There are three diseases of potatoes that are likely to attack the crop in midsummer or be more prevalent after flowering. These diseases—early blight, Botrytis and brown spot—have similar symptoms but need different control, so correct identification is essential.

Early blight is a common disease that is caused by the fungus *Alternaria solani*. The first lesions are usually detected at the end of June on the older leaves that are closest to the ground. The disease is most severe when the crop is under stress. This may occur as a result of poor nutrition, drought, hail or insect damage. When the crop is senescing, it becomes very susceptible to early blight.

Early blight forms circular to angular dark brown spots on leaves. The spots have concentric rings that resemble a target board. The lesions are usually limited by large leaf veins and may be surrounded by a yellowish halo. In severe infections, the foliage is completely covered by lesions, the leaf margins curl up and the leaves eventually dry up and die.

Botrytis (*Botrytis cinerea*) usually develops at the margins or at the tips of leaflets where drops of water accumulate. The lesions are brown with concentric rings, but the rings tend to be wider than those of early blight. When humidity is high, Botrytis will produce a dense grey fungal growth on the lesions, something that is not seen with early blight. To confuse matters, early blight and Botrytis can develop on the same leaf. The fungicide Bravo is labelled to control both Botrytis and early blight.

There is another disease, Brown spot (*Alternaria alternata*), that also produces brown lesions with concentric rings, but the lesions are round and very small. The rings are not as noticeable as those of early blight or Botrytis. Brown spot tends to develop close to the margin of leaflets. The lesions may coalesce to form large necrotic areas with dark brown margins.

Accurate diagnosis is critical because the strobilurin fungicides Quadris and Headline and the strobilurin-like fungicide Reason provide good control of early blight, but not of Botrytis or brown spot. A broad-spectrum fungicide such as Bravo or an EBDC is needed to control these diseases. Although strobilurin fungicides are very effective against early blight, they should never be sprayed back to back. They should be rotated with broad spectrum fungicides to reduce the risk of resistance.
Here are some quick tips for dealing with various weed problems that usually arise in July:

- **Activating soil-applied herbicides:** Herbicides like Dual, simazine, Dacthal and Sinbar need about ½” (12 cm) of rain to be activated. If this doesn’t fall within the first few days of application, it’s time to get the overhead irrigation out. What if it rains heavily after herbicides are applied? If the herbicide has a high leaching potential (eg Sinbar), it may get washed into the root zone, injuring the crop. At the same time, because it is diluted at the soil surface (where weeds germinate), weed escapes may appear too soon.

- **Maximizing postemergent herbicides:** Venture L, Poast Ultra and glyphosate (eg Roundup, Vantage, Touchdown, etc.) are quickly absorbed into growing plants. If weeds are drought stressed, it may be better to wait until later when growth starts again.

- **Sun-shy herbicides:** Devrinol & Treflan are quickly degraded by ultraviolet light. That’s why incorporation is required for these herbicides, Treflan usually by 2 tillage passes, and Devrinol either by tillage or rainfall (or irrigation). Gramoxone is quickly deactivated by sunlight, so apply in cloudy or drizzly conditions (rainfast in 15 minutes)

- **Wick wipers:** The trick is to get the wick wet and keep it wet. Fill the tube with herbicide well before application, allow it time to soak through. Do not use pure water in a wick wiper, as it will drip because it is not viscous enough. If you are expecting to use the wiper again soon, put the wick in a plastic bag, label & date it, and keep in a cool place. You might be surprised how often you use it if it is ready!

- **“Carpet” weeds in strawberries:** There’s lots of weed problems out there that will soon carpet the ground. Here’s some comments on a few of them:
  - **Common groundsel:** Not controlled by Sinbar. Cultivate frequently when weeds have one true leaf. New seedlings will be controlled by Devrinol (registered for use once a year) – prefer timing is Labour Day, applied and irrigated in. Lontrel applied at renovation will control established groundsel, but seeds may still be shed.
  - **Field pansy (violet):** Use Sinbar 3X a year, especially at Labour Day to control seedlings. Cultivate frequently when weeds are small. Wick wipe patches with glyphosate when first observed to prevent seed set. Use Daclath where available in early spring before weeds germinate. Repeat at renovation, Labour Day and pre-mulch.
  - **Dwarf snapdragon:** Not controlled by Sinbar. Cultivate frequently when weeds are small. Wick wipe patches with glyphosate when first observed to prevent seed set. Use Daclath where available in early spring before weeds germinate. Repeat at renovation, Labour Day and pre-mulch.

  **Hint:** Try some chemical renovation with Gramoxone to control existing carpets of weeds, and avoid bringing a new flush of weeds to the surface.

- **Weed in ponds:** Start early! Apply Aquashade (water soluble dye) early in the season before algae & weeds grow. Apply Reward (diquat) at dusk in late June when plants are growing vigorously. Apply Aqua-Kleen (2,4-D) early, and do not use it for irrigation of 2,4-D sensitive crops for at least 60 days. Wait until catkins form on cattails to apply Amitrol or Gramoxone.
Variegated Cutworm
Janice LeBoeuf, Vegetable Crop Specialist

The keys to success when trying to control variegated cutworm in the tomato crop are getting the insecticide to where the worms are and hitting them while they are small.

