# MANAGEMENT OF CURLY TOP IN SUGARBEET WITH SEED AND FOLIAR INSECTICIDES

Carl A. Strausbaugh1, Erik J. Wenninger2, and Imad A. Eujayl1

1USDA-ARS NWISRL, 3793 North 3600 East, Kimberly, ID 83341.

2Univ. of Idaho, Kimberly Res. & Ext. Center, 3806 North 3600 East, Kimberly, ID 83341.

Corresponding author: Carl A. Strausbaugh (Carl.Strausbaugh@ars.usda.gov)

Curly top in sugarbeets can result in severe yield losses, particularly in the Treasure Valley. Curly top is caused by Beet severe curly top virus (BSCTV; formerly CFH strain), Beet mild curly top virus (BMCTV; formerly Worland strain), and Beet curly top virus (BCTV; formerly Cal/Logan strain) which are vectored by the beet leafhopper. However, other more recently discovered Curtovirus species have also been described. In the 2006-2007 survey of sugarbeet in the western United States, several samples failed to amplify with species-specific primers, but did amplify with the curly top coat protein primers. In 2012, symptomatic sugarbeet samples from both the Treasure Valley and Magic Valley gave a similar reaction, indicating an unrecognized Curtovirus species likely exists in the Idaho sugarbeet production area. The USDA-ARS sugarbeet program in Kimberly is currently working to sequence and identify this virus.

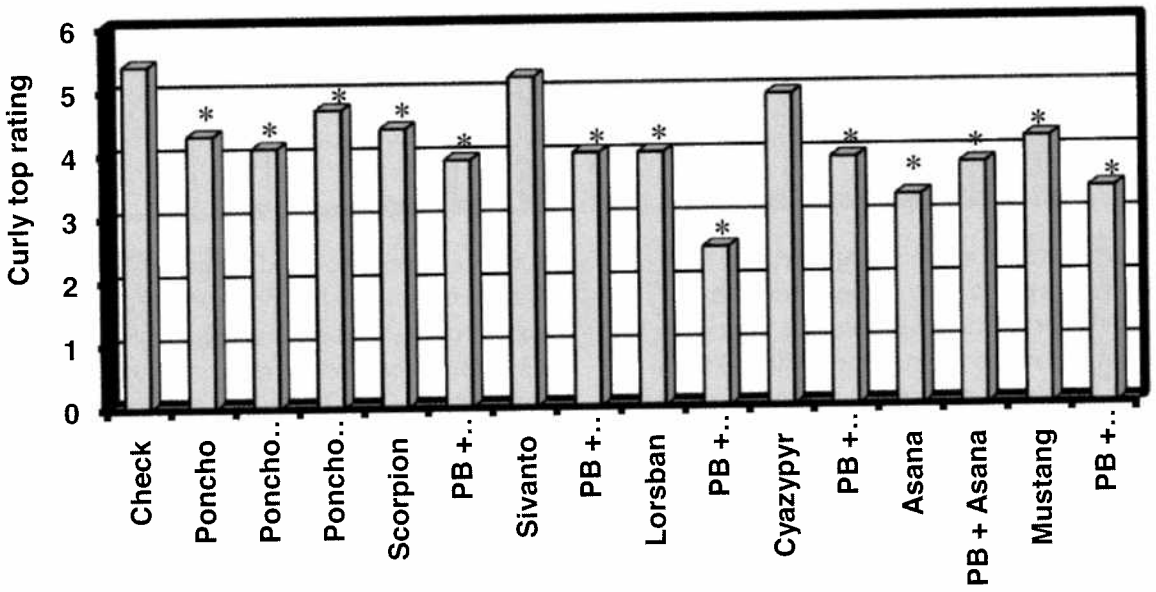


Figure 1. Mean curly top ratings ratings (scale 0 to 9; 0 = no disease; 9 = dead) for 16 treatments in the 2012 field study in Kimberly, ID. The columns with anasterisk were significantly lower (P< 0.0001) than the untreated check. Cultivar B-42 was used for this study and typically ranks among the top ten cultivars for resistance in the curly top nursery. PB = Poncho Beta. Scorpion, Sivanto, and Cyazypyr are currently not registered for use on sugarbeets.

