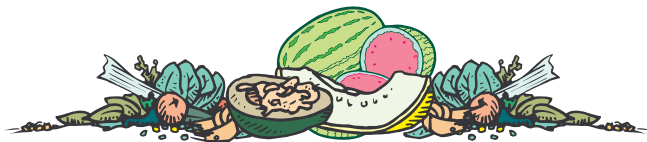


# VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the  
Purdue University Cooperative Extension Service

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**DAMPING-OFF UPDATE - (Dan Egel) -** Vegetable transplants with damping-off can be recognized from wilting symptoms (even though the soil mix appears wet) and a brown discoloration on the stem at the soil line. Damping-off is caused by the contamination of soil mix or transplant trays with one of two fungi. Seedlings infected with the fungus *Pythium* have lesions on the stem that appears wet and slimy. Seedlings with *Rhizoctonia* damping-off often have sunken lesions on the stem and appear fairly dry. The only sure way to avoid damping-off is to have good greenhouse sanitation. (The fungicide Ridomil is no longer labeled for use on vegetable transplants.) To prevent damping-off: 1) do not dump a bag of "clean" soil mix onto a dirty surface where it will likely become contaminated, 2) use new transplant trays or clean and disinfect the old ones. Keep your greenhouse clean to produce healthy transplants. See VCH Issue 356 for more greenhouse sanitation ideas.

**FUNGICIDE USE IN THE GREENHOUSE - (Dan Egel) -** Fungicides are generally not necessary in the greenhouse. The very nature of greenhouses should help to prevent the introduction of bacteria and fungi that can cause disease. However, vegetable growers often ask about fungicides to use in the greenhouse. Plus, there are times for which fungicide use is appropriate.

Unless the fungicide label specifically mentions greenhouse use, it is not labeled for greenhouse use. Few fungicides are labeled for use in the greenhouse. Some formulations of Dithane (e.g., Dithane F-45) are labeled for greenhouse use on vegetables. Some copper formulations (e.g., Kocide 101) are labeled for greenhouse use on tomatoes. A fumigant, Exotherm Termil, is labeled for use on tomatoes for certain diseases. Check with your chemical supplier and be sure to read the label.

One of the most common transplant disorders is damping-off. However, there are no fungicides labeled for greenhouse use on vegetables that will combat this disease. Note that the foliar fungicides listed above will not affect fungi in the soil or have any affect on fungi already within the plant.

Managing transplant disorders relies on prevention since few fungicides are labeled for use in the greenhouse. This is particularly true with damping off. Prevention issues have been addressed elsewhere (VCH Issue 356, March 18). A few are listed in this issue (Damping-Off Update).

**MICRONUTRIENT DEFICIENCIES IN TRANSPLANTS - (Liz Maynard) -** Over the past month some questions have come in regarding yellowing leaves on transplants. In some cases the yellowing could be a result of micronutrient deficiencies. This is likely if: 1) Young leaves emerge yellow or pale green and stay that way; 2) Leaves lower on the plant (older leaves) have normal color; 3) pH of the growing media is high (above 6.8 if a soilless media); 4) Media has been wet and cool. The problem may occur in spots in the greenhouse in areas where flats stay wet and temperatures are a little cooler; or in flats which have a little less growing media. To confirm the diagnosis tissue analysis of the symptomatic leaves would be required.

Micronutrient deficiencies are often caused by unavailability of the nutrient to the plant due to high pH. When media pH is high, iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), and boron (B) become less available to the plant. A deficiency of iron is often seen first, showing up as pale green or yellow young leaves. In soilless growing media the optimum pH for most plants is 5.8 to 6.2. This is lower than in field soil, where a pH of 6.8 would not be too high.

If media pH is high, one solution is to lower it. High pH is often a result of alkaline irrigation water. The alkalinity can be partially neutralized by using an acidifying fertilizer. The acidifying potential of fertilizers is reported on the label as "Potential Acidity" in lb. CaCO<sub>3</sub>

equivalent per ton of fertilizer. A fertilizer with 450 lb. CaCO<sub>3</sub> equivalent is moderately acidifying. If more neutralizing is required, concentrated acid can be injected into irrigation water. Neutralizing alkalinity in the irrigation water will lead to a gradual decline in the growing media pH, and should eliminate symptoms of iron deficiency. The Greenhouse Media Analysis Lab at Purdue University measures greenhouse media pH and water alkalinity, and based on results of your water test, will make recommendations for acid addition to neutralize alkalinity. Samples (at least a cup of soil or 8 oz. water in a clean plastic bottle) may be sent to: Media Analysis Lab, 1165 HORT, Purdue University, West Lafayette 47907.

Another solution is to apply deficient micronutrient(s) as a foliar spray. Plants will respond quickly. It is important not to over-apply micronutrients because toxicity can easily develop. Symptoms described above are likely to be iron deficiency. If a tissue test is not available to identify other deficiencies, iron should be applied. Iron sulfate (20% iron) can be applied at 0.4 oz. per 10 gallons spray solution. It is best to apply early in the morning. As with any new application, test on a small batch of plants before treating the entire crop.

In some cases pH of the media may be fine and the deficiency is caused by a low level of micronutrients. Although most growing media and greenhouse fertilizers contain micronutrients, the levels differ significantly among products. If you have recently changed growing media or fertilizers and are seeing a problem for the first time, find out whether the micronutrient content of mix or fertilizer differs from the previous product. If it is lower, you may need to switch to another product, or consider applying additional micronutrients on a regular basis.

