UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue:

Crop conditions

Just as summer was coming to an end, summer started! The end of August was marked by some of the stickiest weather the Northeast had seen all year. Rain storms around labor day brought some much needed moisture to some areas of the state, while growers in other areas, including much of the southeast, didn't get quite enough if any at all, and were forced to irrigate under cloudy skies. The rain brought with it a return to cooler weather and the end of the summer that felt like it had just begun. Fruiting crops – tomato, pepper, eggplant, and late successions of summer squash – are still coming in, along with the start of the big fall harvests of winter squash, potatoes, and roots. Staying on top of weeds can be tough this time of year with the fall labor crunch. Growers have lost a good part of their labor force to back-to-school season. In fact, some of the people on those hard-harvesting summer crews might be joining us on the UMass campus, as many are enrolled in degree programs at the Stockbridge School of Agriculture. These students aren't the only ones getting educated, though! Nearly fifty farmers and other ag professionals took time out of their packed schedules and came out to Foppema's Farm in Northbridge for our September 3 twilight meeting to learn about scab and fire blight management in apples, some challenges and strategies for disease management in storage onions, and improving post-harvest systems. Thanks to all who participated!

Arthur Tuttle of the UMass Extension Fruit team discussing apple scab management at the Foppema Farm twilight meeting

Pest alerts

This will be our last regular Pest Alerts of the season. This year funding provided by the Northeast IPM Center allowed us to broaded the scope of our weekly pest alerts to include information from neighboring states. Funding paid for field scouts in Rhode Island, Massachusetts and Vermont to weekly scout vegetable farms in each state and publish findings to a regional farmer audience. Special thanks goes to Andy Radin and Lauren Breene at URI, Ann Hazelrigg, Mollie Klepack and Anya Rose at UVM, and Ruth Hazzard, Sue Scheufele and Lisa McKeag at UMass for diligent scouting and careful reporting. We welcome your comments and suggestions for Pest Alerts at: umassveg@umext.umass.edu. Look for regular Pest Alerts again next year.

-K. Campbell-Nelson, UMass Extension Vegetable Program

Cucurbits: **Cucurbit downy mildew (CDM)** is present in Franklin and Hampshire Co. MA but is not spreading very widely. Fields infected with CDM when it first arrived last month that did not receive fungicides are now fairly bare of foliage. According to the CDM-IPM Pipe forecast, MA, VT and RI are all at minimal risk of CDM spreading, while CT is at a low risk. As pumpkin and winter squash fields are getting closer to harvest, growers continue to diagnose disease problems to determine crop storage potential, future crop rotations, and choices for resistant cultivars in the future. One field scouted in Franklin Co. MA had symptoms of **Plectosprium**, **powdery mildew (PM)**,

Plectosporium blight on zucchini stem (above) and pumpkin fruit (below)

cucurbit downy mildew, **Fusarium**, **Black Rot** (aka gummy stem blight), and **Anthracnose**, but NO Phytophthora blight. While the PM and CDM were fairly well controlled, plectosporium specific materials had not been applied, and this disease was causing most of the damage to pumpkin handles and some fruits. Fungicides with efficacy against plectosporium include Bravo, Inspire Super, and Quadris Top. Be careful to rotate between group 11 and 3 fungicides as they can quickly cause the target organism to develop resistance.

Solanaceous crops: **Bacterial Spot** has spread very slowly in a pepper crop in Franklin Co., MA this week due to night temperatures below 60°F. Symptoms were most severe in the variety "Socrates", although yields continue to be good. **White mold** was found in a greenhouse tomato crop in Chittenden Co., VT. This disease has a broad host range including bean, cabbage, carrot, cucumber, eggplant, potato, lettuce, pepper and squash. Moist, cool temperatures are conducive to disease development. Remove infected plants to reduce inoculum build up and survival of long-lived sclerotia. As you are harvesting potatoes, note that the VT diagnostic lab has had several positive samples for **Pink eye** on potato. This abiotic disorder begins early in the season with warm temperatures and wet soils causing corky patches around the eyes which then allow the introduction of several *Pseudomonas* bacteria causing the pink color. This is not a seed-borne pathogen.

