Asparagus: Weed Control Strategies

Robert Hadad, CDVSFP: Asparagus weed control should start the season before planting using the right products for the right purpose. Using cover crops and the timely cultivation techniques can also reduce the use of herbicides (see the cultivation machinery article at http://www.vegetables.cornell.edu/weeds/newcultivationmech.pdf).

It is critical that all labels be read carefully. Rates vary with weather conditions, size of weeds, etc. Follow all recommendations on the label.

For pre-spear emergence:
- Dual Magnum - annual grasses, yellow nutsedge, hairy galinsoga, suppression of other broadleaf weeds.
- Gramoxone Inteon - Allow maximum weed emergence before treating. Add an adjuvant like X-77 or Charger E. Do not make more than 2 applications per season.
- Clarity 2.5 EC (pre and post spear emergence) - sowthistle, mustard spp., redroot pigweed, Russian thistle, common chickweed, field bindweed.
- Devrinol 5 DF (pre and post spear emergence) - annual grasses and broadleaves.
- Fusilade DX (pre and post) - most annual and some perennial grasses.
- Lorox 50 DF (pre and post) - Broadleaves and grasses.
- Sandea (pre and post) - Pre-emergence applications: galinsoga, lamb-squatters, mustard/radish species, redroot pigweed, ragweed, velvet-leaf. Yellow nutsedge is suppressed but not controlled. Post-emergence applications: yellow nutsedge, galin-soga, redroot pigweed, mustard/radish species, ragweed, velvetleaf.
- Callisto (pre spear and post harvest) - annual broadleaf weeds.
- Chateau WDG (pre spear and post harvest) - annual broadleaf weeds.
- Formula 40 (pre spear and post harvest) - perennial broadleaves.
- Karmex DF (pre spear and post harvest) - annual broadleaves and grasses.
- Sencor 4F (pre spear and post harvest) - broadleaves (at low rate); grasses (at high rate).
- Sencor DF (pre spear and post harvest) - broadleaves (at low rate); grasses (at high rate).
- Roundup Weather Max (pre spear and post harvest) - quackgrass and perennial broadleaves.
- Poast (post spear emergence) - annual grasses
- Treflan HFP (pre and post harvest) - For use on established beds. Apply with shallow incorporation. Adjust the rate according to label recommendations for soil type. Split applications can be made with half preemergence followed by half postemergence after last harvest. May aid in prevention.
- Aim EW (post harvest) - selected broadleaves

For more information, refer to the Cornell Vegetable Guidelines (link on pg. 3).

Weed control for organic production:
Weed control is the most serious challenge facing organic asparagus producers. Since asparagus is a perennial crop that increases in bed-width each year, cultivation for weeds “in the row” during spear harvest, and following harvest during fern production, is not possible. Thus, elimination of perennial weeds such as bermudagrass, quackgrass, johnsongrass, and nutgrass prior to planting is especially critical. Annual weeds can be controlled through a combination of cultural, mechanical, and biological control techniques.

Cultivation: To control winter annual weeds that have emerged in the field, cultivate at a shallow depth after the winter ferns (i.e., trash ferns from...
Cultivation between the rows with a high-clearance tractor and 3-point hitch-mounted row cultivators will control the bulk of inter-row weeds during the growing season. During harvest of spears and during fern production, in-row cultivation opportunities are limited. Yet, these in-row weeds pose the greatest threat because weed competition with ferns interferes with crown storage and reduces yield the following growing season.

Mulches and Weeder Geese - On large-scale operations, mulching can be mechanized using straw spreaders or forage wagons carrying green chop or shredded dry mulch. Weeder geese are an alternative to mulching, and have a history of use in asparagus.

Flame Weeding - Flame weeding, which is done with propane flamers, is another possibility for in-row weed control. Hand-held or backpack flamers can be especially useful for spot treatment, though tractor-drawn rigs are available. As a general rule, flame weeding is most effective against annual broadleaf weeds, moderately effective against annual grasses, and a poor option for perennial weed management. Flaming should be considered a potentially useful though experimental tool. ATTRA has additional in-formation on the uses of flame weeding in vegetables, available on request.

