V.2 Historical Trends in Grasshopper Populations in Southern Idaho

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Many people who live in the West want to know when the next grasshopper outbreak will occur. Currently, understanding of grasshopper population dynamics on rangeland is limited. While precise predictions of grasshopper densities cannot be made from place to place and year to year, examining historical records since 1950 reveals trends that may be valuable when managers need to predict when and why the next grasshopper outbreak will occur.

Each year, personnel of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, Plant Protection and Quarantine (APHIS-PPQ) conduct surveys of adult grasshopper populations. These survey records generally do not give information on species composition and do not represent intensive sampling, but they are useful in documenting large-scale, regional trends in overall grasshopper densities.

These records show that areas of high density (more than 8 grasshoppers/yd^2) occur somewhere in the State of Idaho nearly every year, but usually these areas are small. Most grasshopper problems occur in the southern portion of the State. Major outbreaks, covering large portions of southern Idaho, occurred in each decade since 1950: in the early 1950's, 1963–65, 1971–72, and most recently, in 1985.

Although we cannot detail the relative contribution of all factors influencing grasshopper populations, we believe that weather plays a very important role in grasshopper population fluctuations in southern Idaho. The historical records show that high grasshopper populations are associated with above-average precipitation at most locations in that area.

Figure V.2–1 shows the importance of adequate precipitation for grasshoppers by depicting the relationship between the number of acres sprayed for grasshopper control and the total precipitation of the 2 previous years. Since 1950, APHIS and its predecessors carried out spray programs covering more than 100,000 acres in southern Idaho in 7 years following the 15 wettest 2-year periods. No spray programs of more than 50,000 acres occurred following the 15 driest 2-year periods.

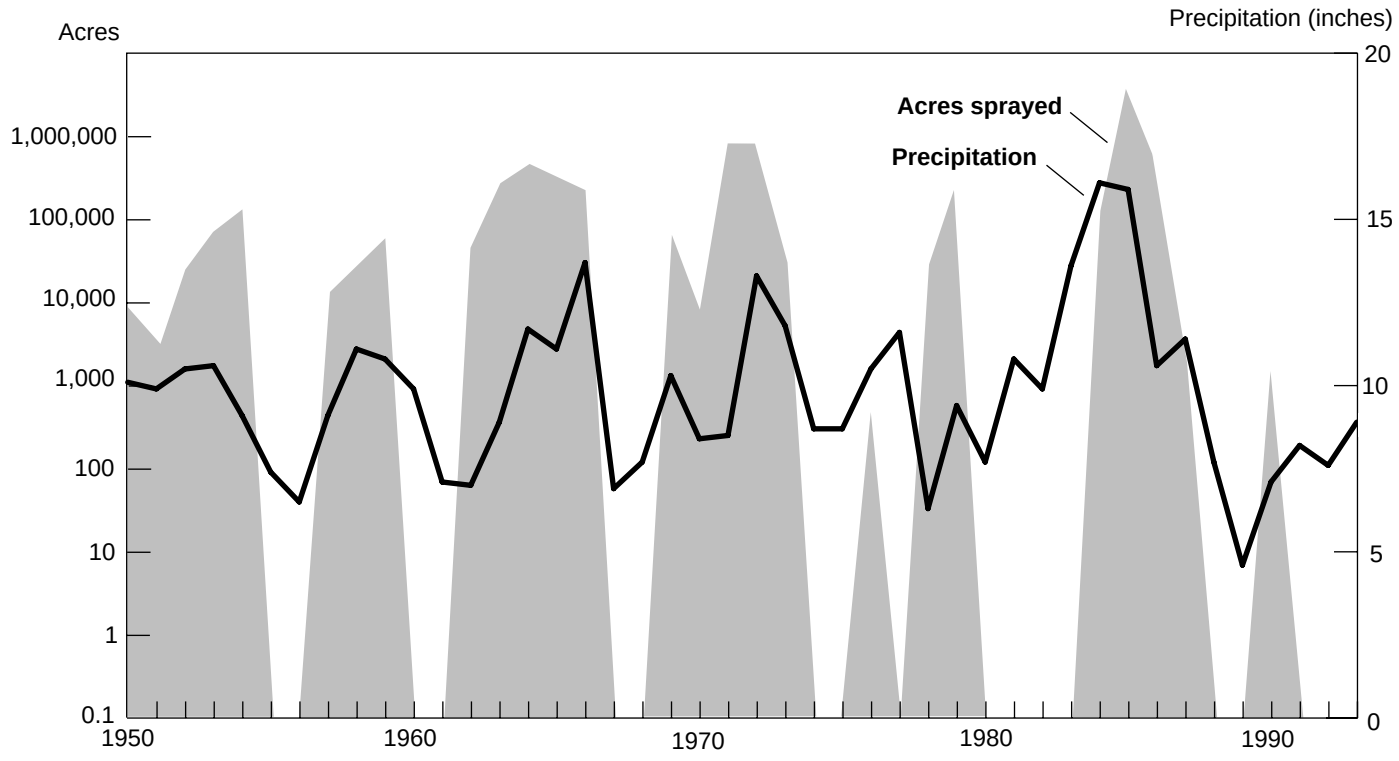

Figure V.2–1—Annual acreage treated for control of grasshoppers in southern Idaho, 1950–92. Precipitation is the average total for the 2 years prior to year of treatment.

Precipitation affects grasshoppers both directly and indirectly. In the Intermountain region, most precipitation occurs between October and April; rainfall in the summer is generally very scant and unpredictable. Grasshopper eggs may be susceptible to drying out during summer drought.

Precipitation also greatly influences the amount and quality of forage available to grasshoppers. As with any herbivore, grasshoppers require abundant energy and protein to achieve maximum reproduction. During drought episodes, rangeland in the Intermountain region provides little green forage in late summer, when many pest grasshopper species reach reproductive stages. Precipitation also may influence the incidence of grasshopper diseases.

Temperature is an important variable. Grasshoppers require a certain amount of heat units to complete development and reproduce. A short growing season at higher elevations may limit grasshopper populations. Cooler, high-elevation areas in southern Idaho usually have lower average grasshopper densities.

Varying 27-year-average densities of adult grasshoppers among 26 locations across southern Idaho reflect the importance of temperature and precipitation. The wetter and warmer locales of southwestern Idaho tend to have the highest average densities, and the cooler, drier areas of eastern Idaho, the lowest.

Biotic (living) factors also help regulate grasshopper populations. Predators, parasites, and pathogens may exert a significant influence on grasshopper population dynamics. Competition for limited resources, especially desired food plants, also may have an impact.

If weather is the primary factor controlling fluctuations in grasshopper populations in southern Idaho, we can do little to prevent occasional outbreaks. Anecdotal evidence from the 1800's suggests that grasshopper outbreaks are a natural feature of southern Idaho rangeland. To date, evidence does not show whether the frequency of outbreaks has increased with the introduction of domesticated livestock or exotic plant communities. Our observations show that maintaining a shrub cover with a perennial grass understory will foster grasshopper populations that are more diverse with more species that are not prone to outbreaks. We therefore suggest that habitat management is the best long-term action to reduce grasshopper problems (see VII.12).

Acknowledgment

This research was supported under cooperative agreement number ID 910-CA7-05 between the U.S. Department of the Interior, Bureau of Land Management, and the University of Idaho.