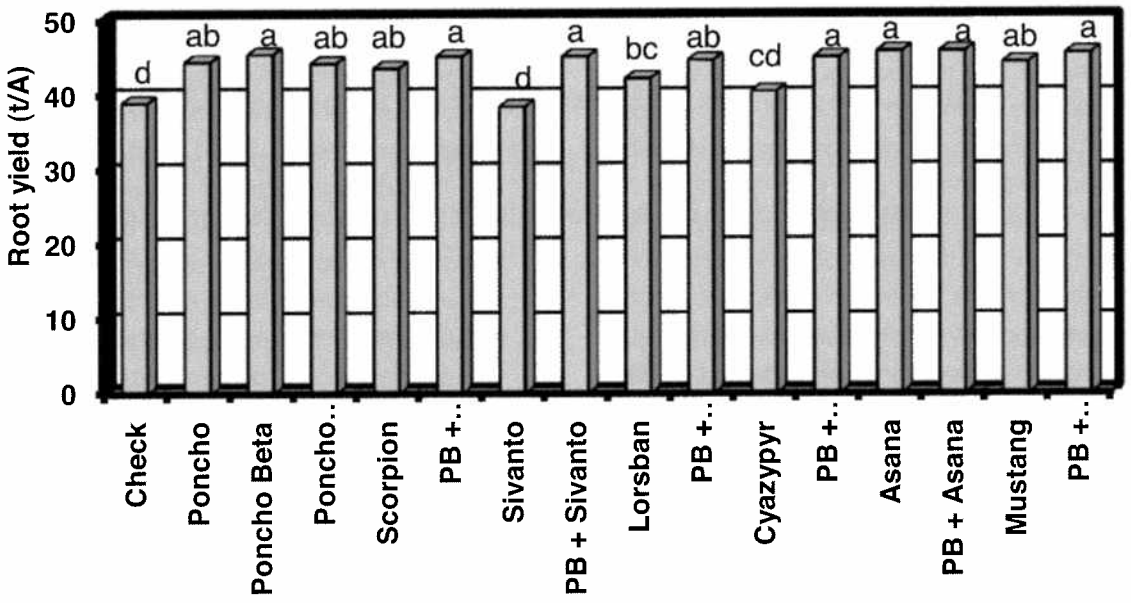


Figure 2. Mean root yield in tons/acre for 16 treatments in the 2012 field study in Kimberly, ID. Columns with a different letter are significantly (P< 0.0001) different. PB = Poncho Beta. Scorpion, Sivanto, and Cyazypyr are currently not registered for use on sugarbeets.

Curly top typically gets initiated in the spring when the host weeds for the beet leafhopper dry up in the desert areas. If the vector migrates into production fields before the eight-leaf growth stage, the impact on the sugarbeetplant is magnified. To control this problem, host resistance has been the mainline defense against curly top since the mid-1930s and remains so today. Beginning in 2006, the neonicotinoid seed treatments (Cruiser, NipsIt, and Poncho) have been shown to supplement host resistance by providing early season protection. Recent research indicates that good curly top control even under severe pressure should be expected up to at least 59 days after planting. In an effort to find a means to extend control beyond this timeframe, a study was conducted in 2012 to evaluate the impact foliar insecticides have on curly top. The field study was arranged in a randomized complete block design with 8 replications and planted with the cultivar B-42, which usually ranks in the top ten for resistance in the Curly Top Nursery. The 16 treatments included a check (no seed treatment) and Poncho Beta-treated seed with and without one of six foliar insecticides (applied seven days before and six days after beet leafhopper release) along with the seed treatments Poncho and Poncho Votivo. On 22 Jun (59 days after planting), six viruliferous beet leafhoppers per plant were released to ensure good disease pressure. Visual foliar ratings on both 15 Aug (data not shown) and 15 Sep (Fig. 1), indicated some seed and foliar treatments reduced (P< 0.0001) symptoms by 13 to 60% compared to the untreated check. Root yields were increased (P< 0.0001) by 8 to 18% compared to the untreated check (Fig. 2). Estimated recoverable sucrose was increased (P< 0.0001) by 12 to 21% compared to the untreated check (Fig. 3). Since the cultivar used in this study typically ranks in the top ten for curly top resistance in the nursery, these data demonstrate the importance of supplementing host resistance with insecticide use when there is good curly top pressure. This data also demonstrates that