Cover Crops - Cover crops are another useful tool in asparagus weed management. Two cover crop systems that have potential in asparagus are “dying mulches” and “living mulches.”

Dying Mulches - A dying mulch is a cover crop planted out of season. While growing it suppresses weeds; then it dies back out on its own without requiring the use of herbicides, mowing, or tillage. Winter rye—planted in the spring—has been used successfully in this manner in several agronomic and horticultural crops.

In asparagus here’s how this might work. Following post-harvest tillage of the asparagus field, the field is over-seeded with winter rye at 120 lbs. per acre to establish the living mulch. Since the winter rye is planted in late spring, and consequently does not receive normal winter vernalization (cold treatment), it never tillers (i.e., it stays short) and eventually “cooks out” by mid-summer. By this time, the asparagus ferns form a thick canopy that shades out most underlying weeds.

The success of this system is dependent on proper timing and good luck. Timing is critical to get the rye established early enough to promote germination when the soil temperatures are still relatively cool, but at the same time, late enough that a cold spell is avoided. Vernalization can occur when the rye is exposed to only 10 days of 45° F night temperatures. Dr. Astrid Newenhouse, formerly with the University of Wisconsin, conducted cover crop research in horticultural crops and provided some preliminary insights into dying mulch and living mulch systems for asparagus. Dr. Newenhouse tried the non-vernalized rye system described above. She agreed that timing was critical with respect to a cool spell. As a result of a cold snap one year, her rye headed out and created additional management problems. Biological farming strategies, like conventional farming strategies, don’t always work as expected.

Living Mulches - Living mulches are cover crops grown in association with annual or perennial crops, primarily for weed suppression and as a soil management practice. The goal is to plant a low-growing cover that suppresses weeds without competing too much with the main crop. In Wisconsin, Dr. Newenhouse’s living-mulch work in asparagus focused on two cover crops: perennial ryegrass and ‘Dwarf White’ Dutch white clover. Both cover crops were fall-established and managed the following growing season with one to three mowings using a walk-behind sickle-bar mower. Preliminary results indicated that perennial ryegrass per-formed better than the Dutch white clover the first growing season. However, in the second growing season these results were reversed, with the Dutch white clover performing better. This research found that living mulches could be highly effective in weed suppression but also quite competitive with the crop, reducing asparagus growth 50-75% in some instances. Clearly, more research is required to find living mulch systems that are more viable.

Harvest - Asparagus can be harvested the second year after planting. A traditional harvest sequence calls for cutting 2 weeks the first year, 4 weeks the second, and 6-8 weeks thereafter. When spears are predominantly small in diameter, harvest should be stopped.

Diagnose pest and disease problems using color pictures: http://vegetablemonline.ppath.cornell.edu/
Cornell Guidelines for fruit and vegetables: http://www.nysaes.cornell.edu/recommends/
Cucurbit Downy Mildew forecast: http://www.ces.ncsu.edu/depts/pp/cucurbit/
USDA Fruit and Vegetable Market News: www.marketnews.usda.gov/portal/fv
Scout Transplants for Disease

By Christy Hoepting, CVP, edited by CLS. Cole crop transplants should be scouted for black rot (BR), Alternaria leaf spot (ALS), downy mildew (DM), wirestem and damping off. It can be tricky to distinguish which disease is present based on symptoms alone, but it is important to know, because these different diseases are managed differently. In general, look for yellowing, tiny black spots on the leaves and stunting. Anyone with symptomatic seedlings is encouraged to contact one of the CDVSFP team members for confirmation via Cornell Plant Pathologist, Dr. Chris Smart.

**Black rot** - Typical symptoms of plants with a seed-borne infection of this bacterial disease include yellowing leaves and black veins. Look especially at the veins. Lesions caused by secondary plant to plant spread are necrotic and V-shaped. Infected seedlings often show no symptoms at all. To manage BR, it is most important to reduce spread during transplant production. 1) Use new supplies and trays. Disinfest greenhouses, old trays, and equipment used in transplant production with a germicidal agent such as quaternary ammonium chloride salts (Q-salts such as Greenshield or Physan 20), or hydrogen dioxide (ZeroTol). 2) Handle transplants only when the foliage is dry. 3) If BR is detected, consider all plants in that flat to be contaminated and remove and destroy immediately. 4) Use copper bactericides regularly once BR has been detected in a greenhouse. Since BR is so tricky to identify early, preventative use of copper bactericides may also be warranted.

