

Soil management options to improve irrigation water use of row crops

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Irrigated agricultural production continues to expand in New Zealand, but with an increasing focus on more efficient water use. Managing the soil to enhance the capture and subsequent availability of irrigation water for crop use has received much less attention than development of irrigation infrastructure. In the light of recent studies that have indicated that some high value water sensitive crops such as potatoes (*Solanum tuberosum*) are not achieving their expected yields in spite of irrigation, we conducted a field experiment to explore how bed architecture, mulch and residue amendments affect soil water capture and availability.

A potato (cv. Bondi) field experiment was set up at Lincoln, Canterbury on a Wakanui silt loam, classified in New Zealand as a Mottled Immature Pallic soil. Treatments (replicated four times) consisted of: two bed architectures (traditional ridge and furrow versus flatbed) and two contrasting irrigation regimes (high versus low frequency); flat beds were then split with +/- straw mulch and +/- incorporated straw. To understand the treatment effect on available water, the soil volumetric water contents were measured continuously. In addition, at the beginning and end of the growing season, infiltration and soil water release characteristics were measured in the field using tension disc infiltrometers and in the laboratory on intact soil cores, respectively. Soil temperature was measured in the +/- mulch plots. In addition, yields were determined.

Yield was greater in flatbed plots and mulched plots, indicating that the ability of the soil to store and supply water was altered by the bed architecture and amendment treatments. We will discuss the effects on infiltration and water availability and implications for improving water use in irrigated potato crops.