

## Can Phosphorus Improve Disease Resistance In Cereals?

NORCROSS, Ga. — Potassium has been directly linked to plant disease resistance by numerous researchers on a wide variety of crops and diseases. But what about phosphorus? Does phosphorus have a part to play in disease suppression?

Phosphorus is present in every living plant cell and has a direct role in plant growth. Plants need it for photosynthesis, respiration, energy storage and transfer, cell division and enlargement, and several other processes. Phosphorus promotes early root growth and development, hastens crop maturity, increases winter hardiness and

improves crop quality. And yes, it helps suppress plant disease, especially root diseases in wheat and barley.

Common root rot, take-all and other root diseases are an unseen problem - but they cost cereal crop growers million of dollars every year in lost yield. These diseases are difficult to control. Cultivars vary in their tolerance to these diseases. Seed treatment and shallow seeding reduce the risk of infection and crop rotation can limit the pathogen populations. Maintenance of good soil fertility is also helpful.

Research has shown phosphor-

us fertilization to be effective in reducing losses from take-all in wheat and common root rot in barley. One recent Saskatchewan study found seed-placed phosphate reduced the frequency of the take-all pathogen in wheat roots by about 50 percent and root rot severity in barley by 10 percent. Another Alberta study showed seed-placed phosphorus reduced the average yield loss of nine cultivars of barley infected with root rot from 40 to 30 percent.

Phosphate fertilizers are most effective in reducing root rot problems when nitrogen is not limiting crop growth. The best disease control is obtained with the application of both nitrogen and phosphorus. Balanced and adequate soil fertility supports healthy plant growth.

How phosphorus reduces disease severity is not known ... but it does stimulate root development.

And, a healthy, vigorous root system will better compensate for infections by root pathogens.

Phosphorus deficiency is common in the cereal growing areas of the Northern Great Plains. About 60 to 90 percent of soils from the Canadian prairies and the bordering states test medium or less in plant available phosphorus, and require fertilization. Suppression of root disease is one more reason for a good phosphorus fertility program.

Root diseases ... out of sight but not out of mind. Pay careful attention to phosphorus fertilization and your crop will have a competitive edge, both above and below ground.

For more information, contact Dr. Terry L. Roberts, Western Canada Director, PPI, Suite 704, CN Tower, Midtown Plaza, Saskatoon, Saskatchewan, Canada S7K 1J5, (306) 652-3535. E-mail: ppic@sk.sympatico.ca

## Pick A Peck Of Unpocketed Peppers

WOOSTER, Ohio — The life of a pepper plant isn't easy. Just when things begin to look positive, something like bacterial spot, Phytophthora blight, white mold, or bacterial soft rot can attack.

Fortunately, researchers at Ohio State University are working to prevent those assaults. Sally Miller, a researcher in the Department of Plant Pathology, is looking for ways to keep seedlings free of bacterial spot while in the greenhouse. This will give the plants a head start on a healthy crop production cycle. She's also testing new compounds for disease control and evaluating crop resistant varieties. Miller said researchers are looking at chemical and cultural control measures for Phytophthora blight, including the incorporation of compost in the field. Fungicides are being checked for the prevention and control of white mold.

Bacterial spot and Phytophthora blight can cause severe losses because there are no really effective control chemicals after the disease has begun. Bacterial spot is most severe when it comes in on diseased or contaminated plants. Phytophthora is soil borne and becomes a problem after heavy rains. Though disease can be detrimental to pepper crops, farmers can take preventive measures to control the spread of disease.

"For bacterial spot, producers must start with clean seed," Miller said. "If the seed has not been tested and/or treated by the supplier, or if they are saving their own seed, treatment to remove bacteria from the seed surface is necessary. Growers must then see that they produce pepper transplants in the greenhouse in a way to reduce the spread of bacteria."

To do this, Miller suggests that growers allow foliage to dry out completely before nightfall, provide good ventilation, never handle the plants when wet, and avoid growing pepper and tomato transplants in the same greenhouse. Miller also warns against growing pepper plants in the same greenhouse with ornamentals. "Thrips can spread tomato spotted wilt virus, which could cause devastation in the field," she said.

If a grower has had a problem with bacterial spot, Miller recommends raising resistant varieties. "They should have resistance to races one, two and three," Miller said. "Unfortunately, other races have now been found in Ohio, although as of 1996 race three predominated."

Phytophthora blight warrants a number of recommendations for disease management, although they usually must be combined. "And they still may not give complete control when the disease pressure is high," Miller said.

Miller recommends growing plants on domed, raised beds, applying the fungicide Ridomil at planting and again twice during the season, selecting well-drained soil, and avoiding fields that have had the disease in the past five years. "Complementary crops, especially pumpkins and squash, are also especially susceptible to this disease."

Although total disease control is not yet an option, cultural practices can help prevent widespread damage. These and other techniques will be addressed at the Ohio Fruit and Vegetable Growers Conference held in conjunction with the Ohio Roadside Marketing Conference, Feb. 5-8 at the Toledo Seagate Center. Miller will be speaking on Integrated Pest Management Essentials and bacterial spot and speck of tomatoes.

For more information, contact Miller at the Ohio Agricultural Research and Development Center, Department of Plant Pathology, 1680 Madison Avenue, Wooster, Ohio 44691. For information about the conference, call Mike Pullins at (614) 249-2424.

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