The Pest Management Regulatory Agency (PMRA) recently announced the approval of an URMULE registration for sweet potatoes in Canada for **MATADOR** & **WARRIOR** (cyhalothrin-lambda) insecticides for control of flea beetles and potato leafhoppers. The active ingredient cyhalothrin-lambda was already labeled on a wide range of crops including grains, oilseeds, vegetables, fruits and white potatoes. Note that Warrior will eventually replace Matador in the marketplace.

Insect control has become an annual, serious problem affecting sweet potato production in Ontario and the minor use registration of Matador and Warrior insecticide is a significant achievement for the industry which until now has had no pest control products available to manage insects or diseases.

The following is provided as a general outline only. Users should consult the complete label before using Matador or Warrior insecticides.

Matador or Warrior insecticide can be used for control of potato flea beetle, tuber flea beetle and potato leafhopper on sweet potatoes at a rate of 83 mL product per hectare in a minimum of 100 L water per hectare. The application interval is 7 days. Do not make more than 3 applications per season.

Do not apply within 7 days of harvest for sweet potatoes.

Follow all other directions for use on the Matador and Warrior insecticide labels carefully.

Matador or Warrior insecticides should be used in an integrated pest management program and in rotation with other management strategies to adequately manage resistance.

This minor use project was sponsored by the minor use office of OMAFRA. We also wish to thank the personnel of **Syngenta** Crop Protection Canada Inc. for their support of this registration and the personnel of the Pest Management Regulatory Agency for evaluating and approving this important pest management tool.

For copies of the new minor use labels contact Jim Chaput, OMAFRA, Guelph (519) 826-3539, Melanie Filotas, OMAFRA IPM Specialist at Simcoe (519) 426-4434 or visit the Syngenta Canada website at [www.syngenta.ca/en/](http://www.syngenta.ca/en/)
Weed control was looking good, especially where little rain had fallen to stimulate late weed germination. But where rains have come (even small showers), weed escapes have established under trees and vines, and in many fields. The question now is: Are weed control efforts worth it at this time in the season?

We know from critical period research that only early season weeds will reduce yields. So from a money-return viewpoint, the answer would be NO, Don’t bother controlling weeds now as there will not be any more increase in yield.

However, there are other factors to consider:

- Late weed escapes may hamper harvest. This is especially true for early escapes of pigweed and lamb’s-quarters, which harden into “trees” and impede machinery and pickers.
- Weed escapes will produce seeds, and may increase weed problems in the future. So for difficult weeds (especially perennials like thistles and quackgrass), it may be worth controlling them now (or preventing seeds by mowing).
- Thick weed cover may encourage rodents. Predators like hawks may have more difficulty in hunting rodents where weeds are thick.

Have you considered the benefits of late weed escapes? A cover of weedy growth can have many benefits including:

- Preventing soil erosion (from both water and wind)
- Encouraging perennial crops to harden off (by absorbing both moisture and nitrogen)
- Providing refuge for beneficial insects
- Adding organic matter to the soil (small quantities, but every bit helps)
- Encouraging soil organisms to flourish, in some cases encouraging herbicide breakdown
- Reducing rot in juice apples

As you make your decision on further efforts to manage weeds, make some notes about problem areas for weeds to help you prepare your weed strategy for next season.

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……the Ontario Greenhouse Vegetable Newsletter, an e-newsletter for Ontario Greenhouse vegetable growers.

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Unsightly Pear Trellis Rust
*Michael Celetti, Plant Pathologist Program Lead – Horticulture Crops*

Pear Trellis Rust (Figure 1), caused by the fungus *Gymnosporangium sabinae* (*G. fuscum*), has been confirmed in several locations in Southern Ontario recently. The disease causes a yellow-orange spot that turns bright red on leaves of both ornamental and edible fruit pear trees (Figure 2). Like many rust diseases, two alternate hosts, juniper (winter host) and pear (summer host), are required to perpetuate the disease from year to year. Pear trellis rust is a regulated disease. The disease can be particularly damaging on pear, resulting in complete defoliation and crop loss if not managed.

The disease overwinters in swellings or galls on infected twigs and branches of susceptible juniper plants (Figure 3). In the mid-late spring after a wet period caused by a rain or heavy dew, the galls on the juniper produce tiny dark horn-like growths that become covered with an orange to orange-brown gelatinous mass called telia. The telia release windborne basidiospores capable of infecting susceptible pear leaves. These windborne basidiospores can be dispersed up to 6 km.

