BACK PADDOCK NUTRIFACT

Guidelines for Sampling Plant Tissue for Annual Horticultural Crops

Why Measure Nutrients In Plant Tissue?

Of the many factors affecting crop quality and yield, soil fertility is one of the most important. It is fortunate that producers can manage fertility by measuring the plant's nutritional status. Nutrient status is an unseen factor in plant growth, except when imbalances become so severe that visual symptoms appear on the plant.

The only way to know whether a crop is adequately nourished is to have the plant tissue analysed during the growing season.

What Plant Tissue Analysis Shows

Plant tissue analysis shows the nutrient status of plants at the time of sampling. This, in turn, shows whether soil nutrient supplies are adequate. In addition, plant tissue analysis will detect unseen deficiencies and may confirm visual symptoms of deficiencies. Toxic levels also may be detected. Though usually used as a diagnostic tool for future correction of nutrient problems, plant tissue analysis from young plants will allow a corrective fertiliser application that same season.

A plant tissue analysis can pinpoint the cause, if it is nutritional. A plant analysis is of little value if the plants come from fields that are infested with weeds, insects, and disease organisms; if the plants are stressed for moisture; or if plants have some mechanical injury.

The most important use of plant analysis is as a monitoring tool for determining the adequacy of current fertiliser practices. Sampling a crop periodically during the season or once each year provides a record of its nutrient content that can be used through the growing season or from year to year. With soil test information and a plant analysis report, a producer can closely tailor fertiliser practices to specific soil-plant needs.

DOs AND DON'Ts OF PLANT TISSUE SAMPLING

DOs

- Sample the correct plant part at the specified time or growth stage.
- Use clean plastic disposable gloves to sample to avoid contamination.
- Sample tissue (e.g. entire leaves) from vigorously growing plants unless otherwise specified in the sampling strategy.
- Take sufficiently large sample quantity (adhere to guidelines for each species provided)
- When troubleshooting, take separate samples from good and poor growth areas.
- Wash samples while fresh where necessary to remove dust and foliar sprays.
- Keep samples cool, after collection.
- Refrigerate or dry if samples can't be despatched to the laboratory immediately, to arrive before the week-end.
- Generally sample in the morning while plants are actively transpiring.

DON'Ts

- Avoid spoiled, damaged, dead or dying plant tissue.
- Don't sample plants stressed by environmental conditions.
- Don't sample plants affected by disease, insects or other organisms.
- Don't sample soon after applying fertiliser to the soil or foliage.
- Avoid sample contamination from dust, fertilisers, chemical sprays as well as perspiration and sunscreen from hands.
- Avoid atypical areas of the paddock, e.g. poorly drained areas.
- Don’t sample plants of different vigour, size and age.
- Don’t sample from different cultivars (varieties) to make one sample.
- Don't collect samples into plastic bags as this will cause the sample to sweat and hasten its decomposition.
- Don't sample in the heat of the day, i.e. when plants are moisture stressed.
- Don't mix leaves of different ages

Reference - Standard sampling procedures and interpretation criteria are based on the guidelines provided in “Plant Analysis – An Interpretation Manual” Reuter and Robinson, CSIRO Publishing 1997.

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Crop	Growth Stage To sample	Plant Part	No. Reqd.
Asparagus	Actively growing ferns during mid growth	Top 30 cm portion of fern	70 - 100
Broccoli	Early heading	MRM Most recently mature leaf at early heading	20
Bean (Green or French)	Before flowering	MRM Most recently mature trifoliate leaf plus petiole at each growth stage	50
	At early (first) flowering		50
	Full flowering		50
Beetroot	When roots 4 – 6cm diameter	MRM Most recently mature leaf	40
Brussels Sprouts	At early sprouts	MRM Most recently mature upper leaf at heading (early sprouts)	20
Cabbage	5 weeks after transplanting	MRM Most recently mature leaf	30
	8 weeks after transplanting	MRM Most recently mature leaf	30
	Heads half grown	Wrapper leaf	15
	At harvest	Wrapper leaf	15
Capsicum	Prior to flowering	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	50
	First flowers open		50
	Early fruit set		50
	Early harvest		50
Carrot	Roots 1 – 3cm diameter	Sample most recently mature leaf minus extended main petiole (at each growth stage)	50
	Harvest		50
Cauliflower	Buttoning	MRM Most recently mature leaf at each growth stage	15
	Heading		
Celery	6 weeks after transplanting	Outer petiole	50
	At maturity	Outer petiole	50
	Mid growth period	MRM leaf plus petiole (Most recently mature leaf including petiole) (different data set)	25
Chinese Cabbage	8 leaf stage	Oldest undamaged leaf at each growth stage	30
	At maturity		15
Cucumber	Before flowering	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	25
	Early flowering		25
Eggplant	Early fruit set	MRM plus petiole (Most recently mature leaf plus petiole)	25
Ginger	60 – 90 days after planting	Upper leaf blade – for all nutrients except N	60
	180 – 250 days after planting	Third leaf from the top of the plant – calibrated for N only	45 - 140
Lettuce	8 leaf stage	MRM Most recently mature leaf	40
	Heads half grown	Wrapper leaf	20
	At maturity	Wrapper leaf	20
Lettuce Cos	8 leaf stage	Oldest undamaged leaf at each growth stage	40
	At maturity		20

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Crop	Growth Stage To sample	Plant Part	No. Reqd.
Onion	Before bulb initiation	MRM Most recently mature leaf at each growth stage	50
	Mid growth		40
Pea	Flowering	Youngest mature compound leaf	50
Potato	Tuber initiation	PYML Petiole of the youngest mature leaf (5th leaf from the growing point) at tuber initiation (tubers double the normal stolon diameter) and also during tuber bulking.	40
	Tuber bulking		
Potato	Plants 20 – 25cm high	MRM Most recently mature leaf plus petiole at each growth stage	40
	At first flowers		
	Tubers half grown		
Pumpkin	Early flowering	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	20
	Early fruit set		20
Rockmelon (cantaloupe)	300mm vines	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	50
	Early fruit set		25
Spinach (Spinacia oleracea)	30 days after sowing	MRM Most recently mature leaf plus midrib at each growth stage	20
	At harvest		20
Squash	Early fruit set	MRM plus petiole (Most recently mature leaf plus petiole)	25
Sweet Corn	3-leaf stage	Sample whole seedling. Cut seedling 25mm above soil surface.	25
	6-leaf stage	Sample whole seedling. Cut seedling 25mm above soil surface.	20
	75 cm high stage	MRM Most recently mature leaf	20
	Just prior to tassel	MRM Most recently mature leaf	20
	Tasselling	Sample ear leaf - leaf adjacent to the uppermost developing ear.	20
Strawberry	At first flowers	MRM plus petiole (Most recently mature leaf plus petiole)	60
	At fruiting	Sample whole leaf (three leaflets) plus petiole of a young mature leaf from new season growth.	60
Sweet Potato	Early vining	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	30
	Before and during root enlargement		30
	Just before harvest		30
Tomato	5 leaf stage	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	40
	First flower		40
	Early fruit set		40
	First ripe fruit		40
	During harvest period		40
Watermelon	Prior to flowering	MRM plus petiole (Most recently mature leaf plus petiole) at each growth stage	25
	Early flowering		25
	Early fruit set		25
	Harvest period		25