**ORGANIC FARM TOURS - (Liz Maynard) -** Sustainable Earth, a non-profit organization in W. Lafayette, has organized tours of organic farms in Indiana. Several market gardens, a vegetable farm, and a mixed vegetable/grain/fruit farm are featured. These field days provide a good opportunity to see how organic operations are managed. For more information and directions to farms, contact Steve Bonney at 765-463-9366, sbonney@iquest.com.



**Elkhart Co., April 24.**

10 am -noon. Sunray Gardens 16595 SR 120. Organic market garden and space/energy efficient greenhouse  
2 - 4 pm Great Circle Farm 201 N. 22nd St., Goshen. Certified organic farm which markets through a Community Supported Agriculture (CSA) project.

**Parke Co., May 27,** 6 - 8 pm. Quiet Springs Farm. Certified organic vegetable farm marketing through a CSA, farmers markets, and wholesale accounts.

**Vigo Co., June 19,** 1:30 - 3:30 pm. White Violet Center. Organic fruit and vegetable production supporting a 40-family CSA.

**Bartholomew Co., June 26,** 10 - 1 pm. Wayne Hoeltke Farm, 3401 S. 250 E, Columbus. Certified organic farm producing corn, soybeans, spelt, fruits, vegetables, nuts.



**SEED AND ROOT MAGGOTS - (Rick Foster and Jerry Brust)**

- Three species of seed and root maggots attack vegetables in Indiana. The seedcorn maggot feeds on seeds and seedlings of sweet corn, cucurbits, lima and snap beans, peas, and other crops. This pest was addressed in VCH Issue 357. Cabbage maggots can cause serious damage to transplants of cabbage, broccoli, cauliflower, and Brussels sprouts and make the fleshy roots of radishes, turnips, and rutabagas unmarketable. Onion maggots are pests of seedling onions, developing bulbs and onions intended for storage.

Cabbage maggot injury is favored by cool, wet conditions. The flies, slightly smaller than a housefly, emerge in late April or early May and lay white eggs at the base of newly set plants. Larvae from this first generation tunnel in the roots of small plants, causing the plants to appear sickly, off color or stunted, and may cause them to die. Early cabbage and turnips are particularly vulnerable to damage. Control of first generation maggots can be achieved using soil insecticides such as Lorsban, diazinon, Guthion, and Dyfonate at planting or transplanting. For short season crops such as radishes and turnips, long-residual insecticides cannot be used. Cabbage maggots usually do not affect later planted crucifers.

Onion maggot flies emerge throughout May and lay eggs at the base of onion plants. The maggots attack the underground portions of the onion plants and cause plants to wilt and die. Seeded onions are more susceptible than transplanted onions. Do not overseed to compensate for losses to onion maggots. The flies do not space their eggs evenly, so you may end up with smaller bulbs because the plant spacing is too close. The second-generation flies emerge during July and the third generation emerges during late August and early September. Each generation will damage onions.

Removing cull onions after harvest and planting as far as possible from fields planted to onion the previous year can reduce damage. Soil drenches of Lorsban or Dyfonate at planting will effectively control first generation maggots and provide some control of the second

generation. As the onions begin to mature, they become physically resistant to attack from onion maggots, unless they have been injured in some way. Be careful during field operations not to damage the growing plants in any way. A nick in an onion bulb allows the maggots to enter and begin feeding. Also, the flies are attracted to damaged onions to lay eggs. Reducing the amount of physical damage to the onions at harvest as much as possible will also reduce the amount of injury from the third generation. Do not apply foliar sprays to kill flies before they lay eggs.



**BACTERIAL SPOT ON TOMATO / PEPPER SEEDLINGS - (Rick Latin)**

- The general health and vigor of our pepper and tomato transplant crops appear to be very good. Moderate amounts of sunshine certainly contributed to healthy seedlings. This is a good time to be reminded that there are a few bacterial diseases on tomato and pepper seedlings that will threaten our crops in the field. As you may recall, we've had problems with bacterial spot, speck, and canker in the past 5 -10 years. However, most of the serious problems resulted from outbreaks of bacterial spot that apparently began with contaminated seedlings. Often, serious field problems can be avoided if the disease is identified in the greenhouse, before seedlings are transplanted.

You should be concerned if you observe a cluster or clusters of small (1/16" diameter), round, dark brown-black spots on true leaves. The cluster pattern of distribution is an important symptom of an infectious problem. The spots will appear on otherwise healthy leaflets, and are often surrounded by a yellow halo. Unlike noninfectious spots on seedlings, bacterial spot symptoms will not occur only between the veins and also will occur on petioles. Also, lesions caused by the bacterial spot pathogen will not have a depressed, shiny appearance when viewed from the underside of the leaf.

I advise discarding plants with symptoms, and at least all plants (symptomatic or not) in plastic trays bordering those with spots. It would be wise to isolate other plants from the same seed lot and observe them closely for additional outbreaks. Make sure you get a confirmed identification of the problem. Treatment with copper hydroxide may reduce spread in the field.



**Special Events**

**Indiana Gourd Society - Spring Meeting** - May 1 - 10 am - 3 pm - Morgantown Volunteer Fire Dept. - Morgantown, IN - Open to Public - Free admission.

**Holland Tulip Festival** - May 6-15 - Holland, MI - Parades, klompen dancers, shows and millions of tulips. For more info, call 1-800-822-2770.

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