



# Pest e-alerts



*Entomology and Plant Pathology, Oklahoma State University  
127 Noble Research Center, Stillwater, OK 74078  
405.744.5527*

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## Vegetable Transplant Health

John Damicone, Extension Plant Pathologist



The use of infected vegetable seed and transplants is a common way that some damaging vegetable crop diseases are introduced into the garden or onto the farm. Bacterial diseases such as bacterial spot of tomato and pepper, bacterial speck of tomato, and bacterial canker of tomato; fungal diseases such as pink root rot of onion; or even virus diseases such as

tomato spotted wilt virus can occur on vegetable transplants and can become stubborn problems for growers to deal with. Last year, infected transplants were suspected as a cause of widespread problems with late blight on tomato in northern states where widespread inoculum and rainy weather favored severe disease development.

Transplants become infected by pathogens carried on the seed or by spread from other sources during transplant production. While only a small percentage of seed may be contaminated, greenhouse conditions are conducive to the development and spread of diseases because plants are often crowded together. Furthermore, bacteria may survive and spread on leaf surfaces without causing symptoms until after transplants are set. Standard recommendations are to “plant disease free seed” or “use disease free transplants”. In reality these recommendations are not very practical because there are few if any independent certification programs that check for pathogens on seeds and transplants. Large seed companies have plant pathology programs that inspect seed fields and test seed for common seed borne pathogens. Quality control from smaller seed companies and transplant growers who supply retailers with

plants and seeds is less vigorous. Vegetable crop growers should develop some level of their own certification program to avoid importing disease problems into their operations.

An obvious first step is to inspect plants to ensure they are free of obvious disease symptoms and insect problems. Avoid purchasing plants that have leaf spots, wilt, stunting, or leaf deformities that are symptoms of disease problems. Inspectors from the Oklahoma Department of Agriculture, Food, and Forestry recently submitted onion transplants to the OSU Plant Disease and Insect Diagnostic Laboratory that had obvious symptoms of pink root rot (Fig 1). Transplants with pink root rot can be expected to perform poorly and are sources of introducing the pink root pathogen into soils. Similarly, plants infested with thrips or aphids may develop virus diseases because these insects carry and spread viruses.



**Fig. 1.** Pink root rot on an onion transplant.

Another choice is to grow your own transplants from high quality seed or seed treated to minimize the chances for introducing seedborne disease. Seed sanitation is especially important for growers who save their own seed. Common seedborne diseases in Oklahoma are bacterial spot of pepper and tomato (Fig. 2), bacterial speck of tomato (Fig. 3), bacterial canker of tomato (Fig. 4), black rot of crucifers (Fig. 5), and watermelon fruit blotch (Fig. 6).



**Fig. 2.** Bacterial spot on pepper.



**Fig. 3.** Bacterial speck on tomato.



**Fig. 4.** Bacterial canker on tomato.



**Fig. 5.** Black rot on kale.



**Fig. 6.** Watermelon fruit blotch.

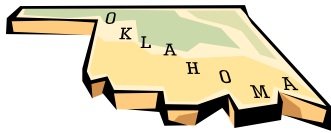
Producing healthy transplants requires a carefully planned, integrated approach using all of the following steps:

