

Plant Sap Analysis

How to collect, handle, and ship fresh leaf samples for sap testing

THE KEY RULE

Collect consistently, keep young and old leaves separate, keep samples cool, and ship as fast as possible.

Sap analysis is only as reliable as the sample. Readings change quickly with crop stage, time of day, water status, and handling — so the best samples are collected the same way each time, kept fresh and cool, and sent to the lab quickly.

1 WHEN TO USE SAP ANALYSIS

Sap analysis gives an in-season look at nutrients moving in the plant sap. It is most useful when the goal is to make timely nutrition decisions, compare good and poor areas, or track how the crop responds after a fertilizer, foliar, irrigation, or stress event.

- **Routine monitoring:** sample the same field zones, crop stage, and time of day each pass so trends are meaningful.
- **Diagnostic sampling:** take separate paired samples from the poor area and the normal area. Do not mix them.
- **Follow-up sampling:** where practical, sample before making a nutrition change, then resample after enough time has passed for the plant to respond.
- **Interpretation:** use sap results with soil tests, tissue tests, yield goals, crop stage, recent weather, and field history. Sap analysis is not a stand-alone recommendation.

2 WHAT TO BRING TO THE FIELD

- Clean scissors, knife, or shears
- Disposable gloves or clean hands
- Two labelled zipper bags per sample: Young Leaf and Old Leaf
- Permanent marker and waterproof labels
- Cooler with ice packs
- Clean towel or cardboard divider to keep leaves off direct ice
- Small gram scale if the lab requires sample weight
- Field map, phone GPS, or sample location notes
- Submission form and shipping label
- Camera/phone for crop stage and symptom photos

3 TIMING AND FIELD CONDITIONS

- Sample early in the day, ideally before 9:00 a.m. If that is not possible, sample at a consistent time every pass.
- Only sample dry leaves. Avoid dew, rain-wet leaves, irrigation-wet leaves, or leaves carrying spray or fertilizer residue.
- Avoid sampling during extreme heat, strong wind, severe drought stress, flooding, frost damage, or immediately after a major stress event — unless the stress is the diagnostic question.
- Do not sample right after a foliar nutrient or pesticide application unless the lab or advisor specifically wants to measure that effect. Record all recent applications.
- For repeat monitoring, collect from the same management zone and similar plant position each time.

4 CHOOSE THE RIGHT SAMPLE AREA

- For a uniform field, walk a zigzag or W pattern and collect from many plants across the zone.
- Keep different zones separate: soil type, irrigation pattern, salinity, compaction, manure history, slope, variety, or crop stage.
- Avoid outside rows, headlands, wheel tracks, low spots, drowned-out areas, old yard sites, manure piles, and obvious spray overlaps — unless they are being sampled as a separate problem area.
- If comparing problem and normal areas, collect both samples the same morning and label them clearly.

5 STEP-BY-STEP: FROM PICKING LEAVES TO THE LAB

- 01 Confirm lab instructions first.** Sap labs may have crop-specific sample size, plant part, bag type, form, and shipping requirements.
- 02 Label bags before picking.** Use one bag for Young Leaf and one bag for Old Leaf. Include sample ID, field/zone, crop, date, time, and plant part.
- 03 Collect the young leaf sample.** In most crops this is the youngest fully developed leaf from the top of the plant. For broadleaf crops it is often the 3rd or 4th leaf down from the top. Avoid tiny new leaves that are still expanding.
- 04 Collect the old leaf sample.** Choose the oldest healthy, still-green, functional leaf from the lower canopy. Do not use yellow, dead, diseased, insect-chewed, or badly damaged tissue.
- 05 Keep young and old leaves separate.** Never combine them in the same bag. The comparison between young and old leaves is one of the main values of sap analysis.
- 06 Collect enough material.** A practical target is 25–30 leaves or 80–150 g per bag, unless the lab gives a different target. Large-leaf crops may require fewer leaves; small-leaf crops may require more.
- 07 Keep samples clean.** Brush off loose dust or soil. If leaf surfaces have residue from foliar products, follow lab instructions; if washing is required, use clean/distilled water and pat dry before bagging.
- 08 Seal and cool immediately.** Put leaves in clean zipper bags, remove extra air, seal, and place in a cooler. Keep leaves cool, but do not freeze them or place them directly against ice packs.
- 09 Complete the form.** Make sure sample IDs on the bags match the form exactly. Put paperwork in a separate dry zipper bag.

10 Ship promptly. Pack with cold packs and insulation, ship early in the week, and use overnight or fastest practical delivery. Avoid samples sitting in a depot over the weekend.

IMPORTANT: SAP VS. DRY TISSUE TESTING

Dry tissue samples are commonly placed in paper bags so they can breathe. Sap samples are normally kept fresh in sealed zipper bags to reduce moisture loss before the lab extracts sap. Always follow the specific packaging instructions from the sap lab.

6 CROP QUICK GUIDE: WHAT TO COLLECT

Use this table as a practical starting point. Lab instructions overrule this table when they differ.

