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SOIL WATER CONTENT, DISEASE, WEED, AND INSECT RESPONSES IN STRIP-TILL SUGAR BEET

Teneur du sol en eau et réponses des maladies, adventices, et insectes lors du strip-till de betteraves sucrières / Bodenwassergehalt und Aufkommen von Krankheiten, Unkräutern und Schadinsekten bei Streifensaat von Zuckerrüben

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. These effects in combination with reduced soil disturbance may affect soil-borne pathogens, weeds, and both pestiferous and beneficial arthropods. A 3-year study was conducted during 2010-2012 to examine responses of soil moisture, disease, weed, and insect responses to 2 tillage treatments (ST and conventional tillage [CT]) and 4 irrigation treatments based on evapotranspiration (ET) rates of CT sugar beet (125, 100, 75, and 50% ET). No uniform disease development was observed for beet necrotic yellow vein virus (BNYVV) or *Rhizoctonia solani*. Weed responses varied by species and among years, but results did not suggest that weed control should be more challenging with strip tillage. Insect pests (*Pegomya betae* and *Aphis fabae*) were largely unaffected by irrigation regime, but showed either lower abundance in strip-till plots or no difference by tillage treatment. Certain groups of soil-dwelling predatory arthropods (Staphylinidae and Opiliones) were favored by strip tillage. Strip-till plots generally contained more moisture in the soil profile at the end of the season than did the corresponding irrigation treatment under conventional till. Yields showed different responses to tillage and irrigation treatments in all three years of this study, suggesting that neither tillage type holds an advantage over the other in all conditions or in all years. Yields generally were comparable between strip-tilled and conventionally tilled plots, and reduced input costs likely will be the strongest driver of continued adoption of strip tillage by growers in Idaho.