

Report from the ad hoc committee to clarify the measurement of pasture consumption

The committee was chaired by Kevin Brussell and included Kathy Soder, Kathie Arnold, Arden Nelson, Lisa McCrory, Jim Gardiner and Juan Velez.

Administrative support provided by Ed Maltby

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Report Title: Thought for the day: Eat more pasture- do less work

Access to Pasture standards

1. Organic dairy livestock over 6 months of age must graze on pasture during the months of the year when pasture can provide edible forage.
2. The grazed feed must provide significant intake for all milking-age organic dairy cows. At a minimum, an average of 30% of the dry matter intake each year must come from grazed pasture during the region's growing season, which will be no less than 120 days per year.
3. Temporary exemption from pasture may be allowed because of:
 - a. Conditions under which the health, safety, or well-being of the animal could be jeopardized, including to restore the health of an individual animal or to prevent the spread of disease from an infected animal to other animals.
 - b. Short term inclement weather.
 - c. Temporary conditions which pose a risk to soil and water quality.
 - d. In no case will temporary confinement and exemption from this pasture standard be allowed as a continuous production system.

The consensus of the group was that the estimation of the consumption of dry matter from grazed pasture will be made looking at the average dry matter intake for the lactating herd each year from grazing. The following is to try to answer some of the questions and concerns that have been raised, providing guidance for the certifier and producer in how they might measure the consumption of dry matter from grazing.

1. Will a producer get de-certified with one year at 25% DM consumption?
 - a. The measurements can not be that precise and are an accumulation of many different calculations including: pasture logs; daily record of TMR provided; tracking refused TMR; weather; time of calving.
 - b. Every farm is different and precipitation may vary greatly over short distances
 - c. The whole farm plan should be geared to a goal of easily meeting the 30% minimum with sufficient margin for usual weather variances;
 - d. As with other situations within the organic certification, the inspector will be looking at many different aspects of production and management to assess the reasonableness of the farm achieving an average minimum of 30% which will determine the level of warning and censure for a one year below an average minimum of 30%.
2. Would there be any situation where an irrigated pasture in an arid climate be allowed an exemption based on "inclement weather"?
 - a. The source of the irrigation (snow or catchment area) can be subject to weather changes:
 1. For ditch irrigation there is third party data available to show yearly variance in availability.
 2. For center pivot or other irrigation there may be limited third party information but good management would record water usage.
 - b. Climatic data for different regions is easily available over the internet and regional information can be used to assess if weather conditions were a factor in poor quality pasture.

- c. It takes longer to establish a productive, balanced pasture in arid areas which make the establishment more susceptible to weather changes. This extended timeline would need to be included within the whole farm plan and realistically appraised with the initial certification. In order to meet the requirement, cow numbers will likely need to be initially adjusted downward from final planned herd size if a new operation does not have already established pasture.
3. What is the role of management?
 - a. A realistic appraisal of the number of cows the pasture can support.
 - b. Layout of farm to maximize access to pasture.
 - c. Seeding of annual forage crops as a balance for extremes of weather or as a permanent rotation to recognize repeated weather patterns.
 - d. Good record keeping to build an accurate picture of the productivity of the pasture to be able to do forward budgeting and to adjust cow numbers, calving pattern or other controllable areas.
 4. Is there enough understanding of calculating dry matter and testing of feed by producers?
 - a. It is only critical when the producer starts to be within 10% of the average minimum of 30% over a year's grazing season(s), probably most that do it on an "as-fed" base would be above this level.
 - b. A work sheet has been developed that will assist producers in calculating and recording the feed consumed by their dairy herd.
 - c. Information is attached on how to calculate dry matter and other factors affecting consumption of feed.
 - d. The certifier would have cause to require testing of feed for volume (i.e. weight of bales) and dry matter from any producer who came close to the 30% minimum rather than requiring them from every producer.
 5. Should allowance be made for micro-variations such as the increased energy used when cows have to walk further, stress from being in heat, housed because of veterinary needs?
 - a. The words "average" and "minimum" when applied to a whole herd of lactating cows over the grazing season(s) during a calendar year gives enough room for these small day to day variances.
 - b. If these small variances affect achieving the **minimum**, the producer should be looking at management and changes to the pasture system to determine how s/he can easily reach the average of 30%.

