

## Pasture Management Critical Values

Ed Rayburn, *Extension Specialist*  
WVU Extension Service, *Agriculture and Natural Resources*  
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Optimizing returns from pasture includes managing the harvest of sunlight through forage production and managing the utilization of that forage with a grazing animal to produce an animal product that has a market value. This is a complex task but relatively easy to accomplish once the manager understands the underlying biological principles and gains experience. Optimum management results in the highest net return to the producer; usually best expressed in dollars per acre. Let's review some of the basic principles affecting pasture-based livestock production and how management can move toward gaining the optimum return.

### Law of diminishing returns

The law of diminishing returns states that when an input is limiting production as more of that input is used there is less additional production for each unit of input up to a critical value beyond which there is no further response (Figure 1). In pastures we manage a number of biological systems that respond in this manner. For the whole system to function at an economic optimum the manager must balance labor, timing and intensity of grazing, and purchased inputs based on their economic response. A list of pasture management inputs and their critical value are listed in Table 1. When an input is at or above its critical value that input will not limit production in the system.

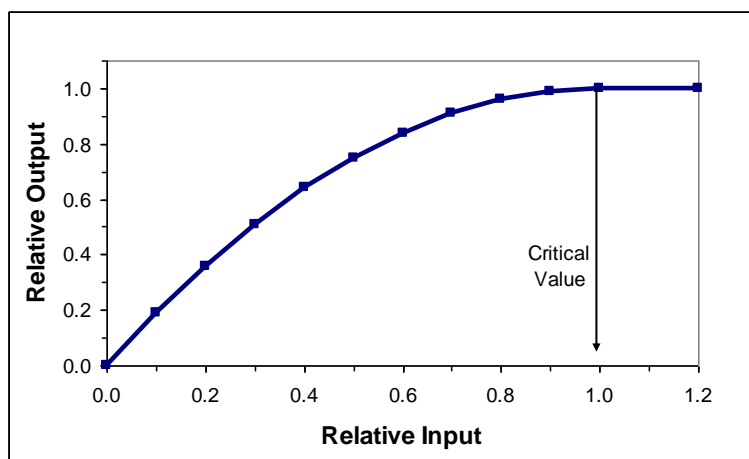


Figure 1. Law of diminishing returns. When an input limits production, output increases at a diminishing rate per unit input up to a critical value beyond which there is no further increase in production.

Table 1. Pasture management inputs and their general critical values when managing cool-season grass legume pastures.

<b>Input</b>	<b>Critical value</b>	<b>Note</b>
<b>Soil Fertility</b>		
Soil pH	6.0 - 6.5	6.0 for clovers and 6.5 for alfalfa
Soil test P	H-	Soil test index numbers for P and K depend on soil test extraction method, how the extract is evaluated, and correlation with field experiments
Soil test K	H-	
<b>Pasture Canopy Management</b>		
Continuous stocking		
Average forage mass	1200 lbs. DM/acre (3-4 inches)	Depends on livestock class, production goals, and forage species
Rotational stocking		
Grazing stay	Days on a paddock	Relative growth Depends on degree and timing of defoliation
	0.5	100
	1	90 to 99
	3	80 to 96
	7	70 to 90
	Continuous	45 to 50
Initial Forage mass	2400-3000 lbs. DM/acre (8-10 inches)	Depends on pasture forage density and species
Residual forage mass	800-1000 lbs. DM/acre (2 inches where grazed)	Dry mature cows or when managing for high legume content or weed control
	1200 lbs. DM/acre (3-4 inches where grazed)	Finishing steers, high milk production/cow, and other times when allowing selective grazing
Legume content	25-30% forage DM or more	Depends on available soil organic N for yield and management for bloat

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