

# VEGETABLE CROPS HOTLINE

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

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**BACTERIAL FRUIT BLOTCH** - (Dan Egel) - This disease has been observed in southwestern Indiana on personal-sized watermelon. This disease has been reported in Indiana on both muskmelon and watermelon in past years. The primary symptom is a dark green irregular blotch that occurs on the top of the watermelon fruit (Figure 1). Older lesions will have a necrotic area in the center of the lesion. Sometimes the rind will crack and white ooze will come out of the fruit. Although bacterial fruit blotch will seldom invade the fruit farther than the rind, the fruit may start to rot from other organisms. Damage results in rotted or defaced fruit.



**Figure 1:** Bacterial fruit blotch lesions on watermelon appear dark and oily. (Photo by Dan Egel)

The bacterium that causes bacterial fruit blotch may be seed borne. The causal bacterium may survive in the greenhouse on benches, flooring or transplant trays. These articles should be cleaned and disinfested seasonally.

Bacterial fruit blotch will spread rapidly in warm moist conditions. Rains or overhead irrigation will quickly spread this disease.

No resistance to this disease has been reported in commercial varieties.

Lesions of bacterial fruit blotch may be observed on the leaves, however leaf lesions do not cause economic damage (Figure 2). Growers who observe leaf lesions may want to apply a copper product to try to slow the spread of the disease. Fruit become infected about two weeks old after pollination. Thus, if there is a significant amount of young fruit in a field, it may be worth applying copper. Although fruit blotch has not been known to over-winter in Indiana it is always a good idea to practice fall tillage and rotate from cucurbit production for 2 to 3 years.



**Figure 2:** Lesions of bacterial fruit blotch on leaves do not cause economic loss and can be easily overlooked. (Photo by Dan Egel)

Current research suggests that fruit lesions will not expand after harvest unless secondary infection has taken place. However, it is a good idea to cull those fruit with lesions. In addition, equipment that fruit comes into contact with should be regularly disinfested. If possible, chlorinate any water used in post harvest operations. Avoid wounding fruit during harvest operations.



**PREVENTING DAMAGE FROM AN EARLY FROST** - *Stephen Reiners, Associate Professor in Horticultural Sciences, Cornell University - (slightly modified for Indiana by Liz Maynard).*

An early frost can have disastrous results. There are two types of frost, advective or radiation. Advective frosts occur when a cold front sweeps into an area. Winds are typically gusty, clouds may occur and the thickness of the cold air layer may reach more than a mile high. One seldom sees the first frost of the season under these conditions. The first frost is typically a radiation frost. These occur under a clear sky and calm winds. Typically an inversion layer develops. The term inversion means that atmospheric conditions are inverse or opposite to normal daytime conditions when air temperature decreases with height. In an inversion, cold air collects near the ground while warmer air lies above this trapped cold layer.

Typically, we may have 3 - 5 weeks of good weather following a frost but the crops have already been damaged or killed. Rather than just talking about the weather, there are several things that growers can do to minimize the effects of the first radiation frost.

These include:

**Watch the Calendar and the Forecast** - Know when the average first frost will be in your area. This is the date by which a frost will occur 50% of the time. Figure 1 shows the average date of the first 32°F in the Fall for locations across Indiana. Keep a careful eye on the weather forecast too. Air with a low humidity will not hold as much heat as more humid air and will cool quickly at night.

**Beware the Full Moon?** - People have always associated the full moon with an increased chance of frost. Some people believe the moon reflects heat from the sun to the earth's upper atmosphere. This heat effect, though small, is at a maximum near the time of full moon. The heat evaporates a light haze or thin cloud formations. Clearing the sky in that way, heat radiates from the surface of the earth and frost is more likely. However, in reviewing weather records of four locations in the Northeast for the last 100 years, a full moon did not increase the chance of a frost. It was just as likely to occur when no moon was present as when the moon was full!

**Harvest Early** - A crop like tomatoes is very sensitive to frost. If you have no way to protect plants, you may want to harvest all fruit that are in the mature green stage of ripening. Fruit harvested at this stage will still ripen, albeit not with the same flavor as fruit harvested with some color. Since you will need to store the fruit, wash in a chlorine bath. Dry and place in boxes in a warm, dark location with some air movement. Tomatoes do not need light to ripen, in fact light will slow ripening. Store where the temperature does not go below 55°F. Lower temperatures will cause the fruit to be poorly flavored.

**Use the Soil** - Your soil serves as a heat reservoir. Just as it may take a while in the spring for a soil to warm, it also takes time in the fall for it to cool. A

loose, cultivated field insulates the soil and prevents heat movement from the soil to the air (and around the plants). This results in frost. A more compacted soil, typical of a field near the end of the season, will lose heat more quickly to the air, protecting the plants from frost. The bottom line - do not cultivate when a frost threatens.

**Irrigate, Before the Frost** - A moist soil can hold 4 times more heat than a dry soil. It will also conduct heat to the soil surface faster than a dry soil, aiding in frost prevention. In a study performed years ago, the air temperature above a wet soil was 5°F higher than that above a dry soil and the difference was maintained until 6 am the next morning.