Brassicas: A variety of caterpillars **Imported cabbageworm (ICW)**, **diamond back moth caterpillars (DBM)** and **cabbage loopers (CL)** were found affecting 5 % of a brassica field in Chittenden Co., VT. **Black Rot** and **Alternaria Leaf Spot** are diseases that have been scouted on cabbage in Franklin Co., MA several brassicas in Chittenden Co. VT and Brusselsprouts and kale in Washington Co., RI. Black rot appeared in RI after rain events last week.

Sweet Corn: **Corn earworm** trap captures jumped this week to their highest levels all summer in many locations of NY, NH and MA and have shortened the spray interval for some growers. Winds from the south and south west last week brought the moths north for the first time since storms hit our area in July. Luckily we are near the end of the season. However, if you still have a few weeks until harvest, keep your corn traps up to check next week's pressure. Do not spray your corn if it is less than 5 days to harvest. Spray intervals may be lengthened by one day if average daily temperatures are less than 85°F as they are now. Only one **fall armyworm** was trapped in Chittenden Co., VT this season and found this week. Only one trap in Rehoboth, MA captured 15 **European corn borer** at a threshold to spray weekly.

Other Crops: **Spotted Wing Drosophila:** Track trap captures across MA here.

Table 1. Corn earworm (CEW) trap captures for the week ending 9/11/14.

Western, MA	
South Deerfield	27
Sunderland	0
Hadley	105
Feeding Hills	47
Central & Eastern MA	
Spencer	10
Tyngsborough	28
Concord	65
Lancaster	37
Rehoboth	35
Seekonk	85[z]
NH	
Litchfield	32
Hollis	11
Mason	115

[z] 5-day trap capture

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 -0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 – 7	5 days
1 - 13	7 – 91	4 days
Over 13	Over 91	3 days

IDENTIFYING DISEASES OF CARROTS

Carrot acreage is on the rise in New England, as more growers target expanding, year-round markets. Carrots can be affected by many bacteria, fungi and nematodes in the field and in storage. Foliar diseases may cause lower yields due to loss of photosynthetic area, difficulty in harvest if the tops are weakened, and lower marketability if the carrots cannot be sold in bunches. Root diseases can lower yields of fresh eating carrots and can spread in storage, drastically reducing yields brought to later markets. Root diseases are caused by soil dwelling organisms and therefore their incidence may vary considerably from farm to farm. Proper disease identification will help you to prevent future outbreaks by adjusting crop rotations accordingly, and prevent moving infested soil from field to field. Some of the major carrot disease symptoms are described below. If you are noticing foliar or root symptoms like those described, send a sample to your state diagnostic lab to confirm, and take steps to protect current and future crops. See the UMass Diagnostic Lab website for

their sample submission instructions.

Alternaria leaf blight of carrot Photo WB Langston

Alternaria Leaf Blight (*Alternaria dauci* and *A. radicina*) symptoms first appear along leaflet margins as greenish-brown, water-soaked lesions which enlarge, turn brown to black, and often develop a yellow halo. Older leaves are more susceptible to infection. When about 40% of the leaf is infected, the leaf yellows, collapses, and dies. Petiole lesions are common, elongate, and can quickly kill entire leaves. *A. radicina* causes similar foliar symptoms but can also produce a dry, mealy, black decay known as black rot on carrot roots held in storage.

Bacterial Leaf Blight (*Xanthomonas campestris* pv. *carotae*) symptoms appear primarily on leaf margins as small, yellow, angular leaf spots which expand, turn brown to black with a yellow halo, and become dry and brittle. Leaflets may become distorted and curled. Symptoms can extend into petioles, produce a yellow-brown, gummy exudate, and occur on flower stalks. Infected umbels can be completely blighted and seed infection can occur—use treated seed to prevent introducing this disease.

