

Status of Soybean Insect Pests in the United States

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In the United States from 1985 through 1990, approximately 60 million acres of soybean were planted annually across 29 states. About 82% of the soybean acreage occurs in inland states drained by the Mississippi River and its tributaries, with the remaining 18% split nearly equally between the Gulf and Atlantic Coast states. It is not surprising that diversity, abundance, and damage potential of soybean insect species vary greatly over this extensive area. Reasons for this variability include differences in climatic and weather conditions, species distributions and environmental tolerances, and production practices. In addition, soybean harbors a rich fauna including more than 700 species of phytophagous insects. Consequently, the importance of insect pests in soybean varies annually and regionally. Although some species may be damaging every year, even a so-called minor pest can seriously affect production if it occurs in sufficient numbers over a wide area.

In most years, only eight species account for most arthropod damage to soybean grown in the U. S. The most damaging defoliators are velvetbean caterpillar, *Anticarsia gemmatilis*; soybean looper, *Pseudoplusia includens*; green cloverworm, *Plathypena scabra*; Mexican bean beetle, *Epi-lachna varivestis*; and bean leaf beetle, *Cerotoma trifurcata*. The most damaging pod feeders are southern green stink bug, *Nezara viridula*; green stink bug, *Acrosternum hilare*; corn earworm, *Helicoverpa zea*, and bean leaf beetle. Other arthropod species of lesser importance are threecornered alfalfa hopper, *Spissistilus festinus*; lesser cornstalk borer, *Elasmopalpus lignosellus*; tobacco budworm, *Heliothis virescens*; beet armyworm, *Spodoptera exigua*; twospotted spider mite *Tetranychus urticae*; and grasshoppers in the genus *Melanoplus*. Threecornered alfalfa hopper and lesser cornstalk borer feed on or in stems or petioles (or both), whereas tobacco budworm, beet armyworm, mites, and grasshoppers typically consume foliage.

Occurrence of soybean pest insects follows a north-south gradient, and in general, insect pressure is greatest on soybean grown in the South, particularly in southern states bordering the Gulf of Mexico and the Atlantic Ocean. The most damaging defoliating insects in the South are velvetbean caterpillar and soybean looper. For example, in 1984 these pests accounted for over \$37 million in damage and control costs in the southeastern United States. In recent years, soybean looper has assumed greater significance because of the development of resistance to pyrethroid insecticides. Corn earworm is most severe in the southern states of the Atlantic Coastal Plains. The most abundant phytophagous stink bug in the South is the southern green stink bug which occurs in Texas, southern Arkansas, and the southeastern states. Another important southern pest is the threecornered alfalfa hopper, which occurs throughout the South but not in the Midwest. Minor insect pests in the South include fall armyworm, *Spodoptera frugiperda*; yellowstriped armyworm, *Spodoptera ornithogalli*; banded cucumber beetle, *Diabrotica balteata*; soybean nodule fly, *Rivellia quadrifasciata*; grape colaspis, *Colaspis brunnea*; bean leaf beetle, lesser cornstalk borer; cutworms; grasshoppers; blister beetles; leafhoppers; *Dectes* stem borer; thrips; white grubs; and wireworms.

In the Atlantic Coastal Plains states of Virginia, North Carolina, and South Carolina, corn earworm is the most serious insect pest of soybean and it ranks second to Mexican bean beetle in Maryland. In spite of the close proximity of North and South Carolina, research indicates that corn earworm losses in these states can be affected quite differently by certain cultural practices (i.e., planting date and varietal selection). Thus, the pest status of soybean insects can change markedly with a relatively small shift in location.

The inland states of Kentucky, Tennessee, Missouri, and Arkansas harbor soybean insect pests common to both North and South. For instance, Mexican bean beetle, which has a very small pest impact in the Gulf coast states but a greater impact in the Midwest, is a major pest in Kentucky and Tennessee. In addition, corn earworm has an important economic impact on soybean grown in the South including Arkansas and Missouri, but not in more northern states. The most serious lepidopteran defoliator in Tennessee, Kentucky, and Missouri is the green cloverworm. Threecornered alfalfa hopper is common in Arkansas but does not occur in the Midwest north of Missouri. Southern green stink bug is considered an important pest in Arkansas but not in Kentucky, where green stink bug is the most important pod-feeding stink bug.