TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE STATE OF COLORADO NATURAL RESOURCES CONSERVATION SERVICE

Economics Technical Note No. 5 **May 23, 2013**

To: All Offices

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Subject: Fertilizing Mountain Hay

Background

High elevation hay meadows are an important forage resource in the intermountain west. For many producers, meadows are the year-round hay and late season forage for their livestock. Fertilizing meadow hay to maximize production is an important decision that should consider the cost of inputs and production potential.

High elevation hay fields are often constrained by a short growing season, seasonal flooding and organic soils. The cost effectiveness of a nitrogen program needs to consider fertilizer cost, expected productivity gains and the value of forage. Nitrogen (N) use efficiency can vary, but 20 lbs of increased forage per lb of applied N is a safe assumption unless there is data indicating otherwise.

Guidance

- Consider if fields are organic or mineral soil type. Mineral soils will generally respond better to N applications.
- Unless hay is worth more than $150/ton, producers need to carefully consider the cost effectiveness of fertilization.
- Do not assume higher N use efficiency, unless there is yield data to support this assumption.
- Fertilizer price is a key variable but hay value (price) is more important.
- Consult *NRCS Practice Standard 590* for additional guidance on the principles of good nutrient management.

Economic impacts of applying nitrogen to grass hay.

Assumptions:

Nitrogen Use Efficiency (lbs forage/lb N)	**20**
Nitrogen Application Rate (lbs N/acre)	**80**
Harvest Costs ($/ton)	**$45.00**
Fertilizer Application Cost ($/acre)	**$7.25**
Increased yield (ton/ac)	**0.80**

Additional income (or loss) per acre with varying hay values and costs of nitrogen.

N Cost ($/lb)	Hay Value ($/ton)					
	$100	**$150**	**$200**	**$250**	**$300**	**$350**
$0.65	-$15.25	$24.75	$64.75	$104.75	$144.75	$184.75
$0.75	-$23.25	$16.75	$56.75	$96.75	$136.75	$176.75
$0.85	-$31.25	$8.75	$48.75	$88.75	$128.75	$168.75
$0.95	-$39.25	$0.75	$40.75	$80.75	$120.75	$160.75

Other Considerations

- Spring application of nitrogen may produce the best hay yield response on single-cutting hay due to the potential for N leaching. Preferred timing is site specific. Producers should consider fertilizer prices and field conditions before deciding on the time of application. Soil tests will help target nitrogen application rates but they are typically 40-100 lbs/ac. Yield response to N may decline at application rates over 100 lbs/ac.

- Use soil tests for P, K and S determinations. Phosphorous may be an important component of fertility needs, especially if legumes are present. Some P may already be part of commercial fertilizer mixes. Soil tests and a pH determination should be used to determine if a targeted P application is necessary.

Resources

Brummer, J.E. & J.G. Davis. 2009. Fertilizing Mountain Meadows. Colorado State University Fact Sheet #535. http://www.ext.colostate.edu/pubs/crops/00535.html

Horn, Blaine. 2010. Nitrogen Use Efficiency of Cool-Season Perennial Forage Grasses Planted With and Without Alfalfa Under Irrigation for Hay Production. SARE Project # FW08-307. http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewRept&pn=FW08-307&y=2010&t=1