Root knot nematode damage

Root Knot Nematode (*Meloidagyne hapla*) forms galls or root thickenings of various sizes and shapes. Growth of infected carrots is patchy and uneven and severely infected carrots exhibit forking, galls, hairiness, and stubby roots. When soil populations of *M. hapla* are high symptoms include stunted plants, uneven stands, premature leaf death, and branches and swellings on both lateral and tap roots. Marketable yield is reduced by deformities, size reduction, branches, and knobs. *M. hapla* persists in the soil and has a very wide host range so rotation is difficult but monocots are non-hosts so small grains and corn as well as resistant varieties of tomato and bean can be grown in rotations to reduce population size.

Black root rot caused by Thielaviopsis baricola

Black Root Rot (*Thielaviopsis basicola*) occurs primarily in storage when conditions are not ideal and temperature and humidity are too high. The fungus causes superficial, irregular black lesions which occur in a random pattern. The discoloration, caused by masses of dark brown to black chlamydospores, is limited to the epidermis. The pathogen rapidly invades wounded tissue and is favored by long post-harvest periods without cooling so careful harvest and immediate cooling and storage can minimize disease impact.

White mold on carrot root. Note presence of black scletia. Photo

White Mold (*Sclerotinia sclerotiorum*) affects many vegetable crops but carrots are particularly susceptible, especially late in the season and during storage. The fungus may be present in soil, storage areas or containers. Symptoms include characteristic white mycelial growth and hard, black sclerotia (overwintering structures), which can been seen on the crown of infected carrots. In storage, the disease is characterized by a soft, watery rot with fluffy white mycelia and black sclerotia present. Sclerotia can persist in soil for many years and the fungus has a very wide host range making this disease difficult to manage. Grasses and onions are non-hosts that can be used in long rotations and a biocontrol organism ("Contans") has been shown to be effective in parasitizing overwintering sclerotia. Contans should be incorporated into infested soils in the fall if a susceptible crop must be planted there next year.

White mold symptoms on overwintered mulched carrots

Cavity Spot and Root Dieback (*Pythium* spp.). Infections from *Pythium* spp. can occur during early root development and are favored by moist soil conditions. Root dieback symptoms appear as rusty-brown lateral root formation, or forking and stunting; symptoms that can be easily confused with damage from nematodes, soil compaction or soil drainage problems. Cavity spot often shows up later in the season near harvest. Horizontal, sunken lesions varying in size from 1 to 10 mm appear on the surface of the root and can provide an ingress for secondary fungal or bacterial infections.

Cavity spot caused by Pythium spp. Photo S. Livingston

Crown Rot (*Rhizoctonia carotae*). Early symptoms are horizontal dark brown lesions around the root crown. As the crop matures the tops may die in patches in the field and as the disease progresses lesions join to form large, deep, rotten areas on the top part of the root. *R. carotae* can also cause crater rot and violet root rot but these diseases are less common in MA. Disease is favored by moist conditions so planting on ridges, harvesting early and without wounding, cleaning equipment and maintaining clean and proper storage conditions

may minimize impact.

Scab (*Streptomyces* spp.) can cause both raised and sunken, dry, corky lesions on the carrot root, however, symptoms are rarely severe enough to cause major losses in yield or crop marketability. Avoid planting carrots in alkaline soils, which are known to favor the incidence of scab, or in potato fields with high incidence of scab, as the disease may be caused by the same organism in carrots.

-by S. Scheufele, UMass Vegetable Program

CLEANING AND DISINFECTING THE GREENHOUSE

If you have had recurring problems with diseases such as Pythium root rot or insects such as fungus gnats, perhaps your greenhouse and potting areas need a good cleaning. Over the course of growing a crop, infectious microbes accumulate and algae flourish on moist surfaces harboring fungus gnats and shore flies.

Attention to greenhouse sanitation and disinfecting are steps that growers can take between crop cycles. Some growers wait until the week before opening a greenhouse to clean up debris from the previous growing season. It is better to clean as early as possible to eliminate over-wintering sites for pests to reduce their populations prior to the spring growing season. Pests are much easier to prevent than to cure.

