

RESOURCES

Resource Conservation District of Santa Cruz County

820 Bay Ave, Ste 136
Capitola, CA 95010
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www.rcdsantacruz.org

Services: Technical assistance, financial assistance, equipment loaners, irrigation evaluations, and more.

Natural Resources Conservation Service (NRCS)

820 Bay Ave, Ste 136
Capitola, CA 95010
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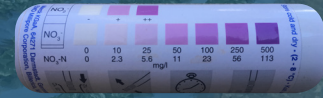
Services: EQIP cost-share and technical assistance for agriculture.



This SNQT Guide was funded by a grant from the California Department of Food and Agriculture's Fertilizer Research and Education Program (FREP) and the Fertilizer Inspection Advisory Board. FREP provides funding to conduct research and education projects to advance the environmentally safe and agronomically sound use and handling of fertilizing materials.



SOIL NITRATE QUICK TEST GUIDE FOR STRAWBERRIES



SOIL NITRATE QUICK TEST GUIDE FOR STRAWBERRIES

This guide provides step-by-step instructions for measuring nitrate form of nitrogen in soil, using nitrate test strips and interpreting the results. It is intended as a quick reference guide to be used directly in the field. It is NOT an alternative to more advanced techniques (Lab nitrogen tests, CropManage, etc).

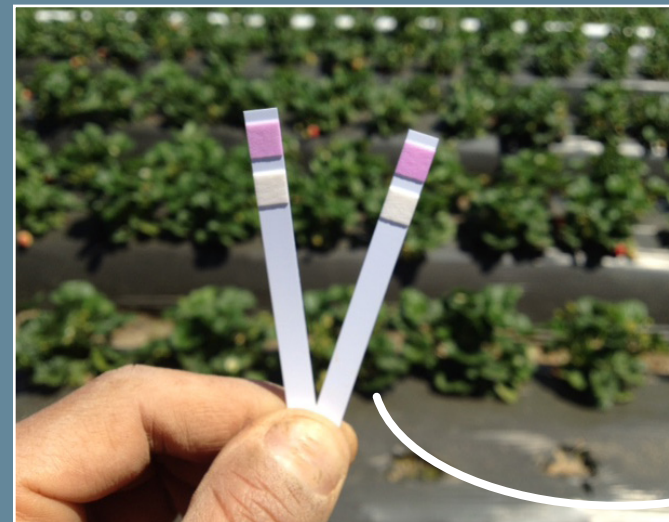
When and where to sample: Biweekly or monthly sampling is recommended between February and September, when the crop nitrogen needs are highest. A composite sample from 8-10 points across the field should be taken. It is recommended to sample at a depth of 12 inches where most of the active roots are found. Sampling at 12 inches gives a good estimate of how much nitrogen is available for crop uptake. A sample between 12 and 24 inches can also be taken and can be used to indicate if over-irrigation has caused nitrate to leach below the root zone.

Items Needed

*pictured items

1. Soil Probe 7/8" x 33" - [*\(www.ams-samplers.com/7-8-x-33-sst-soil-probe-w-handle.html\)](http://www.ams-samplers.com/7-8-x-33-sst-soil-probe-w-handle.html)
2. Two buckets (3-5 gallon)
3. Plastic centrifuge tubes (50 mL) with rack
[*\(www.amazon.com/SPL-Conical-Centrifuge-Racks-Sterile/dp/B01M04HGPJ\)](http://www.amazon.com/SPL-Conical-Centrifuge-Racks-Sterile/dp/B01M04HGPJ)
4. Squirt bottle - [*\(www.amazon.com/Plastic-Squirt-Bottle-Lid-16/dp/B004BNC80C\)](http://www.amazon.com/Plastic-Squirt-Bottle-Lid-16/dp/B004BNC80C)
5. Stop watch or watch with second hand
6. Calcium chloride solution - ***Free from the RCD**
7. Nitrate test strips - ***Free from the RCD**

831-464-2950 or
info@rcdsantacruz.org



HOW TO COLLECT THE SOIL

- 1 Collect 10 samples randomly across the field. **If you are taking samples at two depths, label the buckets to keep track of the sampling depth.**



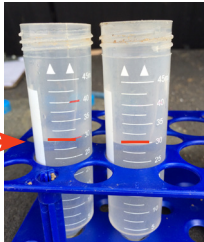
Sample from the plant line into the center of the beds. Angle the probe so you don't sample into the band of fertilizer.



