Vegetable IPM Message
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Message FROM THE EDITOR.

This is the last of the Vegetable IPM newsletters for 2000. The editor wishes to offer thanks to our many contributors. These include members of the UMass Vegetable Team *(Rich Bonanno, Anne Carter, Frank Mangan, Rob Wick, and John Howell)*, authors from other Extension programs, private IPM consultants *(Ray Pestle, Dale Riggs, Jim Mussoni, and Mike Yates)*, farmers *(Paul Willard, Chris Clegg, Elaine Atmore-Droescher, Dan Kaplan, Linda Hildebrand, Ken Nicewicz, John Kelly, Sam Smith, Dave Dumaresq, John Bagdon),* and IPM staff *(Jeff Lerner, Brian Lipke, Pam Westgate, Steve Buckley, Roz Cook, Rolf Parker).* We also appreciate the many growers who participated in our various field projects. And thanks to those growers who asked questions and raised issues that prompted many articles!

In November, we will post the first issue of **Vegetable Notes**. This year the editorship will rotate among members of the Vegetable Team with theme based issues. For 2000-2001, themes will include *Soils* (Editor: Frank Mangan), G*reenhouse Management* (Editor, John Howell), *Year 2000 Research Results* (Editor, Anne Carter), and *Pre-Season Pest Management* (Editor, Rich Bonanno).

--*Ruth Hazzard*

New England Vegetable and Berry Growers Meeting:

Co-sponsored by New England Vegetable and Berry Growers Assoc. and New England Cooperative Extension systems.

Saturday November 4, 2000

Comfort Inn Conference Center

Portsmouth, New Hampshire

Located at Rte 1 By-pass, 2 miles south of Portsmouth Traffic Circle

Registration: **9:30 am**.

Program: 10:00 a.m. to 4:00 p.m.

10:00 a.m. **Sweet Corn Herbicides Update.** Rich Bonanno, UMass Extension

10:30 **Evaluation of Greenhouse Soil Mixes.** Doug Cox, UMass Extension

11:15 **Pest Management on Vegetable Transplants in the Greenhouse.** Tina Smith, UMass Extension

12:00 noon**: lunch.** Served on-site. Pre-reservations only!

1:15 p.m. **Meet Dean Andrew Rosenberg and Extension Station Director William Trumble from the University of New Hampshire**

1:45 **Varieties and Planting Schedules for Small Diversified Farms.** Dan Kaplan, Brookfield Farm, Amherst MA and Ed Person, Ledgewood Farm, Moultonboro, NH.

2;15. **Ebb and Flow Greenhouses.** Doug Cox, UMass Extension

2:45 **Pepper, Supersweet Corn, and Onion Variety Trials, David Handley**, University of Maine Extension

There will also be an **onsite grower survey of favorite tomato varieties**.

To register or for more information call Dominic Marini at 508 378-2546. Registration is $10 for non-members of NEV&BGA. Walk-in registrations are accepted. Preregistration by Oct. 28 is needed to reserve lunch.

Mark your calendar for three more Winter meeting dates:

Saturday December 2. NEW LOCATION!! Bristol County Agricultural School, Dighton, Massachusetts

Friday January 5. Chicopee, Knights of Columbus Hall

Saturday February 3. Waltham Extension Center.

Look for program details in upcoming Vegetable Notes issues.

Fall T**reatments to Reduce Plant Diseases**

--Robert Wick, UMass Extension

Plant pathogens (fungi, bacteria, nematodes and viruses) tend to attack either the above-

ground part of the plant or the below-ground part of the plant. There are exceptions to this rule but it is useful to catagorize them this way because it helps us understand how to manage them more effectively. For many diseases, crop rotation and fungicide applications are very important tools for managing plant diseases. Agronomic practices are also important, and this article addresses practices that should be carried out after the crop is harvested.

Soil-borne pathogens

Pathogens that reside in the soil and do their damage to the roots and crown of the plant are referred to as soil-borne. Soil-borne pathogens have evolved the ability to survive more or less indefinitely in the soil. Most of these are fungi and nematodes. Some are widely distributed in soils but are minor pathogens and do not necessarily cause significant losses to vegetable crops. Examples of minor pathogens include **Pythium**, **Rhizoctonia** and many **nematodes**.

