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## **TILLAGE SYSTEM, NITROGEN FERTILIZER, AND IRRIGATION EFFECTS ON INSECT, WEEDS AND SUGAR BEET YIELDS**

### **ABSTRACT**

Much is not yet clearly understood about the interactive effects of tillage level, nitrogen (N) fertilizer application rates, and irrigation amounts in sugar beet production. A field study was conducted in 2013 and 2014 at the University of Idaho Kimberly Research and Extension Center to study the effects of tillage, N fertilizer rate, and irrigation amount on weeds and pestiferous insects, root and sugar yields, nitrates, and conductivity. Three tillage treatments were established: conventional tillage (CT), strip tillage (ST), and direct seeding (DS). Four N fertility rates were applied at 50, 75, 100, and 125% of recommended rate for CT sugar beet. The irrigation treatments were based on sugar beet evapotranspiration (ET) and were: 50, 100, and 150% of ET. Experimental design was a split plot randomized complete block design with tillage as the main plot, irrigation as the sub-plot, and N rate as the sub-sub-plot. By the 12 leaf sugar beet growth stage, *Chenopodium album* and *Setaria viridis* densities did not differ between CT, ST, and DS at optimum irrigation and N rate. In 2013 leafminer egg and larval densities were greatest in CT compared with DS and ST. Averaged over 2 years, root yield was 8.7 and 6.7 Mg ha<sup>-1</sup> higher in CT and ST, respectively, than DS, but estimated recoverable sucrose did not differ between CT, ST, and DS. Combined yield and quality results over the 2 years indicated no significant interactions among tillage, irrigation, and N rates suggesting that N and irrigation recommendations do not need to be adjusted for tillage.

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