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UNIVERSITY OF MARYLAND
COLLEGE PARK•EASTERN SHORE

Fact Sheet

Fact Sheet 788

Understanding Pasture Stocking Rate and Carrying Capacity

Introduction

One of the most important considerations in pasture management is understanding how much forage various species of livestock require for maintenance, meat production, milk production, and growth. Many first-time livestock producers incorrectly buy animals and then try to fit them on the available pasture acreage.

Pasture carrying capacity depends on many variables: the most important of which are soil productivity, rainfall, and the management ability of the landowner. This fact sheet will describe a process for determining the number of livestock that should be stocked on a given area. It will also explain options that can be used to increase the carrying capacity of pastureland.

Definitions

The terms stocking rate and carrying capacity are similar, but have slightly different meanings.

Stocking rate is the number of animals stocked per acre of grazing land in a management unit for a defined period of time.

Carrying capacity is the stocking rate that achieves a targeted level of animal or economic performance over a defined period of time without causing deterioration of the pasture ecosystem.

Carrying capacity refers to the forage-producing capacity of various pastures. For example, unimproved bluegrass pastures would have a lower carrying capacity than an improved (limed, fertilized, and rotationally grazed) stand of orchardgrass, ladino clover, and red clover. Carrying capacity might also take into account animal preference for various types of forages. For example, sheep prefer low-growing grasses and legumes; therefore, the carrying capacity of a pasture with 2-foot-tall orchardgrass would be less than if the grass were 4 to 6 inches in height.

Animal unit is used to describe the stocking rate recommendation for various classes of livestock. One animal unit equals 1,000 pounds. Therefore, a 1,000-pound nonlactating beef cow is an animal unit. Two 500-pound beef steers would also be one animal unit. Table 1 lists the average equivalent animal units for various species and types of livestock, taking into account different productive stages and feed rations.

There are several factors that should be considered when determining the number of livestock that can be grazed on available pastureland.

1) **Is the pasture improved or unimproved?** Has the pasture been limed and fertilized according to soil test recommendations? Is there a healthy mix of recommended forage grasses and legumes? Have unpalatable weeds and other undesirable plants and objects been removed? Is there adequate shade and water available?

Table 1.

Livestock Class	Number of Animal Units
Beef cow (1,000 pounds), nonlactating	1.0
Beef cow/calf pair	1.3
Yearling (over 18 months) beef steer	0.9
Yearling cattle (12-18 months)	0.8
Calf (under 12 months)	0.6
Mature bull	1.5
Dairy cow (1,000 pounds) 50% forage ration	0.77
Dairy cow (1,300) pounds) 50% forage ration	1.0
Dairy cow (1,600 pounds) 50% forage ration	1.23
Horse	1.2
Sheep/Goat, nonlactating	0.2
Ewe/Goat with young	0.3
Weaned lamb/kid	0.15

Answering no to any one of these questions may mean you have an unimproved pasture. The carrying capacity for an improved pasture is often higher than for an unimproved pasture.

2) **What species of livestock will be grazing the pasture?** Pastures that have wet areas will not support as many animal units as well-drained pastures. Horses, because of their grazing habits and nutritional needs, require more acres per animal unit than do other livestock.
3) **What level of performance or what degree of nutrition is being derived from the pasture?** Growing animals like young steers, heifers, or weanling foals have higher nutritional needs than do nonlactating beef cows, dry dairy cows, or nonlactating mares.
   More attention must be given to maintaining the proper stocking rate for young growing animals than for mature animals at maintenance. For maximum performance, young growing animals must be placed on high-quality pastures.
4) **What type of grazing management will be utilized?** Grazing management is generally separated into four categories: continuous grazing, low rotational grazing, moderate rotational grazing, and intensive rotational grazing.
   A) Continuous grazing–there is only one pasture and the animals graze there throughout the year.
   B) Low rotational grazing–the pasture is divided into two to four sections and the animals are moved every ten days to two weeks.
   C) Moderate rotational grazing–the pastures are divided into several sections and the animals are moved every four to seven days.
   D) Intensive rotational grazing–multiple paddocks are created and the livestock are rotated from twice a day to every three days.

Often, animals should be stocked at a lower number on continuous or low rotational systems than on moderate or intensive rotational systems. The carrying capacity is much greater on the more intensive rotational systems. The level of management required to operate these systems is also much greater.

Conclusion

Maintaining the correct animal stocking rate on pastures is one of the most important considerations in maximizing animal health and productivity. Overstocking a given pasture area is damaging to the environment, causing soil erosion and nutrient pollution of streams and sometimes resulting in decreased animal performance and loss of income from the livestock operation.

There are many variables to take into consideration when deciding on the proper number of head to place on a pasture area of a given size. A general rule of thumb such as one horse per 2 to 3 acres of pasture, for example, might be helpful but is only a starting point. Correctly estimating the carrying capacity and then maintaining a stocking rate in balance with the productivity of the pasture are the first steps to establishing a sustainable and profitable grazing system.

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