



Nutrient Management for Pastures

Introduction

Picture a rural countryside: a red barn, green fields, and cows lazily munching away in a nice green pasture may come to mind. What probably does not immediately come to mind is that this pasture also offers potential environmental benefits. Erosion from well-managed pastures is much lower than from row crops. In addition, pastures require less fertilizer and have a reduced risk of nutrient loss to groundwater and surface water. Pastures also improve soil health, increase organic matter levels, and reduce manure management needs. This fact sheet discusses the basics of pasture nutrient management.

Pasture Nutrient Management Concerns

Pastures offer many nutrient management benefits as compared to traditional row crops. Pasture requires less fertilizer, and as perennial crop, there is less soil erosion, runoff and leaching from well-managed pasture. However, there can still be nutrient management concerns with pasture systems. Often pastures contain environmentally sensitive water bodies such as streams, wetlands, ponds, wells, and springs. When livestock have access to streams this allows direct deposition of manure into water. There are many best management practices that can be implemented to alleviate these concerns:

- o livestock exclusion from waterbody (fence);
- o establishment of stream crossings;
- o locating of shade and supplemental feeding areas away from sensitive areas;
- o providing alternative drinking water sources.

If pasture quality is low, nutrient runoff and/or leaching from the pasture can be high. Therefore it is important to keep pastures in good condition. This can be done by timely renovation, establishment of a new pasture when necessary, and appropriate nutrient management of the stand.

Pasture Renovation

It is commonly thought that poorly-performing pastures need to be plowed and reseeded.

However, improving soil fertility and pH, along with adjusting grazing management, can work wonders in improving pasture quality and species composition. The first step is to carefully evaluate the current condition of the pasture. Consider species composition and weed problems, and take a soil sample to assess soil fertility (for more information on soil sampling, see Fact Sheet #1). Apply lime and fertilizer based on soil test results. Next, consider current grazing management. Intensive grazing management will help protect desirable pasture species and discourage poorer grasses and weeds. Clipping the pasture after grazing will also help control weeds. Overseeding desired species into existing pasture is also an option.

Pasture Establishment

If renovation is not possible, consider establishing a new pasture. There are many considerations in choosing a pasture species. Including a legume in the mix can reduce N needs for the stand. See *Pastures for Profit* for more guidance. Taking a soil sample is the first step in pasture establishment. Use the results to fertilize and lime the soil as needed. If lime is needed, be sure to apply it at least 6 months before the seeding date (for more information, see Fact Sheet #6). Without the correct pH and soil fertility a seeding may establish poorly or even fail completely. Rather than waste valuable time and resources, soil sample first! See Table 1 for fertilizer needs for pasture establishment.

Fertilizer Needs of Established Pasture

Fertilizer requirements of pastures vary based on how the grazing system is managed. Typically, more intensively grazed pastures will require more fertilization. Topdressing N at green-up (50–100 lbs/acre) will allow pastures to be grazed earlier in the season if needed. Topdressing with N during the growing season is also an option. The table below gives fertilizer recommendations for established pastures, based on management intensity, manure history, soil test levels and soil type.

Table 1. Fertilizer guidelines for forages. More specific guidelines will be obtained from a complete soil test analysis. SMG = soil management group. See Fact Sheet #19 to determine the soil management group of your soil.

	Fertilizer Nutrients to Be Added (lbs/acre)												
	Nitrogen (N)			Phosphorus (P ₂ O ₅)					Potassium (K ₂ O)				
	SMG	Soil Test Levels		Soil Test Levels					Soil Test Levels				
No Manure		Manure	VL	L	M	H	VH	VL	L	M	H	VH	
----- Topdressing pastures -----													
Native grasses	1	50-75	20-40	50	30	10	0	0	40	20	15	10	0
	2	50-75	20-40	50	30	10	0	0	45	20	15	10	0
	3	50-75	20-40	50	30	10	0	0	50	30	15	10	0
	4	50-75	20-40	50	30	10	0	0	60	45	15	10	0
	5	50-75	20-40	50	30	10	0	0	75	50	25	10	0
Primarily legumes or legume-grass stands	1	20-40	0	50	30	10	0	0	45	40	20	20	0
	2	20-40	0	50	30	10	0	0	50	40	20	20	0
	3	20-40	0	50	30	10	0	0	70	60	30	20	0
	4	20-40	0	50	30	10	0	0	90	80	40	20	0
	5	20-40	0	50	30	10	0	0	100	80	60	20	0
Intensively managed grasses, rotational grazing	1	125-150	80-100	50	30	10	0	0	45	40	20	20	0
	2	125-150	80-100	50	30	10	0	0	50	40	20	20	0
	3	125-150	80-100	50	30	10	0	0	70	60	30	20	0
	4	125-150	80-100	50	30	10	0	0	90	80	40	20	0
	5	125-150	80-100	50	30	10	0	0	100	80	60	20	0
----- Establishment of legumes -----													
Alfalfa, clover, trefoil other legumes, waterways pond dikes, diversions, etc.	1			85	75	60	40	20	45	40	20	20	0
	2			85	75	60	40	20	50	40	20	20	0
	3			85	75	60	40	20	70	60	30	20	0
	4			85	75	60	40	20	90	80	40	20	0
	5			85	75	60	40	20	100	80	60	20	0
----- Establishment of grasses -----													
Grass and improved grass pastures	1	30-50	20-40	50	30	10	0	0	45	40	20	20	0
	2	30-50	20-40	50	30	10	0	0	50	40	20	20	0
	3	30-50	20-40	50	30	10	0	0	70	60	30	20	0
	4	30-50	20-40	50	30	10	0	0	90	80	40	20	0
	5	30-50	20-40	50	30	10	0	0	100	80	60	20	0

In Summary


Well-managed pastures offer many nutrient management benefits. However, there are still steps that should be taken to improve pasture nutrient management. Consider fencing animals out of waterbodies and other sensitive areas, and provide an alternative water source. Before plowing under an underperforming pasture to re-establish it, take a soil sample, and carefully evaluate soil fertility and current pasture composition. Renovation may be a better and more cost-effective option. Remember, soil sampling should be the basis for fertility management in pastures. Sound fertility management, along with good grazing management, will consistently result in healthy, productive pastures.

Additional Resources

- o Cornell Guide for Integrated Field Crop Management: <http://www.fieldcrops.org>.

- o Cornell University Fact Sheet #1 (Soil Sampling for Field Crops), #6 (Lime Recommendations), #19 (Soil Management Groups): <http://nmsp.css.cornell.edu/publications/factsheets.asp>.
- o Pastures for Profit: A guide to rotational grazing: <http://cecommerce.uwex.edu/pdfs/a3529.pdf>.
- o Prescribed Grazing and Feeding Management for Lactating Dairy Cows: <http://www.glti.nrcs.usda.gov/technical/publications/index.html>.

For more information



Cornell University
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Nutrient Management Spear Program
<http://nmsp.css.cornell.edu>

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