

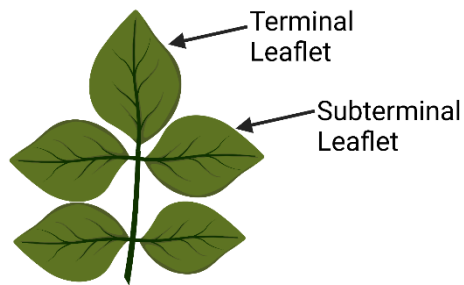
Pistachio Leaf Sampling

Sampling Notes

Pistachio trees have compound leaves which are composed of 3-5 leaflets, each with their own stalk that are arranged opposite each other along a middle vein. To sample pistachio trees, you will collect the most recently matured and **fully expanded leaflet**, *not* the entire leaf. It is important to only sample fully expanded leaflets otherwise the results may be inaccurate. For early season samples, the most recently mature leaflet will be the terminal leaflet. For later season samples (typically after May), the most recently mature leaflet will be the subterminal leaflet.

Created with BioRender.com

Pistachio Leaf



General Sampling Instructions

Sampling Time:

- **Spring Sampling:** The earliest you can sample a pistachio orchard is typically in early to mid-May, or approximately 40 days after full bloom, when the majority of leaves on non-fruiting branches have reached full size. Spring leaf analysis can be used, along with yield estimates, to adjust fertilization rates prior to nut fill.
- **Mid-Summer Sampling:** You can also sample your pistachio orchard just prior to nut fill, typically in late June. These results will be used to determine the effectiveness of prior fertilizer applications. This is the last opportunity to make a fertilizer decision that will affect the current crop.
- **Late Summer Sampling:** The final tissue sampling time is just prior to harvest, typically in August. The advantage of this timing is that nutrient concentrations have stabilized, and University critical levels are established for this sample timing.

Plant part: For early season samples, collect the terminal leaflet. For later season samples, (typically after May) collect the subterminal leaflet.

Sampling Frequency: Samples can be taken between one and five times per season. Analyzing multiple samples per season is recommended to monitor nutrient uptake, to increase the chance of detecting nutrient deficiencies, and to evaluate the fertility program more accurately.

Quantity per Sample: Collect 40 or more leaves per sample.

Sampling Area: If orchard health and/or vigor are different within a field, divide the field into different blocks or management areas. Samples should be collected on approximately a 40-acre basis. Take a different sample for every field that differs in productivity, variety, or soil type. Avoid sick/nutritionally deficient trees, or sample them separately and compare them to areas of better growth to determine what nutrients are lacking.

Overview of Sample Collection: Sample the most recently mature representative leaflets from non-fruiting, well-exposed branches about 6 feet from the ground.

Traditional composite: Walk in a diagonal line across your orchard or desired sampling unit, collecting 2-3 leaflets per tree. Combine leaflets in a paper bag from 18-20 trees that are at least 25 yards apart.

When the sampling area is uniform it is not required to go back to the exact same trees every sampling event. However, starting at the same location every sampling event improves repeatability and helps correlate spring values with summer and more easily track changes. It is best to space the trees you sample across the entire sampling block.

Designated sampling area: In many cases, a designated area may be sampled rather than a composite. This sampling method can be more repeatable than a composite. Select approximately 50 trees in an area where the trees represent a majority of the block. Record either the GPS location or the row and tree count from a specific block corner to the center of the 50-tree area (7 rows x 7 trees). This allows samples to be collected from the same trees for multiple sampling events. Combine collected leaves in a paper bag.

Recommended Tests:

L2: Nitrogen (N), phosphorous (P), potassium (K), zinc (Zn), manganese (Mn), sodium (Na), boron (B), calcium (Ca), magnesium (Mg), iron (Fe) and copper (Cu)

or, where *chloride* is a problem,

L3: Nitrogen (N), phosphorous (P), potassium (K), zinc (Zn), manganese (Mn), sodium (Na), boron (B), calcium (Ca), magnesium (Mg), iron (Fe), copper (Cu), and chloride (Cl)

Preparing Sample for Lab: Combine collected leaves in a paper bag. Take any notes about the sampling block and the growth stage of each sample; make sure to note whether trees are on-year or off-year. Once collected, try to keep the samples cool and ship or deliver them to the laboratory as soon as possible with a **work order form**.

References:

- Beede, R. H., Brown, P. H., Kallsen, C., & Weinbaum, S. A. (2005). Diagnosing and Correcting Nutrient Deficiencies. *Pistachio Production Manual*, 147–157. Retrieved from <https://ucanr.edu/sites/fruitandnut/files/73696.pdf>
- Muhammad, S., Khalsa, S. D. S., & Brown, P. H. (2020). *Nitrogen Management in Nut Crops*. Retrieved from <https://ucanr.edu/sites/ciwr/files/318120.pdf>
- Rosecrance, R. C., Weinbaum, S. A., & Brown, P. H. (2002). Phosphorus and Potassium Nutrition of Pistachio Trees as Affected by Alternate-Bearing. *Better Crops*, 86(1), 18–20.
- Saa Silva, S., Muhammad, S., Sanden, B., Laca, E., & Brown, P. (2012). Almond Early-Season Sampling and In-Season Nitrogen Application Maximizes Productivity, Minimizes Loss. *Almond Board of California*, 1–9.
- Siddiqui, M. I., & Brown, P. H. (2013). *Pistachio Early-Season Sampling and In-Season Nitrogen Application Maximizes Productivity, Minimizes Loss*. 1–9.