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Estimating Amount of Forage in Hay Fields and Pastures[1]

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Forage serves as the primary source of nutrients for livestock in Florida, and efficient use of forage is critical to the livelihood of Florida farmers and ranchers. Estimating the amount of forage in a pasture can provide useful information when making management decisions. There must be enough material in the field to justify the cost of using harvesting equipment (i.e., purchase cost, rental cost, fuel, and labor); otherwise, the area should be grazed. This publication contains instructions for a simple method to determine the approximate amount of forage in hay fields and pastures.

This method for determining the approximate amount of forage dry matter uses a metal ring that is 1/10,000 of an acre in area. After forage samples have been collected, dried, and weighed, the values can be used to determine the approximate amount of dry matter in the field. Below is a description of how to make a ring with a diameter of 2.35 feet and how to collect the required samples.

How to Make A Ring

Tools

- 2 U-Bolts
- Thick gauge, bendable wire
- Wire cutters

Procedure

- Measure the wire to 8 feet 5 inches.
- Using the U-bolts, attach the wire so that you create a circle with a circumference of 7 feet 4.76 inches (some wire will overlap). This will give you a circle with diameter of 2.35 feet or an area of 1/10,000 acre.

Taking Samples from the Field

1. Toss your ring randomly throughout your pasture (cut 6–10 samples).
2. Measure the forage height within the ring using a yard stick (record the height and the sample number).
3. Clip all the material within the ring to the height at which you plan to cut or graze the forage and place in a bag. Write the sample number on the bag.
4. Dry the sample using the methods described in the EDIS publication AG181/SS-AGR-178 *Forage Moisture Testing* (available at http://edis.ifas.ufl.edu/ag181).
5. Determine the average weight in ounces after recording dry matter weights for each sample.
6. Once you have an average dry matter weight in ounces, convert it to pounds by dividing by 16, and then multiply

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by 10,000 to determine pounds of forage dry matter per acre.

7. To determine the amount of material that would be baled, you will need to add approximately 15% moisture back to your sample (see the following example).

Figure 1. A) Measurement of forage height; B) Collection of field sample; C) Weighing dried samples.
Credits: Cindy Sanders, UF/IFAS

Example Using This Method

Using the example values in the table above, the total forage weight (dry) is converted from ounces to pounds (1.01667/16 = 0.0635418 lbs). This value represents the pounds of dry matter in 1/10,000 of an acre. This value is then multiplied to determine the pounds per acre (0.0635418 X 10,000 = 635.418 lbs). This results in 635 pounds of dry matter with an average forage height of 7.21 inches.

Table 1. Example of forage samples taken in the field.

Sample	Forage Height (in)	Forage Weight Dry (oz)
1	7	0.7
2	7	1.4
3	7	0.8
4	7.25	1
5	7	1.1
6	8	1.1
	7.21	1.016667

Note: in = inches; oz = ounces; lbs = pounds

If you choose to bale this material rather than graze it, then moisture should be added back to this value to approximate the total material. Hay is often baled when moisture levels are approximately 15% (85% dry matter), so we will use this value (85%) in this example. To add the extra weight to account for the water in the hay you divide the average forage dry weight (635 lbs/acre) by the portion of the hay that is dry matter (85% = 0.85). This calculation tells you how much material you would have if you chose to bale for hay (635/0.85 = 700 lbs hay/acre). Round hay bales often weigh between 700–900 pounds. If bales are 700 lbs, then this example field would yield 1.07 round bales per acre. If they weighed 900 lbs, this example field would yield 0.83 round bales per acre. When the costs of fuel, equipment, and labor are considered, this field would be better used for grazing or should be allowed to rest and grow more before harvesting.

Conclusion

Determining the approximate amount of forage dry matter in a pasture or hay field can be useful when making management decisions. Although the method described here is simple to use, it can take time to complete correctly. You must collect multiple samples throughout your field and take time to dry each one appropriately. Failure to follow these steps properly will result in misleading dry matter values.

For additional information please check the Forages of Florida webpage at http://agronomy.ifas.ufl.edu/ForagesofFlorida/index.php.