Attachment:

1. Feed Calculation worksheet (legal size)
2. Dry Matter calculation and Walking Energy requirements by Kathy Soder, USDA ERS
3. Pasture consumption calculation by Lisa McCrory

Farm and/or Group Name _____

Month _____

Year _____

Please use a separate sheet for each group or herd of cows

<i>Is the Calculation of feed fed on an As Fed or Dry Matter basis? Please circle one.</i>									As Fed	DM	Columns marked with an * are optional							
Stored Feeds Record									Pasture Record						Production Record*			
Day	lbs of grain /cow	lbs of forage #1 or No. of bales/cow or group	lbs of forage #2 or No. of bales/cow or group	lbs of forage #3 or No. of bales/cow or group	No. of cows worth of TMR mixed/ fed	No. of cows fed TMR or in group	lbs. of refusal/cow or group *	Ref to notes below	Paddock ID-AM	Paddock ID -PM	Hills? Yes or No *	Dist. to pasture in feet *	Pasture Quality Estimate - (5 high quality-1 poor quality) *	Weather - suitability for grazing - (5 high - 1 low) *	No. of cows in tank*	lbs of milk in tank*	lbs of milk/ day *	lbs of milk /cow/day *
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		

Notes on changes in grain, forage and/or TMR correlated to a designated number in the above column on "ref to notes below"

1
2
3
4
5
6

Calculating Dry Matter

Importance of Dry Matter Content

Dry matter intake (DMI) is defined as the amount of feed a cow consumes after the water has been removed. While many farmers are used to dealing with feed in its 'As Fed' form (as it comes out of the silo, pasture, or bin, with the water in it), cows are consuming nutrients, not pounds of feed, and these nutrients must be calculated as DM, for an accurate estimate of nutrient intake. Comparison of feeds on a DM basis allows feeds to be compared on an equal moisture-free basis (for example, if comparing the nutritive value of grass silage vs. grass hay).

NOTE: Forage analysis results will always be more accurate than book values for DM content. If at all possible, use actual DM values, particularly for fresh and ensiled feeds, which can be quite variable. Use of incorrect book values could result in overestimating pasture intake, potentially not meeting the 30% minimum DMI requirement. Additionally, using incorrect DM values can result in other problems associated with imbalanced rations, including decreased milk production and impaired cow health.

Calculating Dry Matter from 'As Fed' Values

To calculate the amount of DM from the known 'As Fed' amount and DM %:

Example: 20 lb. of hay 'As Fed' which is 90% DM (based on forage analysis) is fed to a cow.

How many lb. of DM did you feed?

$$20 \text{ lb.} \times 0.90 = 18.0 \text{ lb. of DM}$$

NOTE: The DM percentage (in this example, 90%) must be divided by 100 ($90 \div 100 = 0.90$)

NOTE: Always remember that the DM value will be *smaller* than the 'As Fed' value because the water content was removed.

Calculating 'As Fed' from DM Values

Example: Your ration calls for feeding 10 lb. DM of hay (with a known 90% DM content) to each cow. How many lb. is that on an 'As Fed' basis?

$$10 \text{ lb.} \div 0.90 = 11.1 \text{ lb. of hay 'As Fed'}$$

NOTE: Always remember that the 'As Fed' value will be *larger* than the DM value because the water content was "added" back in, as it would be weighed on a farm scale.

What if DM is Estimated Incorrectly? (Example)

We have 1000 lb. cows producing 45 lb. of milk that will consume approximately 35 lb. of total DM (from pasture and stored feeds) per cow per day.

We want to feed a very simplistic ration consisting of:

- 60% DMI from grass silage
- 10% DMI from grass hay
- 30% DMI from pasture.

Using book values, we estimate DM of the silage as 28% and the hay as 90% DM.

