

6-24-2002

Corn seedling pathogens

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Recommended Citation

Munkvold, Gary P., "Corn seedling pathogens" (2002). *Integrated Crop Management News*. 1805.
<http://lib.dr.iastate.edu/cropnews/1805>

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Abstract

After a slow start, corn seedling problems have become evident in many fields during the past couple of weeks. With much of the corn now out of the "seedling" stage at V5 or higher, those plants that are not thriving have become obvious. On most of the samples that I have seen, the mesocotyl tissue has been rotted to some extent, either mildly or severely. This condition has resulted in poor growth or death of the plants. On the surviving seedlings, nodal roots have developed and may be able to pull the plants through, although these stunted plants are of questionable value.

Keywords

Plant Pathology

Disciplines

Agricultural Science | Agriculture | Plant Pathology

INTEGRATED CROP MANAGEMENT

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After a slow start, corn seedling problems have become evident in many fields during the past couple of weeks. With much of the corn now out of the "seedling" stage at V5 or higher, those plants that are not thriving have become obvious. On most of the samples that I have seen, the mesocotyl tissue has been rotted to some extent, either mildly or severely. This condition has resulted in poor growth or death of the plants. On the surviving seedlings, nodal roots have developed and may be able to pull the plants through, although these stunted plants are of questionable value. The problems have occurred under a variety of conditions on corn planted at different times, although early May planting in central to southeastern Iowa seems to have been a disease-prone period. Some of the problems can be blamed on the fluctuating soil temperatures earlier in the spring, when some seed took a month to emerge, or saturating rains fell shortly after planting. These conditions are very favorable for seedling diseases and test the limitations of the seed treatments. In other fields, problems have arisen in later planted corn that emerged on time, under conditions that would not be expected to result in seedling disease.



Rotted mesocotyl tissue on corn seedlings.

[Enlarge](#) [1]

There has been a great deal of guesswork regarding the pathogen or pathogens responsible for the destruction, with most of the focus on *Pythium* species. Some of the problems have been severe enough also to fuel speculation about the efficacy of the seed treatment fungicides, especially toward *Pythium*. Over the past decade, *Pythium* species have been perceived as a growing problem in establishing corn stands; thus, fungicides with activity against *Pythium* (mefenoxam or metalaxyl) are standard components of commercial seed treatments on corn. I do not know of any documented examples of *Pythium* insensitivity to metalaxyl or mefenoxam in cornfields. At least 14 species of *Pythium* are reported to cause seedling blight and root rot of corn, and often, identification to species is not done. Based on seed treatment trial results, I have always considered *Pythium* to be a major component of the seedling disease complex, but I have not attempted to identify *Pythium* species from seedlings in these trials.

However, this year I am concerned about the degree of focus on *Pythium* when a real diagnosis has not been done. Although there are some general differences in the appearance of mesocotyl decay caused by various pathogens, it is not possible to accurately identify corn seedling pathogens without laboratory procedures. Such procedures would

include isolating from the tissue or an antibody-based detection method. Unfortunately, *Pythium* is notoriously difficult to recover from plant tissue and the antibody tests are not infallible; so even these methods are not always definitive.

When belowground seed or seedling tissues begin to die, they are rapidly colonized by a variety of fungi and bacteria, many of which contribute to the decay. When we isolate from these tissues we usually find more than one potentially pathogenic fungus, including several species of *Fusarium*, *Rhizoctonia*, *Penicillium*, *Trichoderma*, *Aspergillus*, and *Stenocarpella*. I also have been isolating *Mucor*, which was identified as a corn seedling pathogen several years ago by researchers at University of Illinois. It is impossible to determine which one is the primary pathogen, if there even is a primary pathogen. If a large number of seedlings are cultured it can be possible to infer that a particular fungus is important, but this inference cannot be made for individual plants.

Ultimately, we need to think of corn seedling disease as a complex of fungi (and probably bacteria, too) that must be controlled as a group. Although the activity of seed treatment fungicides against components of the group is a critical issue, on the field level there has not been a lot of emphasis on identifying individual pathogens. Why? Because our management strategies are the same, regardless of the pathogen involved. These diseases are prevented by standard seed treatments (Maxim XL or Captan-Allegiance) and by attempting to plant into soil conditions that are favorable for rapid emergence and unfavorable for disease. When a problem does occur, management usually consists of a replant decision, which is independent of the pathogen(s) involved. The only exception might be if a planter-box treatment containing mefenoxam or metalaxyl was being considered. This treatment is rarely done and even more rarely recommended because we have not seen much benefit to adding more active ingredient to the mefenoxam or metalaxyl already on the seed. In a replant situation, a planter-box treatment would usually not be recommended because the soil temperature would normally be warm enough to avoid disease.

This article originally appeared on pages 110-111 of the IC-488(14) -- June 24, 2002 issue.

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[1] http://www.ent.iastate.edu/imagegal/plantpath/corn/seedldis/seedling_disease.html

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