

2024 University of Arkansas Strawberry Nutrient Monitoring Program

The 'Strawberry Nutrient Analysis Program' consists of six strawberry leaf and petiole plant tissue nutrient samples offered at a total of \$54.00 through the University of Arkansas Agriculture Diagnostic Lab. For each of the six samples, a total analysis (N, K, S and B) on the trifoliolate leaves and nitrate nitrogen (NO₃N) on the petioles will be provided.

In-season strawberry leaf and petiole analyses provide the best means to monitor plant nutritional status and to correct deficiencies early-on before they limit the spring crop. Proper crop nutrition ensures that yield and quality are optimized and protects against applying excess nutrients at an unnecessary expense.

Procedure for Leaf and Petiole Sampling for Plasticulture Strawberry

The key to a successful plant tissue nutrient monitoring program is to sample the correct plant tissue in a timely manner. Growers should start sampling early, ideally right as bloom begins or shortly before. At this stage nutrient deficiencies that may be crop limiting can still be corrected. Sampling during fruit harvest is still useful, but at that point the crop has already “been made”.

Directions for Collecting and Submitting Samples:

1. Sampling period is *approximately* March 1 - May 15. And should begin once plants are actively growing (sending out new leaves and starting to bloom). Fertigation should also start at this time.
2. Select “most recent mature” trifoliolate leaves including the petioles (stem) from 25-30 plants that represent the average appearance of the crop. See Figure 1. Separate petioles from the trifoliolates and secure petioles in a bundles with rubber bands or a twist tie.
3. Collect separate individual samples from different fertilizer injectors or fields where different rates are applied. Wait a few days after the last fertilizer application before sampling.
4. Prioritize collection of samples weekly early in the season. Later sample every 2 weeks, unless nutrients are not within range. Continue sampling until six samples have been collected.
5. **Submit check for full amount (\$54) with first submitted sample.** Check should be made out to “Agriculture Diagnostic Lab”
6. Complete the “PLASTICULTURE STRAWBERRY MONITORING FORM” for each sample. Use a *Sample ID* that you can easily remember and associate with where the samples are being collected. Use this same *Sample ID* for all six samples collected from a single field or area.

Mail all samples with completed paperwork to:

**Agriculture Diagnostic Lab
1366 W. Altheimer Drive
Fayetteville, A R 72704**

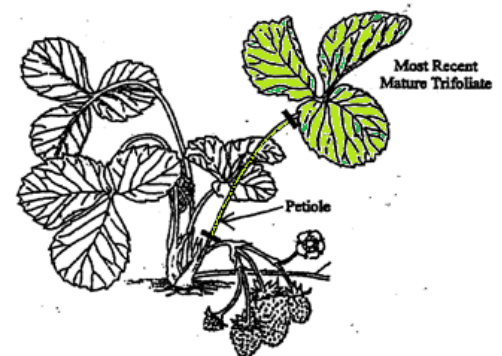


Figure 1. The proper plant parts, petiole and most recently mature trifoliolate, should be sampled for

7. To avoid mailing delays, do not put "University of Arkansas" anywhere on the shipping label and ship via US Post Office or other commercial shipping company. The goal is to have the sample arrive at the lab as soon as possible after the sample was collected, for this reason we suggest collecting the sample on Sunday or Monday and mailing immediately.
8. On the completed paperwork, please provide an email address, phone number or mailing address so that we can return your results.
9. Results should be returned to you 4-5 business days or less after the sample is received in the lab.

How to Interpret and Use the Leaf Tissue Test Results

The lab will test leaf nitrogen content (reported at a %) and the amount of nitrate nitrogen in the petioles (reported as ppm). Leaf nitrogen (%) indicates the amount of nitrogen the plant has taken up and stored in the last few weeks. Petiole nitrate nitrogen (ppm) indicates the amount of nitrogen is actively being taken up by the plant. You should adjust nitrogen fertility rates based on the petiole nitrate nitrogen (ppm) result. **The stages of crop development (bloom vs harvest) have different recommended petiole nitrate levels. The chart on the following page can be used to track your results through the season and as a guide for interpreting your sample results**

- ✓ Research at North Carolina State University has demonstrated that the best fertility program in spring for plasticulture 'Chandler' and 'Camarosa' strawberries is to apply from 50-60 pounds of nitrogen per acre through the drip system in spring. Higher rates may be used on deep, sandy soils. Make fertilizer applications weekly starting around March 1st – 15th when new spring growth is visible. Initial fertilizer application rates should be 0.75 to 1.0 lbs Nitrogen/acre/day (5.25 to 7.0 lb. Nitrogen/acre/week.) These rates should be adjusted based on petiole analysis. The chart on the following page (pg 3) gives recommend fertility rates based on petiole nitrate sample results.

The program also supplies information on leaf potassium (K), leaf sulfur (S) and leaf boron (B). These results should be used to amend fertilizer rates of K, S and B.

- ✓ Common fertilizers used for spring fertigation of strawberry include potassium nitrate and calcium nitrate. Potassium nitrate supplies additional potassium which is required by the plant to grown and produce fruit in the spring. Around 60lbs of potassium is required in the spring. Calcium nitrate is often rotated in during fruit set and early fruit coloring to improve fruit firmness. These fertilizers are best applied to the soil through the drip. Boron is the only fertilizer that can be applied foliarly and still achieve good plant uptake of the nutrient.
 - To apply 5 lbs. of nitrogen per acre requires 33.3 lbs. of calcium nitrate or 38.4 lbs. of potassium nitrate.