Once the basidiospore reaches a susceptible pear leaf, infection takes place, causing yellow orange spots on the pear leaf. The spots eventually enlarge and become crimson red along the margins, making them very noticeable in early summer. In the centre of the yellow spots are tiny raised pimples called pycnia that exude a sticky sugary substance (Figure 4). These pimple-like structures contain sex spores. The sticky substance attracts insects which transfer the sex spores from one pycnia to another, resulting in fertilization (Figure 4). At the end of August the brown coloured underside of the orange lesion begins to swell and blister (Figure 5). In late summer, tiny lantern-shaped growths called aecia protrude from the blister on the underside of the pear leaf. The aecia contains spores (aeciospores) that can only infect susceptible *juniper* hosts (Figure 6). These aeciospores are windborne over long distances and may eventually land on a susceptible juniper host twig where infection occurs. As the fungus grows within the juniper twig or branch, a swelling or gall is produced in which the fungus overwinters. Reports indicate that the swellings or galls on juniper do not produce telia until two years after infection and continue to produce telia for several years thereafter.

There are no fungicides registered in Ontario to control this disease on pears or juniper; however, some of the fungicides applied to control other diseases will have some impact on Pear Trellis Rust. The best way to minimize this disease is to keep the alternate hosts at least 1 kilometre apart from each other. Inspect juniper plants periodically and prune out any suspicious swellings or galls. Pear growers should also insure that susceptible juniper hosts are removed within at least one or two kilometres of the orchard.

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Figure 1. Pear trellis rust lesions on ornamental pear leaf (late spring).

Figure 2. Pear Trellis Rust lesion on pear leaf appear crimson red with tiny dark pycnia in centre (early summer).

Figure 3. Dormant swelling on juniper branch caused by infection with pear trellis rust fungi.

Figure 4. Close up of Pear Trellis Rust lesion on pear leaf with tiny orange pimple-like pycnia in centre (mid summer).

Figure 5. Aecia cups first appear as blisters on the underside lesion on an infected pear leaf (late summer).

Figure 6. Aecia releasing the aeciospores appear as tiny lantern-like structures on the underside of infected pear leaf lesion (late summer).
The most serious disease of pear and apple worldwide is fire blight, caused by the bacterium *Erwinia amylovora*. Infections can occur through various routes and the bacteria attack all parts of a tree, so symptoms are referred to by the plant part affected: blossom blight, shoot or twig blight, fruit blight, limb and trunk blight, and collar or rootstock blight.

The main reservoir of the bacteria is in cankers of infected trees. When the trees break dormancy in the spring, bacteria in cankers begin to multiply and can be spread to susceptible tissues, especially open blossoms and to a lesser extent into new shoots. Secondary infections can occur throughout the growing season, both from infected shoots and from oozing cankers. Rain, wind and insects can spread the disease.

Unfortunately, there are sources of bacteria and routes into susceptible tissues than cannot be controlled. Researchers from Germany have observed that some blossom infections can actually come from within a previously infected tree (Moltmann and Viehrig 2007). In such situations, systemically infected trees showed blossom blight before it was warm enough in the spring for fire blight cankers to be a source of bacteria. In other words, the blossom infections occurred from bacteria moving systemically within the shoots rather than being moved into open blossoms from outside the tree. Antonet Svircev from AAFC in Vineland supports this concept based on observations that pear shoots cut in the winter (no chance of bacteria from cankers elsewhere in the orchard in winter) and forced to blossom in the lab do sometimes have *E. amylovora* present. These findings are a reminder that systemically infected trees are best removed entirely from the orchard so as not to be a continual source of secondary infections, early and late in the season.

It is also unfortunate that one of the primary insect vectors of the bacteria is one which is needed for pollination. Honey bees regularly pick up the bacteria from infected blossoms and unwittingly move it to other blossoms in their quest for nectar and pollen in the orchard. Austrian researchers have been working to overcome this problem by having honeybees deliver microbial fire blight antagonists (microbes that out-compete fire blight bacteria in the blossoms). Although more work is needed to fine tune dispenser construction and product formulation, the work has so far shown that honeybees can easily be manipulated to carry effective loads of strains of *Aureobasidium pullulans* to blossoms. *A. pullulans* is a fungus that competes with the fire blight bacterium but the product (“Blossom Protect”) is not yet available in Ontario. Other insects such as pear psylla are also implicated in the spread of fire blight, so insect pest management is directly related to fire blight management.

Rain can spread *E. amylovora* from tree to tree or blossom to blossom. In fact, the bacteria can survive in water for some time. Researchers form Spain have demonstrated that the bacteria survive best in cooler water (5° C versus 26° C) and that they can survive in nutrient poor water and retain the ability to infect plants for at least 45 days and as long as three years (Biosca et al. 2007). The mere presence of *E. amylovora* is nothing to be alarmed at though; there are bacteria everywhere, and *E. amylovora* in particular has been found in cherry and dandelion blossoms near pear orchards (Moltmann and Viehrig).

