CHAPTER 9 ~ ORGANIC PASTURE MANAGEMENT

INTRODUCTION

Arguably, the first step in any organic production system comes with a shift in thinking. For organic livestock producers a new way of looking at pasture is critical. Pasture is no longer viewed as solely a crop to feed their animals; rather their animals are viewed as tools to manage their pasture. The subtle difference places the emphasis on the pasture management rather than on the animal management. When your emphasis shifts to the pasture you soon realize that the foundation of the pasture is in fact the soil. Catering your pasture management practices to ensure that the quality of the soil is maintained cultivates the growth of nutrient-dense, energy-rich forage which in turn fosters healthy, productive animals.

In production pasture systems the emphasis is on the pasture - a healthy pasture will in turn

OPTIMIZING PASTURE PRODUCTIVITY

Whether you are farming organically or conventionally, many producers with pastures are looking for the "ideal" pasture variety or species to increase animal performance, often looking to replant and renovate any pasture that seems to be low in productivity. Simply stated there is no perfect plant or pasture mix that will turn around a poor pasture, in reality the species planted are far less important than how the pasture is managed. Management Intensive Grazing (MIG-see Chapter 2) is the best tool for optimizing pasture productivity, and as its name suggests the bulk of the work is in the thinking and decision making. The success of MIG is based on the farmer's ability to develop a "grass eye" or in other words a farmer's ability to gain intimate knowledge of their land and its capability both spatially and temporally. Daily observations through pasture walks, creative thinking and flexibility are integral components of MIG, but decisions made in a conventional system may not be the same ones made in an organic system. For example, the traditional concept of a rest period in MIG is to allow pasture an average of 30 days rest (in mid to late season), yet in an organic system such an approach may lead to problems with intestinal

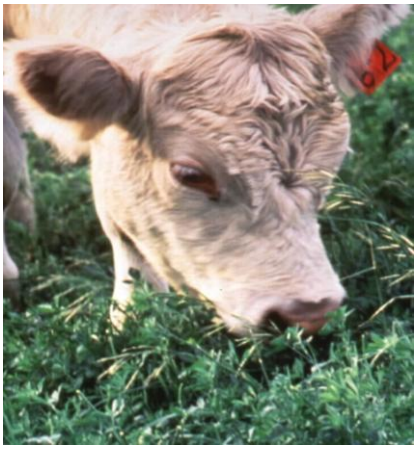
parasites. Intestinal parasites and ruminants have coevolved for thousands of years and the parasites have altered their lifecycle to coincide with the grazing behaviour of their host. Many parasites will have a 21 to 35 day lifecycle so that eggs laid in the first grazing cycle will be ready for infection at the time of the next grazing cycle. Therefore, in designing an organic pasture system, a manager must build in flexibility to alter grazing patterns depending on parasite load. Some producers will alternate grazing cycles with hay harvest therefore allowing for a greater length between egg deposition and the entrance of a host. The collection of conserved forage ensures that the quality of the grass is maintained and that it does not become over mature and less palatable.

Knowing when to move animals and why you are moving them is all part of developing a "grass eye" – a requisite in Management Intensive Grazing (MIG).

Ensuring adequate time for the resting of pastures fosters a tall, dense, uniform sward that maximizes the intake for each bite. Typically, cattle and sheep divide their day equally into grazing, ruminating, and sleeping and so their intake and in turn animal performance is directly related to how much they get in each bite. This is the "science" of grazing. The "art" of grazing is determined by the farmer's ability to produce a tall, dense, uniform pasture. There is no magic to it. It requires years of experimenting with paddock sizes, paddock layout, and rotation schedules. A common saying among graziers is, "good judgment comes from experience, and experience comes from bad judgment." As such, many organic farmers take an incremental approach to MIG and use temporary fencing for the first few years and then develop an appropriate paddock layout with laneways and watering areas.

Get'em in early…

The first grazing cycle sets the stage for the rest of the season. Whenever your land can tolerate hoof action animals should be turned out. Livestock will require supplemental conserved forage, but waiting until the paddock has reached an entry height of 15-20 cm, means subsequent pastures will be over mature and poor in quality. In the spring, root reserves in grasses can tolerate more severe defoliation and have timely regrowth for the next grazing or haying cycle.



Creating a tall, dense, uniform sward ensures that each bite is maximizing intake and in turn animal gain.

