



Animal Health

Anti-Quality Factors in Rangeland and Pastureland Forages

Illinois

General Information

We, as producers and technical specialists, try to focus on providing information to the livestock clients on how to improve the quantity and quality of the forages, produced and consumed, for the livestock to improve performance and gains. First we should look at the definitions of both Quality and Anti-Quality Factors.

Forage and Nutrition

“Forage quality can be defined as the degree to which forage meets the nutritional requirements of a specific kind and class of animal. An ‘anti-quality component’ would, therefore, be any factor that diminishes the degree to which forage meets the nutritional requirements of a specific kind and class of animal.”¹

This is further complicated by the animal types and the various growth and production stages of the animals at different periods of time in their life cycle. The anti-quality components can vary in both kind and class in the plants. The two types are phytochemicals in plant tissues or structural inhibitors in leaf and stem arrangements. These can result in mineral deficiencies, toxicities, or mineral deficiencies. Chemical inhibitors can result from plant metabolism or from microbes living in the plants. Other anti-quality factors in forages can be related to the presence of insects and diseases. Any anti-quality factor can reduce dry matter intake, limit dry mater digestibility or cause nutritional imbalances. These same factors may also be toxins that shut down vital systems in animals, resulting in abnormal reproduction, disturbed endocrine or neurological function, causing genetic aberrations, or suppressing immune function leading to increased death and diseases.

“The study of these anti-quality factors is both complex and compelling because of the many and unrelated causes and yet potential for many interactions and subtle interrelationships.”¹

Economics

If we look at the economic impacts from anti-quality factors, these can have the potential to be very expensive to a livestock operation. “Tall fescue toxicity has been estimated to cost the beef industry over \$600 million annually. Reproductive and death losses of livestock to poisonous plants have been estimated at \$340 million in the 17 western states alone.”¹ Other imbalances in forages can occur such as magnesium deficiency, reported to inflict a loss ranging from 1-3% for beef cows annually. This could be equivalent to \$150 million in the U.S. if only 1% of the 42.6 million cows and heifers that calved by January 1, 1999, weighing 1100 lb. per cow, and were valued at \$0.35 per lb. The fescue toxicosis can have a long lasting and measurable effect on the animals throughout the stress of cross country transportation and throughout a 150 day feeding period. It can also effect livestock production by lowering the immunity of an animal and cause higher medication costs.

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Economics (continued)

Poisonous plants can occur in any rangeland and pastureland area. These can be one of the most important economic impediments to profitable livestock production. "Based on an estimated 1% death loss in cattle, a 3.5% death loss in sheep, and a 1% decrease on calf and lamb crops due to poisonous plants, the economic impact within the 17 western states had been estimated at \$340 million annually."¹ This is only a few of the areas the anti-quality factors can have an impact. Low forage quality that can reduce gain performance is another large contributing factor in the economic picture of an operation. Thus, if we all look at the importance in forage testing for feed values and mineral content, we may improve our operation's bottom line. Also, the species identification within our grazing areas can save us several dollars by utilizing the forage at the proper time and eradicating potential hazardous plants. Some of these poisonous plants tend to grow in shaded areas; thus restricting livestock use in shaded areas may be an easy control mechanism to avoid animal access.

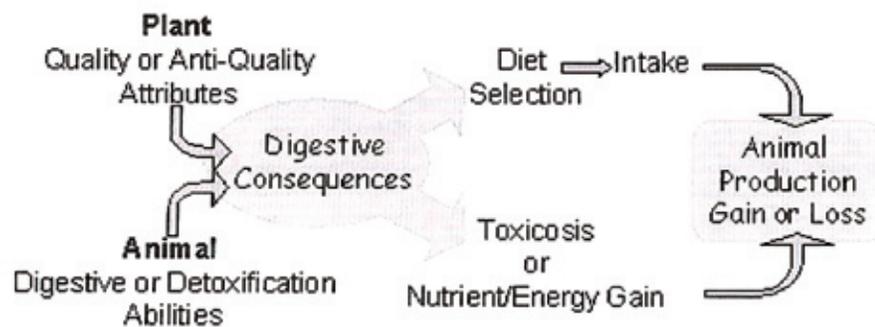


Fig. 1. Digestive consequences are at the center of how animals respond to anti-quality factors in forages. The actual digestive feedback animals receive is determined by plant forage quality and animal digestive and detoxification abilities. The consequences of consumption, in turn, affect diet selection and intake and the nutrients and energy available for animal growth and maintenance.

References

¹ Quotes are taken from Station Bulletin 73 July 2001 prepared by USDA/NRCS Grazing Lands Technology Institute, Idaho Forest, Wildlife and Range Experiment Station Moscow, Idaho and University of Idaho.

Figure 1 from Station Bulletin 73, July 2001, prepared by USDA/NRCS Grazing Lands Technology Institute, Idaho Forest, Wildlife and Range Experiment Station, Moscow, Idaho and University of Idaho.

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