

RESPONSE OF 'SUPERIOR' POTATOES TO SOIL MANAGEMENT AND IRRIGATION

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Rainfall distribution in Aroostook County is irregular, causing periods of both excess and deficient moisture. Improved soil management might help to provide soil conditions to enable the potato crop to tolerate periods of deficient moisture. In the present study, the effects of irrigation and soil management on potato growth and yield were determined over two growing seasons. Soil management, consisting of rotation crop (oats vs. green manure) and soil amendments (none vs. 22.4 Mg ha⁻¹ compost and 44.9 Mg ha⁻¹ manure) were tested in factorial combination with supplemental irrigation treatments (none, moderate and excessive in 1993, and none, reduced, moderate in 1994).

Significant amendment effects were detected on early crop growth, dry matter production and yield in 1993. Tuber size was increased, but specific gravity was reduced by the amendment treatments. Irrigation did not affect the yield. In 1994, late-season haulm vigor, dry matter production, tuber size and yields were significantly increased by irrigation, while specific gravity was reduced. Early crop growth, dry matter production, tuber size and yields were also significantly improved by the amendment treatments.

No significant effect of either amendment or irrigation on any root parameter was detected in 1993. In 1994, root length density and root dry weight were significantly

affected by either irrigation and amendment. Highest root length density values were obtained when both supplemental irrigation and amendments were provided. Root/shoot ratio and root distribution among soil layers were not affected by either irrigation or amendment during the two years of the experiment. Roots were mostly (approximately 85 %) concentrated in the upper 30-cm layer of the soil.

The choice of the rotation crop did not affect yields, tuber size distribution and specific gravity over the two growing seasons. The delayed vine maturity promoted by the green manure treatments did not result in enhanced tuber growth.

The long term effects of using the soil management treatments and the possible impacts of the soil amendments on disease transmission are currently being studied.