Insect & Mite Pests Of Saskatoon Orchards - Part I

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Saskatoon Bud Moth

Symptoms

Flower buds with tiny holes about 1 mm in diameter. Oozing droplets may be present on these buds. Yellowish flower buds that fall off when touched. The folded leaves may contain tiny larvae and some webbing within.

Life Cycle

The saskatoon bud moth, (*Epinotia bicordana*; *Olethreutidae*), is a moth that is greyish-black, and tinged brown in color (Figure 10.1 & 10.2). The saskatoon bud moth lays its eggs during the first two weeks of April at the base of buds and in crevices in the bark of twigs (Figure 10.3). During late-April and early-May, the newly hatched larvae bore into the base of the bud and feed on the interior parts of the flower buds (Figure 10.4). They can destroy entire buds. Mature larvae can be found within leaf material (Figure 10.5) or flower petals that have been tied together (Figure 10.6). The larvae are yellow to light-green in color. Larval development is more or less complete by the time of petal drop.

The cotoneaster webworm (*Cremona cotoneaster*; *Pyralidae*), and the striped bud moth (*Filantima telphusa* - species uncertain) are similar insects that may be present at the same time as the saskatoon bud moth. The cotoneaster webworm is a small, greenish-black larva that feeds into the ends of developing buds, but also skeletonizes young leaves and new growth. The striped bud moth appears very similar to the saskatoon bud moth, although the larvae have reddish-brown stripes that run the length of their bodies.

Control

The insecticide Decis has been registered for use against the saskatoon bud moth. The first application of Decis made when the buds are at the green tip stage will control the saskatoon bud moth.

Plate 10. Saskatoon Bud Moth

Figure 10.1: Adult saskatoon bud moth; 6 times actual size (Photo by L. Harris).

Figure 10.2: Adult saskatoon bud moths mating; 6 times actual size (Photo by L. Harris).

Figure 10.3: Egg of saskatoon bud moth at base of bud (indicated by arrow); 6 times actual size (Photo by L. Harris).

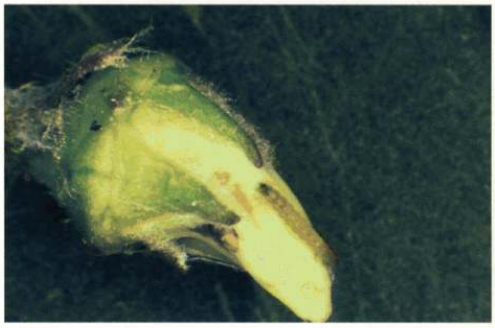


Figure 10.4: Larva of saskatoon bud moth feeding on flower bud; 6 times actual size.

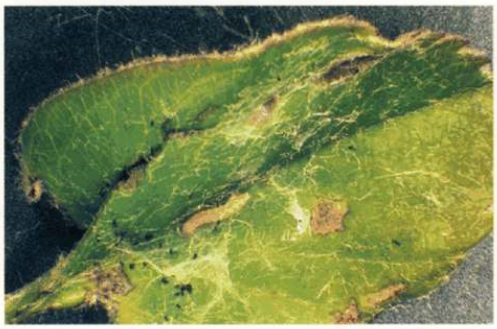


Figure 10.5: Larva of saskatoon bud moth within folded saskatoon leaf; 3 times actual size.

Figure 10.6: Mature bud moth larva in saskatoon flower; 8 times actual size (Photo by L. Harris).

Woolly Elm Aphid

Symptoms

Aboveground: Sparse or reduced establishment of saskatoon plants during the 3 years following transplanting. Saskatoon plants may fail to leaf out in the spring, some branches appear dead, or plants have an obvious lack of vigor (Figure 11.1). Flagging of leaves (development of early-fall coloration) in late-July and early-August, and early defoliation, is correlated with aphid infestation.

Belowground: Bluish-white, waxy or woolly masses may be found on roots 2 to 10 cm below the soil surface in late-July through October (Figure 11.3). A proliferation of tiny white or yellow shoots may also be noticed (Figure 11.2). Dead plants are easily pulled from the soil. Very little root mass remains and few if any secondary roots are present. The remaining roots appear as empty cylinders or sleeves with many distorted swellings.

