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2006 predictions for corn flea beetles and Stewart's disease

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Abstract
Spring has arrived, and following a relatively mild winter, southern Iowa corn is projected to be at high risk from Stewart's disease. This disease (also called Stewart's wilt) is a bacterial disease of corn caused by*Pantoea (Erwinia) stewartii*. The bacterium survives the winter in the gut of hibernating corn flea beetles. In the spring, flea beetles move from overwintering sites and while feeding on the corn, can transmit the bacterium. The bacteria can only spread plant to plant with the assistance of the beetle; it cannot be transmitted from plant to plant. Unfortunately, field corn inbreds and sweet corn are particularly susceptible to this disease.

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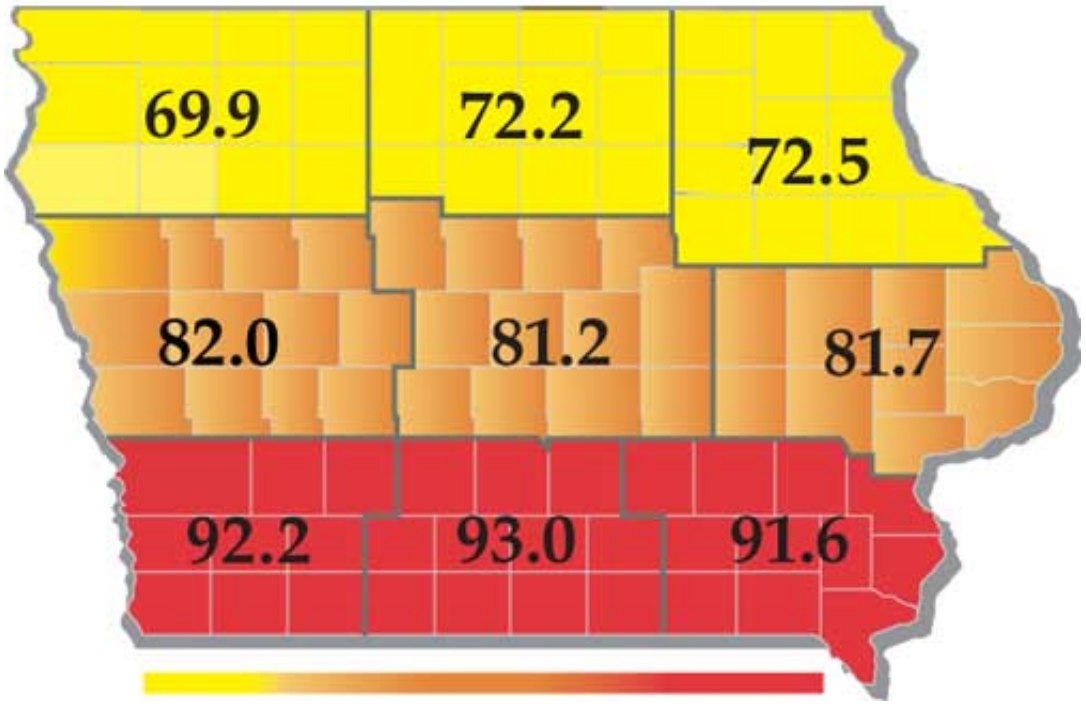
Stewart's disease can occur at any stage of plant development, but symptoms are almost always associated with flea beetle feeding. At the seedling stage, infected plants wilt rapidly from systemic infection, death is common, and plants that do survive are stunted. Later in the growing season, usually after pollination, leaf blight occurs. Disease symptoms are long, wavy streaks that are initially water soaked, and then turn yellow and die. Corn flea beetle feeding scars are visible within the lesions. If the disease is severe, whole leaves may wilt and die. Mild winters during the past decade have resulted in an increased occurrence of Stewart's disease in Iowa. Two models are available to predict the risk of Stewart's disease: the Stevens-Boewe Index and the Iowa State Mean Monthly Temperature Model.