**Downy mildew** - Young seedlings are more likely to die from DM than when larger plants are infected. Yellow angular spots appear on the upper sides of leaves. Under moist conditions, grayish mycelium and spores can be found on the corresponding undersides of the leaves. To manage DM, avoid excessive overhead irrigation to keep surrounding those infected and monitor plants closely for disease symptoms. Do not attempt to separate healthy from diseased plants within a flat. 4) Use copper bactericides regularly once BR has been detected in a greenhouse. Since BR is so tricky to identify early, preventative use of copper bactericides may also be warranted.

(Continued on page 4)

Late last week we received phone calls from 3 different greenhouse/high tunnel tomato growers with what they thought might be Late blight on their tomatoes. After taking a long hard look at the symptoms we were sure that these symptoms were not a result of Late blight. Just to be sure, we sent several pictures to Tom Zitter and Chris Smart, two of our vegetable pathologists, they agreed with our diagnosis that it was not late blight.

So, what caused this water soaking, blackish burning on the leaf margins? We suspect that after several very cloudy, cool weeks of growing conditions, these plants, when exposed to several bright sunny, warm days, started to transpire rapidly. Sometimes when this happens, salts can accumulate from fertilizers and end up at the tips and margins of leaves. This should be temporary as the plant thickens its cuticle and becomes a little more “hardened off” with the exposure to brighter, warmer conditions. 

CB
leaves dry. If you find DM in cole crop transplants, fertilizer can be used to stimulate growth to enable seedlings to outgrow infections. There are no fungicides labeled for use in the greenhouse, but plants that are outside hardening off can be treated with Ridomil Gold, Bravo or any of the several fungicides labeled. Once transplanted into the field, DM-infected transplants should be sprayed with Bravo weekly until no more symptoms are evident. If the weather is hot and dry, DM-infected transplants should grow out of the disease just fine.

**Alternaria leaf spot (ALS)** - Occasionally, ALS occurs on transplants. It appears as small non-descript black spots on the leaves. Sometimes, more diagnostic target spot lesions occur. There is nothing labeled for ALS in the greenhouse. Once the plugs are transplanted into the field, they should be scouted for ALS and Bravo be applied as long as ALS continues to occur.

**Damping off and wirestem** - DO is favored by the weather we have had over the past several weeks and overcrowding. DO caused by *Rhizoctonia solani*, which also causes wirestem (WS) is the most common, but Pythium species can also cause DO. Seedlings infected with WS develop a dark brown lesion on the stem where it contacts the soil surface, and the seedlings start to turn yellow and collapse. The lesion girdles the stem, becomes quite sunken and resembles a “wire”. Most seedlings with WS eventually die in the field, and those that survive, produce unhealthy plants that yield poorly. WS does not spread from plant to plant. Do not over-water. If you have Pythium, Ridomil Gold can be applied to plants that are outdoors. Ridomil does not control WS. For WS, simply do not plant infected seedlings, or expect poor stands.

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**New Late Blight Consortium will Improve Disease Tracking and Management**

*Chris Smart, Meg McGrath Bill Fry, and Abby Seaman*

We are pleased to announce the establishment of a consortium that aims to improve the management of potato and tomato late blight. There have already been several reports of late blight in the Northeast this year, so it’s important to be thinking about late blight even in mid-May.

More details will be provided over the coming weeks on our website, [http://usablight.org](http://usablight.org). Right now, we want to solicit your help in tracking outbreaks of late blight and obtaining samples of infected materials to identify the strain of the pathogen and its sensitivity to Ridomil.

Be sure to scout greenhouse and high tunnel tomatoes and early potatoes for late blight. If you think you may have late blight please contact your local Extension Educator. Knowing where late blight has been found is critical for making the best management decisions. When an outbreak is reported, it will NOT pinpoint your farm, but will report the county in which the outbreak occurred.

