So Many Bugs, So Little Time: Reflections on the Minor Insect Pests of 2002

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Western bean cutworm, soybean aphid, grasshoppers, cowpea aphid and soybean leafminer are minor pests in Iowa but in 2002 they did cause crop damage in scattered areas across the state. This presentation will briefly discuss the biology of these insects, their distribution in Iowa, the type and amount of injury they can cause to crops, and scouting and management strategies for next year.

**Western Bean Cutworm**

The western bean cutworm is a mid-season pest of field corn. Larvae damage corn kernels in ear tips and along the side of the ear. Damaged ears may be invaded by ear molds which further reduces grain quality.

During the 1990’s, the western bean cutworm was rarely reported in Iowa. In 2000 it was first detected in large numbers in 8 northwestern and west central Iowa counties (see map). One field in Holstein, Ida County, had approximately 95 percent of the ears heavily damaged from the larvae. In 2001 the population spread and was reported from 16 counties—some as far east as Bremer County just north of Waterloo. During 2002 either damage to corn from larvae or large numbers of moths were captured in 24 Iowa counties.

The western bean cutworm is a common pest in western Nebraska and the following information on biology and scouting procedures was provided by Wright and Seymour (1996).
Females lay eggs on corn or dry edible field bean leaves. Cornfields in the late-whorl stage are most attractive to the females for egg laying. Eggs are laid in masses of 5 to 200, usually on the upper surface of the top leaves. The eggs are about the size of a pinhead. When first laid, the eggs are white. As the eggs develop they turn tan and then purple just before the larvae hatch. Newly hatched larvae are approximately 1/4 inch in length and are dark brown. Young larvae are tan with a darker, faint diamond-shaped pattern on their backs. As the larvae mature, they become a pinkish tan or pale brown and reach a body length of 1 ½ inches. When the larvae hatch, they first feed on pollen and then move to the corn ears. The larvae feed there for several weeks before they drop to the soil to form a subterranean overwintering chamber. By the end of the five instars, considerable feeding damage can occur. In corn, one larva per plant usually does not cause severe damage but the ears may contain up to 10 larvae, which can substantially reduce yield, because western bean cutworms are not cannibalistic, compared with corn earworms.

This insect can be distinguished from the corn earworm by dark stripes immediately behind the head, and the absence of small dark spines or stripes on the side of the body. There is only generation per year and larvae drop to the ground to spend the winter. It is unlikely that any western bean cutworms can still be found in the ears in mid-September, but their damage will be evident until harvest.

Scouting for the western bean cutworm should begin with the moth flight in early to mid July. In corn check 20 consecutive plants at five locations. If 8 percent of the plants have an egg mass or young larvae are found in the tassel, consider applying an insecticide. Timing of the application is critical. If the tassel has not emerged when the larvae hatch, they move into the whorl and feed on the developing pollen grains in the tassel. As the tassel emerges, the larvae move down the plant to the green silks and then into the silk channel to feed on the developing ear.

Once the larvae reach the ear tip, control is nearly impossible. If an insecticide is needed, time the application so that 90-95 percent tassel emergence has occurred. If the tassels have already emerged, the application should be timed for when 70-90 percent of the larvae have hatched.

If an insecticide application is needed, cornfields should be checked for the presence of spider mite colonies. If mites are found, select a product that does not stimulate mite reproduction. Products that contain permethrin (Pounce and Ambush) or esfenvalerate (Asana) have been associated with increased mite reproduction in western corn production states. Other products labeled for western bean cutworm control on corn include Capture 2EC, Sevin XLR Plus, Lorsban 4E, Mustang, Penncap-M, and Warrior.

A blacklight trap was set up north of Correctionville to capture western bean cutworm moths in 2002. The first moth was captured on June 28 and the population peaked on July 13 at 2,244 moths in one night (see figure). The population dropped significantly the last week of July and the last moth was captured August 18. Information from traps such as these can be useful in future years to help determine when scouting should begin in an area.
Soybean Aphids

From boom to bust, the soybean aphid essentially went from a serious problem in 2001 to almost a passing thought in 2002. Brian Lang, extension crops specialist in northeast Iowa, reported that near Decorah the soybean aphid population peaked on Aug 13 in 2002 at 685 aphids per plant but at 5000 per plant on July 13, 2001. Therefore the 2002 population was about 7 times smaller this year than last year. Very few reports of sprayed fields occurred in 2002 which is in stark contrast to 2001 when approximately 26,000 acres were sprayed in northeastern Iowa. However, this insect still deserves our attention as it possesses the potential to cause economic damage to soybeans.

