MISSISSIPPI STATE UNIVERSITY EXTENSION

Grazing in Harmony: Benefits of Mixed-Species Grazing or Co-Grazing

Different species co-grazing in the same area in Kansas. Photo by K-State Extension News Service

Mixed-species grazing is a beneficial management practice in which two or more different livestock species graze in the same pasture or area. Farmers often graze multiple species together during the same season, though some choose to rotate them instead. There are numerous benefits associated with the animals' natural grazing behavior, including more efficient land use, greater biomass availability, reduced parasite load, improved animal production, and enhanced overall animal health. Small ruminants are highly favored in these methods because other livestock species often avoid the plants they consume, such as weeds, brushes, and woody plants. When combining small ruminants with other livestock, such as cattle, horses, swine, and poultry, producers can improve pasture quality and enhance animal health, thus maximizing production.

Why Mixed Animal Species Grazing?

There are several benefits associated with introducing mixed-species grazing in pastures and for livestock. Each animal species grazes differently from others, requiring different forages and exhibiting distinct selectivity and grazing behavior. When multiple animals graze together, competition within the herd is reduced. Not only will it improve plant diversity and reduce weeds, but multispecies-grazed pastures can also alter soil's physical and chemical properties. Overall, soil health is closely linked to supporting life in ecosystems, including the productivity of plants, animals, and humans. Forages and grazing animals contribute directly to soil health by adding organic matter, thus improving water infiltration and reducing erosion. Soil health affects plant productivity and ecosystem functions while also broadening communities of aboveground and belowground organisms. In this meta-analysis study that included 1,182 comparisons for 24 ecosystem attributes, of sites located in Europe, China, and the U.S., authors compared the effect of grazing cattle and sheep on their own and in co-grazing, showing how the co-grazing had a synergistic effect, significantly increasing over time, aboveground biodiversity (plants and insects) and ecosystem multifunctionality (nutrient cycling, C stocks, water regulation, and plant-microbe symbiosis).

Dietary Preferences. When combining animals, they must complement each other's habits while also enhancing the land and their health. Different animals can co-graze with small ruminants. Both goats and sheep will eat weeds, although goats prefer to browse more than sheep. Table 1 shows the intake preferences of different animal species. This indicates that farmers raising different livestock species can combine these species according to their preferences and the available grazing vegetation. The combinations are endless and can vary by region and from farm to farm. For example, it may be recommended to have small ruminants enter the paddock first, and then allow horses and cattle in, since these graze closer to the ground, so they can remove the infective larvae they left behind. It is important to monitor closely the

grazing behavior of the following species, particularly horses, as they are selective and prone to overgrazing certain areas.

Table 1. Dietary preferences of plant groups for different livestock species.

Species	Grass (%)	Weeds (%)	Browse (%)
Horses	90	4	6
Cattle	70	20	10
Sheep	60	30	10
Goats	20	20	60

Source: Gurung (2020).

Both co-grazing cattle-sheep in multispecies paddocks or swards was recently reviewed in Ireland, showing that the use of conventional pastures, compared to those including *Lolium perenne* (perennial ryegrass or English ryegrass) and six species swards (*Lolium perenne*, *Phleum pratense* [timothy grass, herd's grass, or cat's-tail], *Trifolium pratense* [red clover, purple clover, cow grass, or peavine clover], *Trifolium repens* [white clover, Dutch clover, or ladino clover], *Chicorium intibus* [chicory, blue daisy, coffeeweed, succory, blue sailors, or Italian dandelion], and *Plantago lanceolata* [narrowleaf plantain, ribwort plantain, English plantain, buckhorn plantain, or ribgrass]) improved the performance of the livestock, lowered the fertilization rates, and reduced livestock's effect on the environment.

The effects of sheep and alpaca grazing alone were evaluated in a study in Peru that compared sequential grazing by either species following cattle grazing. It was reported that sheep and alpacas modified their diet selection, improving the nutritional quality by selecting plant parts with higher protein content when grazing together than when grazing alone.

Behavior. A study on the behavioral patterns of cattle and sheep co-grazing in Germany showed that these species responded differently to vegetation composition and grazing management: cattle responded more to management, while time spent grazing, ruminating, or resting remained stable with changes in plant variety. In contrast, sheep on varied swards increased their walking, ruminating, and resting times at the expense of grazing time; these differences were probably due to sheep's greater selectivity than cattle's. Additionally, a different study showed that sheep foraging selectivity increased with plant variety, while cattle foraging selectivity was not associated with plant variety. The foraging selectivity of sheep was significantly lower than that of cattle when plant variety was low.

