

QUANTIFYING INCIDENCE OF WSMV AND IT'S IMPACT ON WATER USE AND YIELD

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ABSTRACT

Wheat streak mosaic virus (WSMV) is the predominate viral disease of hard red winter wheat in the Texas panhandle. The virus can cause significant reduction in yield. Little has been done to quantify disease incidence over a large area or investigate its impact on water use efficiency (WUE). In 2005 – 2006, a disease survey of all 26 counties in the Texas panhandle was conducted using Landsat satellite imagery. Preliminary results showed that 42,000 acres were infected with WSMV. A separate study was conducted to determine the effects of WSMV on wheat root development and water use. Two varieties of wheat, were grown in large containers under three different water regimes, 30, 60, and 80 percent pot capacity. Half of the plants were inoculated with WSMV and half were non-inoculated controls. The total amount of water added to each experimental unit was recorded and after approximately 12 wk plants were harvested to obtain root and top weights to calculate WUE for each treatment. During the first trial, significant differences ($p=0.0001$) in biomass of infected and non infected plants within the three different water treatments were recorded. In the non-inoculated treatments, biomass increased significantly with increasing water. Biomass of inoculated treatments were significantly lower and had no significant increase with increasing water. At full irrigation, infection by WSMV resulted in a 45 percent reduction in water use. These results demonstrate that WSMV is extremely widespread in the Texas panhandle and more research on irrigation scheduling of infected wheat is needed.