Grasshoppers

This year, Todd Vagts, Iowa State University Extension field specialist-crops, reported that young grasshoppers are causing significant defoliation to the edges of a few soybean fields in Crawford County in western Iowa. He noted that the grasshoppers were defoliating the soybean right down to the midrib.

There are no good economic thresholds for grasshoppers in either soybean or corn. Old data recommended a threshold of 15-20 grasshoppers per square yard, but I have always found that counting grasshoppers was an exercise in futility because they hide in the
foliage or they hop out of the area where you are counting. I suggest that you focus on
the degree or intensity of leaf defoliation, combined with a nominal threshold of
grasshopper numbers (one based on experience), and combine this information with a
little common sense in managing grasshoppers. It is usually not too difficult to determine
whether grasshoppers are abundant, so forget trying to count the number per square yard.

In soybean, determine the exact location of grasshoppers in the field and spray only those
areas. Grasshoppers are often concentrated along field edges or waterways, but they
sometimes occur in large areas in the center of the field, especially if weeds were present
last year. Also, soybean fields that are sprayed with herbicides can make a grasshopper
situation worse because the insects move from the dead weeds to the soybean plants, so
these areas should be closely monitored. Consider treatment if grasshoppers are present
and defoliation reaches 40 percent in the preblooming stages or 20 percent in the pod-
forming and pod-filling stages. Reductions in yield can occur during any crop stage and
pod-forming and pod-filling stages are at greater risk than other plant stages. A 40
percent leaf loss during any vegetative stage will result in only a 3-7 percent yield
reduction. Defoliation of 20 percent during the pod-forming and pod-filling stages will
result in similar yield reductions.

In corn, grasshoppers usually are more of a late-summer pest. Injury in corn is more
likely to occur beginning in late July. Consider treatment if grasshoppers are present and
they are clipping silks, ear tips, or removing large amounts of foliage above the ear leaf.
Grasshopper problems in corn usually begin on border rows and then move deeper into
the field. Determine how many rows are infested and spray only those rows. Control of
grasshoppers in mid-to-late summer may require the services of an aerial applicator
because of the crop height.

In all crops, remember that grasshopper nymphs will eventually become adults and cause
more leaf loss during late July, August, and September, but they should not be sprayed
until the injury approaches a level that could cause economic yield loss. This level may
not occur until the nymphs become adults. Fortunately, some insecticides provide
excellent control of adult grasshoppers, such as Asana and Mustang that were tested in
the laboratory this year. The following rates and percent kill at 24 hours were: Asana
(5.8 oz ai/acre = 83%), Asana (9.6 oz ai/acre = 85%), Mustang (3.0 oz ai/acre = 53%), and
Mustang (4.2 oz ai/acre = 98%).

Insecticides labeled for grasshoppers include Asana XL, Capture 2EC, dimethoate,
Furadan 4F, Mustang, Penncap-M, Sevin XLR Plus, and Warrior.

Cowpea Aphid

Iowa producers may have a new pest to contend with in alfalfa. On July 29, Joel DeJong,
ISU field specialist-crops, and I visited an alfalfa field near LeMars that had large
populations of “black” aphids as reported by Peter Westra and Todd Russ (LeMars Agri-
Center, LeMars, Woodbury County). The field was suffering from drought stress and
small populations of aphids were fairly easy to find. Hal Tucker (Tucker Consulting,
Storm Lake) also has reported finding alfalfa fields with black aphids covering entire
plants in northwestern Iowa.
The exact identification has not been confirmed by an aphid expert, but I strongly suspect that these are cowpea aphids, *Aphis craccivora*, based on their physical appearance. This insect recently has become a serious pest of alfalfa in California. In Iowa, close monitoring for this insect should be undertaken next spring to determine its distribution and possible damage potential.

The following information on cowpea aphids was developed by University of California entomologists Summers and Godfrey (2002):

**Identification.** Cowpea aphid is readily distinguishable from other aphids inhabiting alfalfa because it is the only black aphid found infesting the crop. It is a relative small aphid and the adult is usually shiny black, whereas the nymph is slate gray. The appendages are usually whitish with blackish tips.

**Hosts.** Cowpea aphid has an extensive host range. In addition to alfalfa, it infests many other legumes, as well as shepherd’s purse, lambsquarters, smartweed, and curly dock.

