Notes on Grasshopper Development.

More than 100 species occur in Kansas, although only 3 or 4 damage crops and gardens. There are three stages in the grasshopper life cycle — the egg, nymph, and adult. Under good conditions females may lay up to 300-400 eggs each during the summer and fall. Egg pods are deposited in the upper few inches of soil in undisturbed areas, such as fence rows, weedy areas, grasslands, pastures, ditches, etc. Eggs are well protected by the insulation of the pods and can survive extremely cold temperatures.

Hatching occurs in the spring. The earliest hatching grasshopper of concern in gardens is the two-striped grasshopper. It will begin to hatch from mid-May into early June. The migratory grasshopper will begin to hatch about a week after the two-striped, and the red-legged and differential will begin to hatch about three weeks after the two-striped. Most nymphs start feeding within one day after egg hatch and usually feed on the same plants as the adult. Just after hatching, nymphs are vulnerable to adverse weather. Extended cool (less than 65°F) and rainy weather during this period can result in starvation of the young nymphs. Grasshopper nymphs go through five instars. After each instar, they shed their cuticle (molt) and grow larger. Grasshopper nymphs reach the adult stage in six to eight weeks.

Only adult grasshoppers have wings and readily move out of hatching areas. Grasshoppers begin egg laying one to three weeks after becoming adults. Adults live two to three months, depending on the weather. All developmental stages are influenced by temperature, and their growth can be advanced or retarded by favorable or unfavorable temperature.

Economic Levels

What constitutes an economic infestation? Though grasshoppers may appear to be abundant, often they are not as severe as it appears. In wasteland margins nympha populations that average 10 to 20 per square yard are generally be regarded as a light. From 20 to 40 is threatening; above 40 is severe. While a population 20 nymphs per sq. yd. in a fencerow may look severe, generally less than half of the nymphs live to maturity. Obviously, 10 or 15 adults per sq.yard in a small grassy border with abundant vegetation is less of a threat than a large stubble field devoid of green vegetation field with 5 to 8 per sq. yard. Within infested a crop field or in pasture, numbers of 8 adults or more per square yard is generally considered damaging.

Concerns for the Future

Grasshoppers have a great capacity of increase. In a favorable year, a non-economic populations of three adult migratory grasshoppers/square yard can reproduce exponentially so that in the next year the population may reach an outbreak density of 30 adults per square yard. Over a period of favorable years, enormous levels may develop.
In a study in South Dakota in the spring of 1937, a very severe infestation of nymphs (80+/sq.yd.) hatched and survived in many sites. The adults spread throughout the area. Warm weather in the fall allowed the females to lay over any extended period, producing as many as 800 eggs/sq yd. In idle land and depleted rangeland. This resulted in an enormous outbreak during 1938 that eventually led to mass flights of the young adults. Because of the migrations, the outbreak expanded over much of the northeastern part of the state and continued through 1939. It ended in 1940, due, at least in part to a cool, wet spring and caused high mortality among the nymphs. Many similar outbreaks were recorded in the Great Plains and in Kansas during the 100-year period from 1850 to 1950. For reasons not well understood, widespread grasshopper problems significantly decreased in Kansas after about 1958. But there have been problems in surrounding states. There is probably no reason to assume that this trend will continue indefinitely. The next serious problem could be in its beginning stages.

Extension Entomology, KSU, H.L. Brooks