- 1)** Practice sanitation in the greenhouse, especially when it is vacant. Kill all weedy vegetation growing in the greenhouse. Remove and dispose of dead plant debris. Wash benches and containers (pots, flats, etc.) with disinfectant or a 10% bleach solution.
- 2)** Use fresh, heat-pasteurized soil mixes or new soilless potting media. Soilless media containing sphagnum peat moss help suppress seedling diseases (damping-off).
- 3)** Avoid importing live bedding plants or other plant materials into a greenhouse where vegetable transplants are being grown. Bedding plants are notorious sources of tomato spotted wilt virus.
- 4)** Assume that crucifer, pepper, tomato, and watermelon seed are contaminated and apply a bleach treatment. Place seed in a loose-fitting cheesecloth pouch. Immerse the seed in a solution of 20% household bleach (1 qt bleach plus 4 qts water plus ½ teaspoon of dish soap or surfactant) and provide constant agitation for 1 to 2 min. Wash seed in running water for 5 minutes, then dry seed thoroughly. Use treated seed as soon as possible. Long storage times will reduce seed germination.
- 5)** To control damping-off, purchase seed treated with fungicide or apply a fungicide seed treatment (see County Agent's Handbook) for untreated seed or seed that received bleach treatment. For example, dust tomato and pepper seed with thiram 65W at 1 teaspoon per lb of seed.
- 6)** For tomatoes and peppers, use streptomycin (Agri-mycin 17W) at 1 lb/100 gal (1.25 teaspoon/gal) as a foliar spray to control bacterial diseases. Begin sprays when seedlings have the first true leaves and repeat every 4 to 5 days until transplanting. Note: higher rates will cause leaf yellowing. Once transplants recover from transplanting, apply a copper fungicide (such as Kocide 101 at 2 lb/A) as a foliar spray and repeat 1-2 times at 7 day intervals.
- 7)** Maintain an adequate temperature in the greenhouse to ensure rapid seed germination and seedling growth. Damping-off is favored by cool temperatures, excessive seeding depth, and over-watering.
- 8)** Avoid high humidity, prolonged leaf wetness, and condensation on plant surfaces. Water during the day when leaves dry most rapidly. Use fans to circulate air in the greenhouse. Each evening, simultaneously fire greenhouse furnaces and ventilate the greenhouse to reduce humidity levels.

- 9) Routinely inspect plants for symptoms or signs of disease. Rogue and dispose of any plants with disease symptoms and surrounding plants likely to be infected. Identify the disease problem and initiate a spray program if warranted.
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## Wheat Disease Update

Bob Hunger, Extension Wheat Pathologist



**Oklahoma:** No powdery mildew has yet been observed around Stillwater, but fresh leaf rust pustules were observed on 18-March on susceptible varieties (e.g Jagalene) that were planted early (21-Sep). Individual leaves ranged from 05-10 MS-S with all of the pustules being on lower leaves. Brian Olson (Wheat Pathology A&P) and I have also observed infections of *Septoria* on lower leaves, but at very low incidence. No aphids have been observed, although 2-4 ft circular spots that are consistent with barley yellow dwarf have been observed in earlier planted wheat. Soilborne mosaic and spindle streak mosaic viruses continue to show strongly in my nursery and in trials around Stillwater. I will be visiting fields toward central and southwestern OK on Tues/Wed of this week and should have more to report shortly thereafter.



**Kansas:** The following report is from Dr. Erick DeWolf in Kansas from last week (08-Mar), and indicates that he has found leaf rust and powdery mildew in Kansas.



“I was able to take advantage of some warm days this past week to do some scouting for wheat diseases. The wheat in most areas of the state has broken dormancy. I was able to find low levels of leaf rust in research plots near Manhattan located in Northeast Kansas. The rust is still at very low levels (less than 2% incidence and trace severity). The pustules were on leaves that have at least moderate tip-die back associated with winter injury and had a orange color suggesting they are producing fresh spores. This level of leaf rust is common for Kansas in early March. The crop has now had one or more rain events increasing the chance that the disease will spread to the new growth and become established before the old leaves senesce taking the rust with them. The varieties affected by the leaf rust include Jagalene, and TAM 105 (an older variety from Texas). Both of these varieties are known to be susceptible to leaf rust. Powdery mildew was also evident is many of the varieties. The incidence of mildew likely exceeds 70%, but the severity is still very low (< 3%). Wheat planted early appears to have more mildew than wheat that was planted at a more traditional time for Northeast Kansas. The level of mildew at this location is higher than it was on this date a year ago. Trace levels of *Septoria* leaf blotch were also observed. No stripe rust or stem rust has been observed or reported in Kansas to date.”



**Louisiana:** The following report from Dr. Stephen Harrison (wheat and oat breeder, Louisiana State University) received on 18-March indicates that stripe rust is widespread in Louisiana, but not severe.

“I have received a number of reports of stripe rust around Louisiana this week. I think it is safe to say that stripe rust is widespread in Louisiana, but not severe at this point. Weather conditions are favorable for continued spread over the next 10 days, with night-time temperatures in the 50s and 60s. I have not received any reports of stripe rust on varieties that have Yr17 resistance, so do not suspect a race change (yet). The variety ‘Magnolia’ has been mentioned in several reports. Growers should be aggressive in scouting and controlling stripe rust.”

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*Dr. Richard Grantham*

*Director, Plant Disease and Insect Diagnostic Laboratory*

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