

NEHER, OLIVER T. and TAMARA KEETH\*, University of Idaho, Twin Falls R&E Center, 315 Falls Avenue, Twin Falls, ID 83301. **Fungicide trials for the control of *Erysiphe polygoni*, causal agent of powdery mildew on sugar beets in Idaho.**

### ABSTRACT

Sugar beets in the western part of Idaho are mainly furrow or surface irrigated. This can create environmental conditions more suitable for the development of powdery mildew (PM) than under sprinkler systems used in other parts of Idaho and Oregon. Powdery mildew is also detected earlier (July) in the western region than in the southern growing regions of Idaho (August). If PM remains untreated or is treated too late, the crop losses can be severe since PM has the ability to multiply rapidly under favorable conditions. Control of PM relies heavily on fungicide applications, preferable before disease is visible or at its first appearance. The objective of this study was to evaluate products containing trifloxystrobin (Gem 500SC), pyraclostrobin (Headline), difenoconazole/propiconazole (Inspire XT), and prothioconazole (Proline 480SC) for their efficacy to control PM on sugar beets.

Individual products were tested as a single application at disease onset (04 August 10) and in combination with a second, different product, applied as a preceding application prior to disease onset (12 July 10). Treatments were arranged in a randomized complete block design with six replications and were applied using a backpack (CO<sub>2</sub>) sprayer with a 6-ft wide boom equipped with 11002 flat fan spray tips at 28 psi in a total volume of 23 gal/A. Individual plots were six rows wide (11 ft) by 25 ft long and separated by a 5-ft wide alley and were initially planted (16 Apr 10) at a two inch seed drop and later thinned to eight inch plant spacing. The efficacy of the different treatments was determined based on the area under disease progress curve (AUDPC) which was calculated based on four ratings evaluating the percent mature leave area diseased (%MLAD). Plots were evaluated 12 Jul 10, 04 Aug 10, 23 Aug 10, and 15 Sep 10 by sampling 25 leaves from rows two and five of the 6-row plots. Powdery mildew severity was assessed using a 0-5 rating scale, where 0 = 0%, 1 = 1-10%, 2 = 11-35%, 3 = 36-65%, 4 = 66-90%, and 5 = 91-100% of leaf area covered by PM. On 12 Oct 10, plots were topped, the two center rows were harvested, and root yields were determined. Approximately 8-10 beets were sampled from each plot and percent sugar content was determined by The Amalgamated Sugar Company, LLC Tare Laboratory in Paul, ID, using a polarimeter. Data were analyzed by factorial ANOVA using the GLM procedure of SAS, and by separating the treatment means using Fisher's protected LSD test ( $\alpha=0.05$ ).

Comparisons of pooled data for individual applications at disease onset versus two applications (prior disease onset followed by a second application at disease onset) showed significant ( $P\leq 0.05$ ) differences for all tested disease parameters and yield data. Two applications significantly decreased the %MLAD and the AUDPC as well as increased clean yield (ton/A) and estimated recoverable sucrose (ERS ton/A) when compared to the one-time application.

When treatments were separated by application frequency, only trifloxystrobin applied alone at disease onset was able to significantly reduce the AUDPC by 38.9% when compared to the non-treated control (NTC). No positive effects of treatments applied at disease onset on clean yield or ERS could be observed. When individual treatments were applied in combination with a second product (before disease onset), they were all able to significantly reduce the severity of PM (based on the individual %MLAD ratings and the AUDPC) when compared to

the NTC. Only plots sprayed with fungicide combinations comprised of trifloxystrobin followed by (fb) prothioconazole and pyraclostrobin fb difenoconazole/propiconazole had a significant increase in clean yield and ERS when compared to the NTC but were not different to other treatments.

Considering that 2010 was a mild PM year with a delayed disease onset, one fungicide application alone made at disease onset was not enough to significantly reduce the AUDPC or to increase yield parameter. Only two applications – before and at disease onset – were able to provide significant protection against PM, indicating the importance of a “preventative” fungicide application for the control of PM. In this context, preventative should be considered as an early application when the pathogen is introduced to the area and before symptoms are visible to the naked eye.