Anyone who has scouted for variegated cutworm in tomatoes knows that you usually have to burrow right down into the canopy to find these critters – and if it’s hot, they may be hiding in the soil. You have to be sure that the insecticide is reaching them; otherwise you’re just wasting time and money.

In order to get the spray into the lower canopy, you may need to increase your water volumes. Label recommendations for water volumes vary considerably. Ideally, order some water sensitive paper from your sprayer equipment dealer (around $20 for 50 1”x3” papers) and staple, clip, or pin a few within the canopy at different locations before you run the sprayer across. Of course, you have to do this when the canopy and your gloves are dry, because any moisture will show up on the paper. Retrieve them afterwards (be sure to wear protective equipment if you were spraying pesticides) and you will see how effective your spray coverage was in different locations in the canopy. Besides this method, if you are not happy with the control you’ve been getting, try adjusting water volumes (upwards).

Try to apply the insecticide when the cutworms are up in the canopy feeding – early morning or evening while it’s cool. That’s the best time to scout for them too. Remember that pyrethroid insecticides lose effectiveness at high temperatures. If daytime temperatures are high, spray in the evening (when temperatures are below 22°C) or consider another product.

Scouting is part of the second key to success. Target your insecticide applications to small larvae (less than 1”). That takes extra work because you will need to spend some time digging into the crop canopy to catch them early. It’s not an easy job. Pheromone traps help in determining when to begin intensive field scouting. Larvae are much easier to find when they are large and have had time to do more damage, but they are very difficult to control, not to mention that they are about to stop feeding and pupate. At that stage they are finished doing their damage, so there is no point in treating them.
In the past week, fire blight symptoms have begun to appear in apple orchards throughout Ontario and even in Quebec. Fire blight is caused by Erwinia amylovora, a pathogenic bacteria that infects the blooms, fruit, leaves, shoots, limbs, trunks and rootstocks of apple and pear trees.

So why are we starting to see these symptoms in orchards now? Fire blight often enters the tree through blossoms during bloom. Although many growers applied streptomycin sprays at bloom based on predictive models (Cougar Blight, and MaryBlyt), the extended bloom and secondary bloom that we saw in some regions may have left blossoms vulnerable to attack from bacteria. The symptoms of these early season infections may be appearing now in apple orchards. Fire blight also enters trees through wounds caused by hail, insects, summer pruning, deer feeding, and even high winds. So the infections that are appearing in some areas may be a result of post bloom infections. Once a tree is infected with fire blight the bacteria move quickly through the current season’s growth into older growth. Young trees can be killed by this disease and older mature trees may survive but show significant damage.

So now that fire blight is present in orchards, what options do growers have for managing this serious disease? To prune or not to prune—that is the question all growers are asking. Unfortunately there is no easy answer to this question, since the severity of the infection and the weather conditions suitable for infection both have an impact on the decision.

Pruning the trees at this time of year can have several effects:

• Reduce the inoculum, and prevent the spread of disease.
• Increase shoot growth, making the tree even more susceptible to fire blight.
• Increase labour costs.

So how do you know whether to prune or not to prune? When dealing with vigorous trees that have many fire blight strikes, avoid pruning out shoot and blossom strikes early in the growing season. Extensive early pruning stimulates trees to produce succulent shoots, making the tree more susceptible to infections. When dealing with high vigour trees that have only a few fire blight infections, pruning out the fire blight may help to provide complete control of this disease. In slow growing, low vigour trees, the bacteria generally doesn’t move into major limbs or trunks during the growing season, so lesions can be pruned out when the tree is dormant. This may help save time and money.

In orchards where fire blight isn’t a major concern this year, growers may still consider pruning fire blight strikes. Pruning out fire blight cankers, under dry conditions and low disease pressure, may reduce the amount of bacteria that will be present in the orchard in future years.

If you are considering pruning out infections in a young orchard, you should do so as soon as they appear to prevent the spread of the disease to adjacent trees. Depending on the variety, it may or may not be practical to prune out infections in mature trees. Keep in mind that once the terminal buds have set on apple trees, fire blight stops spreading within infected trees and between trees. However, leaving the disease in the orchard may serve as a source of inoculum, and cause increased infections in the result of a hail storm, severe storm, or high wind damage.

