Protocol for Plant Sample Submission to NCDA by Researchers

Research plant samples will not be accepted unless dried and ground prior to submission. No exceptions. Effective 9/1/2024.

1) **Collect the correct sample part for your research.** If your objective is to establish or validate nutrient sufficiency ranges, be advised that most are based on the most recent mature leaf with petioles detached. The NCDA lab detaches petioles for crops where an interpretation is required. The researcher is responsible for this moving forward.
2) **Collect and submit a sufficient amount of plant material to produce statistically valid results**. Submitting very small quantities for analysis produces poor precision in replicate analysis. This is particularly important where your research concerns micronutrients or heavy metals, as precision is much lower as the method detection limit of the analytical method is approached.
    a. Leaf nitrogen analysis by combustion: 50 mg is the minimum to produce a statistically reliable analysis. 100 mg or more is highly recommended.
    b. Leaf ICP analysis (P, K, Ca, Mg, S, Fe, Mn, Zn), 0.5 g is the minimum amount to produce statistically valid results. 1.0 g or more is highly recommended.
    c. Leaf ICP analysis (Mo, Heavy metals), 1.0 g is the minimum amount to produce statistically valid results. 2.0 g or more is highly recommended.

    If sufficient material is not submitted to allow for all requested tests, the NCDA lab will perform as many analyses as possible. No refunds or discounts will be given for tests that were not performed due to improper submission.
3) **Collection of plant material.** Plant materials should be collected only in paper bags. Decay of un-dried plant samples occurs rapidly in plastic and affects the validity of the downstream analysis. The rate of decay varies by plant species—turf and vegetables decay quickly—corn and miscanthus less so. In areas with high temperatures and high humidity, plant samples, even in paper bags, should be packed very loosely during transport and should be cooled to room temperature as soon as possible.
4) **Storage of plant material.** Refrigeration is not recommended for fresh plant material. Short term storage (days, not weeks) is acceptable if plant material is loosely packed. If complete drying of plant material is not feasible within a few days of collection, air-drying is preferable to refrigeration.
5) **Drying plant material.** Leaf material should be dried at 60-70 C for a minimum of 12 hours. Longer drying times may be necessary for coarser plant leaves, stalks, stems, fruits and tubers. Sectioning of these types of samples will expedite the drying process.
6) **Grinding plant material.** Dried plant material should be ground to a minimum of 1 mm fineness. Fibrous crops such as corn and miscanthus require additional processing. Achieving this level of fineness is critical to the analytical precision of your replicates. Ground samples should be thoroughly homogenized prior to submission for analysis. This is particularly crucial for samples that contain more than one plant part, e.g. leaves and stems together. Subsampling of large plant samples (e.g. whole corn) is highly recommended.
7) **Submit a maximum of 50 g of dried, ground plant material in a sealable plastic container.**