

## Maintaining Healthy Pastures

John Hollinger, Organic Ag. Specialist, MAFRI

Forages provide nutrients for livestock to produce meat, bones and hide. The manure and urine that are returned to the land are a valuable source of nutrients. In general, urine contains most of the nitrogen (N) and potassium (K) wastes, while manure contains most of the phosphorus (P) that the animals don't use. Using today's prices for commercial fertilizer, the value of these recycled nutrients certainly adds up:

Value of N, P & K in Manure and Urine		
One 1000-pound cow produces 50-60 lb. of manure and urine per day, which is valued at:		
0.35 lb. N @ 40¢/lb.	=	14¢ N
0.23 lb. P @ 35¢/lb.	=	8¢ P
0.28 lb. K @ 21¢/lb.	=	6¢ K
Total NPK	=	28¢ per cow per day
Therefore:		
10 cows	→	\$2.80/day
100 cows	→	\$28.00/day
500 cows	→	\$140.00/day
<i>Note:</i> If you add the value of organic matter and trace minerals in the manure, then the total value of the manure doubles!		
<i>Source:</i> Joel Salatin, "One Cow Day of Manure: What's It Worth?", <i>Stockman Grass Farmer</i> , September, 1993, p.11.		

Grazing management plays a role in recapturing and evenly distributing these nutrients for soil organisms and plants to use. In smaller paddocks with a high stocking density, urine and manure are more evenly distributed than in large ones. Livestock won't graze as selectively in smaller areas and will space themselves out more evenly. They'll graze closer to the manure piles so that more forage is utilized.

In larger paddocks, watering sites and the paths to these sites will have a higher manure concentration. Good management helps distribute nutrients that will feed soil microbes and encourage healthy soil eco-systems. Locating water, minerals, shade and fly-control devices in different parts of the paddock also discourages nutrient concentration. The location of these high-use areas should ideally be re-located for each grazing cycle.

The soil environment is home to a multitude of beneficial critters helping plants grow better. An acre of healthy soil may contain 1500 lb. of bacteria, 2400 lb. of fungi, 890 lb. of arthropods and algae, 133 lb. of protozoa , 900 lb. of earthworms and even some small mammals.

- Soil bacteria are the most numerous of the organisms in the soil, with about one million of them in every gram of soil. Bacteria play an important role in helping plants take up nutrients.
- The many species of fungi, including mycorrhizae, increase the uptake of water and nutrients, enhance root growth and provide disease suppression.
- Algae produce their own food through photosynthesis and help to improve soil structure by producing a substance that glues soil particles together.
- Protozoa consume bacteria, which speeds up the release of nitrogen and other nutrients through their waste products.
- Nematodes are beneficial soil predators that speed up the rate of nutrient cycling.
- Earthworms are good indicators of soil health. Their burrows enhance water infiltration and soil aeration. Earthworms pass soil, organic matter and soil microbes through their digestive systems as they move through the soil. This process increases the soil's soluble nutrient content.
- Other primary decomposers include dung beetles, sowbugs, millipedes, centipedes, slugs and snails.

All of these organisms, from the tiny bacteria to the large earthworms and snails, function together to produce a healthy, biologically active soil eco-system.

### **Summary**

The health and growth of grazing livestock, whether they are organic or conventional, depend on high-quality pastures, which in turn are a result of a balanced underground eco-system. Good grazing management and knowledge of how animals affect the whole pasture system combine to contribute to lush pastures that livestock need only to harvest. Then, along with astute marketing, profit is the natural result!

*June, 2006*