



## CROP GUIDE - Potato

### Sampling Notes

KB Item: 3488v3

Two approaches are used for tissue testing of a potato crop: (i) analysing the petiole through the season, in particular to monitor the nitrogen status, and (ii) leaf analysis at mid season, to evaluate the status of all plant essential nutrients.

#### (1) Petiole - Early Season

**Sampling Time:** Starting early in the season, and continuing as required.

**Plant Part:** Petiole.

**Collect From:** Fourth or fifth leaves from the top.

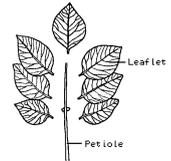
**Quantity per Sample:** 30 petioles from randomly selected plants.

**Recommended Tests:** Basic Plant (excl N) (BPpet), Nitrate Nitrogen (NO<sub>3</sub>).

**Comments:** Petiole analysis is recommended for monitoring the status of nitrogen, which is a key nutrient in potato production. If using this technique, however, we recommend that you consult a local advisor or crop specialist who could provide more specific data for your particular growing conditions.

Separate the leaflets from the petiole immediately after the petiole has been removed from the plant stem.

It can also be useful to analyse the petioles for P, K and Mg.



#### (2) Leaf - Mid Season

**Sampling Time:** When 30 cm tall, or when tubers are half grown.

**Plant Part:** Recently matured compound leaves (leaflets & petiole).

**Collect From:** Fourth or fifth leaves from the top.

**Quantity per Sample:** 25-50 leaves from 25 randomly selected plants.

**Recommended Tests:** Basic Plant (BP), Nitrate Nitrogen (NO<sub>3</sub>).

**Comments:** To help diagnose an obvious problem, leaves showing the first signs of the distinctive symptoms should be collected as soon as abnormalities appear. If sampling outside the normal sampling time it is useful to take a second sample of similar, healthy leaves from nearby unaffected trees for analysis as a comparative standard.



#### Soil

**Sampling Time:** Prior to crop establishment.

**Core Depth:** 15cm.

**Collect From:** Select at random from the whole growing area.

**Quantity per Sample:** 15 - 20 cores.

**Recommended Tests:** Basic Soil (BS), Available Nitrogen (AN).

**Comments:** Soil samples are usually collected for analysis prior to planting the crop.

If trying to diagnose a problem with crop growth and yield, samples should be collected from the rooting zones of the worst affected plants. In these circumstances, a second sample taken for comparative purposes from the rooting zones of healthy plants may be useful.

## Comments

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The suggested interpretation levels for petioles are from U.S. and Australian sources and should be regarded as guideline values only. Unpublished work in New Zealand has shown the levels found in NZ potato crops will vary according to the variety, the area in which they are grown and on seasonal factors (for example, a dry season will result in a lower than normal nitrate-N petiole levels.)

Normal Range levels for Early Season Petioles are given in the table above. Mid season nitrate-N levels will drop to 6,000-10,000 ug/g, P to 0.20-0.40% and K to 8.0-12.0%. Late season levels are normally 3,000-6,000 ug/g for nitrate-N, 0.15-0.25% for P and 5.0-9.0% for K. Magnesium levels tend to be constant throughout the season.

Optimum leaf levels have been obtained from overseas publications, but modifications based on NZ findings have been made. Normal leaf magnesium levels are now lower than those quoted in the overseas references (typically 0.5 - 1.0%). Crops in N.Z. showing no visible stress symptoms have been found to have magnesium levels as low as 0.20%.

Potassium levels also tend to be higher in N.Z. crops, particularly for North Island crops and in 30 cm tall plants. The optimum ranges for potassium adopted at this laboratory have been modified to reflect this observation. (This difference may be due to petioles having especially high potassium levels; the overseas references do not state whether they apply to leaf blades only, or leaf blade plus petiole. We recommend a sampling approach that includes the petiole.)

Potatoes are regarded as having a medium nitrogen requirement and are semi-tolerant towards boron.

Soil pH should be maintained in the range 5.4 - 5.8. While potatoes will thrive at soil pH levels of 6.0, a lower pH is normally recommended to suppress development of potato scab.

Results for copper, zinc and manganese in leaves sprayed with fungicides will not be reliable due to adhering spray residues on the leaves.

Iron levels cannot be reliably assessed from leaf analysis, due to the presence of physiologically inactive forms of iron within the tissue. Also, soil contamination of leaves growing near the ground may elevate total iron results.

## References

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Reuter, D.J. and Robinson, J.B. Plant analysis. An interpretation manual.

Geraldson, C.M.; Klacan, G.R. and Lorenz, O.A. 1973. Soil testing and plant analysis. L. Walsh (Ed), Soil Science Society of America, Ch 22.

Blackmore, L.C; Searle, P.L and Daly, B.K. 1987. Methods for chemical analysis of soils. NZ Soil Bureau Scientific Report 80. NZ Soil Bureau, DSIR.

Weir, R.G. and Cresswell, G.C. 1995. Plant nutrient disorders 3. Vegetable crops. Inkata Press.

## Disclaimer

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Normal Range levels shown as histograms in test reports relate specifically to the sampling procedure provided in this crop guide. The Normal Range levels in test reports and Comments provided in this Crop Guide are the most up to date available, but may be altered without notification. Such alterations are implemented immediately in the laboratory histogram reports. It is recommended that a consultant or crop specialist be involved with interpretations and recommendations.