Although disinfecting should be done routinely, timing does not always permit this extra effort. Take the opportunity to thoroughly clean greenhouses between crop cycles when greenhouses are totally empty.

Cleaning

Cleaning involves physically removing weeds, debris and soil and is the first step prior to disinfecting a greenhouse and equipment. Some growers use a "Shop Vac" on concrete and covered floors to remove debris. Soil and organic residues from plants and growing media reduce the effectiveness of disinfectants. There are some cleaners specifically developed for greenhouse use, for example Strip-It, which is a combination of cleaning and wetting agents formulated to remove algae, dirt and hard water deposits. High pressure power washing with soap and water is also an option. Soap is especially useful in removing greasy deposits however, thorough rinsing is needed because soap residues can inactivate certain disinfectants such as the Q-salts.

Begin at the top and work your way down. Sweep down walls and internal structures and clean the floor of soil, organic matter and weeds. Disease causing organisms can be lodged on rafters, window ledges, tops of overhead piping and folds in plastic. Extra care is needed to clean these areas and also textured surfaces such as concrete and wood which can hide many kinds of organisms.

Install physical weed mat barriers if floors are bare dirt or gravel and repair existing mats. Weed barriers prevent weeds and make it easier to manage algae. Avoid using stone on top of the weed mat that will trap soil and moisture, creating an ideal environment for weeds, diseases, insects and algae.

Benefits to Disinfecting the Greenhouse

Many pathogens can be managed to some degree by the use of disinfectants. Dust particles from fallen growing medium or pots can contain bacteria or fungi such as Rhizoctonia or Pythium. Disinfectants will help control these pathogens. In addition to plant pathogens, some disinfectants are also labeled for managing algae which is a breeding ground for fungus gnats and shore flies.

Managing Algae

Algae are a diverse grouping of plants that occur in a wide range of environments. Algae growth on walks, water pipes, equipment, greenhouse coverings, on or under benches and in pots is an ongoing problem for growers. Algae form an impermeable layer on the media surface that prevents wetting of the media and can clog irrigation and misting lines, and emitters. It is a food source for insect pests like shore flies, and causes slippery walkways that can be a liability risk for workers and customers. Recent studies have shown that algae are brought into the greenhouse through water supplies and from peat in the growing media. Once in a warm, moist environment with fertilizer, the algae flourish.

Proper water management and fertilizing can help to slow algae growth. Avoid over-watering slow-growing plants and especially crops early in the production cycle. Allow the surface of the media to dry out between watering. Also avoid excessive fertilizer runoff and puddling water on floors, benches, and greenhouse surfaces. The greenhouse floor should be level and drain properly to prevent the pooling of water prior to installing a physical weed mat barrier. Irrigation water can also be a source for pathogens and algae. For information on water treatment technologies for control of algae see the Water Education Alliance for Horticulture.

Algae management involves an integrated approach involving sanitation, environmental modification and frequent use of disinfectants.

Greenhouse Benches and Work Tables

If possible, use benches made of wire that can be easily disinfected. Wood benches can be a source for root rot diseases and insect infestations. Algae tend to grow on the surface of the wood creating an ideal environment for fungus gnats and shore flies, and plant pathogens can grow within the wood. Plants rooting through containers into the wood will develop root rot if conditions are favorable for pathogen activity. Disinfect benches between crop cycles with one of the labeled products listed below. Keep in mind that disinfectants are not protectants. They may eradicate certain pathogens, but will have little residual activity.

Bench tops and work tables should be made of a non-porous surface such as a laminate that can be easily disinfected. Avoid using bare wood for these tasks.

Cleaning Containers

Plant pathogens such as Pythium, Rhizoctonia and Thielaviopsis can survive in root debris or soil particles on greenhouse surfaces. If a crop had a disease problem, then avoid re-using containers. Research has shown that Thielaviopsis spores are capable of surviving on recycled plug trays and infecting new crops.

Containers to be reused should be washed thoroughly to remove soil particles and plant debris before being treated with a disinfectant, even if there is no evidence of disease in the crop. Debris and organic matter can protect pathogens from coming in contact with the disinfectant solution.