Life Cycle

The only insects known to feed on the roots of the saskatoon are the woolly elm aphid (*Eriosoma americanum; Aphididae)*, and its close relative, the woolly apple aphid (*Eriosoma lanigerum*). The woolly elm aphid has the potential to cause substantial transplant loss. Young plants less than four years old are the most severely affected. The aphids are blue-black in color and their posterior ends are covered with a white waxy material (Figure 11.4).

The aphids have a complex life cycle which include the elm as an alternate host. This life cycle is illustrated in the color graphic - The Life Cycle Of The Woolly Elm Aphid.

Elm: When the leaves of the American elm begin to unfold in early-May, aphid nymphs emerge from the eggs. This first generation of aphids are wingless females which feed on the underside of elm leaves and give birth to many live young. The fluids injected by the feeding aphids cause the leaves to curl. Distorted and curled elm leaves may contain over 1,000 aphids per leaf, although 200 aphids per leaf is the average number. In mid-June to mid-July, a generation of winged, grey-colored aphids is produced. These aphids migrate to the saskatoon. The duration of the migratory activity is quite long, and begins 35 to 40 days following full-bloom in the saskatoon, about 2 weeks following the bloom of the purple lilac. The beginning of this migration is closely correlated with the blooming of yarrow (*Achillea millefolium*), northern bedstraw (*Galium boreale*), and especially the wild roses (*Rosa* species). Migration may continue throughout the month of July.

Saskatoon: Within an hour of landing on the saskatoon, the winged aphids give birth to 12 to 15 wingless, yellow-orange nymphs on the undersides of the leaves. These nymphs then begin to move down to the saskatoon's roots. Once these aphids reach the roots, their numbers increase quickly. By mid-August, over 200 new aphids may have been associated with a single winged aphid.

Aphid colonies may be found on saskatoon roots from early-July through

October, although it may be difficult to detect the young colonies in July.

By early-September, a new generation of winged, dark-green to black female aphids is produced. This generation migrates back to the American elm, the migration continuing until late-October, depending on the weather. These aphids then give birth to a sexual generation of aphids which mate. The females are essentially a single large egg. They hide in tiny cracks in the bark of the elm, die, and the eggs overwinter in this way.

The woolly elm aphid does not overwinter on the roots of the saskatoon but must return to the elm. The aphid requires the American Elm to complete its life cycle; it cannot do so on the Siberian or Japanese elm.

All cultivars of the saskatoon appear susceptible to woolly elm aphid infestation. Younger, more succulent roots and suckers are more susceptible to infestation. The most susceptible saskatoon plants appear to be those in their second or third growing season, and those growing in unsheltered locations, or in non-irrigated orchards.

Some evidence indicates that this aphid prefers sites with more moisture and moderated temperatures, such as would be found on heavier soils with organic mulches.

Unless grower's carefully monitor for the aphid, their presence and subsequent damage may not be noticed until the spring following infestation. At this point, it may be too late to salvage the plants.

Control

Orthene has been registered for use as a soil injection.

Alternative methods of control that have been investigated include the use of yellow mulches, diatomaceous earth, and predacious nematodes. Yellow plastic mulch sprayed with horticultural oil may act as an attractant and trap. The use of diatomaceous earth around each saskatoon plant (10 g per plant, half incorporated into the soil) may reduce the levels of aphid infestation to some extent, but mainly appears to drive the aphids deeper into the soil. Entomopathogenic nematodes may be purchased and these will attack the woolly elm aphid. A late application of these nematodes may be useful, but results are preliminary and further studies need to be done.

Dormant oils and Tanglefoot are ineffective. Tanglefoot, which is applied to the base of the plant stems as a physical barrier, weakens the stems, which may cause the plant to topple over.