Infected tissues (especially oozing cankers) remain as the biggest source of secondary infections. A lively discussion on the appropriate time and methods of pruning fire blight strikes took place at the International Fire Blight Workshop this year. There is still a variety of opinions on pruning and especially on whether to remove prunings immediately or let them dry down in row middles before mowing. Part of the disagreement comes from the large number of prunings some areas have to deal with during the growing season as well as the uncertainty of whether workers can be careful enough to avoid spreading fire blight from actively oozing cankers. A few prunings in the row middles are likely not a significant source for fire blight spread but improperly handling those prunings on the way out of the orchard may be. Most participants agreed that sterilization of pruning tools was not necessary to avoid spreading the bacteria as long as shoots and wood were dry (remember the bacteria live quite well in water). Some felt that occasionally cleaning pruning tools with straight Lysol was prudent. Philion *et al.* (2007) found no benefit from sterilizing pruning tools when working with a young orchard newly infected with fire blight. They also showed that pruning reduced the severity of the disease but not disease incidence.

When considering the question of when and if to prune out fire blight strikes, it is a good idea to question how much chance there is of continued spread through the year. If high winds, heavy rains, or lots of insect activity (including pear psylla) are forecast, natural spread could be significant if infections are not removed.
E. I. du Pont Canada and the Pest Management Regulatory Agency (PMRA) recently announced the approval of a registrant minor use registration for celery, parsnips and sweet corn in Canada for LOROX L Herbicide for control of weeds. Lorox L herbicide was already labeled on a number of major and minor crops; however the use pattern for sweet corn (in tank mix with Dual II Magnum and Atrazine), celery and parsnips was not harmonized with the other linuron products on the Canadian market. (Afolan F herbicide marketed in Canada by Makhteshim Agan and Linuron 400 L herbicide marketed in Canada by UAP)

Weed control is an annual, serious problem affecting sweet corn, celery and parsnip production in Canada and the minor use registration of Lorox L herbicide permits broader access to linuron products for these minor, specialty crops.

The use directions on the new Lorox L herbicide label are as follows:

**For celery:** Lorox L can be used as a post-emergence application to transplants as soon as new growth has started. Some temporary discolouration may occur. Use 1.9 – 2.5 L per hectare on loam or clay soil with low organic matter or use 2.5 – 4.7 L per hectare on muck or clay soil with medium organic matter. Apply in a water volume of 220 – 440 L per hectare.

**For parsnips:** Lorox L can be used as a pre-emergence application after planting at a rate of 1.3 – 1.9 L per hectare on loam or clay soil with low organic matter or at a rate of 1.9 – 2.5 L per hectare on muck or clay soil with medium organic matter. Rain or irrigation is needed for good control.

A post-emergence application of Lorox L can be applied when the crop has 2 or more fully developed leaves at a rate of 1.9 – 4.7 L per hectare in 220 – 440 L water. On muck soils parsnips must be more than 8 cm tall. Use lower rates on small seedling weeds and higher rates on established weeds. Apply before annual grasses exceed 5 cm and before broadleaf weeds exceed 15 cm. Nozzle pressure must not exceed 275 kPa as crop injury may result.

A pre-emergence application followed by a post-emergence application can be made to parsnips; however these treatments must be at least 2 weeks apart. Never apply more than 2 (two) applications per season.

Do not apply to parsnips within 60 days of harvest.

**For sweet corn:** Lorox L can be tank-mixed as a pre-emergent application with Dual II Magnum and Atrazine 90 WG at a rate of 0.8 – 1.56 L per hectare Lorox, 1.25 L per hectare Dual II Magnum and 1.1 – 1.7 kg per hectare Atrazine 90 WG. This tank mix should be applied in 150 L water per hectare. Only one application per year is permitted and the pre-harvest interval (PHI) is 50 days.

Lorox L herbicide should be used in an integrated weed management program and in rotation with other management strategies. Follow all other precautions and directions for use on the Lorox L label.

The addition of these minor uses were sponsored by **E. I. du Pont Canada** Company and their commitment to securing these important minor uses on the Lorox L herbicide label is acknowledged. We also wish to thank the personnel of the Pest Management Regulatory Agency for evaluating and approving this important pest management tool.

For copies of the new minor use label contact Leslie Huffman, OMAFRA, Harrow (519) 738-1256 or visit the Dupont Canada website at [www.dupont.ca/ag](http://www.dupont.ca/ag)