Disinfectants for Greenhouses

There are several different types of disinfectants that are currently used in the greenhouse for plant pathogen and algae control. They are quaternary ammonium compounds (Green-Shield®, Physan 20®, and KleenGrow™), hydrogen dioxide (ZeroTol® 2.0, Oxidate® 2.0), hydrogen peroxide & peroxyacetic acid (Sanidate®), hydrogen peroxide, peroxyacetic acid and octanoic acid (X™-3), sodium carbonate peroxyhydrate (GreenClean Pro Granular Algicide) and chlorine bleach. Alcohol, although not used as a general disinfectant is mentioned here because it is used by growers to disinfect propagation tools. All these products have different properties. If possible, disinfectants should be used on a routine basis both as part of a pre-crop clean-up program and during the cropping cycle.

Quaternary ammonium chloride salts (Green-Shield®, Physan 20®, KleenGrow™). Q-salt products, commonly used by growers are quite stable and work well when used according to label instructions. Q-salts are labeled for fungal, bacterial and viral plant pathogens, and algae. They can be applied to floors, walls, benches, tools, pots and flats as disinfectants. Physan 20® is also labeled for use on seeds, cut flowers and plants. Carefully read and follow label instructions. Recommendations may vary according to the intended use of the product. For example, the Green-Shield® label recommends that objects to be sanitized should be soaked for 10 minutes, and walkways for an hour or more. Instructions recommend that surfaces be air-dried after treatment except for cutting tools. The label recommends soaking cutting tools for 10 minutes before use, then using the wet tool on plants. One way to do this is by having two cutting tools, one pair to use while the other is soaking. KleenGrow has higher organic tolerances and longer residual activity on hard surfaces.

Q-salts are not protectants. They may eradicate certain pathogens, but will have little residual activity. Contact with any type of organic matter will inactivate them. Therefore, pre-clean objects to dislodge organic matter prior to application. Because it is difficult to tell when they become inactive, prepare fresh solutions frequently (twice a day if in constant use). The products tend to foam a bit when they are active. When foaming stops, it is a sign they are no longer effective. No rinsing with water is needed.

Hydrogen Dioxide and Pyeroxyacetic Acid (ZeroTol® 2.0, OxiDate® 2.0, SaniDate®12.0) Hydrogen dioxide kills bacteria, fungus, algae and their spores immediately on contact. It is labeled as a disinfectant for use on greenhouse surfaces, equipment, benches, pots, trays and tools, and for use on plants. Label recommendations state that all surfaces should be wetted thoroughly before treatment. Several precautions are noted. Hydrogen dioxide has strong oxidizing action and should not be mixed with any other pesticides or fertilizers. When applied directly to plants, phytotoxicity may occur for some crops, especially if applied above labeled rates or if plants are under stress. Hydrogen dioxide can be applied through an irrigation system. As a concentrate it is corrosive and causes eye and skin damage or irritation. Carefully read and follow label precautions. Note that OxiDate® and SaniDate are organic products.

Hydrogen Peroxide, Peroxyacetic Acid and Octanoic Acid (X™-3) is a strong oxidizing agent used as an algecide on greenhouse structures and floor and is labeled for use in chemigation. Follow label rates and precautions.

Sodium Carbonate Peroxyhydrate (GreenClean Pro Granular Algaecide®) is a granular and activated with water. Upon activation, sodium carbonate peroxhydrate breaks down into sodium carbonate and hydrogen peroxide. GreenClean is labeled for managing algae in any non-food water or surfaces. Non-target plants suffer contact burn if undiluted granules are accidentally spilled on them.

