

## Testing Guidelines for a Basic Hayfield

### **Value of testing**

Integrating soil tests and plant tissue tests is the best way to design a targeted and cost effective fertility program, avoiding guesswork. We often unknowingly apply excessive amounts of fertilizers which is expensive, produces lesser feed value, and pollutes the watershed. Soil and plant tissue tests will reveal the nutrients and microorganisms that exist in your system.

The soil tests tell us which nutrients exist in your soil, and the quality and activity of organisms in the soil that can make those nutrients available to the plant. Tissue testing tells us which nutrients the plant is actually absorbing and allows for nimble adjustments in-season. Ideally you take tissue samples 10 days before your first cutting to see if you have any deficiencies. Then you have time to mitigate those deficiencies before your second cutting. We are striving for long term results, so these improvements can take time.

Our goal is to create conditions for the microbial community in the soil to feed the plant. Then, we can add small amounts of fertility and biology if needed for each person's unique set of goals and needs.

**Keep in mind testing is one tool in your toolbox. Looking closely at your plants, digging into the soil with a shovel, using your human senses, looking at yields and input costs, are arguably more important tools. Education and deeper understandings of soil life and health are paramount for reaching your operation's potential.**

### **Which tests to use**

**Soil test (chemistry)** - Agvise F2 Complete - \$55.35 plus shipping

This package includes testing at two depths: 0-6 inches and 6-24 inches. The shallower sample is tested for macronutrients (N, P, K, S); base cations (Ca, Mg, Na); micronutrients (Cl-, B, Cu, Fe, Mn, Zn); and soil properties (pH, soluble salts, organic matter, carbonate (CCE), cation exchange capacity (CEC), and base saturation). The deeper sample is tested for nitrate, sulfate, chloride, pH, and soluble salts only.

**Tissue Test** - Agvise Complete Nutrient Analysis - \$32.25 plus shipping

This package includes testing for total N, P, K, Ca, Mg, Na, S, B, Cu, Fe, Mn, and Zn.

**Soil Life Test (biology)** - Earthfort Labs - \$50 plus shipping

This package includes testing for total moisture%, pH, EC, bacteria/fungi biomass, fungi to bacteria ratio, biological carbon/acre, biological nitrogen/acre, and biological C/N ratio.

### **When to test**

We recommend taking initial soil samples (chem and bio) in the spring when the plant is growing, there is moisture in the soil, and it is warm.

The ideal time for tissue testing is right before you cut or graze for the first time of the year. Then you have a fully growing plant and can make adjustments from there if you need to.

### **How to take samples**

**Soil Tests** - You will need 3 buckets or containers, a long soil probe (like [this one](#)), a screwdriver, 3 gallon ziplock bags, sharpie, maybe a spud bar, two boxes for shipping, and packing material.

Before taking your samples, print the [Agvise](#) and [Earthfort](#) order forms and fill them out. If you have any questions, both companies have great customer service and you can find their contact information on the websites.

On the field in question find an area for your first sample. Brush away any organic debris or plant life. Using a soil probe (or apple corer), remove soil from the top 6 inches of your soil. Empty these cores into bucket A - the screwdriver can help to remove soil from the probe. Using the same hole, remove the next 18 inches of soil and empty these cores into bucket B. It can be hard to get a probe this deep in the soil profile. So use the spud bar and a shovel if need be. In the same area but in a new hole, remove the top 3-4 inches of soil and empty these cores into bucket C. Repeat the 3 cores in 5-10 different sites on your field. Taking soil from 5-10 sites gives a more representative sample for your test.

Mix up the cores in each bucket and dump about 2 cups from buckets A, B, and C into their respective 3 gallon ziplock bags, leaving some air in the bag. Bag A will be sent to Agvise for the 0-6" chemistry test. Bag B will be sent to Agvise for the 6-24" chemistry test. And bag C will be sent to Earthfort for the biology test.

Place bag A and B in a box addressed to *Agvise Laboratories, 804 Highway 15 West, P.O. Box 510, Northwood ND, 58267*. Fill the box with packing material to prevent tearing.

Place bag C in a box addressed to *Earthfort Laboratories, 635 SW Western Blvd, Corvallis OR, 97333*. Fill the box with packing material to prevent tearing.

If you cannot box and ship the samples immediately, store them in a cool place like the fridge, until you can.

It is best to get these samples to the lab within 3-4 days to ensure accurate results.

**Tissue Tests** - Call Agvise at 701-587-6010 in advance of sampling to get a complementary Plant Sample Envelope. This envelope is ventilated and will prevent plant deterioration in shipping. This envelope also has the sample form included. Fill this form out when you receive it.

If you cannot get Agvise's envelope in time, simply punch some holes in a manila envelope or paper envelope. Print out [Agvise's sample form](#) or write down all the information needed on a piece of paper. Include this with your sample shipment.

If you are investigating the nutrient differences between good and bad plants, it is recommended to take two separate samples.

For Alfalfa - Cut the top 6" or the top half of the alfalfa plant when the plant is less than 8" tall. Sample 25 plants (or enough plants to create a softball sized ball when squeezed in your hand) to submit for analysis. Shake excessive dust off of samples. Place samples in the Agvise Sample Envelope and into a box addressed to *Agvise Laboratories, 804 Highway 15 West, P.O. Box 510, Northwood ND, 58267.*

For grass -

- Orchard Grass: Sample either 5 weeks after spring green up or 5 weeks after cutting. Collect the whole plant.
- Smooth Bromegrass: Sample in the summer, midway between mowings. Collect fully developed stems with leaves (about 25).
- Prairie Bromegrass: Sample 6-8 weeks after harvest. Collect tops 2.5" above the soil line (about 25).
- Timothy: Sample early in flowering. Collect whole tops (about 25).

For all other grass species, collect enough vegetation to create a softball sized ball when squeezed in your hand. Shake excessive dust off of samples. Place samples in the Agvise Sample Envelope and into a box addressed to *Agvise Laboratories, 804 Highway 15 West, P.O. Box 510, Northwood ND, 58267.*

Agvise does not provide nutrient sufficiency ranges for grasses. If you are sampling, orchard grass, smooth bromegrass, prairie bromegrass, or timothy, RLS can provide nutrient sufficiency ranges.

If you cannot ship immediately, store samples in the refrigerator.

### **Things to avoid from Agvise -**

1. Do not include plants that have been showing visible deficiency symptoms for more than 10 days. Nutrient analysis of plants that have experienced nutrient stress for an extended time may be misleading. Example: a plant is deficient in sulfur for two weeks before plant nutrient analysis is done. The analysis may indicate that sulfur and nitrogen are deficient. This is because a lack of sulfur has caused problems with the nitrogen metabolism of the plant, not because nitrogen was deficient.

2. Do not include plants that are under stress due to disease. Root and foliar diseases can interrupt water/nutrient uptake or flow in the plant resulting in misleading information.

3. Do not include plants that are affected by excessively wet soil, herbicide drift, cultivator damage, etc. Any severe stress can cause a nutrient imbalance in the plant.”

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