adults appear. They are lighter in colour and newer-looking than the old adults.	The new adults mate and the females begin egg-laying. The adults disperse.
Early - mid July	The new adults mate and some females lay eggs, while others begin physiologically preparing for the winter. *Lygus* of all stages are still present, but nymph numbers decrease.	The adults gradually disappear from the fields.
Late July - early August	A second hatch may occur and new young nymphs appear, progressing to later instars if climate and weather allow. Monitor this population.	A second hatch of APB has occurred once in the last several decades in central Saskatchewan. Areas in southern Saskatchewan may be more likely to experience this second hatch. Hot, early summers are a key to watching for second hatch.
Mid - late August	Migration of adults into late seed fields may cause a rapid climb in numbers and excessive damage to green seed in late August and September.	

CULTURAL CONTROL OF INSECT PESTS

1. Burning Stubble and Debris

Burning stubble and debris in the spring controls:

- alfalfa plant bug (APB)
- alfalfa weevil adults
- superb plant bug
- alfalfa seed chalcid
- other species that overwinter in the field

Burning also offers a field sanitation benefit, destroying the crop disease reservoir in stubble and debris. Another benefit is the immediate release of some nutrients to the crop; however, burning is often difficult to do, especially at the right time. It is difficult to control, it may set crop growth back and delay bloom, and it destroys organic material. Burning annually detracts from the soil improvement aspects of the alfalfa seed crop.

2. Cultivation

An early spring cultivation to incorporate straw and stubble is an alternative to spring burning that decreases the level of an alfalfa plant bug infestation. Cultivation can be either between-row, or broadcast. Alfalfa appears to be unharmed by the operation. Cultivation also removes winter annual and early germinating spring annual weeds, and levels pocket gopher mounds in the field.

3. Monitoring in May and June

Monitoring is done using a sweep net and making 5 individual 180 degree walking sweeps at each field site, with at least one sampling site for every 10 acres. Insect numbers and stages are counted and tabulated, and a *Lygus* + APB number per individual sweep is thus calculated.

What will I see in May and June?

Insects expected in May and June in chronological order:

- ladybird beetles, damsel bugs and spiders are present
- *Lygus* adults migrate into fields and begin egg-laying
- *Plagiognathus* eggs hatch and young nymphs begin feeding
- APB eggs hatch, young nymphs begin feeding
- alfalfa weevil adults become active and begin egg-laying
- *Lygus* eggs hatch, young nymphs begin feeding
- alfalfa weevil eggs hatch and larvae begin feeding
- grasshoppers and aphids may be present
- *Lygus* and APB nymphs develop into new adults

4. Monitoring in July and August

What will I see in July and August?

- *Lygus* and APB 4th and 5th instar nymphs, and new *Lygus* and APB adults appear
- APB adults decrease in number after egg-laying
- alfalfa weevil larvae peak feeding activity extends to mid-July
- second generation *Lygus* and APB eggs hatch in south and central regions
- pea aphids and grasshopper numbers may build up
- ladybird beetles, damsel bugs, lacewings, and spider populations build up; big-eyed bugs and minute pirate bugs are also present, as are parasitic wasps

CHEMICAL TREATMENTS

1. Pre-bloom Treatment

Generally, season-long control of insects in alfalfa seed can be achieved using a prebloom insecticide application. This application must be timed to best control alfalfa weevil, *Lygus*, and alfalfa plant bug populations without affecting pollinator species. Check alfalfa seed fields with a sweep net.

Why would I use a pre-bloom treatment?

- if the numbers of insect pests exceed economic threshold levels for the region (estimated at 4 alfalfa plant bugs or 8 *Lygus* bugs per individual sweep in parkland Saskatchewan or a combination of 5 *Lygus* + alfalfa plant bugs; for alfalfa weevil, estimated at 20 - 25 larvae per individual (180 º) sweep or when 35 - 50% of plant tips show damage)

When do I apply this treatment?