Silage

$$\text{DM} = 0.60 \times 35 \text{ lb. total DMI} = 21 \text{ lb. DMI from silage}$$
$$\text{'As Fed'} = 21 \text{ lb. DM} \div 0.28 = 75 \text{ lb. silage 'As Fed'}$$

Hay

$$\text{DM} = 0.10 \times 35 \text{ lb. total DMI} = 3.5 \text{ lb. DMI from hay}$$
$$\text{'As Fed'} = 3.5 \text{ lb. DM} \div 0.90 = 3.9 \text{ lb. hay 'As Fed'}$$

By difference, pasture DMI = (35 total DMI – 21 lb. DM silage– 3.5 lb. DM hay) = 10.5 lb. DMI from pasture

$$(10.5 \text{ lb. DM from pasture} \div 35 \text{ lb. total DMI}) \times 100 = \underline{30\% \text{ total DMI from pasture.}}$$

We later obtain a forage analysis, where the silage DM is actually 35%.

If we're feeding 75 lb. 'As Fed' silage based on our previous calculations, how many lb. of actual DM are we feeding?

$$75 \text{ lb.} \times 0.35 = 26.3 \text{ lb. of DM actually consumed from silage.} \quad \textbf{(75\% of total DMI)}$$

This means that the cows are obtaining 5.3 lb. more DM from silage (26.3 – 21.0) than we first estimated, or, 5.3 lb. *less* pasture DMI than first estimated. What does this do in relation to the pasture intake organic standard?

$$((\text{Silage DMI} + \text{Hay DMI}) \div \text{Total DMI}) \times 100 = \% \text{ DMI from stored feeds}$$

$$((26.3 \text{ lb.} + 3.5 \text{ lb.}) \div 35 \text{ lb.}) \times 100 = 85\% \text{ total DMI from stored feeds}$$

$$100\% \text{ total DMI} - 85\% \text{ DMI from stored feeds} = \underline{15\% \text{ DMI from pasture}}$$

Pasture DMI was grossly overestimated using book values, and, based on the proposed organic pasture standards, this farm would not be meeting the minimum 30% pasture DMI guidelines.

Table 1. Average book values for DM% of commonly fed dairy feeds (Adapted from NRC, 2001; Dairy Reference Manual, 1995).

Feed	DM (%)*
Cool-season grass pasture	18-28
Legume pasture	18-28
Silage (grass, corn)	28-40
Hay (grass, legume)	90
Barley, Wheat	89
Corn, dry	88
Corn, high moisture	74
Soybean meal, 48%	90

* Values will vary widely, particularly with ensiled and fresh feeds. Use forage analysis results when possible.

Energy Requirements of Grazing Activity

The amount of energy Net Energy for Lactation (NE_L) required for grazing activity is listed below in Table 1. Grazing activity is a function of body weight (BW), distance walked between pasture and parlor, and topography of the pasture. The equations used to calculate these values assume that dry matter intake (DMI) is 'normal' for the given body weight and that pasture is 60% of the total DMI.

Table 1. Estimated NE_L requirements (Mcal/day) associated with grazing flat or hilly ground for an average Jersey cow (1000 lbs) and an average Holstein cow (1400 lbs). Adapted from NRC (2001).

Total distance, parlor to paddock, miles/day	BW = 1000		BW = 1400	
	'Flat'	'Hilly'	'Flat'	'Hilly'
0.25	0.63	3.33	0.88	4.66
0.50	0.71	3.41	0.99	4.77
0.75	0.79	3.49	1.11	4.89
1.00	0.88	3.58	1.23	5.01
1.25	0.96	3.66	1.34	5.12
1.50	1.04	3.74	1.46	5.24
1.75	1.12	3.82	1.57	5.35
2.00	1.21	3.91	1.69	5.47

****High-quality pastures (cool-season grasses or legumes) typically contain 0.69 – 0.72 Mcal/lb of DM.**

Approximately 0.31 Mcal NE_L is required for each pound of 3.5% milk produced (or 0.33 Mcal for 4.0% milk). Therefore, if we assume that DMI and nutrient intake remains the same (which it may or may not), a 1000 lb. cow that has to walk on flat ground 2 miles/day may drop in milk by 2-4 lb. in milk (1.21/0.31).

