

MANAGING FORAGE AND GRAZING LANDS

Pastures and Biodiversity



Farmers often plant monocultures or simple grass-legume mixtures in their pastures. Increased biodiversity in pastures may be one tool to improve sustainability and productivity. This fact sheet addresses some common questions regarding biodiversity in pastures.

1. What is Biodiversity?

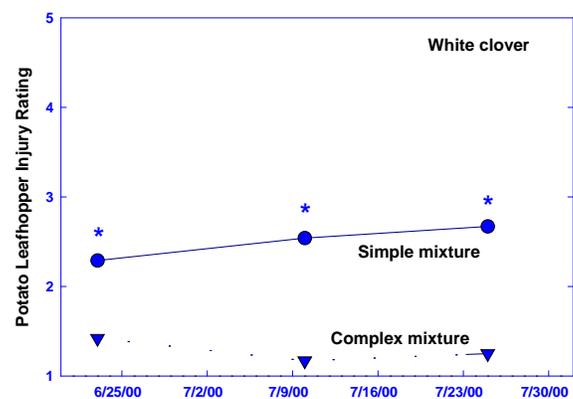
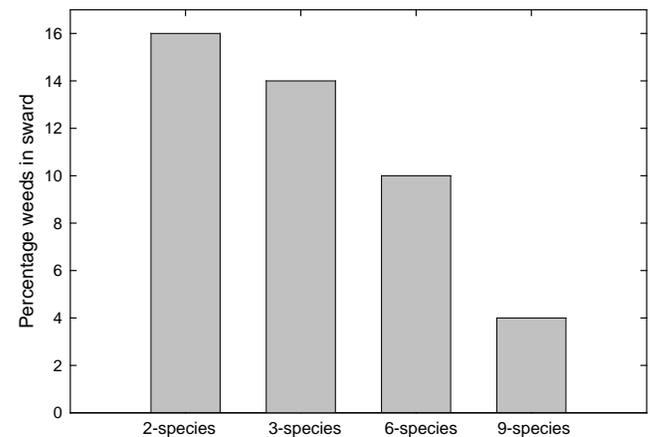
Very broadly, biodiversity refers to all of the biological material including the genetic material, species, and ecosystems that make up the natural world. The earth's biodiversity includes about 1.75 million described species of microbes, insects, plants, and animals.

2. How is Biodiversity Relevant to Pastures?

The basic processes in a grazing ecosystem include primary production, consumption, decomposition, and nutrient cycling. For many years it was known that these basic ecosystem functions were influenced mainly by climate, soils, disturbance, and species composition. Plant diversity is now recognized as a major influence on nutrient cycling and primary production. Having several plant species in a system fills niches, increases the chances of including a productive species, and if a stress occurs, a stress tolerant species can grow. For example, some plant species extract water and nutrients from different soil layers and some plant species can grow at different times of the year extending the grazing season.

3. How can Biodiversity Affect Pasture Production?

Our research shows: (i) Appropriate mixtures of many forage species can increase pasture forage yield, (ii) Increasing the number of species in a mixture can reduce weed invasion and insect pests, and (iii) Dairy cattle perform just as well on complex mixtures of forages and on monocultures or simple mixtures.



Weeds and insect pests may be reduced in pastures of high plant diversity

4. Can Pastures Be Managed for Increased Biodiversity?

Some management practices affect pasture biodiversity indirectly. For example, using rotational grazing and managing pastures to leave more stubble and forage residue can influence beneficial insect and soil microbe populations and benefit some wildlife species. The most direct way to affect pasture biodiversity is to plant and manage many different forages in pastures.

5. How Many and Which Forage Species Should I Plant in my Pastures?

There is no universal forage mixture or number of forage species that applies to all farms. The specific set of forages will depend on your goals, management, soil resources, weather, and many other factors. As a start, most producers should consider using grass-legume mixtures to reduce the cost and use of nitrogen fertilizer and improve the nutritive value of the pasture forage. If you are a beginning grazer, it may be best to stick with simple mixtures until your grazing management skills increase.

6. What About Pasture Mixtures from my Local Seed Dealer?

If you want to use a commercial pasture mix, you should closely examine the forage species or varieties, and amount of each in the mixture to be sure that they fit your goals and management. Some seed companies package mixtures of forages for specific uses, such as “intensive grazing mixes.” Seed companies may change the components of mixtures from year to year, which makes performance comparisons difficult. It also means that the “intensive grazing” mixture a farmer bought one year ago is probably not the same mix available this year. Researchers in Massachusetts, Vermont, and Pennsylvania are currently evaluating a wide range of commercial mixtures.

7. Why Not Target Species and Mixtures for Specific Uses and Areas on my Farm?

Instead of mixing in a little of a lot of forage species and planting it them together, it may be better to target certain forages or combinations of forages for specific parts of the farm and different uses. For example, most research shows that plant diversity is lowest on highly fertile sites because of dominance by a few productive species. Therefore, on a fertile, highly productive soil, it may make more sense to plant a simple mix of one grass and one legume (or perhaps just the grass) to take advantage of the site’s productivity. On other areas of

the farm that are less productive or have other limitations (droughty, poor drainage, etc.) a different mix may work best.

8. What About Grazing Management, which Forage Species Should I Focus on?

This is where a thorough knowledge of the soil and landscape of your farm along with a careful consideration of forage choice is important. For example, if a mixture of bluegrass, white clover, orchardgrass, and alfalfa were established and the producer managed the grazing to fit the bluegrass or white clover (i.e., relatively short grazing height and frequent grazing) the orchardgrass and alfalfa would not survive very long and vice versa.

9. How can I Manage Selective Grazing by Livestock in Complex Mixtures?

Selective grazing of “tasty” forages in complex mixtures may result in unstable mixtures and the loss of these tasty species from the pasture. Selective grazing can be reduced by using rotational grazing with relatively high stocking densities and short grazing periods. Another way to manage selective grazing is to move waterers, feed troughs, or shade areas to different pastures or parts of pastures to redistribute grazing animals. Or, you might use different classes or species of livestock in a leader-follower grazing method to take advantage of differences in grazing animal preferences. Using separate pastures of different forage species or species combinations (as in question 7 above) can help to avoid this as well.

10. Are there New Forage Species Available for use in Diversifying Pastures?

A few new forage species have become available in recent years for use in temperate pastures. Forage chicory has become popular in the last 10 years. Our research in the northeastern USA has shown that chicory produces large amounts of high quality forage; however, it is short-lived (3-4 years) in mixtures and managing stemmy growth is difficult. A few years ago “grazing plantain” (related to the familiar buckhorn plantain in pastures) was touted in parts of the USA. Our research showed that it was not a good forage plant. Kura clover is a legume with potential for temperate pastures. It is long-lived and drought-resistant, but very difficult to establish. Within forage species there are many new varieties available and producers should consult advisors for local information on the performance and adaptation of individual varieties.

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