**Row Covers** - The use of a floating row cover can give you 2°F to 5°F protection. The covers can be laid right over the crop and no support other than the plants is needed. They come in varying lengths and widths, depending on your need. The cost can be high, as the material will cost \$500 - \$700 per acre. You will also need additional labor to help you get the covers on the crop. The best time to apply would be in the late afternoon after the wind has died down. Remove the next morning. If you are careful and avoid ripping the covers you should be able to use the covers over several nights and even next year.

**Irrigate, During the Potential Frost** - Strawberry growers often irrigate their crop on a potentially frosty spring night to protect the crop. Typically, sprinklers are mounted above the crop canopy. As the water freezes, heat is released, 80 calories for each gram of water that freezes. As long as ice is being formed, heat will be released. Often the crop is coated with ice by morning. In fact, this is a major disadvantage, as the weight of the ice will cause branches to break and plants to lodge. Also, if the irrigation rate is not high enough, you may actually cause more frost damage than if you did not irrigate. That's because if the one-gram of water evaporates rather than freezes, it takes 600 calories of heat with it, cooling the environment around the plant. Compared to the 80 calories released on freezing, 7.5 times more water must be applied to provide a net heating effect. Since wind will speed evaporation, wind speeds greater than 5 MPH will make irrigation for frost protection ineffective. And once started, you cannot stop irrigating until the next morning when the sun is on the crop and the ice loosens.

**Chemical Sprays** - Buyer beware! Many materials will claim to provide frost protection using a variety of techniques. No commercially available product seems to be able to stand up to a replicated, scientific test. There will be some people claiming to have miracle products this fall but use them very carefully. Do not put your trust in these materials.

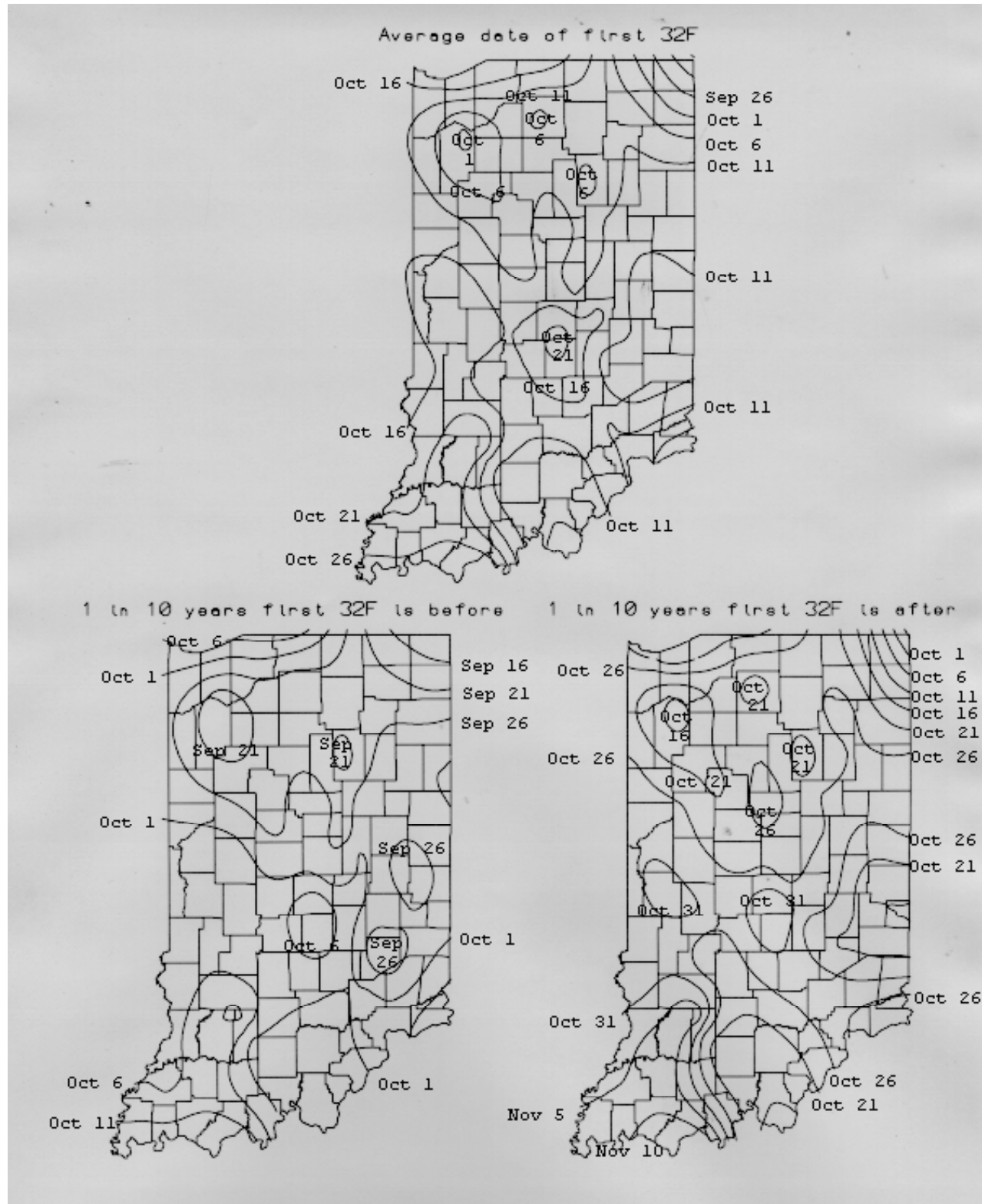
**Heaters** - This has traditionally been used in some areas but the high cost of fuel makes it somewhat prohibitive. They are also more effective in orchards with tree fruit than for vegetables. They can burn propane, natural gas or oil. They are most useful when there is an



