

Evaluating Dry Matter Intake From Pastures



By Erik Brettingen, B.S.

Many producers we work with at Crystal Creek® utilize pasture as a valuable feedstuff in their ration during the grazing season. Pasture is a cost effective feed that provides great nutrition, supports rumen microbes, promotes animal health, and

improves the profitability of many operations when utilized properly. While pasture as a feed can be very beneficial, it has one downfall. It is difficult to measure the dry matter intake (DMI) of your animals when they are on pasture. Dry matter intake is a crucial piece of information for nutritionists when balancing a ration. A balanced ration is essential for optimal production, reproduction, animal health and ultimately profitability.

One crucial aspect of a well balanced ration is meeting the vitamin and mineral requirements of your animals while they are on pasture. While pasture is a great feed that supplies livestock with many of the nutrients they need, it is not uncommon for pastures to be deficient in vitamins and minerals which directly affect your profitability.



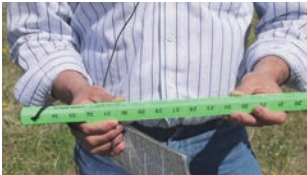
Pastures can vary in mineral content from paddock to paddock as it is largely the soil quality that determines this. Crystal Creek® has a high-quality pasture mineral designed specifically for those producers who utilize pasture as the main feedstuff in their ration. Please contact a Crystal Creek® nutritionist with any questions about incorporating Crystal Creek® mineral into your program for increased animal performance and profitability.

While it is great that many producers utilize pasture, it is important to know how much dry matter (DM) is available for your animals to graze. It is impractical to measure the exact amount of pasture that each cow is consuming. There are three crucial pieces of information needed to monitor the DMI the animals are getting from pasture:

1. The available DM in the pasture
2. Size of the paddock being grazed
3. Number of animals in the paddock

There are tools and strategies that producers can use to measure the DM available in pastures. Taking pasture clipping samples, using pasture plates and utilizing pasture sticks are all methods of measurement that producers can use. Measured

Figure 1: Methods of Pasture Dry Matter Measurement

	Clipping Samples	Falling Pasture Plate	Pasture Stick
			
Cost	\$5.00-\$10.00	\$20.00-\$40.00	\$12.00
Accuracy	+++	++	+
Ease of Use	+	++	+++
Additional Information	Very accurate but only practical to do a few times/year	Professionally manufactured plate meters available for extra cost	Erik's choice for ease of use and consistent DMI measurement

Sources: Image 1.) Ohio State University: <http://ohioline.osu.edu/factsheet/11-HCS-868> Image 2.) West Virginia University Extension Service: <https://www.wvu.edu/~agexten/pubnsltr/TRIM/5022.htm> Image 3.) South Dakota State University: <https://i.ytimg.com/vi/c9CylrIqVl/maxresdefault.jpg>

pasture can then be properly allocated depending on DMI need, allowing a more accurate ration to be balanced by your Crystal Creek® nutritionist. Understanding the benefits of each method will help you make the best choice for your operation. (See Figure 1).

Clipping Sample Method

Measuring pasture clippings is one way of monitoring pasture that is exceptionally accurate. However, it is not overly practical as it is time consuming and labor intensive. In order to take an accurate sample, walk through the pasture or paddock you plan to graze in a “W” shaped pattern taking a variety of samples from different points in the pre-grazed paddock. To take the sample, clip the pasture grass out of a 1 foot square area. When clipping, take the grass down to a level of 3 inches. This represents the actual DM available for the grazing animals. Pastured animals should be moved to a new paddock once the pasture has been grazed to a 3 inch level. Place the clippings from each square foot sample into its own designated bag. After taking several of these samples from the pre-grazed paddock, one more sample is needed for determining the dry matter percentage of

the pasture. For this sample, clip 100 grams of pasture from a random area in the same pasture where the previous samples were taken. Use a Koster tester or microwave to dry down the 100 grams of pasture. If using a microwave, reweigh the sample after one minute of drying, then dry again for 30 seconds and reweigh. Repeat this process until the sample weight does not change, indicating that no moisture is left in the sample.

