



AgriWater

PLANT SAP SAMPLING MANUAL

VARIOUS CROPS



Sap sampling is a relatively new technique for measuring the nutrients immediately available to the plant. This information can be a valuable tool for growers and facilitates accurate identification and correction of nutrient imbalances.

Agriwater can assist with your Sap testing, or you can contact suitable labs directly. A list of labs capable of doing sap testing is located on the last page of this document.

Agriwater

REMINA PIENAAR

Chief Science Officer

remina.pienaar@agriwater.earth



AgriWater

<https://agriwater.earth>

WHERE to take samples

Take the following steps into consideration when collecting leaf samples:

- Avoid the outer rows of the field and the first and last 10 meters (approximately 30 feet) of a row.
- Sample leaves of average leaf quality.
- Sample abnormal plants (with deficiency symptoms) separately. If a deficiency might be present in the young or old leaves of the total crop, sample these leaves separately as a young or old leaf sample.
- Keep in mind the sunny and shady side of the plant. Always consistently sample the same side.

WHEN to take samples

All sampling should be done in the early morning hours and be completed **within the first 3 hours of daylight**. The plant will then have enough leaf-tension with proper moisture conditions.

Recommended routine sampling stages are generally at each change in physiological growth phase of the different crops (Additional samples can be done as required for problem areas or trial purposes):

Alfalfa

- Begin with sampling when the shooting is started
- From then on, every 3-4 weeks until a week before harvest

Apples & Pears

- Pre-flowering
- Fruit set / bulking
- Full fruit size
- Post-harvest

Beans

- Begin with sampling at 5 leave stage
- From then on, every 3-4 weeks until a week before harvest

Canola

- Cabbage/rosette stage
- Start of flowering
- Before/start of podding

Citrus

- 2-3 weeks before flowering
- Early fruit set
- 25mm fruit size
- Full fruit size (before start of colouring)

Corn

- 5 or 6 leaf stage
- Just before flowering
- Just after flowering
- During hive development

Forage (Timothy Hay)

- Sample just before a cut or grazing, so that the fertilization for the new cut can be adjusted
- For intensive monitoring, sample twice per cut

Grapes

- When shoots are 15-30 cm (young leaves only)
- 2 weeks before flowering / early flowering
- Fruit set
- Veraison

Nut Trees

- Early bloom (young leaves only)
- Rapid leaf expansion
- Bulking
- Post-harvest

Potatoes

- First sample early after emergence (young leaves only)
- Sample every 3 to 4 weeks until the “bulking up” stage (young and old leaves)

Wheat

- 20cm plant length
- During fast growing stage
- During flag leaf stage
- Stop sampling after grain head has emerged

Stone Fruit

- Post petal fall (first fully expanded leaves – young leaves only)
- Mid-season green fruit
- Early fruit colouring
- Post-harvest

WHAT to include in samples

PLEASE NOTE: Samples that have a fungal, bacterial or virus infection are not allowed and will not be processed. The leaves must also be free from insects.

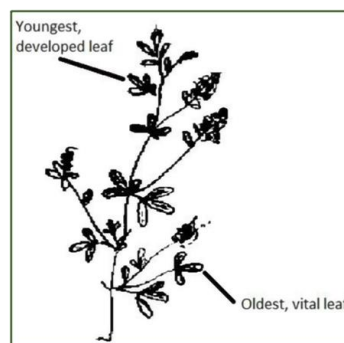
Refer to Pic.4 & 5 (page 6) for examples of proper young and old leaf samples. Be sure to not take young leaf samples too young – leaves must be fully developed. Similarly, don't take old leaf samples too old – leaf must still be whole and functioning.

► Alfalfa

Young leaf samples: take the **youngest, fully developed leaf**.

Old leaf samples: Separately, pick old **but still vital leaf** from the bottom part of the plant.