Chlorine bleach. There are more stable products than bleach to use for disinfecting greenhouse surfaces. Chlorine bleach may be used for pots or flats, but is not recommended for application to walls, benches or flooring. When used properly, chlorine is an effective disinfectant and has been used for many years by growers. A solution of chlorine bleach and water is short-lived and the half-life (time required for 50 percent reduction in strength) of a chlorine solution is only two hours. After two hours, only one-half as much chlorine is present as was present at first. After four hours, only one-fourth is there, and so on. To ensure the effectiveness of chlorine solutions, it should be prepared fresh just before each use. The concentration normally used is one part of household bleach (5.25 percent sodium hypochlorite) to nine parts of water, giving a final strength of 0.5 percent. Chlorine is corrosive. Repeated use of chlorine solutions may be harmful to plastics or metals. Objects to be sanitized with chlorine require 30 minutes of soaking and then should be rinsed with water. Some would say that rinsing is not necessary. Bleach should be used in a well-ventilated area. It should also be noted that bleach is phytotoxic to some plants, such as poinsettias.

Alcohol (70 percent) is a very effective sanitizer that acts almost immediately upon contact. It is not practical as a soaking material because of its flammability. However, it can be used as a dip or swipe treatment on knives or cutting tools. No rinsing with water is needed.

Organic Disinfectants that are listed by the Organic Material Review Institute include OxiDate 2.0 and SaniDate 12.0. Ethyl or isopropyl alcohol is used to disinfect tools. Organic growers should always check with their certifying organization before using any material new in their growing practices. For list of products see: Organic Material Review Institutes (OMRI).

This information is supplied with the understanding that no discrimination is intended and no endorsement implied. Due to constantly changing regulations, we assume no liability for suggestions. If any information in this article is inconsistent with the label, follow the label.

Steps to Prevent Disease Contamination

- Disinfect benches, preferably made of wire. Pots, flats and trays should be new or disinfected. Wood benches can be a source for root rot diseases and insect infestations. Algae growing on wood surfaces create an ideal environment for fungus gnats and shore flies. Plant pathogens such as Pythium can grow within the wood and plants rooting into the wood can become infected.
- Disinfect potting tables preferably made of a non-porous surface such as a laminate.
- Set up washing stations for hand washing and foot baths at the entrances of each greenhouse, especially propagation houses.
- Keeping hands and fingernails clean can help reduce the spread of diseases. If wearing latex or other protective gloves, clean as you would your hands and change periodically. Change the disinfectant daily in foot baths and wash floor mats weekly.
- Keep pets off of benches and potting areas.
- Provide supports throughout the greenhouse to hang hose nozzles. Keep all containers and hose nozzles off the floor

to prevent contamination with pathogens.

- Keep growing media in a clean area and covered.
- Avoid carrying over plant material.
- Avoid accumulating dirty pots, old growing media or plant debris in the media mixing area.
- Make sure trash bins in the greenhouses are covered so that disease spores do not spread to the crop.
- Use horticultural oil on vegetation/weeds outside, around the greenhouse perimeter to smother over-wintering pests.

Updated 2012. For references and resources, see on-line version of this article.

-Prepared by Tina Smith, UMass Extension Educator, Greenhouse Crops and Floriculture Program

FALL WEED MANAGEMENT ADVICE

Weed management is still important at the end of the season. There are three main activities that need to be completed. They are: fall field scouting, preventing weed seed production, and controlling perennial weeds.

End of Year Weed Scouting

It is worthwhile to take the time to check fields for weed problems at this time of year. A quick scouting can identify problems that will be expensive to solve if they get out of control and can provide clues that will help in designing a weed management program for next year. Mapping weedy spots, and keeping some kind of permanent record of weed surveys, can help you evaluate your weed management over the years. Make a map of each field and fill in the following information:

How Many? How dense are the weeds? If weeds are very dense, they may be having an impact on yields. This is especially true if these weeds emerged early in the season, when competition is greatest. If weeds were actively growing during the period of greatest crop growth, consider changing the weed management program.

Which Weeds? Identifying weeds can help identify potential problems before they get out of hand, and can help you decide if you need to modify your weed control program. Weeds like yellow nutsedge, field bindweed, and quackgrass are spreading perennials, which have underground parts that enable them to spread throughout whole fields. Because these weeds can be very damaging, and are very difficult to control, they are worth "nipping in the bud". In addition, keep an eye out for annual weeds that are new to a field or are increasing in numbers. Some weeds can be very difficult to control in some or all of the crops in your rotation. Galinsoga, for example, is hard to control in cole crops, peppers, and squash. Nightshades are difficult to control in tomatoes for growers who rely on herbicides for control, because they are in the same family as tomatoes. Velvetleaf is hard to control in sweet corn.