Pasture-based organic livestock producers soon realize that what is left behind in the paddock is as important as what their animals harvested. Leaving an adequate residual (exit height) will allow forage plants to re-grow without having to tap their root reserves. A common rule-of-thumb of grazing is "take half, leave half" which, as it suggests, is that animals should exit when they have grazed a sward down to half the entrance height. This is another example of the "art of grazing" or where the "grass-eye" needs development. Cattle should enter swards at a height of 25 cm (10 inches) and exit at 12 cm (5 inches), while sheep intake is optimized at an entrance of 20 cm (8 inches) and an exit at 10 cm (4 inches). These exit heights serve several benefits in an organic system. Maintaining photosynthetic tissue with high residual heights does not deplete carbohydrate reserves, but other important factors include: 1) reduction in parasite infection; 2) maintenance of grass:legume balance to ensure a high energy pasture with little chance of bloat; 3) decrease in soil compaction with the decreased stocking rate; and 4) in a healthy competitive sward there is less chance of weed invasion.

How much pasture does a cow need?

Most farmers aren't going to grab their calculators to work out the amount of forage available for their animals. Over time most graziers become comfortable in assessing the quantity of pasture in each paddock and can adjust the stocking rate accordingly. However, for those just starting out…another good rule-of-thumb is to assume that in a leafy, vegetative sward each inch provides about 90 kg (200 lbs.) of forage dry matter/acre. So, in a pasture with a sward height of 25 cm (10 in.), there is 450 kg (1000 lbs) of forage available (assuming you leave half). In general, a cow will consume about 2.5 percent of her body weight per day in dry matter; therefore a 450 kg (1000 kg) cow will require 11 kg (25 lbs) of forage. As such, the 25 cm (10 in) pasture should be able to feed 40 animals (450 kg or 1000 lbs each) for one day or 20 animals for two days.

Pasture Species

Pasture species selection in organic systems does not differ greatly than that in conventional grazing management. The ideal grass-clover mixture is to have 30 to 40% clover, however under MIG the clover content can increase sharply if the sward is grazed too low. The increased clover content may increase the protein content of the forage, but at the detriment of yield. Also, organic producers lack options for bloat control and therefore must be cautious with high clover swards. Although, organic producers are encouraged to use only organic seed, the lack of availability of organic forage seed permits the use of conventional seed provided it has not been treated by any prohibitive substances (e.g., synthetic fertilizers, fungicides, or genetically modified inoculants).

Maintaining 30% legume (e.g., white clover) will ensure a high quality pasture rich in both energy and protein.

Pasture Fertility & Nutrient Management

All too often researchers and extensionists state that having animals grazing eliminates the need to add additional fertility. This is not so. In situations where the stocking rate is relatively lower than maximal (recommended in organic systems) animals will selectively graze creating an uneven distribution of manure and urine; and depending on the proximity of water and shelter the surrounding areas could also have a disproportionate amount of nutrients. To ensure that a greater area of the pasture is receiving adequate nutrients, it is recommended that pastures receive compost or fresh manure. The rate of application will depend on desired pasture productivity and on historical performance.

When you begin viewing the soil as the foundation for good animal performance the use of compost on pasture makes sense. Most pastures in Atlantic Canada that have not been overgrazed should have moderate levels of organic matter (above 3.0%), and in these soils most macronutrients (N, P, K, S, Mg, and Ca) are abundant, but are often not available to fully meet the needs of rapidly growing pasture plants. The role of compost is not to directly provide these nutrients; rather compost is to inoculate the soil with living microorganisms (i.e., bacteria, fungi, protozoa, amoebae, and nematodes) which in turn enhance nutrient cycling. Creating a healthy living soil through the use of compost can have additional benefits in organic pasture systems. For example, compost can improve soil structure, thereby alleviating the damage of compaction (weeds like Canada thistle prefer compacted soils), increasito verifyng water infiltration (reducing areas that tend to puddle and get punched up by animals); increasing water retention (allowing grasses to survive drought-like conditions); and breaking down fecal matter more quickly (removing the nutrient source for intestinal parasite eggs).

Other than manure there is no economical source of organic N, and therefore organic farmers often pass on the immediate spring green-up that cool-season grasses provide in response to nitrogen, and favour N provided by legumes such as red and white clover, and Birdsfoot trefoil. Many soils in Atlantic Canada have low amounts of available phosphorus, and if compost does not bring about desired plant tissue levels then supplemental phosphorus may be required. Unfortunately, organic P sources such as rock phosphate and soft rock phosphate (Cal-Phos) are slow in their release and cost prohibitive. If potassium levels are insufficient and winter injury of legumes and grasses like perennial ryegrass is suspected, then potassium sources such as wood ash, greensand, potassium sulphate or langebenite (Sul-Po-Mag) may be used.