**Damage.** Cowpea aphid has been a long-time resident of alfalfa in California as well as other states. Although frequently present in low numbers, it has rarely, if ever, reached population levels that cause damage. In the winter of 1999 cowpea aphid was found throughout both the high and low desert, stunting the alfalfa and causing serious injury. Damage was particularly severe in the high desert where the majority of varieties grown are semidormant. As temperatures warmed and the alfalfa resumed growth, plants failed to grow because of heavy aphid populations. This aphid produces a considerable amount of honeydew upon which sooty mold grows. The honeydew also makes the alfalfa sticky, which causes problems with harvest.

**Resistant varieties.** There are no known alfalfa varieties that are resistant to cowpea aphid, but genetic variation for resistance is known and resistant cultivars can be expected in the future in California.

**Biological control.** This aphid is susceptible to the usual complement of aphid predators including lady beetles, lacewings, damsels bugs, and syrphid flies.

**Monitoring.** Aphid infestations in a field are typically patchy, especially an early infestation. Stems on alfalfa plants in infested areas are often completely covered with aphids, whereas plants in other areas of the field may seem aphid-free. Currently, no monitoring guidelines or sampling strategies are available for cowpea aphids in alfalfa. It is suggested that, as with all monitoring, several areas in the field be observed for the presence of the aphid. On dormant alfalfa, pay close attention to plants as they begin breaking dormancy. If shoots are failing to grow normally and cowpea aphid is present, control measures should be considered.

**Management decisions.** No guidelines or economic threshold levels have been established for cowpea aphid in alfalfa. For the present, common sense must prevail; if alfalfa is not growing properly and cowpea aphids are present, consider taking control measures.

**Soybean Leafminer**

The soybean leafminer is a minor pest of soybean. This beetle seems to be fairly common in soybean this spring because reports of this insect have come in from eastern, central, and southwestern Iowa. The adult soybean leafminer is approximately 6 mm in length
and bright red with a narrow black stripe extending down the back between the wing covers. The antennae, head, and legs also are black.

The larvae mine the leaves, creating a pocket, or blister-like injury, between the upper and lower leaf surfaces. The adults overwinter in protected areas, probably using the same habitat as bean leaf beetles. Soybean leafminers have one generation per year. Soybean leafminers are not known to cause economic damage to soybean. They are most commonly found along field margins. The adult beetles scrape and chew leaf tissue, causing a skeletonizing-type of defoliation. Soybean should grow out of any feeding injury caused by the adult beetles and control with insecticides solely for this insect is probably not justified. However, the beetles can transmit bean pod mottle virus. Brent Werner, an undergraduate student at Iowa State University, found last year that soybean leafminers were effective vectors of this soybean pathogen. His research indicated that 80 percent of the soybean plants fed upon by this insect in the laboratory became infected with bean pod mottle virus. The significance of this finding is that soybean leafminers can contribute to the spread of this pathogen in soybean fields. Any management tactics applied to soybean for management of bean leaf beetle also should effectively control soybean leafminer.

On August 1, Gary Guge, extension education director; Jeff Bradshaw, graduate student in entomology; and I visited a soybean field north of Little Sioux in Harrison County to view soybean leafminer injury. I must admit that I was skeptical of the amount and magnitude of injury that both Gary and the farmer had described to me over the telephone. When we entered the more than 60-acre field the plants were uniformly small (18-24 inches), mostly from a lack of sufficient moisture, and the entire field had an off-color, light green cast to it from the leaf injury caused by adult soybean leafminers. Beetles seemed to be everywhere and the density ranged from 0 to 37 beetles per plant and averaged 5.4 per plant. Ten rows from the field edge, 10 sweeps with a net were taken down the row and produced six bean leaf beetles and 288 adult soybean leafminers. There was a small amount of bean leaf beetle injury (small round holes) in the leaves but a significant amount of injury was caused by soybean leafminers. The adult beetles scrape the leaf surface, causing the leaves to turn light green or white.

I would not expect this problem to be widespread; this is the first time that I have heard or seen significant soybean leafminer injury to soybean. Typically, some injury can be expected from the larvae during June and July, but adult injury across a field is very rare. Plants that are experiencing drought stress may have a greater probability for yield loss from this insect. Strong consideration should be given to the yield potential before a soybean field is sprayed for leafminers.

Acknowledgement

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Literature Cited
