UMassAmherst Outreach UMass Extension

Livestock Grazing and Stocking Rates

Introduction:

Pasture quality is affected by soil and water availability, as well as the mix of plant species. Animal species, size, and health, as well as animal density will influence pasture vigor. Overgrazing leads to a number of environmental problems, including surface and groundwater contamination by nitrates and phosphates found in animal urine and feces, soil compaction, weed problems, and erosion in areas where plant material has been largely or entirely destroyed.

Overgrazing creates problems:

- **Polluted water**
- **Soil compaction**
- **Erosion**
- **Weed problems**

Pasture Mix Selection:

A mix of grasses and legumes provides the best pasture quality. Legumes have the benefits of high protein and superior palatability, as well as adding nitrogen to the soil. Grasses add roughage, grow rapidly and have high yield. Species mixtures also ensure that when one is not growing well, another will. 'Cool season' grasses do best in cool, wet weather, while 'warm season' grasses grow when it is hot and drier. Sod-forming grasses such as Kentucky Bluegrass will stand up to trampling better than bunching grasses such as Timothy. Some pasture species may cause problems for specific animals. An example is Alsike clover which can increase photosensitivity and/or cause liver damage in some horses. Appropriate pasture management practices usually improve poor pasture significantly without resorting to total reseeding. A poorly growing weedy pasture will support fewer animals than a healthy pasture containing a variety of nutritious grasses and legumes.

Undergrazing also causes problems:

- **Poor pasture utilization**
- **Increased need for mowing**
- **Spread of less desirable plant species**

Rotational Grazing:

It is important that all pastures be given some "rest" time. Ideally, animals would begin grazing a pasture when plants are 6 to 10 inches tall and removed when plants are no less than 3 inches tall. These heights are somewhat dependent on forage species. The vegetative period of growth of a species is the ideal time for grazing. Overgrazing can cause muddy conditions, erosion, killing desired pasture species and allowing for the introduction of weeds that tolerate compacted soils. On hilly land especially, rainwater runoff high in nutrients from animal feces and sediment will cause downstream pollution. Undergrazing is also undesirable as animals are likely to graze selectively, allowing less desirable plants to outcompete desired ones. Undergrazed pastures require more frequent mowing to keep undesirable plants in check, and especially to keep those plants from going to seed and spreading further. Subdividing pasture and rotating animals encourages livestock to eat a wider variety of plants. To maximize grazing efficiency, use a very high animal density for a very short time (intensive grazing). In a large pasture animals have more grazing options and can be very choosy in plant selection. In this case, choosiness is specific to livestock species. Goats for example, will eat more woody plants than horses will. Pastures will recover while animals are moved elsewhere, and when necessary, mowing can be used to eliminate tall weeds when animals are moved out. Ideally, at least four pastures are involved in rotational grazing. Pasture recovery typically takes from 2 to 6 weeks. Rainfall, temperature, and soil fertility, as well as grazing intensity, will influence rate of pasture recovery.

Livestock on Pasture:

- **<u>Stocking Rate</u> describes how much livestock a farm can accommodate given pasture availability.**
- **<u>Animal Density</u> describes concentration of animals on a given pasture at a given time.**

Water Availability:

Water availability is important on two levels. Annual and seasonal rainfall patterns affect pasture growth, potential soil erosion and runoff problems. Also, drinking water availability affects pasture management options, as well as potential for soil erosion.

Water for Growing Forage:

In general, greater rainfall during the growing season means more pasture growth. Most areas in Massachusetts receive about 45 inches of precipitation annually. Variations in soil water holding capacity based on texture, structure, and depth generally have more effect on pasture growth variation within the state than rainfall variation does. On average, rainfall does not vary much among the grazing months of May through October. However, light intensity and duration as well as temperature variation influences growth of pasture plants and excessive heat causes drying conditions, pastures require constant monitoring.

Water for Drinking:

Drinking water access is an important consideration in creating pasture subdivisions. It is most convenient not to move watering facilities, but rather to subdivide pasture such that the same watering facility can be accessed from several pastures. The down side of this is that animals will always be gathering in a single area which may lead to muddy conditions. If the area is not flat, soil erosion and nutrient runoff will also occur. Note that if livestock are watered at a stream, and drink from the same location for extended periods, this can lead to mud and stream-bank erosion problems as well as downstream pollution. Regular watering of animals at streams is almost never appropriate.

Stocking Rates:

USDA defines one thousand pounds of live weight as one animal unit (AU). Animal Density (AD) is defined as AUs/grazed acre. A general starting ratio for stocking is 0.5 to 0.8 (500 to 800 lbs of animal grazing per acre). A typical horse might be one animal unit (1000 lb), so 2 acres of "average" pasture would be recommended per horse with average management. This could consist of one 2-acre pasture, two 1-acre pastures or four ½-acre pastures. etc. Five to fifteen sheep or goats depending on breed and age might also constitute one AU. Specific starting points for stocking rate vary according to the quality of the pasture. For example, 4 acres of "average" pastureland could support twenty 100 pound sheep at a stocking rate of 0.5. Subdividing into four 1 acre pastures, grazed in rotation with good fertility management, would allow you to keep perhaps 30 sheep on these pastures. Grazing 30 such sheep on 1 acre would give an Animal Density of 3.0, with a stocking rate of 0.75 if the sheep were rotated among the 4 pastures. Use the following table as guide to help adjust stocking rates to your own situation.

Decrease Stocking Rate If:	Increase Stocking Rate If:
Poor pasture quality	Excellent pasture quality
No pasture rotation	Rotating several pastures
Stony, ledgy hillside soils	Well fertilized land with low erosion potential
Regrowth is abnormally slow	Animals are given supplemental feed
Low rainfall or excessively drained (i.e. dry) area	Animals are avoiding species you would like them to eat

In general the higher the AD, the more intensive the pasture will be grazed and management required.

In order to preserve pastures, there are times when livestock should be removed. When it is muddy, as it is for a period every spring, and livestock are outdoors, it is necessary to have an area which is well drained and flat for them to stay. This is often called a "sacrifice area" because plant growth has been sacrificed. This area should be convenient to water and shelter. A small sacrifice area can save a large pasture.

Resouces:

Massachusetts Department of Agriculture Resources. 251 Causeway Street. Suite 500. Boston. MA 02114. Phone (617) 626-1700. Website: <www.mass.gov/agr>.

Massachusetts Department of Conservation and Recreation. <www.mass.gov/dcr/> .

New England Small Farm Institute <www.smallfarm.org/uploads/uploads/Files/Stocking Rates.pdf>. (They suggest a stocking rate of 1 acre rather than 2 acres per one animal unit (1000 lbs). This assumes well managed pasture on high quality pasture land).

USDA Economic Research Service www.ers.usda.gov/

Warren, L. and Sweet, C. Manure and Pasture Management for Horse Owners; Caring for Alberta's Rural Landscape. Alberta Agriculture, Food, and Rural Development. 2003. <http://www1.agric.gov.ab.ca/$department/deptdocs.nf/all/agdex9377>.

For more information visit www.umass.edu/cdl
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