Site-Specific Risk Assessment of Sorghum Ergot Using Doppler Radar

Fekede Workneh and Charlie M. Rush, TAES-Amarillo/Bushland

Infected sorghum panicle showing honeydew (typical symptom)

BACKGROUND

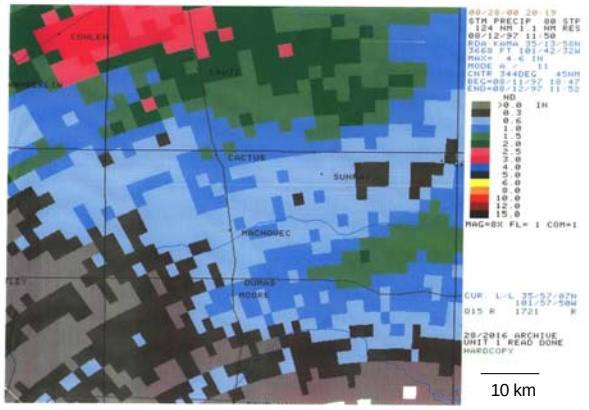
Historically about 95 percent of the U.S. sorghum seed supply is produced in the Texas Panhandle. Sorghum ergot caused by the fungus *Claviceps africana* was detected in the United States for the first time in 1997. Since its introduction, the disease has periodically caused widespread damage in seed production fields in the region. Sorghum ergot generally requires cool weather and humid conditions for an optimum infection. In the Texas Panhandle, rainfall is a major source of high relative humidity. However, rainfall events are often spotty and can vary within a small area, both in incidence and intensity. Rain gauges provide point measurements and existing ground weather stations are too far apart to provide accurate representation of localized rainfall events. Radar-based precipitation estimates have greater spatial resolution (4 km % 4 km) and coverage (230 km) than gauge-based measurements, and hence, are more applicable for interpolation and regional risk assessment than gauge-based rainfall measurements.

OBJECTIVES

- Understand the ecology and epidemiology of sorghum ergot and develop a weather-based risk prediction model.
- Construct a regional site-specific sorghum ergot risk prediction map using radar rainfall measurements.
- Develop a web-based sorghum ergot risk assessment system.

RESULTS/BENEFITS

- Rainfall, in addition to providing humidity for infection, is associated with suppression of temperature such that it remains within ergot-favorable range during the rainfall event. Temperature and relative humidity (rainfall), account for most of the variation in ergot severity. An initial weather-based sorghum ergot model was developed based on this finding.
- An ergot risk assessment map of the Texas Panhandle is being developed using radar-estimated rainfall in collaboration with Dr. R. Srinivasan (Spatial Science Laboratory, College Station). Within each of the 4 km % 4 km grids, whenever there was greater than 2.5 mm of rainfall, a relative humidity of 90 percent was entered in the model.
- Growers can log onto the website from home and determine whether management action is necessary using GPS locations of their fields.



Doppler radar image of different levels (shades) of rainfall intensities (2 km pixels)

Texas A&M University System Agricultural Research and Extension Center
6500 Amarillo Blvd. West, Amarillo, Texas 79106
Phone: (806) 677-5600; Fax: (806) 677-5644
www.amarillo.tamu.edu