

GUIDELINES FOR SAMPLING PLANT TISSUE FOR ANNUAL CEREAL, OILSEED, GRAIN LEGUME 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.

DOES AND DON'TS OF SAMPLING

DO'S

- 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 trouble shooting, 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.
- Do not sample plants of different vigour, size and age.
- Do not 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

CROP	GROWTH STAGE TO SAMPLE	PLANT PART	NUMBER Required
Barley	Seedling to early tillering (GS 14 -21)	Whole tops cut off 1cm above ground	40
	Early tillering to 1st node (GS 23 - 31)	Whole tops cut off 1cm above ground	25
	Emergence of head from boot (GS 50 – 51)	Whole tops cut off 1 cm above ground	25
	Early tillering to 1st node (GS21-31)	Youngest expanded blade (YEB) plus next 2 lower blades,	40
Canola	6 leaf to rosette	Whole tops	25
	Prior to flowering	Youngest mature leaf	40
Chickpeas	Pre-flowering	Whole tops	25-40
Cotton	All growth stages	Youngest mature leaf blade without petiole	40 – 50
	All growth stages	Petiole of youngest mature leaf blade - for NPK only	40 - 50
Cowpea	Pre-flowering	Youngest mature blade (trifoliate leaf)	40 - 50
Faba beans	Vegetative pre-flowering	Whole tops	20
	Early flowering	Recently mature leaf	75-100
Lentils	Pre-flowering	Whole tops	25-40
Lupins	Pre-flowering	Recently mature leaf	50 -75
Linseed	Immediately pre-flowering	Upper fully expanded leaves FEL stripped from stem	100s
	63 days after sowing DAS	Whole shoot cut 2 cm above ground level	30
Maize	24 to 45 days after planting.	Whole tops - seedlings 15cm to 40cm tall cut off 1cm above ground	40
	Prior to tasselling.	Fully developed leaf below whorl. Cut leaf at base where it joins the sheaf.	25
	Silking to tasselling.	Ear leaf. Cut leaf at base where it joins the sheaf.	25
Mungbean	Pre-flowering	Youngest mature blade (trifoliate leaf)	40 - 50
Navybean	Pre-flowering to early flowering	Most recently mature trifoliate leaf	30 - 40
Oats	Seedling to early tillering (GS 14 -21)	Whole tops cut off 1cm above ground	40
	Early tillering to 1st node (GS 23 - 31)	Whole tops cut off 1cm above ground	25
	Emergence of head from boot (GS 50 – 51)	Whole tops cut off 1 cm above ground	25
	Early tillering to 1st node (GS21-31)	Youngest expanded blade (YEB) plus next 2 lower blades,	40
Peanut	Pre-flowering to early flowering	Most recently mature trifoliate leaf	40 - 50
Peas (field peas)	Pre-flowering	Youngest mature compound leaf (leaves from 3 rd to 5 th nodes from top)	60 – 80
Rice	Mid tillering until panicle initiation	Y leaf i.e. most recently expanded leaf	50
	Mid tillering until panicle initiation	Whole shoot WS – whole tops cut off 1 cm above ground	25
Sorghum	Seedlings < 30cm tall	Whole plant – seedlings to 30 cm tall cut off 1cm above ground	40
	Just prior to flowering or at early flowering	3rd leaf below the whorl	30
Soybean	Early flowering to early pod set	Most recently mature trifoliate leaf	30-40
Sugarcane	During active growing season (November to May)	Leaf strips from third leaf from top of stalk from stalks of average height (first leaf is one that is more than half unrolled). Third leaf corresponds to top visible dewlap. Fold third leaf in half and cut and retain the folded middle 100 - 150mm section. Retain this middle 200 – 300mm section and discard the rest. Strip out and discard the midrib from this 200 – 300 mm section of leaf strip.	30 - 40

CROP	GROWTH STAGE TO SAMPLE	PLANT PART	NUMBER Required
Sunflower	Early budding (R1 stage)	YFEL youngest fully expanded leaf	40
	Petals visible (R5.1 stage)	YFEL youngest fully expanded leaf	40
Wheat / Triticale	Seedling to early tillering (GS 14 -21)	Whole tops cut off 1cm above ground	40
	Early tillering to 1st node (GS 23 - 31)	Whole tops cut off 1cm above ground	25
	Flag leaf ligule just visible to boots swollen (GS 39 – 45)	Whole tops cut off 1cm above ground	25
	Early tillering to 1st node (GS21-31)	Youngest expanded blade (YEB) plus next 2 lower blades,	40