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## Animal Unit Months, Stocking Rate and Carrying Capacity

One of the keys to a successful livestock operation is the proper use of pasture, either native rangeland or tame forages. To properly manage the land, a producer must be familiar with the amount of dry matter forage the pasture can produce and the amount of forage required over the grazing season by each animal and the herd as a whole.

With this knowledge, the proper combination of land, time and number of animals may be chosen to ensure the sustained, long-term productivity of the pasture. The optimum number of animals on the pasture makes efficient use of the forage without waste, but still leaves enough forage to allow quick and complete recovery.

### Animal Unit Month

Knowing how much forage an animal needs is the first step in determining how many animals can be supported on the land available.

The amount of forage required by one animal unit (AU) for one month is called an Animal Unit Month (AUM). One animal unit is defined as a 1,000 lb. (450 kg) beef cow with or without a nursing calf with a daily requirement of 26 lb. (11.8 kg) of dry matter forage. Therefore, one AUM is equal to 780 lb. (355 kg) of dry matter forage (30 days x daily forage requirement).

#### Animal Unit Equivalents

Animal sizes vary and forage requirements change with the size of the animal. Similarly, different classes of livestock have varying requirements depending on size and maturity. A 1,000 lb. cow is the standard measurement of an animal unit. Animal unit equivalents (AUEs) have been calculated for various kinds and sizes of animals.

Equivalents for animals that exceed or fall below the weights shown can be estimated on the basis that the AUE would be proportional to weight.

Animal Unit Equivalent Conversions		
Animal	Weight (lb.)	Animal Unit Equivalent (AUE)
Cow	1,000	1.00
Cow	1,500	1.50
Heifer	700	0.80
Steer	700	0.85
Bull	1,700	1.40
Horse	1,300	1.20
Sheep	120	0.20

## IT'S A FACT

One animal unit (AU) requires 780 lb. (355 kg) of dry matter forage per month and is referred to as an animal unit month (AUM). Over a four-month grazing period, that totals 3,120 lb. (1,429 kg). A herd of 30 animal units over the same four-month period would require 93,600 lb. (4,212 kg) or nearly 47 tons (21.15 tonnes) of forage. The producer must determine whether the particular pasture can provide that much forage.

## Stocking Rate

Stocking rate is the number of animals on a pasture during a month or grazing season, and is usually expressed in animal unit months (AUM) per unit area. As an example, a quarter section that supports 30 cows for a four-month grazing season has a stocking rate of 120 AUMs per quarter section (4 months x 30 cows), or 0.75 AUMs/acre (120 AUMs divided by 160 acres).

Using a stocking rate too high for the land to support over a period of time can result in overgrazing. Conversely, a stocking rate which does not use the available forage to its optimum is an inefficient use of the land.

## Stocking Density

Stocking density is the number of animals on a piece of land at a particular point in time. For example, a herd of 30 cows on a 20 acre rotational grazing paddock has a stocking density of 1.5 animal units per acre, even though the stocking rate for the 160 acre pasture remains at 0.75 AUMs/acre.

## Carrying Capacity

Carrying capacity describes the average number of animals that can be placed on a pasture for a season without harming it. Expressed in AUMs, it is a measure of a pasture's ability to produce enough forage to meet the requirements of grazing animals.

Carrying capacity can be determined by experience gained over the years, or by calculating long-term forage yields for the pasture, if possible. This information is used to determine how heavily a pasture can be stocked. For example, a pasture with a carrying capacity of 120 AUMs can support 30 animal units for four months (120 AUMs divided by 4 months). Remember, an animal unit is equivalent to a 1,000 lb. cow.

If larger or smaller animals are placed on the pasture, the carrying capacity does not change, but the stocking rate does. For example, grazing 30 - 1,500 lb. cows on this same property for four months would result in over-grazing. Cows weighting 1,500 lb. require approximately 50 per cent more forage than cows weighing 1,000 lb. (see Animal Unit Equivalent Table). Therefore, the stocking rate for 1,500 lb. cows would be 50 per cent lower, or about 20 animals.

## IT'S A FACT

The carrying capacity and related stocking rates can be increased by improving the forage production of the pasture. For example, sod-seeding alfalfa into native rangeland will increase forage production and therefore carrying capacity. However, the converse is also true. If long-term forage production of the pasture decreases, so does the carrying capacity.

## Determining Stocking Rates

Assume you have a quarter-section pasture with a carrying capacity of 200 AUMs, based on long-term forage production records which indicate an average annual production of 78 tons of forage. (Each AUM requires 780 lb. of forage).

Determining the stocking rate for different size animals requires expressing the rate first in animal unit equivalents, then converting to actual numbers of animals.

For example:

### 1. How many 1,000 lb. cows can the pasture support for a four-month grazing period?

Carrying capacity	200 AUMs
Divided by grazing period	4 months
Equals	50 AUEs

Since 1,000 lb. cows are the standard measure for an animal unit equivalent, the number of AUEs equals the number of animals.

50 - 1,000-pound cows can be placed on the pasture.

### 2. How many 1,500 lb. cows can be stocked on the same pasture described in example one?

Carrying capacity	200 AUMs
Divided by grazing period	4 months
Equals	50 AUEs

Since 1,500 lb. cows are equivalent to 1.5 animal units (see AUE Table), stocking rate is determined by dividing the animal unit equivalents by 1.5.

50 AUE divided by 1.5 = 33 - 1,500 lb. cows may be placed on the pasture.

### **3. How many 700 lb. steers can be stocked on the same pasture as described in examples one and two?**

Carrying capacity	200 AUMs
Divided by grazing period	4 months
Equals	50 AUEs

Since 700 lb. steers are equivalent to 0.85 animal units (see AUM Table), stocking rate is determined by dividing the animal unit equivalents by 0.85.

50 AUE divided by 0.85 = 58 - 700 lb. steers may be placed on the pasture.

This fact sheet outlines how to determine stocking rates to meet the roughage requirements of grazing livestock, and allow for a proper level of use for sustained pasture production. It does not deal with another important aspect of live-stock production—the need to meet specific nutritional requirements of the livestock at critical periods during the grazing season.

Detailed information on this topic can be obtained from your regional grassland specialist or your local agricultural representative.

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