

The Effect of Applying a Nutrient in Leaf Sprays on the Absorption of the Same Nutrient by the Roots

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Journal of Experimental Botany, Volume 8, Issue 3, 1957, Pages 401–412,

GILLIAN N. THORNE, The Effect of Applying a Nutrient in Leaf Sprays on the Absorption of the Same Nutrient by the Roots, *Journal of Experimental Botany*, Volume 8, Issue 3, 1957, Pages 401–412, <https://doi.org/10.1093/jxb/8.3.401>

Abstract

SUMMARY

Ammonium nitrate solution applied to the leaves of sugar-beet increased plant dry weight and uptake of nitrogen by the roots. Uptake of phosphorus by the roots of swedes, but not sugar-beet, grown with high phosphorus supply to the roots, was decreased by applying sodium phosphate solution to the leaves; uptake from a lower phosphorus supply to the roots was unaffected. Phosphorus applied to the leaves had no effect on dry weight. Potassium uptake by the roots of sugar-beet plants grown with high potassium supply to the roots was unaffected by painting the leaves with a potassium chloride solution, that of plants with an intermediate potassium supply was increased, and plants grown with a low supply to the roots absorbed almost all the available potassium so painting could not much increase uptake by the roots. Application of potassium to the leaves increased dry weight of plants with low or medium potassium supply to the roots and did not affect that of plants with a high potassium supply.

The top: root ratio for phosphorus content in mg. per plant was greater for phosphorus absorbed via leaves than for phosphorus absorbed via roots. Increasing the phosphorus supply to the roots increased this ratio for phosphorus absorbed either via leaves or roots.

Potassium absorbed by leaves was slightly more efficient in increasing dry weight than potassium absorbed at the same time by the root. A similar comparison was not possible for nitrogen or phosphorus.

The results of these and previous experiments indicate that all the nitrogen and potassium and over 80 per cent. of the phosphorus applied to leaves was absorbed. The small amount of phosphorus remaining unabsorbed on the surface of the leaf was unaffected by phosphorus supply to the root.

Spray concentrations of potassium chloride and potassium sulfate affect potato growth, yields, and chemical composition

- [Winston M. Laughlin¹](#)

American Potato Journal **volume 39**, pages 100–106 (1962)

Summary

Nine weekly sprays of solutions of 0, 1.2, 2.4, 3.6, and 4.8% K₂O as KCl and K₂SO₄ supplying 0, 12, 24, 36 and 48 pounds K₂O per acre during the season were applied to Arctic Seedling potato foliage in a 5² factorial in 1959 and 1960.

Rapid reduction in tuber specific gravity occurred with increasing concentrations of potassium chloride sprays. Increasing concentrations of potassium sulfate slowly reduced the specific gravity. This reduction became significant only at the highest concentration.

Leaf margins and tips burned when sprays of potassium chloride exceeding 1.2% K₂O were used. No leaf injury resulted from any spray concentration of potassium sulfate.

Tubers from plants receiving potassium chloride contained more potassium and magnesium than did those receiving potassium sulfate.

Each increasing concentration of potassium spray increased the tuber potassium content.

Potassium spray concentrations exceeding 1.2% K_2O significantly increased tuber magnesium content.