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Strip crop rotations influence weed density and sugar beet yield.

Sugar beet seedlings must be protected from winds in the spring because wind and soil particles can abrade young seedlings, stunt, and kill the crop. Planting corn and soybeans in strips followed by fall mulch tillage may reduce wind erosion and protect sugar beet seedlings. Research was conducted on a commercial farm in Bay County, Michigan. Sugar beets were planted following two years of corn and soybean strip-cropping. In this research we evaluated three postemergence herbicide programs for weed management in sugar beets.

Potash (250 lb/A) was applied to the field in the fall prior to sugar beet planting. The field was then chisel plowed using 3-inch twisted shovels. The field had 41% corn residue and 19% soybean residue prior to planting. The soil type was a loamy sand. The field was tilled once in the spring with a combination tool that included discs, sweeps, spring tooth harrow, and a rolling basket. The planter was a 12-row John Deere 7000 with Martin row cleaners mounted on each seeding unit. The row cleaners were two iron wheels with interlocking fingers that cleared residue and soil clods from the seed bed. Sugar beets 'E-17' were planted at a 4-inch spacing in the same direction as the strips of residue; six sugar beet rows were planted in the corn and six rows in the soybean residue. Starter fertilizer (200 pounds of 9-26-15 with ¼% boron) was applied two inches to the side and two inches below the seed. Pyrazon (Pyramin DF) at 1 lb of active ingredient/band acre was applied preemergence in a 10-inch band over the sugar beet row. Postemergence herbicide treatments included: 1) a desmedipham + phenmedipham + ethofumesate (Betamix Progress) split application at 0.08 lb of active ingredient/acre applied twice, 2) desmedipham + phenmedipham + ethofumesate (Betamix Progress) once at a standard rate of 0.08 lb of active ingredient/ acre, 3) a desmedipham + phenmedipham (Betamix) split application at 0.33 lb of active ingredient/acre applied twice, 4) a hand-weeded control, and 5) no postemergence herbicide. The herbicide treatments were applied using a 12-row band sprayer. Two flat fan nozzles covered a 10-inch band over each row. The sprayer traveled at 6 m.p.h. and herbicides were applied in 8 gpa at 35 p.s.i.. The first split application was made 21 days after planting. Cultivation with cut away discs and tunnel shields occurred 25 days after planting. The second split application and the full rate treatment were applied 30 days after planting. At 35 days after planting, 28% liquid ammonium nitrate at 30 g.p.a. was applied with the second cultivation.

Weed densities were measured in a 250 square foot area in each plot. The area measured included the 10 inch band width. The prominent weeds were common lambsquarters and redroot pigweed. All postemergence herbicide treatments controlled weeds in sugar beets in both years. The field area in soybean residue had consistently more weeds in both years than the corn residue. The corn crop was cultivated the year before which reduced weed populations in corn. The soybean crop could not be cultivated because it was drilled and late emerging weeds may have emerged in the soybean canopy and set weed seed.

Sugar beet stand, yield, and sugar content in both years of research was greater where sugar beets were planted into corn residue compared with soybean residue. We

conclude that planting sugar beets following corn was advantageous from a weed management standpoint and resulted in better sugar beet stands, yield, and percent sugar.