

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Historical Materials from University of
Nebraska-Lincoln Extension

Extension

2000

NF00-427 Management of Seed and Seedling Diseases of Corn

Jim Stack

Follow this and additional works at: <https://digitalcommons.unl.edu/extensionhist>



Part of the [Agriculture Commons](#), and the [Curriculum and Instruction Commons](#)

Stack, Jim, "NF00-427 Management of Seed and Seedling Diseases of Corn" (2000). *Historical Materials from University of Nebraska-Lincoln Extension*. 892.

<https://digitalcommons.unl.edu/extensionhist/892>

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.



NebFact



Published by Cooperative Extension, Institute of Agriculture and Natural Resources,
University of Nebraska-Lincoln

Management of Seed and Seedling Diseases of Corn

Jim Stack, Extension Plant Pathologist

To minimize the impact of disease on corn profitability, it is important to start the season with healthy vigorous plants; this means avoiding seed and seedling diseases. Seed and seedling diseases occur in field corn, popcorn, sweet corn, seed corn, and specialty corn production, and can cause loss in both continuous corn or corn-soybean rotations. Successful early season disease management includes consideration of the disease history of the field (the spatial distribution of the problem and the causal pathogens involved), the use of seed-applied fungicides, the cropping practices employed (e.g., tillage, rotation), and the genetics of the hybrid relative to susceptibility to the prevailing diseases.

Seed and Seedling Diseases

Early plant development is critical to the season-long health of the plant. Fungi, bacteria, and nematodes all cause seed and seedling diseases in corn. The majority of early season diseases are caused by fungi. Several different species of fungi which are active over a wide range of environmental conditions attack the seed and/or the developing seedling. Depending on the pathogen population and the environmental conditions, these diseases can result in partial loss of root function or death of the developing plant. Disease on seedling roots can impair the normal function of roots for the entire season. In 1999, the high rainfall and below average temperatures in late April and early May resulted in extensive root disease in many fields. Most of these root diseases were caused by *Pythium* and *Fusarium*, although *Rhizoctonia* and other fungi were involved in some fields. Poor emergence and poor early plant development were widespread.

As a result of early season fungal infections, plants with poorly developed root systems easily lodged after wind storms late in the season. This effect was widespread in northern Clay and southern Hamilton counties where whole fields were affected by an 85 mph wind in August. Protecting the seed and seedling is important to ensuring a healthy plant for the duration of the season.

The most important determinant of seed and seedling disease severity and impact in any year is the weather. It can be assumed that weather conditions favorable to seed and seedling disease development will occur periodically in all fields and frequently in some fields. Site-to site variation in weather can

account for large differences in the amount of disease among fields. It is important to know the history of each field with respect to problem areas and the causal pathogens.

Field-applied Fungicides

Post-emergence application of fungicides for seed and seedling disease prevention is not common in Nebraska. There is little information available on rates and timing for field applications. Only in high value production systems (e.g., seed corn, specialty corn) would this generally be profitable. Success would depend on a detailed knowledge of the causal pathogen and the spatial distribution of the problem. Pythium and Fusarium diseases are commonly found in the same field and at times in the same plant. Consequently, combination products are usually required for adequate protection.

Seed-applied Fungicides

Due to the widespread distribution of seed and seedling fungal pathogens of corn, most, if not all, corn seed is treated with fungicides prior to bagging. Under most planting conditions these fungicides perform very well and protect the plants for the first 10-14 days after planting. Under extreme conditions (e.g., excessive or sustained high soil moisture and or prolonged low soil temperatures), however, protection may be reduced and serious short-term (e.g., seed decay and damping-off) and long-term (e.g., impaired root development) effects may result. Under those conditions, no product will completely protect the seed and seedling. Unlike soybean, corn does not have a great ability to compensate for reduced stand; a reduction in the number of plants in the field will usually result in reduced yield. Consequently, the probable risk of impact from seed and seedling fungal diseases is high. Relative to the total cost of seed, the cost of seed applied fungicides is low and fungicide treatment is generally recommended.

The vast majority of corn seed is treated with the following products either alone or in some combination: Apron, ApronXL, Captan, Maxim, and Thiram. Since the seed is treated by the seed company prior to packaging, the cost of fungicide seed treatments are incorporated into the cost of the bag of seed. The following fungicides are used for the prevention of seed and seedling diseases of corn in Nebraska:

- **Apron, ApronXL:** Protects against the major Pythium species that cause seed and seedling disease of corn in Nebraska,
- **Captan:** Protects against the major seed and seedling pathogens common to Nebraska corn production systems, including Pythium, Fusarium, Rhizoctonia, and Phomopsis,
- **Maxim:** Protects against the major seed and seedling pathogens common to Nebraska corn production systems, including Fusarium, Rhizoctonia, and Phomopsis, and
- **Thiram:** Protects against the major seed and seedling pathogens common to Nebraska corn production systems, including Fusarium, Rhizoctonia, Phomopsis, and Pythium (fair activity).

*Although some fungicides are labeled for multiple pathogens they are not equally effective against all the pathogens on the label. No endorsement is intended for the products listed above nor criticism meant for products not listed. **READ AND FOLLOW ALL LABEL INSTRUCTIONS.**

Profitable Seed and Seedling Disease Management

The most critical issue for profitable management of plant disease is obtaining an accurate and timely diagnosis. Symptoms can easily be confused among different diseases as well as between diseases and

other factors (e.g., environmental effects on specific hybrids, mineral deficiencies and toxicities, herbicide interactions). A misdiagnosis could result in applying a fungicide when it would not be effective or applying the wrong fungicide. If this occurs, you lose twice: the disease is not controlled and you incur the cost of the fungicide application.

Seed and seedling diseases of corn caused by *Pythium* spp., *Fusarium* spp., and *Rhizoctonia solani* are widespread in Nebraska. Different chemicals are used to control these very different pathogens. A misdiagnosis could result in the application of Apronr (effective against *Pythium*) when the pathogen involved is actually *Fusarium* or *Rhizoctonia*. Again you lose twice: the disease is not controlled (Apronr is not effective against *Fusarium* or *Rhizoctonia*) and you incur the cost of the fungicide application. Accurate and timely diagnoses are critical to profitable disease management.

File NF427 under Plant Diseases
C-7, Field Crops
Issued May 2000

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.

University of Nebraska Cooperative Extension educational programs abide with the non-discrimination policies of the University of Nebraska-Lincoln and the United States Department of Agriculture.