Liming of pastures is very common in Atlantic Canada and is required quite frequently. Soil pH in organic pastures should be in the range of 6.0 to 7.0 to ensure both the adequate uptake of most macro and micronutrients, but also to enhance the persistence of legumes such as red and white clover. Ideally, lime should not be applied at rates higher than 4 tonnes/ha or 3500 lbs/ac and can have best results when applied in combination with a compost application of 1 to 2 tonnes/ha. Most formulations of lime are acceptable for use in organic systems

Water and Fencing

The role of water in organic pasture management cannot be overstated. Milk is about 85% water so it just makes good sense to provide cows and ewes high quality, clean, fresh water that is in close proximity to the pasture being grazed. Providing water in each paddock is the best way to ensure a more even distribution of manure and urine and the best way to increase pasture utilization. Cattle and sheep have herd and flock mentality, respectively, and so if they have to travel more than 700ft for their water they will travel as a group, requiring more energy, less time for grazing, and potentially less volume of water consumed by the smaller animals in the group. Some organic producers may meter-in minute concentrations of hydrogen peroxide as a sanitizer for the water trough, as well as anecdotal evidence has suggested it has benefits in reducing parasite load and the incidence of bloat.

In terms of fencing, organic systems do not differ greatly than conventional grazing designs with the exception of treated fence posts. Treated fence posts that have been in place prior to 2003 are permitted, but subsequent to that date all treated posts must be replaced.

If cattle are within 700 feet of water they will drink individually rather than as a herd, favouring better manure distribution and increased water intake.

WEED MANAGEMENT

With the exception of horticultural vinegar (which offers moderate control as a non-systemic contact herbicide) there are no commercial herbicides accepted in organic systems. But the first step in weed management in organic systems is to redefine what a "weed" is. So called "weeds" can be viewed as messengers that are giving clues to problems in your soil, your fertility, or your pasture. The presence of dandelion or curled dock, may suggest your pastures are acidic or if the composition of your pastures is almost solely low growing, less yielding grass species such as bluegrass, bentgrass, sheep fescue, etc., you may have overgrazed pastures. So, in these examples weeds are "telling" you that you should alter your pasture management practices to favour a competitive advantage for higher yielding, desired pasture species. Alternatively, a change in the soil ecosystem may be warranted to favour desired pasture species. For example, the liberal application of compost can impact soil structure and soil health that can be detrimental to invasive weed species and swing the balance back towards productive pasture species. This is especially true in pastures that have been overgrazed and have become compacted. Organic livestock producers must also view certain weeds as supplemental feed. Many broadleaf weeds such as dandelion, plantain, chicory, and yarrow are high in protein, low in fibre, and rich in both macro and micronutrients. Some organic producers will look for areas that have poor grass coverage and specifically plant forbes such as chicory and plantain.

INTESTINAL PARASITES

The climate in Atlantic Canada is ideal for parasites and as such is the major deterrent for organic sheep production. Organic producers seek not to eliminate parasites completely, but to keep them at a manageable level. Parasites and ruminants have co-evolved for thousands of years. Most organic cattle and sheep will be infected with intestinal parasites, however only a few will become diseased. In NS, the best defense for internal parasites is to have adequate land to allow for a "clean graze" system. Clean grazing ensures that the land (hay or pasture) is grazed only once every 12-14 months. Other recommendations include a reduced stocking rate, rotational grazing with a higher residual grazing height (10cm), grazing after the dew has dried, dragging and topclipping pastures, culling cows/ewes prone to disease, breeding for resistance, using alternative dewormers, providing adequate vitamin/mineral supplements, incorporating high tannin legumes in pastures such as Birdsfoot trefoil, multi-species grazing, and vaccinating if appropriate.

Offering a rich pasture with high quality legumes and grasses in combination with forbes like chickory, plantain, and dandelion may be an animal's best defense against disease from internal parasites.

Suggested Reading and Resources

- Atlantic Canadian Organic Regional Network (ACORN) is the umbrella organization for organic agriculture in Atlantic Canada (www.acornorganic.org)
- AgraPoint (www.agrapoint.ca)
- Organic Agriculture Centre of Canada (www.
- Organic Livestock Handbook. 2000. Canadian Organic Growers, ed. Anne Macey
- Organic Dairy Farming. 2006. Midwest Organic and Sustainable Education Services, ed. Jody Padgham.