



This bulletin from the Cooperative Extension Plant Health Clinic (Plant Disease Clinic) is an electronic update about diseases and other problems observed in our lab each month. Input from everybody interested in plants is welcome and appreciated.

Pepper and Tomato

Spring is just around the corner. Growers should already have submitted soil samples to the soil lab to check the pH and the nutritional profile of their gardens. The service is free in Arkansas. Eager home gardeners are ordering seed, and many are already at their local nurseries looking for vegetable starts. Some of the problems we see every year can be avoided by planting at the proper time. Tomato and pepper crops require warm soil temperatures to grow properly, flower and set fruit. Both tomatoes and peppers prefer soil that has a pH of 5.5 - 6.8, is fertile, deep, and well drained. They need at least 6 hours of direct sun a day. Growers can get off on the wrong foot in the spring by planting when soil and air temperatures are too cold. Low temperatures can of course kill your plants. However, temperatures may not be low enough to kill the plant, but low enough to injure the bloom, causing deformed fruit, commonly known as catfaced fruit. Another common problem is the practice of planting solanaceous crops such as tomato, pepper, eggplant, and potato in the same spot in the garden each year. This can lead to a build-up of disease-causing organisms. Crop rotation can be practiced in even a small garden plot. Divide the garden into three sections:

1. Nightshade plants: potato, tomato, eggplant, peppers.
2. Mustard group: cabbage, cauliflower, broccoli, Brussels sprouts, kale, collards, kohlrabi, sprouting broccoli, pak choi, Chinese cabbage, turnip, mustard greens, rutabaga, radish, horseradish.
3. Everything else: corn, beans, pumpkin, cucumbers, squash, melons, etc.

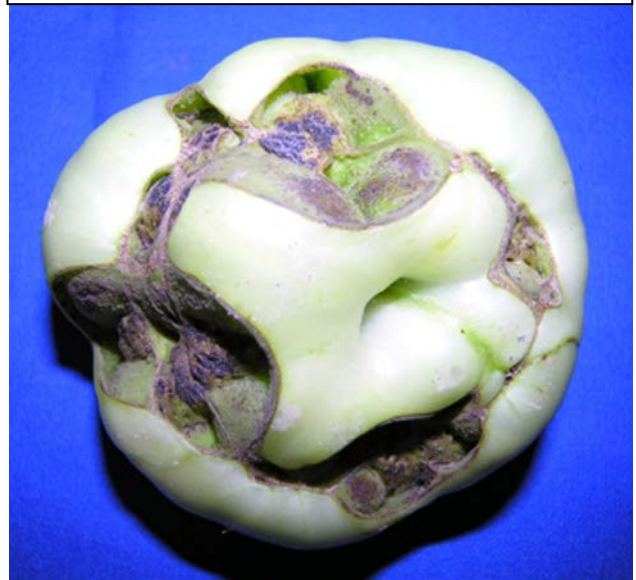
Practice at least a three-year rotation between groups.

Pepper catfacing-abiotic cold injury



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Tomato catfacing-abiotic cold injury



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Sherrie Smith

Lettuce-Bacterial crown rot

Soft rot of lettuce, caused by the bacterium *Erwinia carotovora* subsp. *carotovora*, can cause heavy losses both in the field and at market. Soft rot in the field begins as rapid wilting of the outer wrapper leaves. Vascular tissues develop a pinkish to brown discoloration. The pith of the stem becomes water-soaked, macerated, greenish, and gelatin-like. Eventually, the entire head becomes slimy and collapses. The pathogen usually gains access to the plant through wounds or stomates. Warm conditions and very moist to saturated soils are conducive to a rapid increase of Soft rot disease. These same conditions are also favorable for pythium root and crown rots, which are sometimes found along with Soft rot in the same field. Cultural controls are extremely important in controlling Soft rot. These include crop rotation, good soil drainage, avoidance of overhead irrigation, and proper fertilization to produce vigorous crops. Copper fungicides applied early before extensive disease development has been found helpful. Control of pythium, consists of providing good drainage and the use of fungicides such as Ridomil SL.