Crop	When to begin	Young leaf sample	Old leaf sample	Typical target
Wheat, barley, durum, oats	After plants are well established; stem extension is often useful for in-season decisions	Newest fully developed upper leaf. In early tillering, lab may request above-ground or base leaves.	Older healthy green lower leaf when enough canopy is present.	Full sandwich bag or about 80–150 g per bag
Canola	4–5 leaf stage onward; repeat through bud/flowering if monitoring	Youngest fully expanded upper leaf.	Oldest healthy green lower or basal leaf.	About 80–150 g per bag
Peas, lentils, beans, soybeans	Vegetative stage onward once enough leaves are present	Youngest fully developed leaf or trifoliolate with petiole if requested.	Lowest still-green functional leaf or trifoliolate with petiole if requested.	25–30 leaves or about 80–150 g per bag
Corn	V5–V6 onward; before and after key growth stages if monitoring	Youngest fully developed leaf; many protocols use the middle third of the leaf.	Lowest healthy green leaf; avoid senescing leaves.	15–25 plants or 80+ g per bag
Potato	After emergence; repeat during vegetative growth and before/between bulking stages	Youngest fully developed leaf or petiole as lab specifies.	Older healthy lower leaf or petiole as lab specifies.	About 40 leaves or 150 g per bag
Alfalfa and forage stands	When stand is roughly 20–30 cm tall or before bloom, depending on lab goal	Youngest fully developed leaves or top growth.	Oldest healthy vital leaves, if lab requests young/old comparison.	About 150 g per bag, or enough to fill the requested bag

7 WHAT NOT TO SAMPLE

- Wet leaves from dew, rain, irrigation, or spray droplets
- Leaves covered in soil, dust, fertilizer granules, manure, or fresh foliar residue
- Leaves that have heated in a truck cab, sat in the sun, frozen in direct contact with ice, or been left overnight without cooling
- Dead, yellow, dried-out, diseased, insect-chewed, hail-damaged, or mechanically injured leaves
- Plants from headlands, wheel tracks, field edges, drowned-out spots, or obvious overlaps (unless kept as a separate diagnostic sample)
- A mixed bag of young and old leaves

8 SAMPLE INFORMATION TO RECORD

Record this	Example
Sample ID	Field 7 – Normal – Young; Field 7 – Normal – Old
Crop and variety / hybrid	Wheat variety, canola hybrid, corn hybrid, pulse variety
Growth stage	Tillering, flag leaf, 5-leaf canola, V6 corn, early flower
Field / zone location	Field name, GPS pin, irrigation zone, soil type, problem vs. normal
Date and time collected	June 18, 8:15 a.m.
Plant part	Youngest fully developed leaf; oldest healthy lower leaf
Weather and moisture status	Cool morning, dry leaves, irrigated 3 days ago
Recent applications	Fertilizer, manure, foliar, herbicide, fungicide, insecticide, irrigation/fertigation
Symptoms or field notes	Chlorosis on hilltops, compaction, salinity, drought stress, photos attached

9 PACKING AND SHIPPING PROCEDURE

- Place Young Leaf and Old Leaf bags into the cooler as soon as they are collected.
- Use cold packs above and below the samples, but separate the bags from direct contact using a clean towel, cardboard, or bubble wrap.
- Do not add loose ice. Meltwater can damage labels, paperwork, and sample integrity.
- Put the submission form in a separate sealed bag so it stays dry.
- Use a sturdy box. Fill empty space so bags do not bounce around or get crushed.
- Ship the same day where possible. Overnight shipping is preferred. Avoid shipping late in the week if the box could sit over the weekend.

BEFORE YOU CLOSE THE BOX, ASK YOURSELF

Can the lab clearly tell which bag is young leaf and which is old leaf?

Are the leaves cool but not frozen?

Is the form dry?

Will the box arrive quickly?

If yes to all four, the sample has a much better chance of producing useful results.

10 FINAL FIELD CHECKLIST

- | | | |
|--|---|--|
| <input type="checkbox"/> Field and zone selected | <input type="checkbox"/> Crop stage recorded | <input type="checkbox"/> Leaves dry and clean |
| <input type="checkbox"/> Young leaf bag labelled | <input type="checkbox"/> Old leaf bag labelled | <input type="checkbox"/> Young and old leaves kept separate |
| <input type="checkbox"/> Enough sample collected for each bag | <input type="checkbox"/> Samples sealed in zipper bags | <input type="checkbox"/> Samples cooled immediately |
| <input type="checkbox"/> Recent sprays / fertility / irrigation recorded | <input type="checkbox"/> Form completed and sample IDs match bags | <input type="checkbox"/> Packed with cold packs, insulated from freezing, and shipped promptly |

REFERENCES

NovaCropControl sampling guides. Sample before 9:00 a.m., only sample dry leaves, keep young and old leaves separate, and use about 30 leaves for many crops.

Future Analytics plant sap sampling guide. Use youngest fully developed and oldest vital leaves, avoid field edges, keep young and old samples separate in labelled zipper bags, and sample in the morning or late evening.

NutraDrip sap sampling instructions. Collect young and old leaf material separately, target adequate fresh weight, keep samples labelled and cool, avoid freezing, and ship quickly.

New Age Laboratories plant sap analysis. Sap analysis depends on maintaining sample integrity from the point leaves are detached and using crop-specific protocols.

NEED HELP WITH SAP SAMPLING THIS SEASON?

Your Johnston's Regenerative Agronomist can scout, sample, and interpret results with our PhD soil scientists — then build a custom foliar plan for your field.

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