The soil-borne pathogens that tend to cause severe diseases of vegetable crops tend to be more locally distributed. **Sclerotinia**, **Phytophthora**, the **club root** organism, and **root-knot nematodes** are examples of these. Soil-borne pathogens are difficult to control because they have the ability to survive for many years in the soil. Fumigation is and option but is expensive and not completely effective. The best time to fumigate is the fall but attention must be paid to soil temperature and moisture. Plowing crops into the ground after the growing season does not help reduce soil-borne pathogens. In some cases plowing may make the problem worse. Soil-borne pathogens generally do not produce spores so they do not tend to move from field to field easily. However farming practices that move soil can move these pathogens to new locations. For example, if you have a field that you know is contaminated with Phytophthora capsici, work in that field last. Take your equipment back to the barn and spray the soil away.

Of the soil-borne pathogens, the **late blight** fungus, *Phytophthora infestans* is an exception in several ways. *Phytophthora infestans* can survive on undecomposed plant material on top of the ground but unless oospores form (not very likely in New England) the fungus cannot survive in the soil. Diseased plants should be plowed into the ground. It is especially important to bury cull piles of potatoes and tomatoes. **Phytophthora blight of cucurbits** is caused by *P. capsici*. This Phytophthora species can survive for very long periods of time in the soil. Plowing under infected plant debris will not help, and may increase the level of soil contamination. However, chisel plowing may improve drainage, and that can help reduce Phytophthora blight. There may be some benefit gained from removing the diseased fruit from the field. However, do not dispose it on agricultural land. Diseased fruit should be land-filled or placed where cucurbits and tomatoes will never be grown.

Sclerotinia blight is another disease that is difficult to manage. Sclerotinia produces sclerotia which are hard black structures that allow the fungus to survive for many years in the soil. The sclerotia look like large mouse droppings and are usually embedded in the fruit and stems of the plants. A single head of cabbage can have thousands of sclerotia. If

practical, remove diseased plants and fruit from the field. Plowing will preserve the sclerotia in the soil but will put them at a depth that will inhibit germination. Discing will tend to place the sclerotia in a more favorable place to germinate. Like many seeds, sclerotia will only germinate when they are within an inch of the soil surface. Improving drainage by chisel plowing would also be of value.

If you must plant crucifers into soil that has the **club root fungus**, apply lime to bring the pH up to 7.1 to 7.2. This is best done in the fall so the limestone has a chance to work. In small plantings where it may be practical, pull affected plants out of the ground and remove from the site. Improving drainage by chisel plowing would also be of value.

Sudangrass and rapeseed may reduce populations of some **nematodes** and reduce their damage. Soil incorporation of two month-old Sudangrass was found to be more effective against root-knot than three month old plants. For tobacco fields that have tobacco cyst nematode, plow the field as soon as possible after harvest. This can eliminate a whole generation of tobacco cyst nematode.

Air-borne pathogens

We refer to pathogens that produce abundant crops of spores that are easily blown about in the wind as air-borne. These are not completely mutually exclusive of soil-borne pathogens. For example Sclerotinia and Botrytis produce sclerotia that help them survive in the soil, and they produce air-borne spores. Generally, air-borne pathogens cause leaf spot, blight, fruit rot and stem canker. Most of these fungi and bacteria cannot survive in the soil but they can survive on undecomposed plant material on top of the ground. Plowing plant debris under the ground is an effective way of eliminating these pathogens. Crop rotation further insures less exposure to pathogens. Discing is not as effective because some of the diseased plant material remains on top of the soil. Examples of air-borne pathogens are **Alternaria**, **Cercospora**, **Septoria**, **Fulvia**, **Cladosporium**, **Colletotrichum**, **Didymella**, **rusts**, and **powdery mildews**. Powdery mildews cannot be controlled by plowing because these fungi will blow in from some distance.

Viruses survive the winter in insect vectors and perennial weeds. Other than weed control, fall practices would be of little value to reduce virus diseases. **Bacteria** also cause disease above-ground and most cannot survive in soil for more than a year. An exception would be soft-rot bacteria but they are minor pathogens. **Clavibacter**, the bacterium that causes tomato canker, can survive about 2 years in tomato debris. Stakes that are used for tomatoes may become contaminated with Clavibacter or several fungal pathogens. If steam is available, place them under a tarp and heat to about 180 F for 30 minutes to an hour. Stakes can also be put into a barrel and treated with a strong chlorine solution. Mix house hold bleach with water in a ratio of 1:10 or 1:20. The solution will loose its effectiveness quickly so make it up fresh for each batch of stakes.