In a recent study in Catalonia, Spain, 240 cattle, horses, and sheep were monitored for 6 months using geolocation collars. It was found that cattle and horses tended to use the lowlands more for grazing, while the sheep preferred the higher lands. All species avoided dense forest areas and chose open areas, such as wetlands and meadows. Horses preferred fibrous diets and remained in areas close to the water sources, while cows and sheep were more independent of water sources. Sheep were the most selective, and horses were the least selective.

Gastrointestinal parasites. An alternative concept is that paddocks with varied plant species (multispecies) are recommended, as they may favor parasite control by allowing browsing and by providing the benefits of "self-medication" through plants containing antiparasitic compounds (such as tannins) at higher levels.

Small ruminants and cattle do not share the "worst enemy," which is the barber pole worm, or *Haemonchus contortus*; however, cattle serve as a host for *Haemonchus placei* (barber pole worm, large stomach worm, or twisted wire worm). Grazing cattle after goats will undoubtedly dilute L3 (infective) larvae from both grazing species, reducing parasite levels at the end, because larval establishment does not occur in the same way in cattle as in small ruminants.

Because cattle harbor different internal parasites than sheep and goats, multispecies grazing can effectively aid parasite control, provided it does not involve a major parasite such as *Trichostrongylus axei*, also known as the small stomach worm or stomach hairworm, which is commonly shared among small and large ruminants. On the other hand, goats are natural browsers but can also graze (i.e., they prefer shrubs, weeds, and woody plants) and can also be used alongside cattle when clearing areas, bushes, or woods are required.

The co-grazing of sheep and goats does not always alter the infection patterns of these species. In a gastrointestinal nematode study of dairy sheep and goats co-grazing in the Czech Republic, 210 goats and 196 sheep were monitored, and the co-grazing did not affect the seasonal dynamics of parasitism within each host, and both species harbored *Haemonchus contortus* (barber pole worm), *Trichostrongylus/ Teladorsagia* spp. (*Trichostrogylus*: bankrupt worms or stomach hair worms, and *Teladorsagia*: brown stomach worm), and *Oesophagostomum columbianum* (nodule or nodular worm).

In a separate study, co-grazing of deer, sheep, and cattle was evaluated for gastrointestinal and pulmonary nematodes, and combining deer with either sheep or cattle was found to control nematodes in young deer in autumn. The combination with cattle reduced the number and delayed the timing of anthelmintic treatments in deer and reduced the effect of internal parasites on their weight gain. On the other hand, cattle and horses generally do not share these same parasites with sheep and goats, and therefore, they act

as "dead-end" hosts (die rather than reproduce). A study in northern France evaluating 44 farms found that co-grazing horses and cattle reduced strongyle infection in horses by lowering parasite load. They found that young horses grazing with cattle had 50 percent fewer parasites in their feces than those grazing alone.

Summary of Benefits and Challenges

While there are many benefits to mixed-species grazing in a pasture, it also comes with challenges. By understanding both sides of this management approach, producers can determine whether it is best suited to their operations.

Benefits

- **Improved Pasture Utilization:** Different species graze pastures more evenly due to differences in diet and plant preferences, which can aid in pasture rest and recovery.
- **Reduced Parasite Load:** Because parasites are species-specific, mixing different species disrupts their life cycles, thus reducing parasite loads.
- **Increased Productivity:** Grazing different species on the same pasture can increase animal production.
- **Increased Profitability:** Grazing multiple species enables the production of more products (meat, milk, wool, and hides) and a more efficient use of pasture resources.

Challenges

- **Nutritional Requirements:** Each species has different dietary requirements, so they cannot always eat the same thing.
- **Potential Aggression:** Some animals may or may not get along, especially during breeding seasons, which can lead to bullying or injuries.
- **Complex Management:** When housing multiple species simultaneously, more planning is required for tasks such as feeding, fencing, and care for each species.
- **Predators:** While cows can sometimes protect smaller animals, this is not always the case; therefore, having a guardian animal, such as a donkey, is often necessary.
- **Biosecurity:** Cross-infection of diseases can be a challenge for co-grazing practices. For example, the cross-infection caused by *Dichelobacter nodosus*, can cause foot rot in sheep, but also interdigital dermatitis in cattle.

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