Plate 11. Woolly Elm Aphid

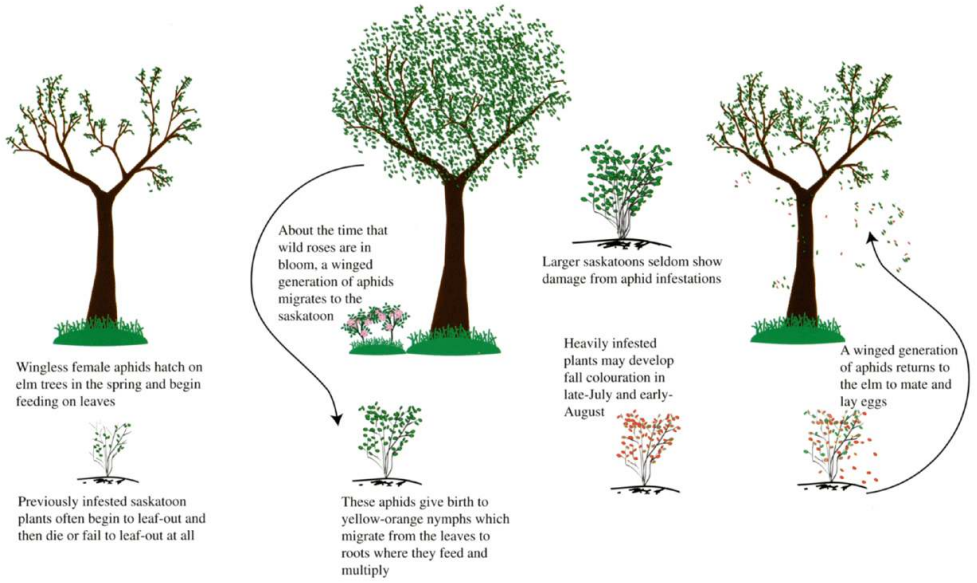
Figure 11.1: Stunted growth characteristic of root aphid-infested saskatoon; 1/4 actual size.

Figure 11.2: Saskatoon plant killed by woolly elm aphid infestation; note substantial shoot proliferation from crown and destroyed root system; 1/8 actual size.

Figure 11.3: Woolly elm aphid infestation on crown of plant; 1/2 actual size.

Figure 11.4: Woolly elm aphids on saskatoon root; 7 times actual size (Photo by L. Harris).

The Life Cycle Of The Woolly Elm Aphid



Hamish Tulloch, 1997

Saskatoon Sawfly

Symptoms

Small (2 mm diameter) holes may be found at the top of small, green fruit; larger holes may be observed on the sides of larger, green fruit. Such fruit may contain a 4 to 7 mm long, white, or light-brown larva. Towards the end of June, some fruit may appear as black, empty shells.

Life Cycle

The saskatoon sawfly (*Hoplocampa montanicola* and three other *Hoplocampa* species; *Tenthredinidae*) is a type of plant feeding, non- stinging wasp. Its host plants include both the saskatoon and chokecherry.

Adult sawflies are about 6 mm long, and are yellow with brown markings (Figure 12.1). The adults appear in May each year, 3 to 9 days, on average, prior to the period of maximum flowering in the saskatoon. They feed within the flower nectaries of the saskatoon and may also feed on pollen. Mating occurs at this time.

Eggs of the sawfly are laid in the nectaries of the blossoms of the saskatoon, the position being marked externally by a dark scar about 1-2 mm long on the calyx of the flower (Figure 12.2). Normally, only one egg is laid within any single flower. It is common to find 1 or 2 eggs per flower cluster, although up to 9 eggs have been found. Eggs are present during the periods of flowering and petal drop in the saskatoon and hatch from about 4 to 11 days on average after petal drop in the saskatoon.

Young larvae begin feeding at the top of the developing fruit. They often feed on more than one fruit. On average, each larva damages about 2 fruit per cluster. Attacked young fruit usually drop off the plant, but older fruit attacked later often remain attached, even though they consist only of an empty shell (Figure 12.3).

Mature larva are about 6 mm long and have a yellow-brown head. The last fruit that is eaten is completely hollowed out (Figure 12.4).

Larval development requires about 45 days and is complete by the end of June; subsequently the larvae drop out of the fruit. A study made at the University of Saskatchewan found that the larval drop was particularly noticeable when branches of saskatoons were covered with bags after petal drop; many larvae were found in the bags from mid- to late-June. These larvae overwinter in the soil and pupation (a stage of transformation to the adult form) occurs in the spring.

Larval feeding can cause large numbers of immature fruit to drop from a saskatoon bush; one study done at the University of Saskatchewan found that, in some years, more than 90% of the potential fruit crop could be lost because of larval feeding.

Control

The insecticide Decis has been registered for use against the saskatoon sawfly. The second and third applications of Decis will control the saskatoon sawfly.

Plate 12. Saskatoon Sawfly

Figure 12.1: Adult sawfly on saskatoon flower; 6 times actual size (Photo by L. Harris).

