

## Crop Information

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### Potato Nutrition

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This season with every season, the weather creates conditions that will affect some nutrient availability. Last season it was Mg because of the dry conditions. When this occurs this element seems to be a problem all the way through the season as was Mg last year.

This year we are noticing in tissue test that we have received on various crops that the element is Potassium and in some cases Zinc. Cool wet soil conditions and water soaked soil conditions will always reduce the availability of Potassium. The up take of Potassium by the root is very dependent on the root temperature, it is very low at 4 degrees C, increases rapidly up to 20 degrees C, and then more slowly between 20 and 30 degrees C.

Potassium promotes starch deposition and plays a vital role in certain reactions in the photosynthesis process. Low levels of potassium have a negative influence on quality aspects such as chip colour and specific gravity.

The daily Potassium demand for Potato is 5.7 kg/ha/day. Potassium is involved in numerous metabolic pathways within the plant and is usually the first nutrient that becomes limiting to the plant with any stress condition that we may experience in the growing season.

Over 60 enzyme systems are activated by Potassium. It is difficult to imagine a growth or reproductive process in plants that is not directly or indirectly impacted in a very significant way by Potassium. Potassium plays the following roles;

#### Photosynthesis

- \* Coloration of leafy vegetables (healthy green colour)
- \* Uniformity of ripening
- \* Growth rate

#### Synthesis of amino acids and proteins

- \* Food quality

#### Carbohydrate synthesis and translocation

- \* Bud development
- \* Sugar content (reducing sugars in potato)
- \* Enhanced flavour

#### Lignin and cellulose development

- \* Firm stems and stalks
- \* Resistance to bruising and physical breakdown
- \* Longer storage life and internal quality

#### Disease and insect resistance

- \* Thicker epidermal layer
- \* Fewer blemishes
- \* Higher market grade
- \* Less culls and waste

### Root Growth

- \* More effective utilization of soil moisture
- \* Improved nutrient uptake
- \* Greater vigour

In the early stages of potato growth, sprout emergence to Vegetative growth the most important elements are Nitrogen, Magnesium, Sulphur, Boron and Phosphorus to develop foliage and begin chlorophyll production. As the crop moves into establishing canopy and fully expanded leaves Iron, Manganese, Zinc and Copper become of more importance to establish photosynthesis. As the crop goes through vegetative growth stage and into optimum light interception Magnesium, Phosphorus, Nitrogen and Potassium become more important.

Classification of nutrients in this manner allows us to understand the nutrient requirements at certain stages but placement of these nutrients and timing of application to ensure the availability of these nutrients at specific stages is ongoing. A complete nutrient management program begins with a soil test and fertilizer application to in season supplementation with to foliar applied nutrients to correct deficiencies or shortcomings in the crop.

A complete management program requires the use of petiole analysis to identify the nutrients that are deficient. Although we have indicated that this season we have documented Potassium and Zinc as problem nutrients due to weather patterns one cannot assume this to be the case. Supplemental application of nutrients that are not required may cause or create other deficiencies and have a negative effect.

A potato crop that is low at this time with Potassium (less than 10% in the petiole), requires supplementation in order to produce the leaf area and carbohydrate production necessary to produce the quality and yields. However if Potassium levels are adequate and additional Potassium is applied it may suppress Magnesium and or Calcium that could create quality problems in the future.

A Pro-active petiole analysis program throughout the season is a valuable management tool in any crop but particularly in the potato crop when processing quality of this crop is so important.

#### How it is done

Using a pro-active petiole program beginning early in the season monitor the crop for nutrient requirements.

Remove the 4th petiole from the top of the plant, strip away the leaves and submit the petioles. Petiole should be taken from 20 locations in the field taking 3-4 petioles from 3-4 plants in order to get a good representative sample.