

***Fusarium* Forum**

Speakers included: Mohamed Khan (North Dakota State University), Bernd Holtschulte (KWS), Maria Niehlgard (Syngenta), and Barry Jacobsen (Montana State University).

In the Red River Valley of Minnesota and North Dakota, *Fusarium* root rot, with rotting frequently progressing from the inside of the beet outward, was first confirmed in 1996 and demonstrated to be *Fusarium oxysporum*. In Minnesota, the disease is especially correlated with warm, wet soil, particularly if they are waterlogged. Affected beets have a higher respiration rate than healthy beets from the same field and can have the significant reductions in sugar content that have been reported for *Fusarium* infected beets in other areas.

Potential interactions between *Fusarium oxysporum* and other problems affecting the beet, such as root maggot, sugar beet cyst nematode, rhizomania, and other fungal diseases such as *Verticillium* have been observed in a number of growing areas.

In Europe, *Fusarium* causes a problem in seed production in several areas. In addition, beets in Germany, France, and Italy have been observed with constricted roots, a tip rot and discoloration of the vascular tissue. The primary fungus associated with this is *Fusarium oxysporum*, with *F. acuminatum*, *F. solani*, *F. culmorum*, *F. moniliforme* (= *F. verticillioides*), *F. anthropilum*, and *Verticillium dahliae* also causing symptoms. A *Fusarium*-resistant variety from the United States was susceptible to this problem. In the Netherlands and Sweden, symptoms are more similar to the *Fusarium* yellows historically found in the western United States, with interveinal chlorosis and leaf death. However, vascular discoloration may not be present in the field. This disease is generally in patches and is estimated to cause yield losses of 5 to 10 %, with losses up to 50% in severe cases. The disease seems to be more prevalent in sandy soil. Several species were found to cause symptoms, with *F. oxysporum* and *F. verticillioides* showing the typical symptoms. However, *F. solani* and *F. graminearum* also were found from affected roots. *F. solani*, while pathogenic, was found to cause less foliar symptoms than *F. oxysporum*. When different sugarbeet lines were tested with these isolates, some lines were found to have resistance to both *F. oxysporum* and *F. verticillioides*.

In the Intermountain west of the United States, *Fusarium* yellows has been reported to be one of the most common diseases. In this area, the disease is most severe under warm temperatures and drought stress. In testing, at high inoculum levels, isolates that caused yellows symptoms could cause a root rot, at least of seedlings. *Fusarium oxysporum* f. sp. *betae* was reported as the primary pathogen in this area, but other pathogenic species can be found in this area as well, including *F. acuminatum*, *F. avenaceum*, *F. solani*, and *F. verticillioides*. The most severe symptoms are caused by isolates of *F. oxysporum*, but other species also can be involved in the disease.