Lettuce Soft rot-*Erwinia carotovora* subsp. *carotovora*



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Lettuce Soft rot-*Erwinia carotovora* subsp. *carotovora*



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Lettuce-Downy mildew

Lettuce Downy mildew, caused by the fungus *Bremia lactucae*, is found wherever lettuce is grown when conditions favor the disease. At least 5 hours of leaf wetness coupled with cool temperatures is necessary for infection. Conidia (spores) of the fungus can be blown for hundreds of miles to infect susceptible crops. Inoculum may also reside on overwintering volunteer plants. Once initial infection occurs, secondary rounds of sporulation and infection occurs as long as cool, moist conditions persist. Symptoms begin as small yellow spots on the upper leaf surface. A white-cottony growth appears on the corresponding tissue on the underside of the leaf. Lesions eventually turn brown as the leaf tissue dies. Although Downy mildew attacks older leaves first, it spreads to newer tissue, and can become a systemic infection, causing browning and streaking in the vascular system of the plant. The best defense against Downy mildew is the use of resistant cultivars.



Lettuce Downy Mildew-*Bremia lactucae*



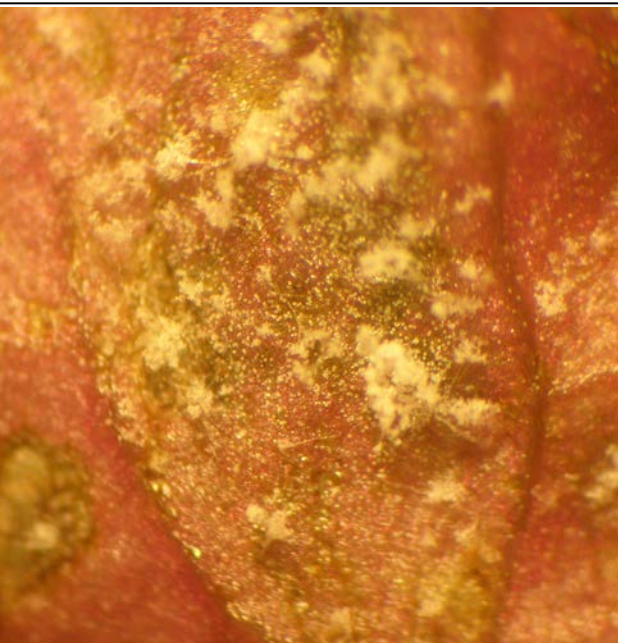
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**Lettuce Downy Mildew
conidiophores and conidia-*Bremia lactucae***



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**Lettuce Downy Mildew
sporulation-*Bremia lactucae***



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Strawberry

Phytoplasma are specialized bacteria that invade plant phloem tissue and cause disease. Sap-sucking insects transmit phytoplasma from plant to plant. Four families of planthoppers and two genera of psyllids, as well as leafhoppers are known to be vectors of phytoplasmas. The bacteria enter the insect's body through the stylet when feeding on an infected plant. From there, they move through the intestine, and eventually colonize the salivary glands. When the insect feeds on an uninfected plant, the bacterium is transmitted to the plant. Phytoplasmas may also be transmitted by parasitic plants such as field dodder. Symptoms include leaf yellowing, smaller than normal leaves, stunting, witches' broom, dieback, poor root growth, and sometimes plant death. A very common symptom is phyllody, the production of leaf-like structures in place of flowers. Many types of plants are susceptible to phytoplasma diseases, including, ornamentals, and weeds, fruit and vegetables crops. Asters, cannas, chrysanthemums, delphiniums, flax, phlox, veronica, zinnia, gladiolus, marigolds, cosmos, coneflowers, peaches, strawberries, sugarcane, coconuts, lettuce, carrot, onion, celery, anise, broccoli, cabbage, cauliflower, celeriac, chicory,



dandelion, dill, endive, escarole, white mustard, New Zealand spinach, onion, parsley, parsnip, potato, pumpkin, radish, salsify, shallot, spinach, squash, and tomato are susceptible. There is no cure for plants with phytoplasma infection. Plants with symptoms should be destroyed. Good weed control and the use of insecticides where warranted help control the insect vectors.

Coneflower Phytoplasma symptoms-phyllody



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Strawberry Phytoplasma Symptoms-phyllody



Photo courtesy of Randy Arnold, Arkansas grower