If you have questions, contact:

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Extension Specialist – Horticulture Crops Production
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Email: amcwhirt@uada.edu
Phone: 501-671-2229

Strawberry Plant Tissue and Petiole Nutrient Sufficiency Ranges

Most Recent Mature Trifoliolate (leaf)	
N (%)	3.0-4.0
K (%)	1.1-2.5
S (%)	0.15-0.40
B (ppm)	25-50

Reference: Campbell CR, Miner GS. 2000. Strawberry, annual hill culture. In: Campbell CR, editor. Reference sufficiency ranges for plant analysis in the southern region of the United States. Raleigh (NC): NC Dept of Agriculture & Consumer Services. Southern Cooperative Series Bulletin 394.

Petiole Nitrate Nitrogen (NO ₃ -N) (ppm)			If the test result is:		
Week	Minimum	Maximum	Low	Sufficient	High
1*	600	1500			
2-3	4000	6000	7 lb N/	5.25 lb N/	0 lb N/
4	3500	6000	Acre per	Acre per	Acre per
5-8	3000	5000	week	week	week
9	2000	4500			
10	2000	4000	7 lb N/	5.25 lb N/	0 lb N/
11	1500	3000	Acre per	Acre per	Acre per
12	1000	2000	week	week	week

* Sampling generally begins the first week in March and continues for 12 weeks (the end of May)

Sample ID (Field):						
Sampling Date	Crop Stage					B
		Nitrate (ppm)	N%	K%	S%	(ppm)

Quick reminders on strawberry fertilization and plant tissue nutrient content:

- A total of about 90-120 units of N is required for the strawberry crop. Half of this should be applied through the drip in the spring.
- **Week 1 corresponds to when the plants begin growing in spring, weeks 2-5 correspond to plant growth, bloom and early fruit set. Weeks 5-12 correspond to late fruit set and harvest.**
- During vegetative growth (early spring) NO₃-N should increase to 4,000-6,000 ppm. Petiole NO₃-N values should reach 3,000-5,000 ppm by early harvest and then gradually decline to around 500 ppm by the end of harvest.
- In general, NO₃-N levels should never be below 500 ppm. Exceptions to this rule are during early winter dormancy and after harvest. During plant establishment (Fall) petiole NO₃-N should approach 1,500-2,000 ppm.
- Excessive NO₃-N greater than 10,000 ppm may reduce yield and fruit quality.

If you have questions, contact: Amanda McWhirt, Ph.D. Extension Specialist – Horticulture

Email: amcwhirt@uada.edu Phone: 501-671-2229

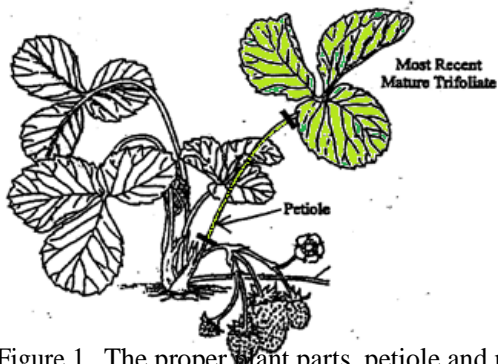


Figure 1. The proper plant parts, petiole and most recently mature trifoliolate, should be sampled for reliable results.

AGRICULTURAL DIAGNOSTIC LABORATORY
1366 W. ALTHEIMER DRIVE
FAYETTEVILLE, AR 72704
479-575-3908
agrilab@uark.edu

Payment / Billing Options

Payment enclosed \$ _____ Client Chk # _____
 Invoice Client \$ _____
 Invoice County \$ _____ Provide: CC _____
 & DS or GR _____
 Add'l Info: _____

Please make checks payable to: Agri Diagnostic Lab

PLASTICULTURE STRAWBERRY MONITORING FORM, KIT# _____
Lab will assign Kit #

INSTRUCTIONS: Randomly collect 20-25 of the most recently mature trifoliolate leaves and petioles from a representative area of the crop. Separate petioles and leaves immediately after sampling. One *Sample ID* should be used for each field or fertilizer injector. Use the same *Sample ID* to identify that field for all six sampling periods. If you plan to sample multiple fields, use different *Sample IDs* for each, and submit individual payments for each field. Analysis will be provided for Total N,K,S,B on the leaves and Nitrate-N will be analyzed on the petioles. The cost is \$54.00 / six sampling periods.

PRODUCER NAME: _____ ADDRESS: _____ <div style="text-align: right; margin-right: 100px;">ZIP CODE _____</div> EMAIL: _____ PHONE: _____ COUNTY: _____ Crop Planting Date: _____

SAMPLE INFORMATION (The section below must be filled out completely)

SAMPLE ID (Field): _____ DATE SAMPLED: _____ SAMPLING PERIOD (CIRCLE ONE) 1 2 3 4 5 6 VARIETY: _____ SOIL TYPE: CLAY SILT LOAM SANDY BLOOM STAGE: NO FLOWERS TIGHT BUDS POPCORN OPEN BLOSSOM <div style="text-align: center;"> PETAL FALL GREEN FRUIT WHITE FRUIT RIPE FRUIT </div>