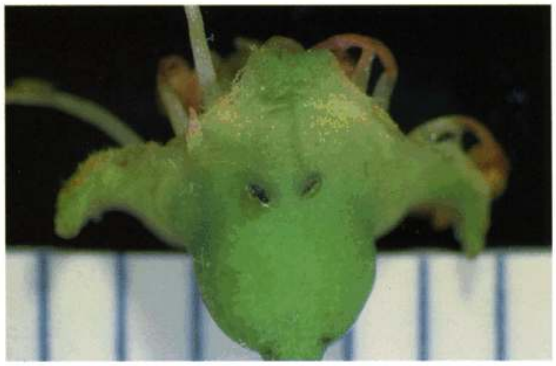


Figure 12.2: Scars made by a sawfly while depositing eggs on the exterior surface of a developing saskatoon fruit; 12 times actual size.

Figure 12.3: Immature fruit damaged by sawfly; 9 times actual size.

Figure 12.4: A mature sawfly larva within a saskatoon fruit; 11 times actual size.

Apple Curculio

Symptoms

Dark puncture wounds, less than 1 mm in diameter, may be observed on green fruit and tender shoot tips. Fat, curled larvae with brown heads, or whitish to transparent pupae, may be found within the centers of ripe fruit.

Life Cycle

The apple curculio (*Anthonomus quadrigibbus*; *Curculionidae*; previously *Tachypterellus quadrigibbus*), belongs to the beetle family of insects and is a type of weevil. The apple curculio is native to North America and is widely distributed. Its host plants include the apple, hawthorn, pear, and saskatoon.

Adult curculios emerge in the spring during the time that the saskatoon is in flower. Adults are about 5 mm long and reddish-brown in color (Figure 13.1). They have a characteristic long curved snout. Adult curculios can be found during the periods of flowering and petal drop in the saskatoon. They feed on immature fruit and shoot tips producing characteristic puncture marks (Figure 13.2). The feeding punctures are relatively large in diameter (about 0.5 mm), often 2-3 mm deep and may be found on any part of a fruit (except the top). Fruit with several feeding punctures develop to an irregular shape and often are hard.

Egg laying does not occur until near the end of the period of fruit drop in the saskatoon, on average, 28 to 33 days after the period of peak flowering in the saskatoon. Egg laying by the apple curculio is restricted to punctures at the base of the young fruit close to where the fruit's stem is attached; the punctures are sealed with excrement. Only 1 egg is laid per fruit.

Early larval development in the saskatoon is restricted to 1 developing seed within the fruit (Figure 13.3). By the time larval development is complete, all seeds will be eaten (Figure 13.4). Feeding is restricted to the developing seeds and is not associated with the fleshy part of the fruit. The fruit are beginning to ripen at this time and do not drop off. Larval development and pupation (a stage of transformation to an adult form) occur in fruit that stay on the plant. Larval development requires less than 31 days. Pupation occurs within the ripe fruit and requires less than 7 days. Adults emerge by mid-July.

The ripe fruit do not appear to be fed upon by the new generation of apple curculios. The new generation of curculio adults enters the leaf litter very soon after their emergence from ripe fruit and overwinter in this stage; adults are not found after the period of fruit ripening. Only one generation occurs each year. Damage to saskatoon fruit by the apple curculio can be extensive. Adult feeding does not appear to cause fruit loss but causes fruit to be of poor quality. Fruit with larvae inside them also are not desirable. One study done at the University of Saskatchewan found that in some years, 80 to 99% of mature fruit could be damaged.

Control

The insecticide Decis has been

registered for use against the apple curculio on the saskatoon.

The third application of Decis will help control the apple curculio.

Plate 13. Apple Curculio

Figure 13.1: Adult apple curculio on developing saskatoon fruit; 5 times actual size (Photo by L. Harris).

Figure 13.2: Feeding punctures made by the apple curculio on a saskatoon fruit; 10 times actual size.

Figure 13.3: Immature apple curculio larva within a saskatoon fruit; 10 times actual size.

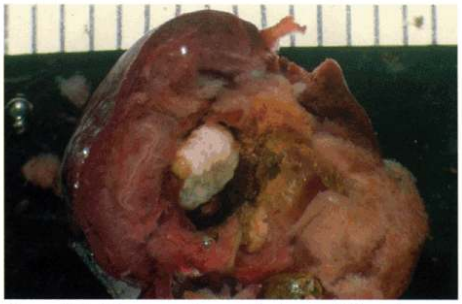


Figure 13.4: Mature apple curculio larva within a ripe saskatoon fruit; 5 times actual size.

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