What worked? It is also useful to look at the whole field and evaluate the effectiveness of your weed control efforts. If some weeds are generally escaping, identify them. They may point to weaknesses in your herbicide or cultivation program. If mostly grasses, or mostly broadleaves are escaping, it may require an adjustment of either the rates or the timing of grass or broadleaf herbicides. You may also find the New England Vegetable Management Guide useful. This manual contains a chart listing the effectiveness of vegetable herbicides on most of the common weeds in New England. Use this guide to find an herbicide labeled for your crop that might give better control than the one which was used.

Where are the weeds? Weeds in the rows or planting holes are much more damaging to crop yields than between-row weeds. Weeds in rows may be an indication that cultivation equipment needs adjustment, or cultivation needs to be done earlier.

Preventing Weed Seed Production

Annual weeds produce incredible amounts of seeds. Annual grasses normally produce 3,000 to 5,000 seeds per plant, small seeded annual weeds such as pigweed and lambsquarters can produce 100,000 to 250,000 seeds per plant, and larger seeded broadleaf weeds such as velvetleaf and smartweed can produce 5,000 or more seeds per plant. Perennial weeds can also produce seeds or other reproductive structures. For example, one yellow nutsedge plant can produce 2000 tubers. Perennial weed management is covered below. Once fields are harvested, they should be tilled or disked as soon as possible

to prevent seeds from maturing. Be especially concerned with weeds that are new to a field or are in abundant supply. If time is short, one alternative is to mow the weeds. This will remove the primary seed stalk but will also encourage lateral branching. Eventually, however, these branches will produce seeds and must be destroyed.

Perennial weed management

The best time to control perennial weeds is in the Fall. All perennial weeds have storage structures (tap roots or rhizomes) below ground that enable these plants to survive the winter and regenerate themselves the following year. Fall tillage of perennial weeds will kill top growth and fragment the storage organs but will not kill the weed. Frequent tillage will, over a long period of time, control perennial weeds but, in most cases, this is not practical.

Perhaps the best control technique for perennial weeds is an application of glyphosate (Roundup) before the plant goes dormant. Perennial broadleaf weeds such as bindweed or dandelion should be sprayed while they are still actively growing which is usually before a hard frost. Perennial grasses, such as quackgrass, can be sprayed as late as mid-November. Use 10 to 20 gallons of water per acre when spraying Roundup. Two quarts of the herbicide will provide much better control at 10 gallons of water per acre than at 40 gallons of water per acre. Spraying on a mild afternoon following a cold or cool morning is best to encourage translocation of the herbicide to the below-ground storage structures. Disking or tilling two weeks after application will also improve control of the weeds.

Many growers fight perennial weeds such as quackgrass in corn fields year after year because their primary goal in the Fall is to plant a cover crop. This is usually followed by a Spring application of Roundup which provides top kill but does not kill the whole weed. Applying Roundup at the proper time is the only way for it to achieve good control. Delaying the seeding of a cover crop may be a necessary evil in the fight against perennial weeds.

-Rich Bonanno, UMass Extension Weed Specialist

PLANTING SMALL GRAINS FOR SPRING VEGETABLE WINDBREAKS

by Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu

Originally published September 27, 2013 in University of Delaware Extension's Weekly Crop Update

Small grain windbreaks are a useful tool when planting warm season vegetables the following spring. Small grain crops planted in early fall will overwinter and then elongate and head in the spring. Depending on the crop used and when they were planted in the fall, they can reach 3-5 feet in height by the end of April. Small grain windbreaks serve two main functions: 1) they provide protection against wind that can desiccate or physically injure transplants and young plants and reduce sandblasting in sandy soils and 2) they help retain heat by reducing convective heat losses of wind passing over plant beds. Small grain windbreaks are particularly useful where vegetables are grown on plastic mulch. They also can serve as a winter cover crop.

