Grazing Stick Instruction Manual

The ability to accurately estimate forage dry matter availability and animal forage dry matter demand is critical in balancing forage plant persistence and animal performance. A grazing stick is a tool that a grazing manager can use to estimate available standing dry matter. As with any tool, taking time to learn how to properly use it will increase the accuracy of the results.

A very basic first step is to understand that forage yields and animal forage demand are expressed in terms of dry matter or "dry matter basis." This simplifies calculations as moisture content of forage will vary according to season, growth stage and species. For example, a 1,100 lb dry cow has a dry matter requirement of approximately 30 lbs/day. If she is grazing a pasture that has a moisture content of 60%, to meet her dry matter demand of 30 lbs, she will consume a total volume of 50 lbs of forage. When moisture is included, this is termed "as-fed" or "as received."

Proper grazing stick use will help you better manage both forages and grazing animals.

Step 1
Determine Pounds Per Acre Inch
A direct relationship exists between inches of forage canopy height and pounds of standing dry matter (lbs/ac). This relationship varies depending on forage species and stand density (Table 1).

Table 1. Estimated Available Standing Dry Matter Pounds Per Acre Inch (lbs/ac in)

Forage	Average Good	Low-High Range
Bermudagrass	235	80-730
Fescue	160	50-265

A more complete table is found on your grazing stick. When measuring canopy height, take several measurements across the area to insure that canopy height is representative of the entire pasture. Measure to the top of the canopy. If the canopy has fallen over, straighten, but don’t stretch, the canopy to measure (Figure 1).

Figure 1.
Correct use of the grazing stick to measure canopy height.

Example: A bermudagrass canopy height of 10" and an average good value of 235 lbs/ac in would equal a dry matter availability of 2350 lbs/ac.

To reduce the variation in the range of lbs/ac and calibrate both your eye and the grazing stick, clip random, representative forage samples using a frame measuring 12" x 23". Measure canopy height where forage is clipped. Weigh and record sample weights in grams. Save a sub-sample to determine forage moisture content (see formula on back).

Use the following formulas to determine lbs/ac with a 12" x 23" frame:
Grams wet wt X % dry matter = grams dry weight
Grams dry weight X 50 = lbs/acre
lbs/ac ÷ inches canopy height = lbs/ac in

You may continue to calibrate your eye and the grazing stick throughout the growing season or until you become comfortable estimating % dry matter and stand density. At that point, simply measure canopy height and convert lbs/ac in to lbs/ac.

Step 2
Convert Total Pounds Per Acre to Available Pounds Per Acre

- Total lbs/ac X % utilization = lbs/ac of grazeable forage
- Example: 2,350 lbs/ac bermudagrass X 65% utilization = 1527 lbs/ac available for animals to consume

Percent utilization will vary according to plant species, season and management goals. Introduced forages will generally have higher utilization rates than native forages. The rule of thumb is 65 to 70% for bermudagrass and 25 to 30% for native grass.

Step 3
Determine Animal Intake (Forage Demand)

This is determined by estimating what percent of an animal's body weight it will consume in dry matter in one day. The percentage will vary according to class of animal and forage quality (Table 2). An approximate range is 2 to 4%. A value of 2.5% is most often used.

• 1,100 lb cow X 2.5% intake = 28 lbs of dry matter demand per head per day

Table 2. Grazing Formulas

$$\text{Number of Paddocks} = \frac{\text{Days of Rest}}{\text{Days of Grazing}} + 1$$

$$\text{Number of Animals} = \frac{\text{lbs/ac DM X Acres X \% utilization}}{\text{(Animal Wt X \% intake) X days}}$$

$$\text{Reserve Herd Days} = \frac{\text{lbs/ac DM X Acres X \% utilization}}{\text{(Animal Wt X \% intake) X No. Head}}$$

Dry Matter Forage Intake as a % of Body Weight

Dry Cow	2 to 3%
Lactating Cow	3 to 4%
Dairy Cow	3 to 4%
Stocker	2.5 to 3.5%
Horse	2 to 3%
Sheep and Goats	3.5 to 4%

Step 4
Putting it All Together

Grazing stick estimate of bermudagrass yield = 2,360 lbs/ac
2,360 X 65% utilization = 1527 lbs/ac available
1,100 lb cow X 2.5% intake = 28 lbs dry matter demand per day
1,527 lbs available/28 lbs demand = 54 days

Your grazing stick has helped you determine reserve herd days. In this example, one acre of bermudagrass will supply grazing for one cow for 54 days.

Determining Forage Dry Matter Using a Microwave Oven

1. Chop forage in 1" to 2" lengths.
2. Weigh out approximately 100 grams (3.5 ounces).
3. Spread forage thinly on a microwave-safe dish and place into microwave.
4. Heat for 2 minutes and reweigh.
   - If forage is not completely dry, reheat for 30 seconds and reweigh. (Microwaves vary considerably in drying capacity. It is better to dry for short intervals and reweigh until the last two weights are constant than to over-dry and run the risk of burning the forage and damaging the oven.) Continue this process until back-to-back weights are the same or charring occurs.
   - If charring occurs, use the previous weight.
5. Calculate moisture content using the formula:

$$\text{\% moisture content} = \frac{WI - W2}{WI} \text{ X } 100$$

- WI = weight of forage before heating
- W2 = weight of forage after heating
- Dry Matter (DM) is the percentage of forage that is not water
- DM equals 100% minus percent water
  Example: moisture content = 14%
  DM = 100-14 = 86%