

## **EFFECTS OF TILLAGE AND IRRIGATION PRACTICES ON SUGAR BEET YIELD AND SOIL MOISTURE**

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### **ABSTRACT**

Strip tillage (ST) saves grower time and fuel expenses by reducing tillage to a narrow band where the seed and fertilizer are placed. Residue from the previous crop may reduce erosion and near-surface wind velocity, enhance soil moisture, and improve soil tilth and water infiltration. A study at the University of Idaho Kimberly Research & Extension Center (Kimberly, ID) was initiated during 2010 to compare yield and soil moisture among two tillage treatments (ST and conventional tillage [CT]) and four irrigation treatments based on evapotranspiration (ET) rates of CT sugar beet (50, 75, 100, and 125% ET). During 2010, clean yield did not differ between tillage treatments, but was significantly lower in 50% ET plots relative to the other irrigation treatments. Percent sucrose in 75% ET plots was higher for ST treatments during 2010, possibly due to increased water retention on these plots; however, estimated recoverable sucrose (ERS) did not differ among treatments. During 2011, clean yield and ERS were higher in CT plots, possibly due to a wet spring that may have slowed seedling development in ST plots. Percent sucrose did not differ among treatments during 2011. Clean yield differed significantly among tillage and irrigation treatments during 2012; yield was generally lowest for CT plots under 50 or 125% ET and for ST plots under 75% ET. During 2012, percent sucrose was significantly higher for CT plots and also differed by irrigation treatment; sucrose was higher for 75 and 100% ET treatments than for 50 and 125% ET treatments. ERS differed among tillage and irrigation treatments; patterns were similar to those of yield differences. Weekly soil moisture readings were taken during each season at 15-cm increments to a depth of 1.52 m. Where differences were observed, ST treatments generally showed greater water retention than CT treatments. Yields showed different responses to tillage and irrigation treatments in all three years, suggesting that neither tillage type holds an advantage in all conditions or years. Yields were generally comparable between tillage types, and reduced input costs likely will be the strongest driver of continued adoption of strip tillage by growers in Idaho.