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Silk Clipping Insects on Corn

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Silk clipping insects like the corn rootworm beetle and the Japanese beetle feed on the green silks of corn plants and are most active during the plant's flowering stage. Damage from these insects can cause reduced kernel set and yield if significant silk clipping occurs during the critical pollination period. This publication has been prepared to help you evaluate corn fields during this period and to help you determine whether insecticide application is necessary to protect the corn silks from these beetle populations during pollination.

Pollination Process
Damage during pollination can drastically affect kernel development and corn yield. An ear shoot which is not well-formed and fully pollinated can never mature to a full-sized ear. In addition to silk damage, poor soil fertility, delayed silking and hot, dry weather can also affect the pollination process and thus reduce the number of kernels per ear. Table 1 shows the sequence of events in the flowering and pollination process.

Each corn silk is a long, slender tube leading to an ovule which, if fertilized, becomes a kernel of corn. Silks from near the base of the ear emerge first; those from the tip appear last. During pollination, pollen grains fall on the corn silks where they germinate and new kernels begin to develop. The first visible sign of successful pollination is that silks stop growing, wilt and turn brown.

During the first ten days to two weeks after pollination, the cob develops to its full length and diameter. The developing kernel does not reach the watery blister stage until one to one and one-half weeks after fertilization.

Table 1.- Events in the Pollination of a Medium Maturity Corn Hybrid

<table>
<thead>
<tr>
<th>Event</th>
<th>Time After Pollination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tassel Emerges</td>
<td>55 to 50 days</td>
</tr>
<tr>
<td>Pollen Shed Begins</td>
<td>After tassel fully emerged and about 1 to 3 days before silk emergence</td>
</tr>
<tr>
<td>Silking Begins</td>
<td>3 days after full tasseling</td>
</tr>
<tr>
<td>Peak Pollen Shed</td>
<td>By third day after tasseling</td>
</tr>
<tr>
<td>All Silks Emerged</td>
<td>Within 3 to 5 days after first silks appear</td>
</tr>
<tr>
<td>Fertilization</td>
<td>12 to 24 hours after pollen grain lands on silk</td>
</tr>
</tbody>
</table>

If corn is planted before May 10, most of the pollination process will be completed by mid-July. This is generally before peak silk feeding activity. Selecting an early planting date and proper maturity group can help you avoid pollination when silk clipping is likely to be most severe.

Silk Clipping Insects
Japanese beetles pose the greatest potential for silk damage in the eastern and central portions of Kentucky, while corn rootworm beetles are the most common silk feeders in the western part of the state.

Japanese Beetles
The Japanese beetle was accidentally introduced into the United States about 1912. It has gradually spread westward and now is established in the eastern half of Kentucky. This westward spread across the state is expected to continue. Adults have a metallic green body and coppery brown wing covers. A row of five white spots can be seen along each side of the body and a pair of spots on the top of the last segment. The beetles are about 3/8 inch long and 1/4 inch wide.

Japanese beetles spend about ten months of their year-long cycle as white grubs in the soil. Adults begin to emerge from the soil in June and are active for about four to six weeks. The population peaks about mid-July. They may be very numerous in corn fields, averaging ten or more beetles per ear.

Corn Rootworm Beetles
Three species of corn rootworm beetles occur in Kentucky. All may be found feeding on corn silks. The northern species is a 1/4 inch long, solid green to tan insect with long antennae on the head. Western corn rootworms are the
same size as northerns but yellow-green with three black stripes down the back. Southern corn rootworms, also 1/4 inch long, are yellow with 12 black spots on their back.

Northern and western corn rootworms have similar life cycles. They overwinter in the egg stage. These eggs are deposited in the top few inches of soil, primarily in corn fields. Eggs hatch in early summer of the following year and, if the field was planted in corn again, the larvae will feed on the roots during June and July. The larvae complete their development and pupate. This nonfeeding stage precedes the emergence of adults. Adult beetles begin to emerge from the ground in July and are most numerous during August. The beetles feed on silks and pollen and the females lay eggs in the soil. Both northern and western corn rootworm beetles have only one generation a year. Southern corn rootworm beetles have two generations each year. They, like the northern and western species, are strong fliers and may move into corn fields at silking time to feed.

Evaluating Beetle Damage To Silks
Beetle feeding on corn silks does not necessarily mean that kernel set will be reduced. It is important to determine when silk clipping is occurring relative to the pollination process and general growing conditions. This can be accomplished by carefully monitoring crop development and silk clipping activity. An insecticide application should be considered only if silks are green and need to be protected when beetle feeding is severe.

If a problem is anticipated, frequent field visits during the pollination period is necessary to determine whether silk clipping is occurring before pollination has been completed. This is likely in fields silking during the peak of Japanese beetle activity or in fields of late planted corn which is attractive to adult rootworm beetles. Begin checking these fields when silks first appear. Go at least 40 feet into the field and examine groups of 20 plants in at least five random locations within the field. Record the date, the total number of plants on which ears are silking and the numbers of beetles feeding on each ear. Even if no beetle activity is seen on the first visit, continue to check the fields at two to three day intervals until silks have turned brown. If 1) less than 75 percent of the ears have silks, 2) there are five or more rootworm beetles or two or more Japanese beetles on each ear, and 3) silks are being clipped to within one-half inch of the ear tip, then an insecticide application should be considered to protect the silks.

ADULT JAPANESE BEETLE
NORTHERN CORN ROOTWORM

WESTERN CORN ROOTWORM
SOUTHERN CORN ROOTWORM

EAR WITH CLIPPED SILK