Estimating Pasture Forage Mass From Pasture Height

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How do you decide when to move animals to new pasture? How long can they feed on a pasture before they should be moved again? The short answer is, "It depends." It depends on the number and size of animals, pasture size, production goals, available alternative pastures, and the forage mass present in the pasture. In order to practice pasture budgeting, you need an estimate of forage mass measured as pounds of forage dry matter/acre.

Clipped samples are the standard for scientific research, but they require considerable time and labor and are not practical for farm use. It is easy to measure pasture height, and there is a strong relation between height and forage mass within a pasture. Forage height can be measured several ways. The simplest is to use a ruler (Fig. 1). Another method is to use a plate meter that lies on the surface of the pasture, compressing the pasture down to a level that supports the entire weight of the meter plate. Two plate meters used in the United Sates are the falling plate meter (Fig. 2) and the rising plate meter (Fig. 3).

Measuring pasture forage mass is a three-step process.

1. Record pasture height at different points in the field. Take 15 to 45 heights depending on the size of the pasture. Calculate the average pasture height.
2. Evaluate the pasture's density in relative terms as thin, average, or thick.
    a. Thin-density pastures are young stands (one to two years since seeding), hay meadows used for aftermath grazing, and pastures without sod-forming grasses or white clover as an understory.
    b. Average-density pastures are mixed species stands including tall fescue, orchardgrass, bluegrass, perennial ryegrass, white clover, and red clover.
    c. Thick-density pastures are dense stands of tall fescue or tall fescue mixed with other grasses on fertile soil, closely rotationally grazed with adequate but not excessive regrowth periods.
3. Use the average pasture height to look up the estimated forage mass on Table 1. Find the row corresponding to the average pasture height and the column corresponding to the estimated density. The number at the intersection is the estimated forage mass in pounds of dry matter (DM) per acre, when clipped at ground level.

With this information, you can determine if the measured forage mass will be sufficient for the number of animals and the length of stay that you are contemplating. An animal unit (1000 lbs. animal live weight) of grazing livestock will consume about 25 lbs. of DM per day.

Each of the three measurement methods has its advantages and disadvantages. The ruler is simple but is a more subjective measure, especially in diverse swards. The falling plate meter is inexpensive and less subjective. The rising plate meter is more costly but is handier than the falling plate meter since it provides an automatic calculation of the average height. Whichever method you use, it can help you improve your accuracy in estimating forage mass for pasture budgeting.

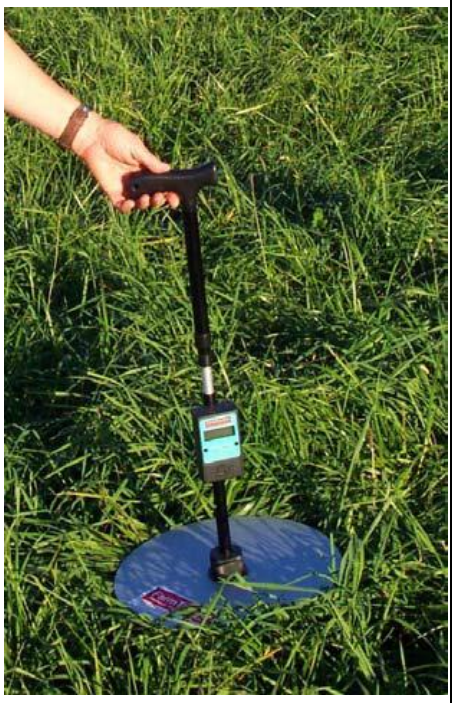
Fig. 1. Use a ruler to measure pasture height by placing the end of the ruler on the ground, hold the ruler vertical, and estimate the average height of the top leaves in the pasture.	**Fig. 2.** Use a falling plate meter to measure pasture height by placing the ruler through the center hole in the plate, place the ruler's end on the ground, lower the falling plate meter onto the pasture, measure the plate's height above the ground.	**Fig. 3.** Use the rising plate meter to measure pasture height by holding the shaft vertically, place the plate on the pasture, push tip down to the ground, making the plate rise up the shaft moving the counter to measure the plate height above the ground.
		

Table 1. General calibrations for pasture forage density and forage mass at different mean pasture heights as measured with a ruler, a falling plate meter, and a rising plate meter.

Measurement Method			Pasture Density		
			Thin	Average	Thick
Ruler Ht. inches	Falling plate meter Ht. inches	Farm Tracker rising plate meter Ht. inches	Forage Mass lbs. DM/acre		
2	1.0	0.8	350	680	1020
3	1.7	1.3	580	1070	1570
4	2.3	1.8	810	1440	2070
5	3.0	2.4	1050	1770	2500
6	3.6	2.9	1300	2080	2870
7	4.2	3.4	1550	2370	3190
8	4.9	3.9	1810	2620	3440
9	5.5	4.4	2080	2860	3640
10	6.2	4.9	2350	3060	3770
11	6.8	5.4	2630	3240	3840
12	7.4	5.9	2920	3390	3860