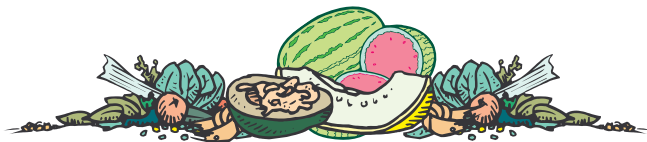


VEGETABLE CROPS HOTLINE

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

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PLASTIC MULCHES - (*Liz Maynard and Jerry Brust*) - The benefits of black plastic mulch are known to most vegetable growers in Indiana: higher soil temperatures, weed control, water conservation, increased early yields, and sometimes increased total yields of warm season crops such as muskmelons, watermelons, tomatoes, and peppers. Fewer growers use clear plastic mulch, which raises soil temperature more than black plastic mulch, resulting in even earlier yields for the warm season crops. Anyone who has used clear plastic mulch without an effective herbicide also knows that weeds thrive under clear mulch and an effective herbicide under the mulch is necessary.

Although black and clear mulches are the most commonly used, they are not the only types available. Wavelength-selective mulches allow only certain types of radiation to pass through the plastic. The IRT, or infrared-transmitting mulches allow infrared (IR) radiation to pass through, but do not allow the light needed for plant growth to pass through. The IRT mulches warm the soil more than black plastic, but less than clear plastic. Weed control is generally good, but not quite as good as with black plastic - without an herbicide, there will be some weed growth under the IRT plastic. Early yields with IRT tend to be greater than on black plastic, but less than on clear plastic. For example, in a study with muskmelons conducted in Quebec, Canada, green IRT mulch increased average soil temperature during transplant establishment 1 to 2 degrees, to 59 or 60, compared to black mulch. In the same study, clear mulch increased soil temperature 7 to 8 degrees over black mulch. The muskmelons grown on IRT mulch flowered at the same time as or 7 days earlier than on black mulch, and first harvest was 5 to 7 days earlier. On clear mulch, melons flowered 4 to 9 days earlier and first harvest was 1 to 1.5 weeks earlier than on black plastic.

Recently, colored mulches have sparked interest among vegetable growers and researchers. The color of mulch determines not only what radiation will pass through the mulch, but also what wavelengths of radiation are reflected away from

the mulch. The reflected radiation can influence both plants and insects.

Reported effects of colored mulch on crops include increased early yield of tomatoes on red mulch, improved pepper yield on yellow or silver mulch, and higher cucurbit yields with red or blue mulch. These

effects have been inconsistent in published field trials. For example, in some 3-year research studies, colored mulch will do well in one year, but no differently than black in the other two. This one year difference is often highly significant, and when averaged over the three years, the colored mulch looks like it yielded best, although in fact it did well for only one year. Growers in Southern Indiana trying several different colored mulches have seen no difference in earliness, overall yield, or quality of their vegetables.

Some inconsistencies in crop response to colored mulch may be due to the use of different types of mulch: a colored mulch from one manufacturer may not have the same light transmitting or reflecting properties as the same color mulch from another manufacturer. Industry is meeting this challenge by marketing mulches with particular specifications. For example, the red Selective Reflecting Mulch (SRM-Red) produced by Sonoco reflects a defined spectrum of light found to enhance above-ground growth of tomato plants. As researchers and growers gain more experience with specific colored mulches, we will be better able to judge whether they are worth using to promote increased or earlier yields.

Mulch color can also influence insect populations. The most effective example of this is the response of aphids to silver or shiny reflective mulch. The reflected light reduces the number of aphids that land on the crop. When these mulches are used in a squash or pumpkin crop, the reduction in aphids leads to a reduction of virus diseases transmitted by the aphids. Studies in SW Indiana have shown reflective mulches to be an effective way to reduce virus in pumpkins. Other colors of mulch have not been shown to consistently reduce insect populations and damage.

If you use reflective mulches to reduce virus problems, use the most reflective you can find. The more reflective, the better the aphid control. Soil temperatures will be cooler under highly reflective mulches, but the extra light reflected to the crop will more than

compensate for the cooler soil if pumpkins are planted in June. In SW Indiana pumpkin vines in reflective mulch were 22% longer than vines in black plastic mulch by 3 weeks after transplanting.

There are good reasons for experimenting with new mulch types. If you choose to try a new mulch this year, consider these suggestions. Use it in a small area. For comparison, follow your normal practices in the same area, alongside the new ones. If you are in doubt about weed control under the plastic (many colored mulches allow enough light through for weed growth), use a labeled herbicide under part or all of the new mulch.



FOOD SAFETY AND PRODUCE - (*Richard Linton and Liz Maynard*) - It seems as though whenever we pick up the local newspaper or watch the news on television, there is some type of information on food safety. Ever since the outbreak involving *E. coli* O15:H7 and undercooked hamburger patties in 1993, there has been an enhanced attention for food safety issues. In turn, consumers are more aware and, in some cases, more concerned about the food that is processed and consumed. In the United States, we can assuredly claim that we produce the safest food in all the world. This is true today more than ever before. However, there are still food safety issues and problems that researchers, regulatory agencies, and the food industry need to address to assure the safety of our food supply.

