Grazing Management Can Reduce Grasshopper Problems

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Problems with high numbers of grasshoppers can be reduced with biologically effective grazing management strategies, says a North Dakota State University range scientist.

"Grasshopper populations have a history of periodic outbreaks, which can occur as the outward expansion of a 'hot spot' or as an escalation of low to high numbers across an area," states Lee Manske, range scientist at NDSU's Dickinson Research Extension Center. "The periodic outbreaks in the Northern Plains tend to be associated with drought conditions and heavy grazing on native rangeland and domesticated grasslands. Little can be done to alter precipitation levels, but grazing management practices that increase the amount of vegetation cover can help to control pestiferous grasshopper species and suppress population outbreaks when weather conditions favor the insects."

Grassland management strategies that repeatedly remove most of the vegetation reduce plant density and herbage biomass production. Areas with open vegetation canopy and spots of bare ground are favorable grasshopper habitat, offering ideal egg-laying sites and basking sites where grasshoppers warm themselves in the early morning sun to speed metabolic rates and improve growth rates. Under these grassland conditions, amounts of solar radiation that reach the soil surface increase, as does airflow over the ground. The resulting increase in light and decrease in humidity discourage growth of important agents that cause grasshopper diseases, and the higher soil and air temperatures accelerate grasshopper egg production, egg development, and the growth and maturation of the young insects.

Grazing management practices that decrease vegetation cover, as the seasonlong strategy does, promote grasshopper population increases. Practices that enhance vegetation cover discourage grasshopper population increases. The twice-over rotation system on native rangeland is effective in grasshopper management because the strategy leads to greater plant density and herbage production and fewer open areas in the vegetation canopy cover.

These plant community characteristics develop because the twice-over rotation system is biologically effective. It coordinates grazing with grass growth stages and removes a small amount of leaf material from grass plants between the third-leaf stage and the flowering stage. This timed defoliation stimulates plant processes and soil organism activity that enhance plant growth, and the greater herbage biomass production leads to microhabitat conditions unfavorable for grasshopper population increases. Compared to seasonlong grazing treatments, the twice-over rotation system has 25 percent greater grass basal cover, an average of 33 to 45 percent more herbage biomass production during each growing-season month, and 31 percent less open area in the vegetation canopy.

A recent study confirms that grasshopper populations are lower on the twice-over rotation treatment than on the seasonlong treatment. Dr. Jerry Onsager, retired research entomologist, USDA-Agricultural Research Service, followed grasshopper numbers for five growing seasons on native rangeland areas managed with either a seasonlong strategy or the twice-over rotation system. The average number of grasshopper days per square meter was 748 on the seasonlong treatment, considerably greater than the average of 229 on the twice-over rotation treatment. During the last two years of the study, a local grasshopper outbreak with an average density of 22.6 adult grasshoppers per square meter occurred on the seasonlong treatment. This population outbreak did not occur on the twice-over rotation treatment, which maintained an average of only 3.9 adult grasshoppers per square meter.

The improvement in the vegetation characteristics of rangeland managed with the twice-over rotation system yields lower temperatures, higher relative humidity, and reduced sunlight within the grasshopper microhabitat. These changes negatively affect the growth and survival of immature grasshoppers in the nymphal stages and result in reduced grasshopper numbers and in suppression of local grasshopper population outbreaks.