some foliar insecticides such as the pyrethroids Asana and Mustang may be applied to help reduce curly top when the efficacy of the seed treatments declines. The decline appears to not occur until sometime beyond 59 days after planting, but the actual duration of longevity of efficacy remains to be clarified. Using foliar insecticides repeatedly throughout the early season for curly top control would not be recommended, but foliar insecticides should be considered as a means to extend control provided by the seed treatments sometime beyond 59 days after planting. In addition, repeated use of pyrethroids early in the season will have negative effects on natural predators which could lead to high populations of certain pests, including aphids and spider mites. If mites are a problem, then the use of Lorsban could be considered, since it should impact mites and also provide good supplemental curly top control. This curly top field study will be repeated in 2013 and be available for the general public to tour in late July.

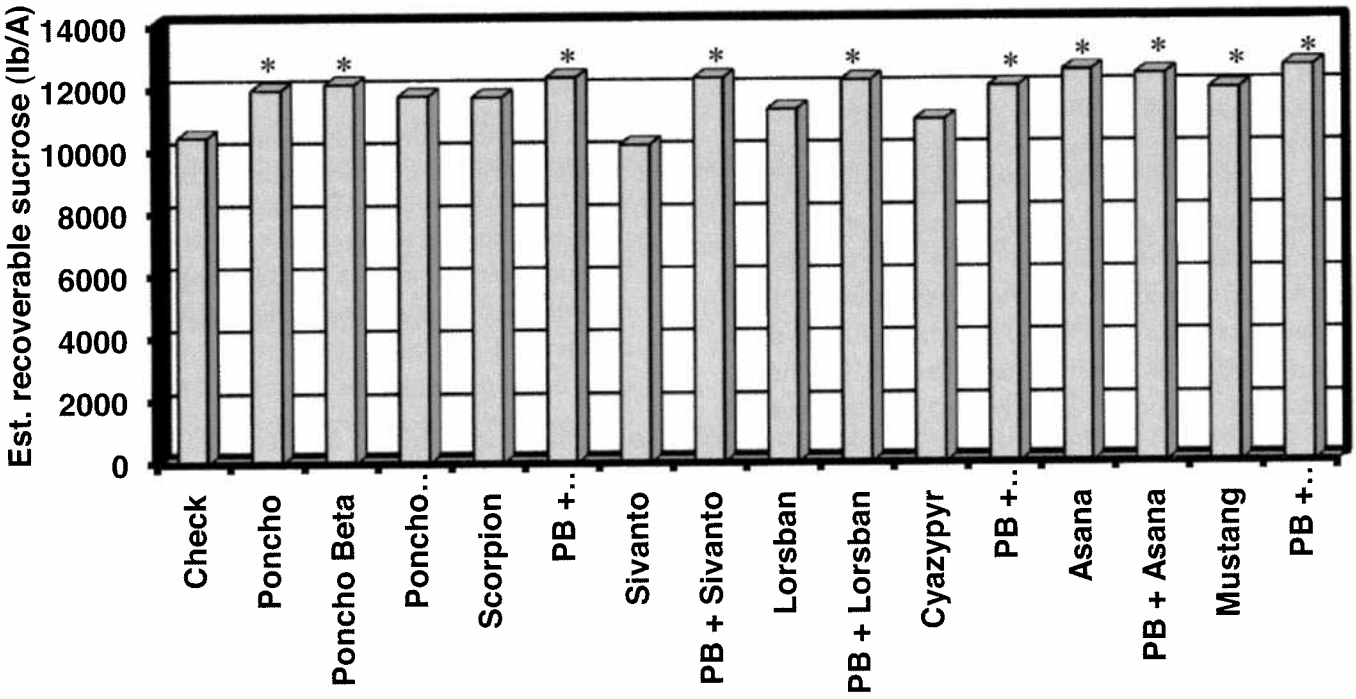


Figure 3. Mean estimated recoverable sucrose in pounds per acre for 16 treatments in the 2012 field study in Kimberly, ID. Columns with an asterisk are not significantly ($P < 0.0001$) different from each other, but are different from the check. PB = Poncho Beta. Scorpion, Sivanto, and Cyazypyr are currently not registered for use on sugarbeets.