

WEBB, KIMBERLY M.* and TAMMY BRENNER, USDA-ARS, Sugar Beet Research Unit, 1701 Centre Avenue, Fort Collins, CO 80526. **Environmental conditions that contribute to development and severity of sugar beet *Fusarium* yellows caused by *Fusarium oxysporum* f. sp. *betae*: temperature.**

ABSTRACT

Fusarium yellows in sugar beet, caused by *Fusarium oxysporum* f. sp. *betae*, continues to cause significant problems to sugar beet production by causing considerable reductions in root yield, sucrose percentage, and juice purity in affected sugar beets. Environment plays a critical role in pathogen invasion of plants, influencing pathogen interactions with the host, by determining pathogen effectiveness in colonizing the host, and by regulating the genetic mechanisms associated with expression of resistance to disease in the host. Although *Fusarium* yellows development is believed to be extremely dependent on temperature, with very little disease occurring at <20C, and optimum symptom development occurring between 24-28C, little information is known how much air or soil temperature(s) individually contribute(s) to *Fusarium oxysporum* successful invasion of sugar beet, and it's potential impact on the effectiveness of resistance. In growth chamber experiments we studied how temperatures corresponding to early (16/6C), mid (26/11C) and late (32/16C) season contributed to severity of disease development on two susceptible varieties (USH20 and FC716), using two isolates of *F. oxysporum* f. sp. *betae* (F19 and Fob 220a) by measuring the area under the disease progress curve (AUDPC). In secondary experiments we will further analyze how increasing temperatures impact effectiveness of resistance against the same isolates. The most disease was observed when plants were grown at 26/11C and the least amount of disease occurring at the coolest temperatures (16/6C). There were differences in severity of disease as well as initial symptom development between the two varieties tested and with the two isolates of *F. oxysporum* f. sp. *betae* used.