Sugarbeets XX-15 Root Feeding Insects

Sugarbeet Root Aphid

Gary L. Hein

Sugarbeet root aphids, *Pemphigus betae*, are a common problem in sugarbeet fields in this region. Their life cycle is an important factor in their pest status. Resistant varieties and cultural practices are the main management tools for this insect.

Identification (life cycle and seasonal history)

Sugarbeet root aphids have a complicated life cycle that includes an overwintering generation on narrowleaf cottonwood trees. In the fall, a sexual reproducing generation produces over-wintering eggs on the narrowleaf cottonwood. These trees do not occur in the plains, but are the major species of tree growing along river and dry creek beds at higher elevations above 4,000 to 5,000 feet. During the rest of the year all aphid reproduction is done asexually by females which give live birth to their young. In the spring, the over-wintering eggs hatch and the aphids seek expanding cottonwood leaves on which to feed. Early aphid feeding on the expanding leaves results in the development of a gall at the base of the leaf. Within this gall the female aphid raises a colony of winged aphids. When mature these winged aphids (summer migrants) leave the cottonwood trees and fly to sugarbeet fields. With the aid of air mass movements these migrants can travel long distances. This migration occurs from about mid June through mid July depending on the latitude and elevation.

The winged aphids arriving in the sugarbeet fields establish colonies on the sugarbeet roots, and if conditions are right, large colonies develop on the roots. Subsequent generations remain wingless. The aphids on the roots are yellowish white, broadly oval in shape, and secrete a white waxy material that gives the aphid colonies a distinctive white ‘moldy’ appearance. Several generations of aphids will be produced on the beet roots, with populations peaking in late August and early September.

Beginning in late August or early September, winged forms of aphids (fall migrants) are produced in the root colonies. These winged aphids fly out of the beet fields and back to the mountains to establish an overwintering generation on the narrowleaf cottonwoods. Some root aphids will remain in the soil in the fall and overwinter. These aphids are capable of beginning new infestations on sugarbeet or other host weeds (lambsquarters and pigweed) the following spring; however, these aphids are not winged, their
movement is limited, and they are not likely to move to new sugarbeet fields. Avoiding a close rotation of sugarbeet and controlling lambsquarters and pigweed in rotated crops will lessen the potential for problems from root aphids that overwinter in the soil.

**Plant Damage and Response**

Root aphids feed primarily on the secondary roots of the sugarbeet; however, heavy infestations may be found covering the surface of the beet. Their feeding interferes with nutrient and water uptake and transport. Severe infestations in association with plant stress (i.e. drought) can cause leaf yellowing and wilting. Root aphid damage will result in reduced sugar percentage and tonnage losses to sugarbeet. Recent research in this region indicates that even moderate populations of root aphids, where no above ground symptoms are evident, can result in significant sugar losses (up to 30 percent) on susceptible varieties. Additional stress, such as drought or disease, will increase the impact of the aphids.

**Management Approaches**

The best option for managing the sugarbeet root aphid is the use of resistant varieties. Recent testing of sugarbeet varieties has shown that many varieties have excellent resistance to the aphid in the field, and susceptible varieties can be severely impacted by the presence of aphids. Most sugarbeet seed companies have lines with excellent resistance to the aphid. Testing has been done to determine resistance levels for regional varieties; however, not all varieties grown in the region have been evaluated. Sugar company or seed company representatives should have the most current information on varietal responses to root aphids. If varieties are showing a considerable presence of aphid colonies in the fall as indicated by the extensive presence of the white waxy material in the colonies and sugarbeet yield or quality is reduced, these varieties should be avoided, if possible. In determining varietal response to aphids, it is important to inspect multiple beets. Some varieties show a segregating response where individual plants will vary in their resistance to the aphid. Some of these varieties have been shown

Cultural practices also will reduce the risk of problems from the sugarbeet root aphid. Avoiding a close rotation of sugarbeet and maintaining good control of lambsquarters and pigweed in rotated crops will lessen the potential for root aphids overwintering in the soil. If this is done, reinfestation will need to occur from migration from narrowleaf cottonwoods. Spring migrations to sugarbeet fields throughout the region are likely to occur each year, although the level of migration may vary from year to year. The extent of the problem will depend on several factors that affect both aphid survival through the winter and spring and the weather patterns during and following migration. Proper irrigation during the latter half of the season will reduce stress on the sugarbeet plants and reduce the impact of the aphid. Of particular importance is late season irrigation (late

There are currently no registered chemical controls that are effective in consistently controlling sugarbeet root aphids.
Categories: Insects, Sugarbeets, Root Aphid

Date: 04/19/2006