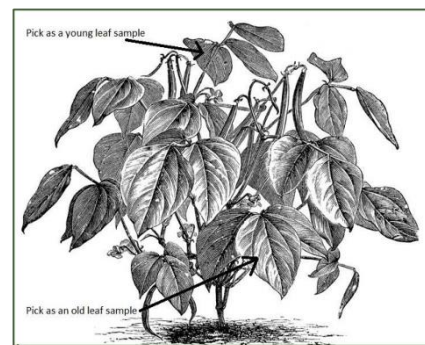
Please **remove the petioles** from the leaves. These petioles can have a significant effect on the analysis of the leaf sample.



► Apples & Pears

Young leaf samples: take the **youngest, fully developed leaf** from the top of the shoot.

Old leaf samples: Separately, pick old **but still vital leaves** from halfway of the shoot length.

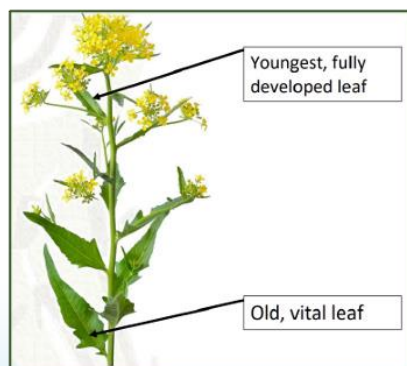


► Beans

Young leaf samples: take the **youngest, fully developed, representative leaf**.

Old leaf samples: Separately, pick **old but still, representative vital leaf** from the lowest part of the plant.

Please **remove the petioles** from the leaves. These petioles can have a significant effect on the analysis of the



► Canola

Young leaf samples: take the **youngest, fully developed leaf** from the top of the plant.

Old leaf samples: Separately, pick the **oldest, vital leaf** at the lower part of the plant.

Please **remove stems** from all leaf blades. Stem will influence the leaf sample and cause less accurate results.



► Corn

Young leaf samples: take the **youngest, fully developed leaf**. For corn this will be the 3rd leaf from the top of the plant.

Old leaf samples: Separately, pick the **oldest, vital leaf** at the lower part of the plant. Most of time this is the 3rd leaf from the lowest part of the plant.



The part from the **middle of the leaves** will be used for the samples.

► Citrus

Young leaf samples: take the **youngest, fully developed leaf** from the top of the shoot.

Old leaf samples: Separately, pick **old but still vital leaves** from halfway of the shoot length.



► Forage

For a grass sample, cut the grass just above the root and keep in mind to sample such an amount so the sample bag is fully filled, and the sample has enough mass

► Grapes

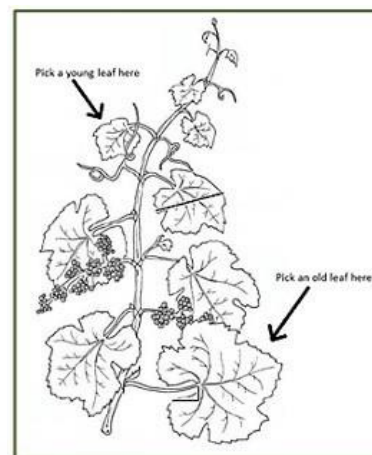
Young leaf samples: take the youngest, fully developed leaf. For grape this will be the 4th or 5th leaf from the top of the vine.

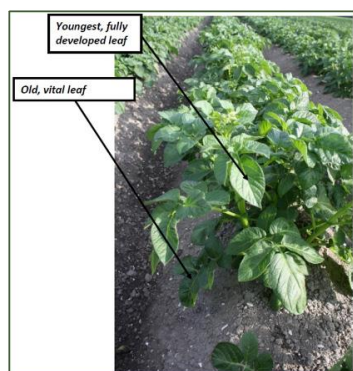
Old leaf samples: Separately, pick the oldest, vital leaf at the lower part of the vine.

► Nut Trees

Young leaf samples: take the **youngest, fully developed leaf** from the top of the shoot.

Old leaf samples: Separately, pick **old but still vital leaves** from halfway of the shoot length.





► Potatoes

Young leaf samples: take the **youngest, fully developed leaf**.

Old leaf samples: Separately, pick the **oldest, vital leaf**.

Please **remove the petioles** from the leaf. These petioles can have a significant effect on the analysis of the leaf sample.