- APB nymphs are in the 1st - 4th instars
- 3rd instar *Lygus* nymphs are present, along with 1st and 2nd instar nymphs (the presence of 3rd instar nymphs indicates that the hatch is well underway and there are few eggs left to hatch); burned fields are generally in early bud stage, non-burned fields in late bud stage

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NOTE: The pre-bloom treatment can be hard on beneficial insects and pollinators such as bumble bees, solitary bee species, and honey bees. If insecticide application coincides with bloom of hawksbeard or dandelion:

(a) use a chemical with a short residual period
(b) avoid insecticide drift into non-target locations
(c) spray in the evening after bees have ceased foraging

These practices will minimize the risk to these beneficial insects.

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2. Summer and Late Summer Chemical Treatments

If an insecticide application is needed during the bloom period, it must be selective for insect pest species and timed for the least harm to pollinators.

Why would I need to apply a summer insecticide treatment?

Generally, if an insecticide is used in the pre-bloom period then further insecticide applications will not be needed. However, there are sometimes situations when the numbers of insect pests during the pre-bloom monitoring period do not trigger the need for control. In these instances there is a need to continue to monitor the fields during July and August. A mid-season or late season economic infestation of alfalfa weevil, *Lygus*, and / or alfalfa plant bug is not common, but there is a possibility that insect pest numbers will exceed their damage thresholds. There are no firm damage thresholds for this time of year, since these situations rarely occur. The best advice is to monitor these fields and watch for damaged pods.

Alfalfa weevils can cause considerable damage to alfalfa seed fields throughout the prairies. Alfalfa weevils overwinter as adults in alfalfa stubble, and feed and lay eggs on young alfalfa stems. The small green larvae defoliate leaves, stems, and buds.

It is quite common to see an increase in *Lygus* numbers in the second or third week of July and up until the first two weeks of August; normally, the numbers will then drop. However, if mid-season monitoring shows in excess of 8 *Lygus* per individual sweep for more than two weeks, the crop is suffering from moisture stress, and the seed is young and milky, insects may cause damage to the seed crop. Occasionally, late-blooming alfalfa seed fields can act as magnets for *Lygus* adults which are leaving cut hay fields or maturing fields of canola and grain in search of a new feeding ground prior to onset of hibernation. These *Lygus* adult populations can reach very high numbers and can severely damage young green seed pods. Although there are no firm damage thresholds for these situations, 15 *Lygus* per individual sweep in green fields in late August have been seen to lead to pod drop. Monitor these fields closely and watch for pod damage or pod drop.

Generally, alfalfa plant bug adults leave the fields in mid July and are not seen again. However, in some years, an abnormally early summer season will allow for the development of a full second generation of alfalfa plant bug which may necessitate a second treatment.

In Saskatchewan, the pea aphid overwinters in the egg stage on alfalfa and other perennial legumes. Depending on accumulation of heat units, there can be five or more generations per year. Small numbers of this overwintering population are present in spring and early summer, but the main part of our population migrates in on air streams from southern areas of the continent, usually in mid-July. Populations can remain high until early to mid-August, when aphid crowding, plant quality decline, and increased predator and parasite numbers cause winged aphids to develop and leave the fields, and the populations crash. Inclement weather, especially heavy rain and high winds, can also cause populations to decrease.

Although pea aphid populations cause alfalfa seed loss infrequently, if immigration occurs early in the season, and if weather conditions are optimal for aphid reproduction, populations may reach levels high enough to cause yield decline, especially if the crop is drought-stressed. Some growers believe that in some years, pea aphid numbers warrant treatment. The damage threshold is about 200 per individual sweep (this equates to about one quarter cup of aphids in the net after 5 sweeps).

The pea aphid prefers to feed on field peas rather than alfalfa. Alfalfa seed producers in areas with few pea fields may experience more damage than those in areas with many such fields. Likewise, growers in warmer, more southerly areas of the province may have greater pea aphid problems than those in northern areas.