By dividing the dried weight by the 100 grams of fresh pasture you will have the DM percentage of your pastures (See Figure 2). Weigh each clipping that was taken from the paddock separately. Record each weight individually. Add up all the weights and average them. Take that number and multiply by the percent DM of the pasture. This calculates the average DM available in 1 square foot of pasture. You will now need to multiply that number by 43,560 (the number of square feet in an acre). This procedure, although time consuming and labor intensive, will deliver exceptionally accurate results and should ideally be done once every month to measure DM as the grazing season progresses and pasture DM yields fluctuate.

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Figure 2: Dry Matter Available Per Acre of Pasture

Pasture Location (1 foot squared)	Weight of Clipping As Fed (lbs.)	DM % (from drying and weighing)	Weight of Clipping (DM Weight)
A	0.300	28	0.084
B	0.240	28	0.067
C	0.432	28	0.121
D	0.500	28	0.140
E	0.232	28	0.065
F	0.211	28	0.059
G	0.346	28	0.097
H	0.293	28	0.082
Average	0.317	28	0.089

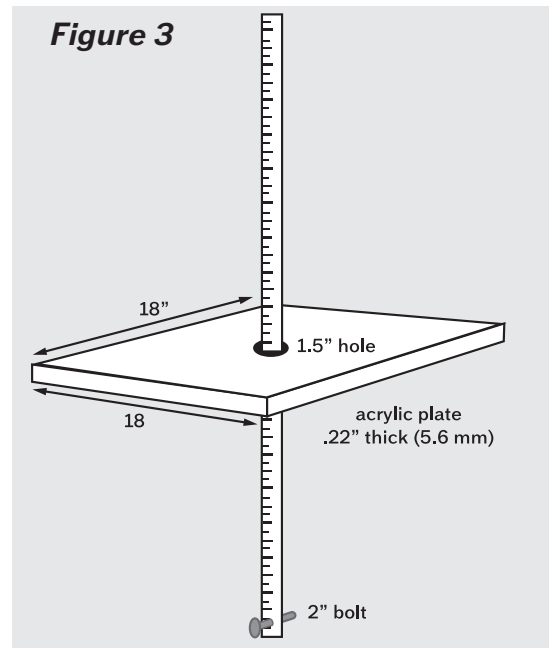
Avg. DM: 0.089 lbs. x 43,560 sq. ft./acre = 3,877 DM pounds available per acre

Pasture Plate Method

A more convenient method of pasture measurement that can be carried out frequently is the pasture plate. It is a faster (but still accurate) alternative to the clipping sample method. There are various styles and models of pasture plates. A pasture plate can easily be made by cutting a piece of acrylic (Plexiglas) in an 18 x 18 inch square. Cut a 1.5 inch hole in the center of the plate and place a yardstick through the hole with the “zero” end down (See Figure 3).

For the most accurate use of a pasture plate, it will need to be calibrated periodically throughout the year using the clipping method described earlier. To do this, raise the pasture plate to the top of the forage canopy. Let the plate fall on the forage until the point at which the forage is supporting the weight of the plate. Record the height at which the plate is resting on the yardstick. Now take the square foot clipping sample from within the 18x18 inch square where the plate was placed. After you have taken the clipping samples and measurements with the plate, the plate can be calibrated by correlating the heights measured by the plate with the clipping weights from the sample areas using the calculations in Figure 2.

Once the plate has been calibrated, it can then be used to make DM estimates without any need for clipping as you now know how much DM is available based on the measurements from the stick. For a faster and more convenient measurement, raise the plate to the top of the forage canopy and release it just as stated before. If the plate has not been calibrated, a constant of “390” has been derived through research trials carried out by



http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprd1097378.pdf

university professors and published in “Pastures for Profit.”¹ Simply multiply the inches measured by the plate by 390 to calculate an estimate of the DM available. This is not as accurate as properly calibrating the plate 3 times a year using the clippings, but it is an option if calibration is not possible and strongly preferred over choosing no method of pasture DM measurement.