A 1400 lb. cow walking on hilly ground 2 miles per day may drop in milk production by more than 10 lb./day (5.47/ 0.31 = 17.6 lb of milk lost) if additional energy (or DMI) does not make up the difference for this increased activity.

Measuring 30% DM from Pasture

By Lisa McCrory

Current USDA National Organic Program Regulations require access to pasture for all ruminant animals [§205.237, §205.239] (*see end of article for exact wording*). USDA Accredited certifiers have been enforcing this standard since the inception of the program in 2002. The current rule, however, lacks measurable standards and has led the USDA /NOP to say that the current standard is unenforceable and as a result, organic dairy farms are not being treated equally. Producers and consumers alike have not been happy about the lack of enforceable standards. Knowing that there are organic dairies selling milk as organic and *not* using pasture sends a confusing message to consumers and threatens the health and potential growth of the organic dairy industry.

In April 2006, USDA/NOP invited producers, certifiers, resource individuals and industry representatives to participate in a pasture symposium. This meeting was intended to assist the USDA/NOP in understanding the importance of pasture on organic farms and to develop standards for pasture that were reasonable and enforceable within an organic system plan.

At that meeting, the majority of the certifiers and farmers agreed that specific and quantifiable pasture standards were necessary and could easily be documented using current record-keeping regimes of certified organic livestock farmers. The following standard has been approved by producer organizations, advocacy groups, processors and certifiers throughout the United States: *“Ruminant livestock must graze pasture for the growing season but not less than 120 days per year. The grazed pasture must provide a significant portion of the total feed requirement but not less than 30% of the dry matter intake on an average daily basis during the growing season.”* This wording was also voted on and approved by the NOSB in 2005 as a guidance document for certifiers.

Because a measurable higher standard has not yet been adopted by the NOP, Organic Valley/CROPP has developed higher standards, which were voted and approved by their producer members. Organic Valley is now requiring that the producer’s farm plan includes a provision that “ruminant animals over 6 months of age receive a ... minimum of 30% of their dry matter intake from pasture for a minimum of 120 days per year”.

In anticipation of a measurable pasture standard, Vermont Organic Farmers (VOF), the certification arm of NOFA-VT, and NOFA-NY Certified Organic LLC have included a section in their application forms that allows a producer to evaluate their pasture use. These forms help the certifier and the producer determine if the NOSB recommendation of 30% dry matter and 120 days is being met. If a producer is not meeting the 30% minimum requirement, they are asked to justify their management and in some cases to increase their pasture acreage.

Other Northeast certifiers (MOFGA Certification Services LLC, Baystate Certifiers, Pennsylvania Certified Organic) do not provide any record keeping forms that evaluate dry matter intake from pasture at this time. Don Franczyk of Bay State Certifiers said that they are taking the ‘wait and see’ approach; when the NOP presents their proposed standard, they will move forward with the necessary paperwork for documentation. At this time, Bay State Certifiers has 6 certified dairies in Massachusetts and Connecticut, 4 of which are practically 100% grass-fed. MOFGA Certification Services and PCO work with their producers if they see that the producer is clearly limited in pasture for the size of their herd. They make it clear that if the NOP rule implements measurable pasture requirements, their continued certification may be in jeopardy. When writing non-compliance notices to producers, MOFGA Certification Services cites the definition for pasture included in the rule which states that “pasture must provide food value and that

natural resources must be maintained or improved”. Certifiers have a long history with using feed calculations to red-flag potential compliance issues. For example, the 80/20 feed exemption, when calculated on an as fed basis, was based on certain assumptions about the weight of hay bales. It is also a requirement for producers to provide information on feed harvested for each production year. Certifiers must be aware that a margin of error exists in all of these calculations and realize that their best use is determining which producers need additional evaluation.

Producers are required, by any certifier, to submit an Organic Farm Plan that demonstrates how they are building soil fertility, preventing soil degradation/erosion, a description of their out-door access practices, and where their feed is coming from. From these requirements, a system is already in place to calculate intake from pasture. Pasture intake information can be determined by ‘back-calculation’ or by providing a ration plan for the herd during the grazing months.

