

COMPETITIVE ABILITY OF VOLUNTEER CORN IN CORN AND SOYBEAN. Jill Alms, Mike Moechnig, Darrell Deneke, and Dave Vos, South Dakota State University, Brookings, SD.

Volunteer corn can be a problematic weed in corn-soybean and corn-corn cropping systems. However, there is little information available quantifying the effects of volunteer corn on soybean or corn yield, particularly in drier regions of the Midwest where competition for soil moisture may influence weed-crop growth interactions. Concerns regarding the effects of volunteer corn on corn have increased due to greater continuous corn acres resulting from expansion of the ethanol industry. One option for controlling volunteer corn in corn may be to rotate glyphosate- and glufosinate-tolerant corn varieties. However, glufosinate may only partially control volunteer corn which could result in corn yield loss. Similarly, glufosinate used to control volunteer corn in glufosinate-tolerant soybeans may also result in partial volunteer corn control and soybean yield loss. Studies were conducted in Brookings, SD to 1) quantify the effect of volunteer corn on corn yield, 2) quantify the effect of partially controlled volunteer corn on corn yield, 3) quantify the effect of volunteer corn on soybean yield, and 4) quantify the effect of partially controlled volunteer corn on soybean yield.

The effect of volunteer corn on corn yield was determined by establishing volunteer corn densities of 0, 0.2, 0.8, 1.2, 1.9, 2.5, 2.7, or 3.5 plants m^{-2} in Dekalb DKC 46-60 VT3 corn. Volunteer corn density treatments were established in a RCB design with four replications. Volunteer corn seed was collected from DKC 58-73 harvested in 2006, scattered on the soil surface on May 14, 2007 and incorporated approximately 4 cm below the soil surface using a field cultivator. On November 7, 2007, volunteer corn ears were hand-harvested from the center five feet of each ten foot wide plot and the remaining corn in the center five feet was harvested with a plot combine on November 10. The results indicated that corn yield loss ranged from 0-13% among the volunteer corn densities or 0-9% when accounting for corn grain produced by volunteer corn. In another study, volunteer glyphosate-tolerant corn was established at 3.5 plants m^{-2} in corn and glufosinate (470 g a.e. ha^{-1}) was applied when volunteer corn was 13, 18, 28, or 46 cm tall. These treatments were established in a RCB design with four replications. Visual estimates of volunteer corn control were greatest when glufosinate was applied to 18-28 cm tall volunteer corn. Partially controlled or uncontrolled volunteer corn did not reduce corn yield. These results indicated that volunteer corn had a relatively minor affect on corn yield and incomplete control of volunteer corn with glufosinate did not reduce corn yield.

The effect of volunteer corn on soybean yield was determined by establishing volunteer corn densities of 0, 0.2, 0.6, 1.5, or 3.5 plants m^{-2} in soybeans. Volunteer corn treatments were established in a similar manner as the volunteer corn in corn density experiment. Soybean yield loss ranged from 0-54% among the volunteer corn densities. In another study, volunteer corn was established at 1.5 plants m^{-2} in soybean and clethodim was applied at 13.2, 26.3, or 52.6 g a.i. ha^{-1} when volunteer corn was approximately 51 cm tall. At the low, medium, and high clethodim rates, volunteer corn biomass was reduced by 0, 30, and 76%, respectively, and soybean yield loss was 5, 14, and 21%, respectively. These results indicated that volunteer corn greatly affected soybean yield and even partially controlled volunteer corn resulted in soybean yield loss.