► Stone Fruit

Young leaf samples: take the **youngest, fully developed leaf** from the top of the shoot.

Old leaf samples: Separately, pick **old but still vital leaves** from halfway of the shoot length.

► Wheat

For a wheat sample in the tillering growth stage you can sample leaves from the plant base – only one sample at this stage.

Further samples:

Young leaf samples: The **youngest, fully developed leaf** from the top of the plant.

Old leaf samples: Separately, sample the **oldest, but still healthy leaf** from the bottom of the plant.

Keep in mind to **remove the stems** from the leaf, as they will not give a good indication and influence the leaf sample.



Sample Sizes

For an average, representative sample approx. **150 grams** (6 oz.) of leaves are needed. The number of leaves may vary depending on crop type, as well as due to cultivar, size, thickness, and other natural variations. Generally, the number of leaves required for samples of various crops are as follows:

Alfalfa: Enough to fill approx. 150 (6 oz.) grams

Apples & Pears: 40-60 leaves

Canola: Enough to fill approx. 150 (6 oz.) grams

Citrus: 50-70 leaves per sample

Corn: 20 leaves per sample

Beans: 30-40 leaves per sample

Forage: Enough to fill approx. 150 (6 oz.) grams

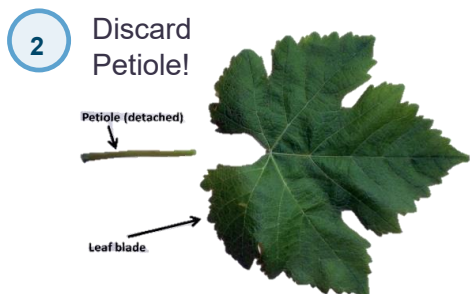
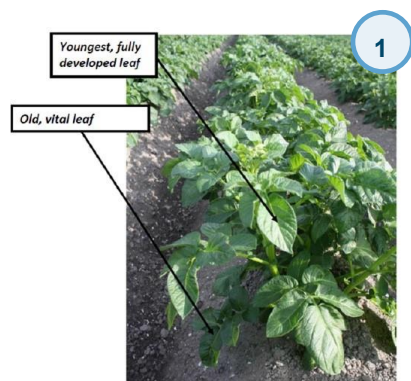
Grapes: 40-60 leaves per sample

Nut trees: 50-80 leaves (approx. 150g) per sample

Potatoes: 30 leaves per sample

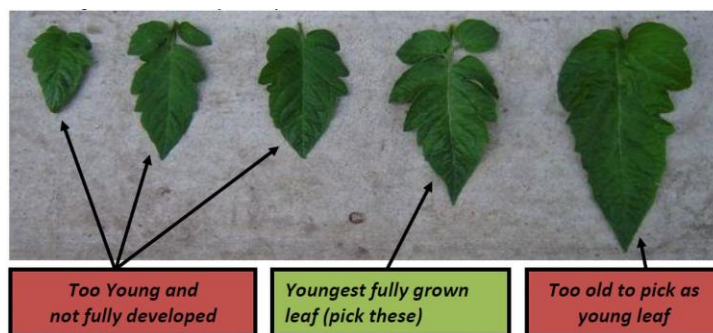
Wheat: Enough to fill approx. 150 grams (6 oz.)
(A4 (8-1/2 X 11) size sample bag is filled to $\frac{3}{4}$)

Note that young leaf samples generally require more leaves per sample to make up the required mass. If you are unsure about the sample size, please feel free to contact us.



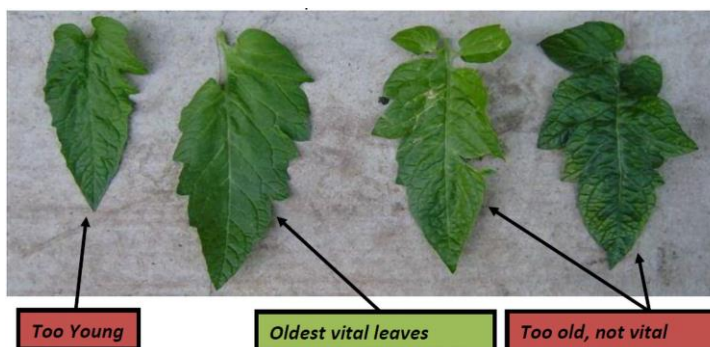
4

Young Leaf Samples – Tomato Example



5

Old Leaf Samples – Tomato Example



Booking, Packaging & Sending Steps

Labs have specific protocols and forms. Please conform to the requirements of the lab you choose.