Our project involves 17 institutions and is funded by a 5-year award from the USDA. Our activities will integrate extension, research, and education to help control the disease. These include systems for helping growers make management decisions, methods for identifying pathogen strains and their traits, and plant varieties that are more resistant.
Phomopsis twig blight caused by the fungus Phomopsis spp. (including P. vaccinii), has been found in our region and can be a serious disease if it is not addressed. This disease tends to be a problem for plantings that are in low lying areas and have frequent spring frost issues. It may also be a problem following winters that have excessive temperature fluctuation and/or following summers where drought stress may have been an issue. Those plantings that do not have irrigation may be more at risk than plantings that have water available consistently during a drought period. According to Mark Longstroth of Michigan State University Cooperative Extension, a mature blueberry planting can use as much as 2 inches of water a week during shoot growth and fruit ripening. Once the soil dries out both shoot and fruit growth stop. Most growers are well aware that one consequence of drought is small fruit size, but many growers do not realize that overall vigor and health can be seriously affected by even one season’s lack of water.

The phomopsis fungus overwinters in cankers or dead twigs and produces spores during the spring bloom period. Spring rains distribute spores, but warm temperatures favor infection. You can see that some of these weather patterns point to probable infection, but certainly not all. Last winter, although we did have some severe cold, we saw almost no temperature fluctuations and no spring thaw. Still, look for symptoms to appear on smaller twigs first, causing bud collapse as the plants begin to leaf out. (Figure 1) This does not always happen, and sometimes the plant will leaf out normally and then collapse in the summer.

The pith and wood of phomopsis infected twigs become discolored. Since bushes which are weakened or predisposed by winter injury or are in poor vigor are vulnerable to attack by this fungus, measures to maintain optimum plant growth and vigor help to minimize the effects of this disease. All blighted or discolored wood should be pruned and removed (ie not chipped into mulch) during the dormant season or whenever newly infected tips appear. No cultivars are known to have resistance. Winter cold injury usually occurs to the flower buds before it damages older wood. Early winter injury to buds appears as brown, dead tissue before spring growth resumes but late winter injury may not show up until after bud break. (Figure 2) This is where the confusion occurs between canker infection and winter injury, and the fact that they don’t always happen in the same fashion makes it even more confusing.

To assess injury dissect buds: dead flower buds appear dark brown instead of light green. Injury to older canes and wood is not apparent until spring growth begins. (Figure 3) Branches and whole canes may fail to leaf out or break bud normally, then cease growth and die when warm weather occurs.

If you know that you have phomopsis twig blight, control measures should be taken. Copper sulfate or lime sulfur should be applied at dormancy. Fungicides that include Ziram, Abound, Pristine among others should be applied at Green tip. Follow label directions for all of these fungicides. Pruning is also an important part of the control approach.

*All photos courtesy of the Michigan State University blueberry website: [http://www.blueberries.msu.edu/](http://www.blueberries.msu.edu/)

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**Websites of Interest**

- **Diagnose pest and disease problems using color pictures:** [http://vegetablemdonline.ppath.cornell.edu/](http://vegetablemdonline.ppath.cornell.edu/)
- **Cornell Guidelines for fruit and vegetables:** [http://www.nysaes.cals.cornell.edu/recommends/](http://www.nysaes.cals.cornell.edu/recommends/)
- **Cucurbit Downy Mildew forecast:** [http://www.ces.ncsu.edu/depts/pp/cucurbit/](http://www.ces.ncsu.edu/depts/pp/cucurbit/)
- **USDA Fruit and Vegetable Market News:** [www.marketnews.usda.gov/portal/fv](http://www.marketnews.usda.gov/portal/fv)
**Weekly and Seasonal Weather Information**

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NA¹—The Granville weather station was established this year (2011) so there will be no 2010 data reported as there is no history for this site.

**Upcoming Meetings and Notices**

**Organic Field Days:** June 1st. Join Dr. Thomas Bjorkman and Elizabeth Dyck as we tour two farms using cover cropping extensively in their rotations. We will discuss ways to increase cover crop use in your rotation, ways to control cover crops, and the effects cover crops have had on the health of soils on these farms. Washington County: location TBA; Schoharie County: location TBA.