Rye has been the preferred windbreak because tall types are still available and it elongates early in the spring. While barley is also early, tall varieties are not generally available. Wheat and triticale are intermediate and later.

Windbreaks are planted in every drive row, between every 2-3 beds or between every bed. Maximum protection and earliness are achieved when windbreaks are used between each bed and black plastic mulch is used for beds. Orientation of windbreaks so they are planted East-West is preferred to reduce shading.

Setting up windbreaks can be done in several ways. A simple method is to plant the field solid with the small grain and then till planting strips using a narrow tillage device (tractor mounted rototiller or multiple passes with a narrow field cultivator) in the spring before it puts on much growth. Tilling bed strips is best done in March. Alternatively, a non-selective herbicide can be used to kill strips in the late winter or early spring and then tilled later. Another method is to set up grain drills to plant 2 or 3 rows of small grain and then block the seed meters to skip the area where the beds will be in the spring. This allows more flexibility in the spring for tilling beds because there is less vegetation to manage. A third method we have tried in demonstrations at our UD Georgetown research station is to plant bed areas with a winter killed cover crop and then rye in the windbreak areas. This is done by dividing up and blocking certain seed meters on the drill. We use a drill with both small grain seed box and a small seed box. We plant forage radish with the small seed box in the area we want to have the bed and block the other seed meters, and do the opposite for the rye in the larger seed box.

It is best to plant windbreaks earlier in the fall to get good fall tillering. The first 2 weeks of September are ideal for planting rye in MA. Rye can be planted later but will then be delayed in the spring by several days and tillering may be reduced. You should plant at standard rates or higher (120 lbs/acre equivalent or more) for the most effective windbreaks. Higher seeding rates should be considered when planting late.

UPCOMING EVENTS

Soil Fertility and Cover Crops for Vegetable Production

When: Tuesday, September 16, 2014, 4:00 pm sharp!
Where: URI Agronomy Farm, Plains Road, Kingston, RI 02881
Sponsored by the University of Rhode Island Cooperative Extension and Northeast SARE. This FREE program will feature the following:

- Featured speaker: Tom Morris of UConn on Soil Fertility
- Update on organic soil amendment trial and melon/cuke beetle projects
- High tunnel peppers, eggplants and tomatoes
- Some new cover crop choices
- Fresh watermelon and SNACKS
- TWO pesticide recertification credits

Register on-line, or call 401-874-2967

Greenhouse Vegetable Production in Containers

When: Wednesday, December 10, 2014 from 9:30 am to 3:45 pm
Where: Sturbridge Publick House, 277 Main Street, Route 131, Sturbridge, MA 01566
Join us for this educational program on container grown greenhouse vegetable production (tomatoes, greens and cucumbers).

- Growing Greenhouse Tomatoes and Greenhouse Cucumbers in Containers
  Rich McAvoy, University of Connecticut
- Perfecting Biocontrol in Greenhouse Vegetables
  Carol Glenister, IPM Laboratories, Locke NY
- Growing Bench-top Greens
  Brian Krug, University of New Hampshire
  Brian will talk about current UNH research including cultivars and growing methods.
- Diseases and Disorders of Greenhouse Tomatoes, Cukes and Greens
  M.Bess Dicklow, University of Massachusetts Extension Plant Disease Diagnostic Laboratory
- Grower to Grower Panel
  Brad Clegg, Four Town Farm, Seekonk, MA
  Dave Volante, Volante Farms, Needham, MA

Registration: $40 per person or $35 per person for 3 or more from same business. Includes morning refreshments, breaks and handouts. Two contact hours for pesticide recertification have been requested. Register on-line, or contact Tina Smith, 413-545-5306, tsmith@umext.umass.edu for more information.

Vegetable Notes. Ruth Hazzard, Katie Campbell-Nelson, Lisa McKeag, Susan Scheufele, co-editors. Vegetable Notes is published weekly from May to September and monthly during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted.