

# DIY tissue tests to determine plant N sufficiency in small grain crops

Karla Estrada ([cestrada@ucdavis.edu](mailto:cestrada@ucdavis.edu)), Valerie Wong, Valentina Roel, Cameron Pittelkow, Mark Lundy, Dept. of Plant Sciences, UC Davis

## Collecting Samples

- Large handful of representative plants are needed
- Include all plant parts (stems, leaves)
- Take representative samples:
  - Avoid odd or dissimilarly treated areas not representative of the field or management zone area; avoid field edges
- Run nitrate tests soon after collecting samples, or store in a fridge or other cool place between sampling and testing. Fresh is best!
- Samples can also be tested on material that has been uniformly dried.



## 2023 UC Davis Small Grains Field Day Demo

### NeCi Superior Enzymes

<https://nitrate.com/store/index.php/nitrate/plant-petiole-nitrate-kit>

- Cost:
  - 5-pack = \$45, 25 = \$165, 50 = \$305
- Materials needed:
  - garlic press, scissors
- Time needed:
  - ~ 15-20 minutes, multiple tests can be done at once

Nitrate-N (ppm)	0	200	500	1000
Nitrate (ppm)	0	900	2200	4400

Visit <http://nitrate.com/petiolesapnitratetesting> for more information about petiole testing

Reading results: color reference sheet is provided

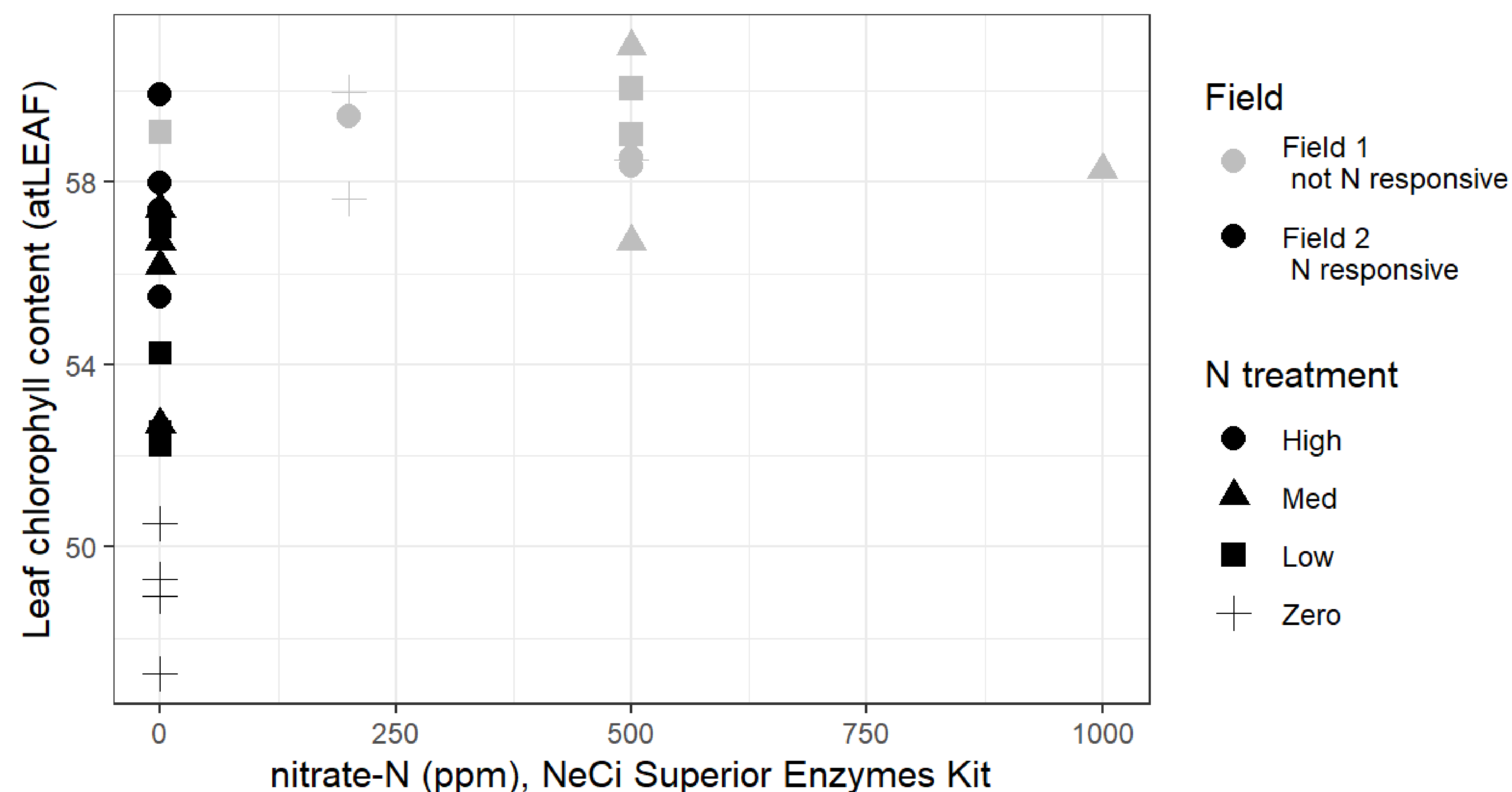
## MSU Strip Test

[https://animalrangeextension.montana.edu/forage/nitrate\\_strip\\_instructions.html](https://animalrangeextension.montana.edu/forage/nitrate_strip_instructions.html)

- Cost:
  - ~\$2.50 / test strip (50 per bottle)
- Materials needed:
  - Coffee grinder, Water Works Test Strips (can be purchased on Amazon), ~ 0.5L bottle with purified water
- Time needed:
  - ~ 10-15 minutes, multiple tests can be done at once



**Figure 1 (right).** Comparative measurements of nitrate-N via NeCi test kit and leaf chlorophyll measurements from plants in the same plot across two locations measured at approximately the boot stage of growth. Plants in Field 1 were not responsive to rates of N fertilization; whereas plants in Field 2 were highly responsive to differences in N fertilizer rates. Nitrate test kit was able to differentiate the deficient and non-deficient field but was less sensitive to differences in individual N rates than leaf chlorophyll measurements.



## LaMotte

<https://www.wardsci.com/store/product/8878930/lamotte-plant-tissue-macronutrient-test-kit>

- Cost:
  - ~45 nitrate samples = \$150
- Material needed:
  - purified water, scissors
- Time needed:
  - ~ 7 minutes, 2 tests can be done at once



Results can be divided into three categories: dark pink, light pink, and no color (L to R).