inversion. The heaters break down the inversion and mix the warmer air with the cooler. Most of the protection from heaters is due to this with only a slight effect from radiated heat from the heaters.

**Wind machines** - These are more often seen in orchards, similar to heaters but they could provide protection for vegetables. Like heaters, they work best when there is an inversion and warm air from above is mixed with the cold air at the surface. Typically, the fans have a diameter of about 16 feet and are mounted on a 30 foot steel tower. The engine to power the fan is usually 85 to 100 hp. The cost of installation is similar to heaters but they use only about 10% of the energy that heaters do. A single wind machine can protect 5 to 10 relatively flat acres.

Be prepared for an early frost. Use more costly methods of frost protection on your most profitable crops. By protecting your crop from that first frost, you may add weeks to your growing season.



**FARM SUSTAINABILITY TOURS** - (*Jerry Nelson*) - The remainder of The Indiana Farm Sustainability tours will be held from 10 a.m. to 3 p.m. the third Thursday of each month.

Future tour dates are listed below:

- \* October 11; "Specialty-Marketing Partnerships"; Birky Family Farms, Valparaiso Farmers' Market and Crème de la Crop CSA, all of Valparaiso.
- \* November 15; "Food Trends, a Look at Consumer Food Expectations and How We Can Meet Them"; Purdue Food Science facilities of West Lafayette.

For more information and to register, visit <[www.conf.purdue.edu/farmtours/](http://www.conf.purdue.edu/farmtours/)>. Each tour is \$15 per person, which includes lunch, refreshments and materials. Individuals have the option to register for all of the tours or to select one or two at a time. Registration is due seven days prior to a tour.

The Purdue Small Farms Team, the Purdue New Ventures Team, Indiana State Department of Agriculture (ISDA) and the North Central Region Sustainable Agriculture Research and Education (NCRSARE) sponsor the 2007 Indiana Farm Sustainability Tours.

For questions and more information, please contact Jerry Nelson, New Ventures Extension educator and tour coordinator, at (812) 886-9582 or [jnelson@purdue.edu](mailto:jnelson@purdue.edu) or Roy Ballard at (317) 462-1113 or [rballard@purdue.edu](mailto:rballard@purdue.edu).



**NCR SARE FARMER/RANCHER GRANT PROGRAM** - (*Rick Foster*) - The North Central Region Sustainable Agriculture Research and Education Program has announced the call for proposals for their Farmer/Rancher Grant Program. Details are available at <<http://ncr.sare.org/prod.htm>>, (deadline is 4:30pm, December 03, 2007). This program is available for producers to receive up to \$6000 for an individual or up to \$18,000 for groups of three or more

independent producers for research, demonstration, and educational programs on their farms. Search the website to find examples of successful topics that have been funded in the past. To assist growers in preparing their grant proposals, Purdue is joining together with Ohio State University and the University of Illinois to put on an IP Video workshop that will focus on successful grant writing, the details of the SARE Farmer/Rancher grant program, and tips from farmers who have successfully competed for these grants in the past. If you are interested in participating in this workshop, please contact your local county Extension educator and ask him/her to sign up for the broadcast. Each county Extension office has the capacity for hosting a site for this workshop. There is no charge to attend the workshop. In addition to my other duties, I serve as the SARE coordinator for Indiana, so please contact me if you have additional questions, (765) 494-9572; [rfoster@purdue.edu](mailto:rfoster@purdue.edu).



**MARK YOUR CALENDAR FOR THESE UPCOMING EVENTS** - (*Announcements*) - Point your web browser to <[www.hort.purdue.edu/fruitveg/events/events.shtml](http://www.hort.purdue.edu/fruitveg/events/events.shtml)> for details as the event nears.

- November 27, 2007. **Fulton County Vegetable Program**, Rochester, IN. (574) 223-3397
- November 29, 2007. **Vegetable Variety Showcase**, Southwest Purdue Agriculture Center, Vincennes, IN and other locations via IP video. (812) 886-0198 or (219) 785-5673
- January 3, 2008. **Illiana Vegetable Growers School**, Schererville, IN. (219) 785-5673
- January 28-30, 2008. **Indiana Horticultural Congress and Trade Show**, Indianapolis, IN. (765) 494-1306.

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