Pasture Stick Method

The most convenient way to measure pasture quickly, accurately and efficiently on a regular basis, is the pasture stick. Although not as accurate as the clippings, the pasture stick allows for pastures to be measured on a daily basis, which is crucial for adequate DMI monitoring.

To use the pasture stick, simply place the “zero” end of the ruler completely down to the soil and measure the height of the pasture canopy (not the tallest plant). Once the height is recorded, slide the stick horizontally, with the dots facing up, along the ground under the forage layer. Without moving or straining to see the dots on the stick, count the number of dots that are visible through the pasture grasses. The number of dots seen will represent the estimated DM per acre inch. This is portrayed as a chart on the stick. With the measurement of the pasture height (in inches) and the DM per acre inch as represented by the dots, multiplying the numbers will equate to the DM available per acre of your pasture.



Figure 4:**Pasture Allocation Equation**

$$\begin{aligned} & (\text{Measured Avg. DM Yield of Pre-Grazed Pasture Acre}) \times (\text{Size of Pasture in Acres}) \\ & = \\ & \text{Total DM available of Pasture} \end{aligned}$$

$$\frac{\text{Total DM Available of Pasture}}{\text{Number of Animals in Pasture}} = \text{Pounds of DM Consumed Per Animal}$$

**It is important to note that animals must be moved when pasture is grazed down to 3 inches; this ensures accurate DMI amounts from measurements and provides pasture health and persistence.*

Like the alternative methods, multiple samples are needed for each pre-grazed paddock and then averaged for optimum accuracy and representation of the DM available. This method is quick, efficient and practical as it can easily be carried out while moving cows to a new paddock and the correct amount of pasture can be allocated in minutes with the help of the pasture allocation equation in Figure 4. The pasture stick is a very useful tool that can help graziers measure pasture on a regular basis to increase pasture utilization and ultimately profitability. To order your own pasture stick, visit Grassworks online at: <http://grassworks.org/?110700> and click on "Grazing Stick Order Form".

Developing A Pasture Rotation Strategy

With the available DM in the pasture accounted for, it is then important to know the size of the paddock that the animals are grazing. When the available DM and paddock size are known, use of the allocation equation (Figure 4) will allow for an accurate and rapid calculation of how much DM the animals are eating based on paddock size, available DM per acre and number of animals. When you know what the animals are consuming from pasture, it is then important to understand if this is an adequate DMI. With the help of your Crystal Creek® nutritionist, the needed DMI can be calculated based on the current ration, other feeds the animals are consuming, animal species, and energy needs based on stage of life. If communication with a Crystal Creek® nutritionist is not possible, the percentages in Figure 5 are general guidelines for varying species at different energy needs.

Figure 5:**Dry Matter Need**

Animal	As % of Body Weight
Dry Cow	1.5-2.3 %
Lactating Cow	3.5-4.5%
Beef Animal	2.5-3.5%
Horse	2-3%
Sheep & Goats	3.5-4%

Pasture is a very beneficial way to raise your animals. With proper management, pasture is extremely cost effective and can help provide livestock with what they need to thrive. Whether you are using pasture clippings, pasture plates, or a pasture stick, you will be able to better determine the DM available in your pastures regularly; resulting in better monitoring of the DMI from pasture. Regardless of the measuring method, consistent and frequent pasture measurement is the key to knowing what your animals are getting from pasture. It is important to communicate with your Crystal Creek® nutritionist about the herd's DMI from pasture to achieve better balanced rations, lower feed costs, more productive animals and increased reproductive performance and greater profitability. If you have any questions, or would like to learn more about the Crystal Creek® Nutrition Program, contact Crystal Creek® at 1-888-376-6777 to speak with one of our knowledgeable nutritionists or livestock specialists.

¹"Pastures for Profit" by Paul Peterson, Dennis Johnson, Dennis Cosgrove, Beth Albert and Dan Undersander