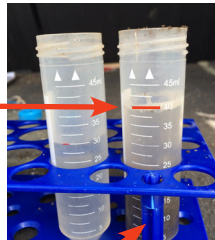
- 2 Mix the cores in each bucket thoroughly. If clay, take a pinch from each core.

HOW TO PROCESS THE SAMPLE

- 3 Fill 2 tubes per depth with calcium chloride solution to the **30 mL mark.**



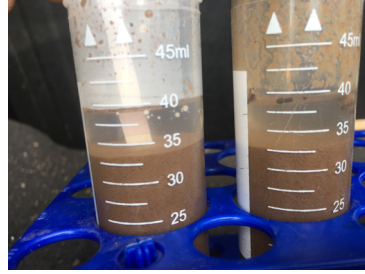
- 4 Add small pinches of soil until the solution reaches the **40 mL mark.** Use two tubes for the shallow sample and two for the deep sample.



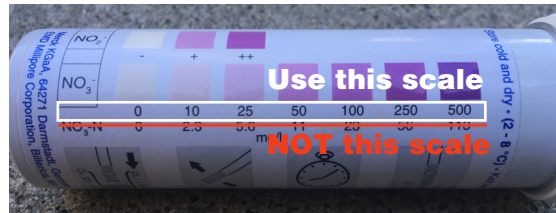
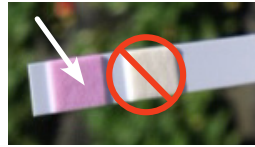
- 5 Shake vigorously for at least 1 minute until all the soil is in solution.



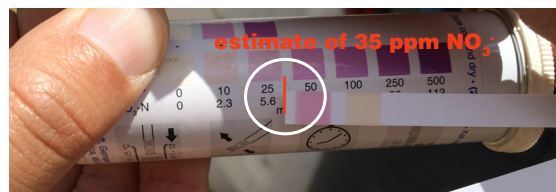
- 6 Let the tubes rest on the rack until the soil has settled to the bottom of the tube and a clear layer of solution has developed at the top. This usually will take 5 to 10 minutes but can take up to 30 minutes in clay soils. Dip a test strip in the solution for one second at the top of each tube being careful not to touch the settled soil. Remove the test strip and shake it to dry it off, and start the timer.



- 7 Wait 60 seconds and compare the color of the reagent pad at the end of the strip with the color scale on the strip container. Read the upper set of numbers (ppm of NO_3^-), not the lower ones (ppm of NO_3^- -N).



The reading for the sample in the picture below will be about 35 ppm of NO_3^- since the color of the test strip is between 25 and 50 ppm of NO_3^- in the upper scale.



HOW TO USE THE RESULTS

Multiplying the result of the 12" sample by two gives a rough estimate of the pounds of nitrogen contained in one acre of soil to a depth of 12 inches. For example if the result is 25 ppm of NO_3^- , about 50 pounds of nitrogen per acre are in the 0 to 12 inch layer of soil.

Strawberries uptake less than 25 pounds of nitrogen per acre from planting until the end of March, and then about 1 to 1.5 pounds of N per acre per day from April to mid-October. The total uptake per crop cycle is about 200 to 250 lb/acre.

Management during winter months:

The suggested time to sample for winter fertilization is the beginning of February.

If the result of the test is above 15 ppm NO_3^- , no fertilization is needed.

If the result of the test is below 15 ppm NO_3^- , apply 10 to 20 pounds/acre of nitrogen split into two applications.

Management during spring and summer:

The recommended time and sampling frequency for spring and summer fertilization is biweekly or monthly between April and September, when the daily crop nitrogen uptake is around 1 lb N/ac. During this period the crop needs 7 lb N/ac weekly or 14 lb N/ac bi-weekly. Based on the nitrate test results you can adjust how much N you need to apply to meet the crop uptake.

The table and the figure below indicate the recommendations for weekly applications based on test results.

Nitrate in the irrigation water and soil mineralization will also provide nitrogen to the crop. A heavier soil with higher organic matter will mineralize a greater amount of N per acre per day and sandier soils less. A higher organic matter soil can meet a sizeable portion of crop needs just through mineralization. That plus nitrate in the water (depending on the quantity) can provide further N.

HOW MUCH NITROGEN FERTILIZER TO APPLY (APRIL - SEPTEMBER)

If the result in ppm of NO_3^- is	Apply pounds of nitrogen per acre per week
0	14
5	12
10	10
15	8
20	7
25	6
30	5
40	4
50	2
>50	No fertilizer