1. Sap Analysis Request Form Submission

- Complete the sap analysis request form (as required by the lab you choose)

2. Lab Labels Preparation

- Wait for lab labels to be sent to you for printing. Some labs provide a blank form, others like NovaCropControl require specific pre-printed labels and customs declarations.

3. Labelling Samples

- Add the sampling date on the labels and ensure all information is displayed correctly.
- Ensure each sample is correctly labelled with the lab label and associated barcode if provided.

8. Shipping Preparation

- Obtain the shipping address for booking courier services, which will be provided with all

4. Batching Samples

- Plan to have as many samples together in one batch to save on shipping costs.

5. Sample Storage

- If necessary, store samples correctly packaged in airtight plastic zip lock bags in the fridge (do not make contact with ice, and do not store in the freezer) for a few days if samples cannot all be taken on the same day.

6. Packaging of Leaf Samples

- Place leaf samples in plastic zip lock bags that can seal airtight.
- Clearly mark each bag before going out to take samples.
- Use separate bags for old and young leaf samples.

7. Shipment Documentation

- Include a sample shipment authorization letter and shipment sample identification label in the shipment documentation when sending samples.

other required labels and documentation mentioned above.

9. Packaging for Shipment

- Samples can be shipped in standard parcel packaging boxes provided by the chosen courier service.
- Cooling and insulation are not required.
- Use the smallest packaging size where samples can be tightly packed to minimize samples falling around inside the packaging and to reduce courier cost

Other Packing Considerations

- Do not package leaf samples with ice. Leaf contact with ice will damage leaves cause them to spoil.
- Do not leave leaf samples in the sun. Excessive heat will cause leaves to spoil faster.
- Samples should reach NCC lab ideally within 7 days after picking to ensure proper leaf integrity for processing.
- When storing samples at your facility before sending, keep in a cool place and not exposed to direct sunlight. Can be stored in a refrigerator – **not a freezer**. Also try to avoid leaving samples in a parked vehicle (unless under cover or on cold days) for extended periods throughout the day to prevent exposure to excessive heat.

Ongoing Technical Support

As part of Agriwater's commitment to our customers, our team of agronomy and chemical engineering professionals can provide support for Sap testing and other test reports.

Reviewing historical water, soils and plant testing and advising on the changes you may see is part of the service.

Review of periodic testing and analysis of changes in nutrient use can help our clients maximize the benefits of Agriwater.

Experience from over 3,000 installations and long term observations of the effect of treated water on a broad spectrum of crops, soil types and water quality give our team a unique perspective on the improvements in soil health. Please note that some of these services come with associated costs.

More than just hardware sales, we support the transition to healthy soil.

The Agriwater Team

PLANT SAP TESTING LABS

NovaCropControl

Recommended (the lab we use)

Remina can assist due to our ongoing relationship with them.

Nijverheidsweg 30
5061 KL Oisterwijk
The Netherlands

Phone: +31(0)13-5902864

info@novacropcontrol.nl

www.novacropcontrol.nl/en

NEW AGE Laboratories

160 Veterans Blvd.
South Haven, Michigan 49090
USA

Phone: (269) 637-5658

Fax: (269) 798-5986

Toll-Free: (888) 215-6788

newagelaboratories.com

Apical Labs

1382 SE 3rd Ave, Suite 4
Canby, OR 97013
USA

Phone: (503) 479-8407

Info@apical-ag.com

apical-ag-home.com



For enquiries or advice, please contact us at:

REMINA PIENAAR

Chief Science Officer

remina.pienaar@agriwater.africa

JOIN US ON SOCIAL



10/23 Version 1.1



agriwater.earth