There are five main areas that are considered important sources of hazards in fresh produce. They are water (on farm and processing), manure, food handlers, the harvesting and processing facility, and during transportation.

On the farm, the main hazards are bacteria (*Escherichia coli*, *Salmonella*, *Vibrio cholera*, and *Shigella*), parasites (*Cryptosporidium*, *Cyclospora*, *Toxoplasma*) and viruses (Hepatitis A, Norwalk virus). All of these hazards can commonly be associated with fresh produce. Contamination usually originates from animal waste, human waste, or contact with a contaminated source. Currently, the best practices to use are to identify the source and distribution of the water used on the farm. Surface water is usually more contaminated when compared to ground water. Be sure to identify if there are any sources of animal waste or human waste nearby. If a well is used, be sure that it is in good working order and maintained. Also, test for likely contaminants on a periodic basis.



While manure is stored or treated, it is important to prevent contamination of fields or water from leaching, run-off, or wind-blown particles. Keep the manure storage/treatment area far from vegetable fields and packing houses. Consider covering manure to reduce leaching, wind erosion, and recontamination of treated manure.

Manure application practices influence the risk of microbial contamination. The longer the time between application and harvest, the lower the risk. Raw (untreated) manure, or inadequately treated manure should not be applied to a vegetable crop during the growing season, unless the crop has already been harvested. Apply raw manure after harvest of a vegetable crop, or apply the previous fall to a cover crop, or apply the previous season to an agronomic crop. Whenever it is applied, incorporation of manure is recommended.

Root crops and crops which grow low to the ground such as lettuce, spinach, greens, and unstaked tomatoes are more likely to become contaminated from manure applied to the soil than are crops such as sweet corn, staked tomatoes, or peppers. Try not to plant root or low-growing crops in fields where raw manure was applied that season.

Feces of animals and humans also may contain pathogens. High populations of wild animals may lead to contamination of vegetables in the field. To the extent possible, minimize presence of wild and domestic animals in vegetable fields.

Contamination from humans may come from improper use of municipal biosolids (sewage sludge), improperly maintained toilet facilities, or poor worker hygiene. Common sense and training can reduce contamination from these two sources. The use of municipal biosolids in vegetable fields is governed by Part 503 of Title 40 of the Code of Federal Regulations.

If a food handler is infected with or carries disease agents they shall not be permitted to work with foods. Also, food handlers which show any other signs or symptoms of disease (cold, flu, gastroenteritis) should not be handling food during any step of production, harvesting, preparation, or handling.

In the packing area, it will be important to ensure a clean and sanitary condition of the facility and the package. The facility should have an effective cleaning and sanitation program and integrated pest management program. During packing, any visible dirt should be removed, damaged containers should be repaired or discarded, packages should be protected from any form of contamination and the pallets used to transport packages should be kept clean and sanitary.



SUBDUE 2E - (*Dan Egel*) - Damping-off of vegetable transplants shows up as wilted and collapsed seedlings. Close inspection reveals that the stem has rotted at the soil line. The stem directly beneath the soil line is sometimes an off color brown instead of white or light green. Several different fungi can cause damping-off, however, *Pythium* species are often responsible for the

damage. In the past, Subdue 2E has been labeled for use in the greenhouse to combat *Pythium* damping-off. This greenhouse use is no longer supported and any such use will now be considered off label.

Vegetable growers should not despair. Good sanitation can solve damping-off problems. *Pythium* and other fungi are introduced to soilless mixes via contamination. Soilless mixes come pasteurized, that is heated to kill fungi that cause diseases. Opening a bag on a dirty greenhouse floor can, however, introduce problem fungi. Using dirty tools on the mix can also cause problems. Remember, your soil mix is only as clean as the dirtiest surface with which it has come into contact.



BAD HEADLINE NEWS? - (*Dan Egel*) - The time is early one July morning, just about harvest time. As you turn on the TV to hear the news and a bit of weather, you wonder about produce prices this year. Imagine your horror when the top news story is how farmer X from anywhere USA has applied pesticide Z to (your vegetable of choice) illegally. You close your eyes and see the price of (your vegetable of choice) going through the floor.

What are the costs of illegal pesticide applications? Most growers do their very best to apply pesticides safely and legally. Still, it is awfully tempting to cut corners sometimes. Some laws appear to be mere technicalities. Perhaps the law farmer X broke was 'a mere technicality'. The details, however, will be lost on the public who will steer clear of the vegetable in question and, perhaps, the entire produce section.

There are many good reasons for reading and following the label. First in my mind is the law which is designed with safety in mind. Another good reason is the scenario discussed above. Next year, try to imagine that today's pesticide application is tomorrow's headline. Remember, no news is good news.



UPCOMING MEETINGS

February 16 – Specialty and Veg Crop Meeting, Dinky Center, CR 950 East & 550 North, Daviess County, IN, 6:30 pm – 8:35 pm. Contact Bob Yoder (812) 254-8668 or Dan Egel (812) 886-1098.

February 17 – SW Indiana Melon & Vegetable Growers Association Meeting, Vincennes, IN, 8:30 am - 3:00 pm. Contact Jerry Nelson (812) 882-3509.

April 10 & 11 – 1999 Indiana Gourd Show, Johanning Civic Center (Hwy US 31), Kokomo, IN, 10 am – 4 pm.



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