Grazing Strategies Offer Natural Grasshopper Management

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Improved grazing management strategies can help control pest grasshopper populations, says a North Dakota State University range scientist.

"Rangeland pestiferous grasshopper populations tend to increase when grassland habitat conditions are favorable for the development of the insect from egg to adult. Habitat conditions on grasslands can be modified by defoliation practices, and producers can implement biologically effective grazing management to minimize the potential for grasshopper population outbreaks," says Lee Manske, a range scientist at NDSU's Dickinson Research Extension Center.

Grasslands with reduced plant density and reduced standing herbage offer favorable habitat for rangeland grasshoppers, Manske explains. The favorable habitat conditions can result from heavy grazing pressure, drought, and poorly timed grazing periods that do not allow grass plants time to recover from defoliation.

With reduced vegetation canopy cover and enlarged areas of bare ground, the amount of solar radiation that reaches the soil surface increases, as does the airflow over the ground. The reduced vegetation structure results in higher air and soil temperatures and lower humidity in grasshopper microhabitat. These grassland habitat conditions are favorable for pest grasshopper population increases.

"Grassland habitat with open vegetation canopy and areas of bare ground provides ideal basking sites, where grasshoppers warm themselves in the early morning sun to speed metabolic rates and increase growth rates," Manske explains. Patches of bare ground also are favored egg-laying sites. Higher soil and air temperatures accelerate grasshopper egg development, growth and maturation of young insects, and egg production of adult females.

In addition, habitat with intense sunlight and low humidity near the soil discourages the growth of important pathogens that cause grasshopper diseases. As a result, mortality rates of immature grasshoppers decline and greater numbers of the insects survive into adulthood, Manske says.

Areas with habitat unfavorable to grasshoppers are those on which plant density is increased so that only a few small spots of bare ground occur and on which adequate herbage biomass remains after grazing periods so that the vegetation canopy is nearly closed, Manske notes. The increased vegetation structure reduces the amount of sunlight reaching the ground and increases the humidity near it. In these grassland habitat conditions, grasshopper metabolic rates and growth rates slow and disease increases mortality rates among young grasshoppers.

"Many traditional management practices produce habitat favorable for grasshopper population outbreaks," Manske warns. "Commonly used practices that help grasshopper populations increase to problem levels include beginning grazing before plants have reached the third-leaf stage; grazing spring and summer pastures or haylands during the fall; and management treatments such as seasonlong, deferred, and repeat seasonal grazing that leave little residual vegetation following defoliation periods."

"Producers can suppress potential grasshopper outbreaks by implementing grazing management that minimizes habitat favorable to the insects," Manske says. He recommends three management practices that develop grassland habitat unfavorable for grasshopper outbreaks:

- Delaying the start of grazing until grasses have reached the third-leaf stage (early May for crested wheatgrass and smooth bromegrass and early June for native rangeland)

- Grazing native rangeland with a twice-over rotation management system that coordinates rotation dates with plant growth stages

- Grazing complementary forage types during the fall rather than grazing spring and summer pastures or haylands late in the season.

The importance of effective grazing management in controlling grasshoppers was evident during a recent small-scale outbreak, Manske reports. Habitat on areas managed with a seasonlong grazing system was favorable for the insects, and the density of adult grasshoppers on these pastures averaged 22.6 per square meter. In contrast, habitat conditions on areas managed with a twice-over rotation grazing system discouraged proliferation of the grasshoppers: the average density of adults on areas under this biologically effective management was only 3.9 per square meter.

Implementing improved cultural management practices is not a quick fix to a major problem, Manske explains. Grazing management strategies that produce habitat unfavorable for grasshopper population outbreaks are a long-term solution to grasshopper problems and take three or more years to show substantial results.

"Regardless of this delay, pastures that were grazed using traditional management and that had increasing grasshopper numbers last summer and fall need a change of management," he says. "These areas need to be managed with grazing practices that beneficially stimulate biological and ecosystem processes so that plant density begins to increase and residual vegetation canopy starts to become denser and covers a greater portion of the soil surface."

Manske warns that unless the problems with habitat conditions on these pastures are addressed, the number of grasshoppers could rise to an unmanageable level during the upcoming grazing season. He emphasizes that because rangeland grasshopper outbreaks are a serious and recurring problem, implementing long-term grazing strategies that effectively produce grassland habitat unfavorable for grasshopper development is simply sound management.