The alfalfa blotch leafminer is a small fly that lays its eggs in alfalfa leaves. The larvae feed inside the leaf and mine the leaf, giving it a flecked, mottled, or tunneled appearance. This pest has been present in eastern Canada for about 30 years; it has recently been found in many parts of the prairies. The larval mines decrease alfalfa forage quality; to date their effect on seed production is unknown.

Finally, grasshoppers are an occasional problem in alfalfa seed production. Grasshopper damage generally appears to be more severe when the alfalfa seed crop is thin, dry, and under environmental stress. A lush, thick, and healthy alfalfa field is able to support a grasshopper population with little damage. The Saskatchewan Ministry of Agriculture extension bulletin, Grasshopper Control, outlines grasshopper infestation ratings in detail for egg, nymph, and adult populations. A severe infestation is equivalent to 13 or more grasshoppers moving away as you take a step in the field. Often, grasshopper numbers will appear high in bee shelter access roads in the field, but in these roads and open areas, numbers over 25 grasshoppers per step equate to a severe infestation.

When would I apply a summer insecticide treatment?

- *Lygus* and APB are in 4th and 5th instar stage, and significantly exceed the early season damage threshold (estimated at 4 alfalfa plant bugs or 8 *Lygus* bugs per individual sweep in parkland Saskatchewan or a combination of 5 *Lygus* + alfalfa plant bugs), or
- 2nd generation *Lygus* hatch is well underway and exceeds the 8 per individual sweep early season damage threshold for more than a week, or
- when numbers of aphids (200 per sweep) or grasshoppers (a severe infestation might be 13 or more grasshoppers per step) warrant
- remember that a healthy, lush alfalfa crop can withstand much more damage than a drought-stressed crop

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Order a sweep net directly from:

Therese Nemeth
Pro Metal
455 Henderson Drive
Regina, SK S4N 5W8
tel (306) 525-6710 fax (306) 525-5434
Cost $59.95 + tax + shipping cost

Insect pests of alfalfa grown for seed production in Saskatchewan

Common Name	Scientific Name
Alfalfa Blotch Leafminer	*Agromyza frontella*
Alfalfa Plant Bug	*Adelphocoris lineolatus*
Alfalfa Weevil	*Hypera postica*
Grasshopper	*Melanoplus / Camnula spp.*
Lygus Bug (Tarnished Plant Bug)	*Lygus lineolaris*
Pea Aphid	*Acyrthosiphon pisum*
Two-spotted Spider Mite	*Tetranychus urticae*

Insecticides registered for control of insect pests in alfalfa seed production

Insecticide	Insect Pests Controlled
Assail 70 WP (acetamiprid)	Alfalfa Plant Bug, *Lygus* Bug (suppression)
Beleaf 50 SG (flonicamid)	Pea Aphid
Coragen 20 SC (chlorantraniliprole)	Alfalfa Weevil (suppression)
Cygon 480 EC / Lagon 480 E (dimethoate)	Alfalfa Blotch Leafminer, Alfalfa Plant Bug, Alfalfa Weevil (reduction), Grasshopper, *Lygus* Bug, Pea Aphid
Decis 5 EC (deltamethrin)	Alfalfa Weevil, *Lygus* Bug
Matador / Silencer 120 EC (lambda-cyhalothrin)	Alfalfa Plant Bug, Alfalfa Weevil, Grasshopper, *Lygus* Bug, Pea Aphid
Oberon (spiromesifen)	Two-spotted Spider Mite
Rimon 10 EC (novaluron)	*Lygus* Bug

Insecticides currently registered for use on alfalfa
(alfalfa seed production not stipulated)

Dibrom (naled)	*Lygus Bug, Pea Aphid*
Imidan (phosmet)	*Alfalfa Blotch Leafminer, Alfalfa Weevil*
Malathion	*Alfalfa Blotch Leafminer, Alfalfa Weevil, Grasshopper, Lygus Bug, Pea Aphid, Two-spotted Spider Mite*
Sevin XLR (carbaryl)	*Grasshopper*