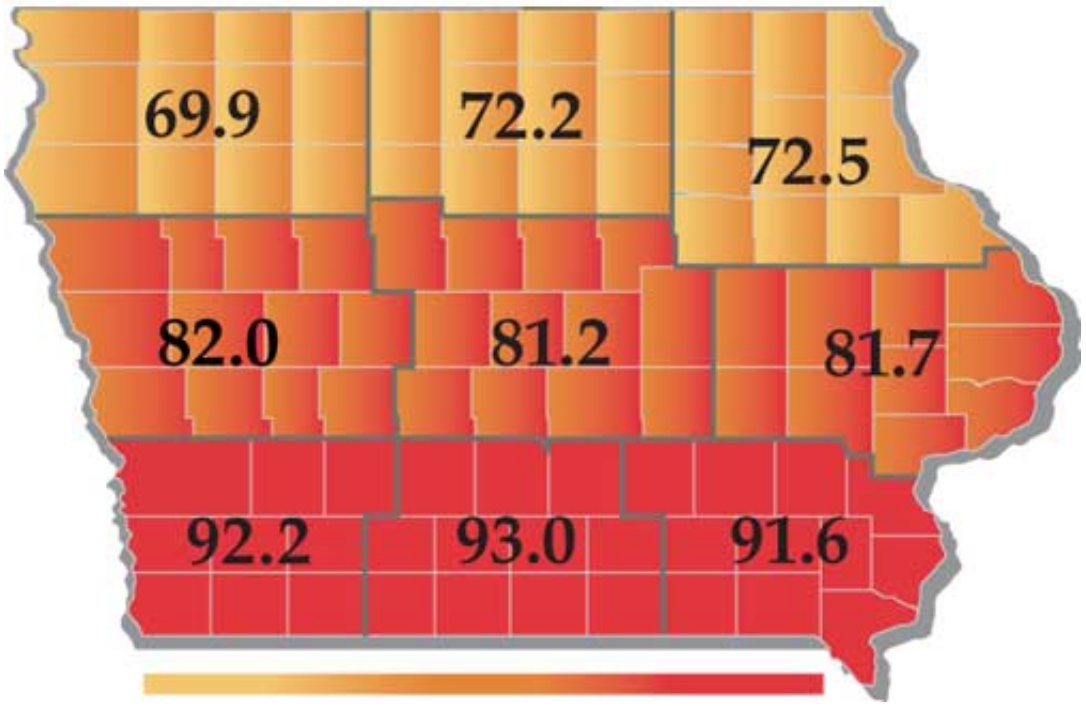
Stevens-Boewe Index



[1]
Figure 1. The Stevens-Boewe Index forecasts a high risk of the late leaf blight of Stewart's disease in southern Iowa in 2006.

The Stevens-Boewe Index predicts the severity (how much of the corn leaf tissue is infected) of the leaf blight stage of Stewart's disease in the late summer. The risk is calculated by summing the average monthly temperatures for December, January, and February. A sum below 80 °F indicates a slight risk, 80-90 °F is considered low to moderate risk, and greater than 90 °F is considered high risk. Forecasting with the Stevens-Boewe Index, southern Iowa has a high risk of the late leaf blight phase of Stewart's disease (Figure 1).

Iowa State Model



[2]
Figure 2. The Iowa State Model predicts moderate to high risk for StewartÃ¢â‚¬â„¢s disease

to occur in 2006 in the lower two-thirds of the state.

The Iowa State Model predicts the prevalence (whether or not Stewart's disease occurs) for Stewart's disease. A high prevalence of Stewart's disease is predicted if the mean monthly air temperatures for December, January, and February are each above 24 °F. For December 2005, the mean temperature was greater than 24 °F only in crop reporting districts 7, 8, and 9 (all southern Iowa). In January 2006, the mean temperature was above 24 °F in all nine crop districts, while in February the temperature averaged above 24 °F in crop districts 4-7. The end result is that the model predicts that there will be a moderate to high risk for Stewart's disease to occur in 2006 in approximately the lower two-thirds of the state (Figure 2).

Insect Economic Thresholds

This disease can be controlled on susceptible corn by controlling the corn flea beetle with a foliar-applied insecticide, but timing of the application is critical. Seed treatments also may provide a better approach to control. A 2000 study at the University of Illinois demonstrated that two insecticides, imidacloprid (Gaucho®) and thiamethoxam (Cruiser®), applied to sweet corn seed reduced the incidence of Stewart's wilt by 50 to 85 percent under field conditions with naturally occurring populations of corn flea beetles. These seed treatment insecticides controlled Stewart's wilt during the very early growth of corn plants when applications of conventional, foliar insecticides were ineffective, according to the researchers. The full article may be found at http://www.apsnet.org/pd/pdfs/2000/0726-01R.pdf.

Use the following thresholds for rescue treatments in corn:

Field corn--prior to stage V5, 50 percent of plants with severe feeding injury and 5 or more beetles per plant.

Seed corn--on susceptible inbreds, 10 percent of the plants with severe feeding injury and 2 or more beetles per plant.

Labeled insecticides include, but are not limited to, Asana XL, Capture 2 EC, Lorsban 4 E, Pounce 3.2 EC, and Warrior. See manufacturer's labels for use rates and restrictions.

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