FALL WEED MANAGEMENT ADVICE

--Rich Bonanno, UMass Extension

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, hedge 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 which 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 which might give better control than the one that 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 3000 to 5000 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 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 to achieve good control. Delaying the seeding of a cover crop may be a necessary evil in the fight against perennial weeds.

In conclusion remember to scout and map your fields, prevent weed seed production, and apply Roundup at the right time to control perennial weeds.

Late Season Vegetable Insect Management

--*Alan Eaton, UNH Cooperative Extension*

As the growing season winds down, many insect problems wind down too. Cooler temperatures mean that life cycles are slowed down. For some insects (many thrips for example) the first frost means a great drop in numbers. For others with built-in antifreeze, they can continue during warmer periods in the fall. European corn borers, adults of rootworms and various armyworms and cutworms are in the second group.

There are a few things that you can do in late summer and fall that may help reduce insect problems for next year. One regards Colorado potato beetle (CPB) No matter how high the numbers, it really doesn't make sense to try to spray CPB's late in the season. They can do very little damage to crops at this time of year, and applying chemicals now may just hasten the day when they become resistant to whatever you pick. Just remember that many of them will overwinter in the soil near the edges of the field, so moving potatoes elsewhere next year will help.

Destruction of crop residues may greatly assist in reducing next year's population of some pests. European corn borer is one example. The larvae survive in the dead stalks over the winter. If you chop up the crop residue, many of the larvae are killed, and there are lower numbers to start off next season. If you need to leave a standing crop over the winter, perhaps you can chop it up well in the early spring. If you do decide to chop in fall, the earlier you can do it, the greater the chance of establishing a good cover crop to reduce winter erosion.

Heavy crop residues are just what squash bugs need to overwinter in good numbers. If you leave plenty of cover for them, they will overwinter nicely in the field. Just after Thanksgiving last year, I visited a pumpkin field (no, I won't tell you whose!) that was alive with squash bugs under every dead leaf, vine, and piece of fruit. Nearby, where winter rye was established, there were none to be found. There are some pests that won't be affected by anything you do now. Fall armyworm and corn earworm are examples. They don't survive the winters anywhere that the soil freezes deep and hard. Neither will tomato hornworms. They are all examples of pests that migrate into New England each summer, and die in fall or winter.

One last thought ---- one of the most effective things you might do is write down what worked well (and what didn't) this season, to assist in planning for next year.

SARE FARMER/GROWER GRANTS

The farmer/grower grants of the Northeast Sustainable Research and Education (SARE) program support producers who want to try something new on their farm-- technique for adding value, a new crop, or a method of direct sales, for example. The goal the program is to help farmers shift to sustainable and innovation production and marketing practices that are profitable, environmentally sound, and beneficial to the community. Proposals

can address a broad range of agricultural production or marketing issues. You must be a commercial farmer to apply. Grant funds can be used to rent equipment, buy materials, pay for project-related services like soil tests or technical advisors, and to compensate you or your employees for the time spent seeing the project to completion. You must have some kind of technical advisor for the project (another farmer, extension or NRCS staff, supplier, consumer groups, or some other ag professional), but you, the farmer, should be the one actively in charge. This program has funded scores of research projects in the Northeast each year. The average grant in 2000 was $4,350.

For more information contact the Farmer/Grower Grant Program, Northeast SARE, Hills building, University of Vermont, Burlington, VT 05405-0082, call 802-656-0471, fax 802-656-4656, or email at nesare@zoo.uvm.edu. The Northeast SARE website is http://www.uvm.edu/~nesare.

Proposals must be postmarked by Monday, December 4, 2000.

Vegetable IPM Message, Ruth Hazzard, Editor. The Vegetable IPM Message is published weekly from May to September and includes contributions from the UMass Extension Vegetable Program faculty and staff, growers, and private IPM consultants. Authors of articles are noted; author is R. Hazzard if none is cited.

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