To back-calculate, one compares what is fed in winter, to what is fed in the summer. The total dry matter is determined from both rations; then the summer ration is subtracted from the winter ration. The difference between those two rations would be the amount being provided from pasture. Divide the dry matter value of the pasture into the dry matter value of the winter ration and you will get your pasture %.

Example:

100 milking cows weighing an average of 1100 each. Average milk production per cow is 50 lbs/cow.

Winter ration:

50 # Haylage (40% dry matter) = 20 lbs dry matter

5 # dry hay (90% dry matter) = 4.5 lbs dry matter

15 # grain (90% dry matter) = 13.5 lbs dry matter

Total Dry Matter = 38 lbs

Summer ration:

12 # grain (90% dry matter) = 10.8 lbs dry matter

4 # dry hay (90% dry matter) = 3.6 lbs dry matter

Total Dry Matter = 14.4 lbs

Winter Ration (38) – Summer Ration (14.4) = 23.6 lbs dry matter remaining = pasture portion of the ration

To determine the % Dry Matter from Pasture: 23.6 divided by 38 = 62% of the daily ration = pasture.

To calculate the ration based upon the dry matter needs of your cows, you can also forward calculate. Dairy cattle consume approximately 3.5 % of their body weight in dry matter intake daily. Total dry matter intake can vary slightly based upon the breed and the total pounds of milk produced, but these average values will help producers and certifiers identify those farms that are close to the minimum allowances.

Example 1: a herd of 100 Jerseys weighing an average of 950 lbs each. They each need approximately 33.25 lbs dry matter per cow per day ($950 \times .035 = 33.25$ lbs). The cows are fed 12# of grain per day (90% dry matter) and 4 # of dry hay (90% dry matter) per day to complement their pasture.

Expected dry matter intake per cow: 33.25 lbs

- minus dry matter intake from grain -10.8 lbs

- minus dry matter intake from hay - 3.6

Total dry matter from pasture = 18.85 lbs

To determine the % dry matter from pasture: 18.85 divided by 33.25 = 57% of the daily ration = pasture

For those producers who still like to supplement their pasture with a TMR ration, here is another calculation.

Example 2: a herd of 60 cows weighing an average of 1300 lbs. They each need approximately 45.5 lbs of dry matter per day ($1300 \times .035 = 45.5$ lbs). The cows are fed a TMR ration that includes 40 lbs of haylage/corn silage (40% dry matter) and 14 lbs of grain (90% dry matter).

Expected dry matter intake per cow:	45.5 lbs
-minus dry matter intake from grain	-12.6
-minus dry matter intake from silage	- 16.0
Total dry matter from pasture =	16.9 lbs

To determine the % dry matter from pasture: 16.9 divided by $45.5 = 37\%$ of the daily ration = pasture

Whether or not your certifier or processor is asking you for a pasture dry matter calculation, I recommend you work on making these determinations for your farm. Work with your nutritionist, ask your local Extension agent to help you, or contact your local organic dairy technical outreach person available through MOFGA, NOFA-VT, NOFA-NY, PCO, NOFA-Mass and NOFA-NH. It is best to know where you stand now so that you can start planning for any adjustments that may need to be implemented within the next year or so (optimistic, aren't I?). I am sure most dairy graziers will find that they are well over the 30% minimum standard, so don't be intimidated by doing the calculations for your farm; I am sure you will be pleasantly surprised.

CURRENT REGULATION AND DEFINITION:

Definition of pasture as written by the NOP in the definition section of the rule: Land used for livestock grazing that is managed to provide feed value and maintain or improve soil, water, and vegetative resources.

205.238 Livestock Health Care Standards

(a)(3) Establishment of appropriate housing, pasture conditions, and sanitation practices to minimize the occurrence and spread of diseases and parasites;

§ 205.237 Livestock feed. --

The producer of an organic livestock operation must provide livestock with a total feed ration composed of agricultural products, including pasture and forage, that are organically produced and, if applicable, organically handled:

§ 205.239 Livestock living conditions.

(a) The producer of an organic livestock operation must establish and maintain livestock living conditions which accommodate the health and natural behavior of animals, including:

(1) Access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its stage of production, the climate, and the environment;

(2) Access to pasture for ruminants;

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