If you decide to prune out fire blight strikes, pruning should not be initiated until terminal bud set has occurred (early August) and remember to make cuts into at least 2 year old wood where the bacteria is less likely to multiply. Pruning cuts should be about 30 cm (12 inches or more) below the visible symptoms. Always prune during dry weather, since it reduces the potential for spreading the disease. The efficacy of sterilizing pruning shears to prevent the spread of fire blight is debatable, and sterilization may not always be practical. If you are planning on taking the time to sterilize your tools use a solution of 1 part bleach to 5 parts water. This solution will be effective in about 1 minute of wetting (http://www.ncw.wsu.edu/treefruit/blightcut.htm). It should be noted that there is no benefit to be gained by spraying cut surfaces on the tree with chlorine products, since the chlorine binds with the wood and is inactivated immediately. In sections where trees are severely affected, it may be more cost-effective to simply remove the whole tree than to prune it. Pruning clippings should be tossed into the row middles and allowed to dry before mowing them down. Avoid hand thinning, bud pinching and other activities until after terminal set, since these activities may help to spread the disease.

Consult the OMAFRA factsheet Fire Blight of Apple and Pear in Ontario, Order No. 02-011 for more information on fire blight—http://www.gov.on.ca/OMAFRA/english/crops/facts/02-011.htm
Energy Conservation in Irrigation

Rebecca Shortt, Irrigation Engineer, OMAFRA

When it gets hot and dry our plants need water. Irrigation is an excellent tool to ensure consistent yield and quality through dry periods. However, irrigation systems can use large amounts of energy which can be costly, especially as the cost of diesel and electricity rise.

Effective irrigation helps conserve water and can also help reduce your energy costs.

Effective irrigation can be achieved using 4 principles:

• Know the general water requirements of your crop
• Use an irrigation schedule for your operation to determine irrigation volume to apply and frequency of application (based on crop, soil texture and climate)
• Modify your schedule based on current weather (rain and heat)
• Verify your methods by monitoring soil moisture

Effective irrigation means applying only the right amount of water when the plant needs it. This avoids unnecessary water pumping which uses energy and costs money.

For example:
An over application of 1” water over 1 acre costs $10 in energy (to operate a traveller with limited lift and a short distance to field). If you multiply that by the irrigated acres it begins to add up.

Imagine you have a 50 acre farm and you apply 2” of water when the plants only require 1.5”. You also irrigated 6 times when you only needed to irrigate 4 times. This means 5” of water were applied unnecessarily. The application of those 5” over 50 acres cost you $2,500! That’s enough money to take your spouse on a plane to Hawaii next winter!

Other Energy Conservation Tips

• Irrigate more effectively: avoid irrigation on hot sunny and/or windy days. Try to irrigate at night when you will have minimum evaporation losses
• Only apply the amount of water required for crop growth (excess watering wastes energy and money)
• Check system regularly for leaks and repair immediately

For more information see:
• OMAFRA Factsheet: How to Prepare for Irrigation During water Shortages, Order No. 99-023
Spring and summer is a great time to make compost. Get the manure in the spring and add extra carbon materials if needed to raise the C:N ratio to around 30:1, and put it out in windrows. Temperature should increase to over 55ºC with no problem, especially in a year like this.

There is however one other very, very important factor – water! To make good compost, the water content should be about 50-60% moisture. That is fairly easy to achieve in the spring with moist materials and an occasional rain. In a dry year like 2005, there has been no rain (in many areas) to replenish the moisture that is lost during the composting process. If the compost gets too dry, the microbes will stop working, and it will take longer to finish the compost. More importantly, if it gets too dry, spontaneous combustion can occur, which could destroy the compost and/or result in a fire hazard.

When making compost you should periodically check the temperature. During the active phase, the temperature should be over 55ºC for at least 15 days when in windrows (or 3 days if using an in-vessel or aerated system). During this time the bacteria and fungi are breaking down the carbon materials (straw, shavings, etc) to carbon dioxide, water and some other gases. Some water will go to the lower part of the pile (with gravity) and some of this water evaporates from the pile with the flow of warm air. As the compost in the top half and edges of the pile dries, the temperature increases above the optimum temperature and this kills some bacteria/fungi. Turning at this stage will help to eliminate the hot spots and the wet spots by making the pile/windrow more uniform and keep the compost process going.

You should also check the pile for moisture. The easiest way is to use a grab test. Reach into the pile in several areas and grab a handful. Squeeze it tight and then open your hand. If moisture oozes from between your fingers when you squeeze, it is too wet. If when you open your hand you see some beads of moisture on your hand but there is no excess water, it is about right. If you see no sign of moisture and the ball of compost is totally loose in your hand, it may be too dry.

When the compost is too dry you should add water to the pile. The best way to do this is to add water while turning. Some compost turners have adapters to add water while turning. This can take a significant amount of water. Irrigation over the top can help, but typically it would just put water on the top and a lot would run off, making it too muddy to turn the pile right after watering to mix it in.

Covering piles is another way to reduce moisture loss in the summer, but you still need to monitor the moisture and temperature. Covers can be fabric or a 6 inch layer of compost or straw. Plastic sheets are not suitable because the pile must be able to breathe to allow for carbon dioxide and other gases to escape, and for oxygen to get into the pile.

It is easy to put out the compost and forget it when you are busy, but stop and have a look once in a while. For more information on composting see the new OMAFRA factsheets - Agricultural Composting Basics (Order #05-023) or Manure Composting as a Pathogen Reduction Strategy (Order #05-021).