

Pasture quality, carrying capacity and profitability is significantly variable from region to region in Minnesota. This is also true from pasture to pasture within region. Minnesota Farm Business Management records suggest profits varying from \$2.10/acre to \$62.00/acre, based on the low vs. high profit managers.

There are four main factors that impact profit including:

1. Level of management
2. Pasture productivity
3. Species diversification
4. Land value and potential range of uses

One of the points often discussed in relation to nearly any pasture presentation is the value of having a legume component to your pasture blends. Reasons for including the legumes include:

1. Increased productivity
2. Less problem with summer slump
3. Fixation of nitrogen
4. More drought tolerance
5. Higher forage quality

The bottom line is that numerous research articles suggest increase in gains from a minimum of .1 up to .35 lbs/hd/day with the addition of legumes in the pasture blend. This is regardless of pasture rotation. One of the considerations needing to be addressed when evaluating options of specific species is the current soil pH. Nearly all legumes are more productive and have a longer persistence with pH's greater than 6.0 and prefer it in the range of 6.5 – 7.0. This is due to the nutrients being more available for the plants to take them up and utilize them for growth.

This information is widely known and discussed in relation to alfalfa hay production and the same principles apply for pasture production. Therefore when deciding if you would like to utilize a legume in your pastures it is recommended to pull a soil sample to see if you need to increase soil pH with an application of lime. At this point many of you are thinking, "there is no way I can lime or reseed my pastures" due to slope, drainage, rocks accessibility, etc, therefore eliminating legumes as an option. This is not necessarily the case.

One question often asked is whether top dressing lime will impact soil pH. A study done by Penn State University suggests either annual applications or frequent applications over time increase soil pH, as seen in Figure 1 and 2. It also suggests it takes about 1 year to impact pH. The study does not suggest to favor one treatment method over the other. In most pastures it would work better to apply more lime (slower application speed) less frequently.

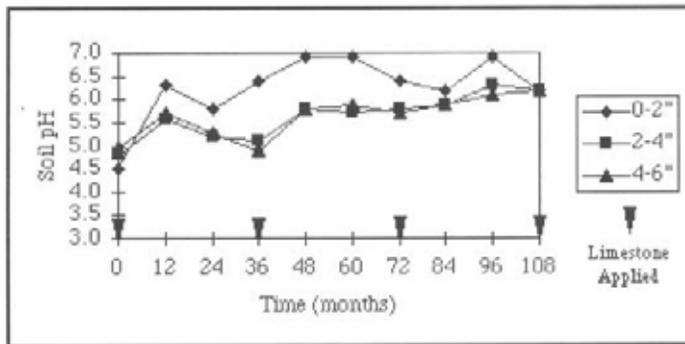


Figure 1. Soil pH vs time for a no-till soil limed at 6000 lb/A every third year

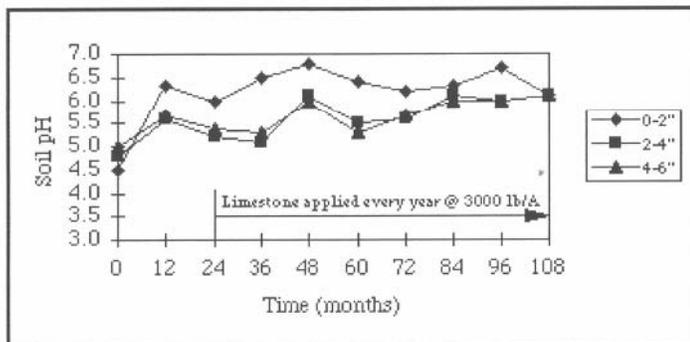


Figure 2. Soil pH vs time for a no-till soil limed at 6000 lb/A initially and then every year since 1987 at 3000 lb/A.

In another study performed by Grimsbo Jewett, annual applications of lime tended to increase soil pH over two years in Table 3, but also increased yield by approximately 1/2T/year with no other input, fertilizer, etc., Table 4.

Table 3. Change in pH from Surface Application of Lime at the Jewett Farm

Lime Treatment (lb/A)	pH		
	1997	1998	1999
No Lime	5.1	5.2	5.2
Blandin Ash, 500	5.2	5.3	5.5
Blandin Ash, 1,000	5.3	5.5	5.8
Cutler-Magner, 500	5.4	5.4	5.8
Cutler-Magner, 1,000	5.2	5.3	5.5
Cutler-Magner, 1,500	5.2	5.3	6.0

Table 4. Effect of Surface Application of Lime on Forage Yield at the Jewett Farm

Lime Treatment (lb/A)	Yield (lb/A dry matter)	
	1999	2 year Total
No Lime	3,120	8,160
Blandin Ash, 500	4,060	10,500
Blandin Ash, 1,000	4,300	10,190
Cutler-Magner, 500	4,020	9,750
Cutler-Magner, 1,000	3,920	10,720
Cutler-Magner, 1,500	3,940	10,900

These studies suggest top dressing is an option for increasing soil pH. Other considerations based on my observations/ studies suggest:

1. Calcium based lime may be better than magnesium
2. The finer the texture of the product the better
3. It takes about 1 year to have an impact on pH
4. Rain and soil texture have an impact on how fast the lime will migrate through soil profiles
5. Aeration of soil increases change especially in finer textured soils

Although this would allow for the use of a legume in your pasture mix, you may still not want to use a legume due to:

1. Fertility requirements
2. Stand longevity
3. Increased need for management
4. Risk of bloat
5. Ability to seed pastures

For more information on lime, liming materials and the economic impact, please contact your local University of Minnesota Extension Office for publications: *Liming Needs in Minnesota*, AGFS 5957A; *Lime Needs in Minnesota*, AGFO 5956B; or *Liming: Taking a Look at Liming Materials*, AGFS 2677A. If you have further questions, please contact Troy Salzer at 218-384-3511.

Bibliography:

1. *Effectiveness of Surface Liming For No-Till Fields and Pastures*, prepared by Douglas B. Beegle, Professor of Agronomy, Department of Agronomy, Penn State University, 1985.
2. *Surface Application of Liming Materials*, Jane Grimsbo Jewett, Palisade, MN

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