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Pest problems in North American native plants

by Dr. Heidi Kratsch *and* Dr. Larry Rupp

Coping with insect, disease and weed problems is challenging when handling conventional nursery crops. But, with growing demand for North American native species, an increasing number of nurseries are propagating and producing native plants for naturalized gardens and for conservation and reclamation use. The result is neither an increase nor a decrease in the incidence of pest problems in the nursery; rather, it often means a change in the pest population and necessitates an adjustment in approach to pest-management issues in a nursery setting.

We oversee an ornamental native plant production and evaluation program at Utah State University, Logan, and work with an ever-changing variety of native species. We would like to share some of our experiences in dealing with pest problems during production of native plant species.

Disease susceptibility. Proponents of native plant gardening cite native plant resistance to local pest problems as a benefit, and to some extent this is true. In pesticide trials with 4-month-old seedlings, we have noticed that disease pressure tends to be less with native species, and some appear to be resistant even when inoculated directly with the disease-causing organism. This was demonstrated in replicated trials with *Shepherdia argentea* (silver buffaloberry) inoculated with *Phytophthora parasitica* (root rot), and *Purshia mexicana* (Mexican cliffrose) and *Alnus maritima* (seaside alder) inoculated with *Phytophthora cinnamomi* (one of the causal agents of root rot).

Cicadas commonly cause ovipositor damage to plants in the wild, but nursery-grown plants are not usually affected.

Terminal growth of nursery-grown canyon maple on July 22 (left) and typical wild maple on June 9 (right). Note the difference in terminal bud set and the presence of leaf tatter on the nursery-grown plant.

This also may hold true for mature plants under landscape conditions, but only if plants are sited properly and maintained in a way that simulates the conditions to which they are native. For example, *Penstemon* (beardtongue) is native to arid and semiarid regions in North America. It is sensitive to heavy, wet soils and will develop root rot diseases under these conditions when the pathogen is present. Growing *Penstemon* in heavy, clay soil or overwatering plants in containers can encourage development of disease.

In fact, relatively small changes in the growing environment (such as the north side of a house versus the south side) may put a native plant in a distinctly non-native setting, where it may suffer from reduced competitive advantage relative to pests. It is tempting to assume that, by virtue of their adaptation to a certain environment and coevolution with beneficial insects and soil microbes, native plants are free from disease and insect problems. But native plants also have coevolved with pests, and those pests will be present in their native region. On the other hand, it is possible for an exotic plant to be pest-free when introduced to a new environment if there are no organisms adapted to attacking it.

By its very nature, a nursery is an "artificial" environment. That is, plants are grown under conditions that restrict root growth, either in pots or in-ground in close vicinity to other plant materials. In particular, a greenhouse is even more artificial in that natural controls, which might protect species in their native habitat, usually are not present. For example, although *Sphaeralcea* (globemallow) species are rarely affected in the wild, in an enclosed setting, they are attractive to aphids that attack the flower buds. We have used horticultural oils and pyrethroids to control aphids in our native plant propagation greenhouse, but our best long-term solution was to get *Sphaeralcea* out of the greenhouse and into the open air as soon as the weather permitted.

In the nursery. Nursery environments encourage growth patterns that can be very different from those in a native environment, and plants may be exposed to pests or physiological conditions they may otherwise avoid simply due to timing. For example, uncultivated *Acer grandidentatum* (canyon maple) typically sets a terminal bud in early June after three to five nodes have formed. Similar plants grown in the same vicinity, but in an irrigated nursery, will continue to have active terminal buds well into July and produce much longer shoots with many more nodes and even secondary shoots from lateral buds. As a result, the actively growing meristems and new leaves of nursery-grown plants may be exposed to conditions that simply do not exist when uncultivated plants are at the same physiological stage.

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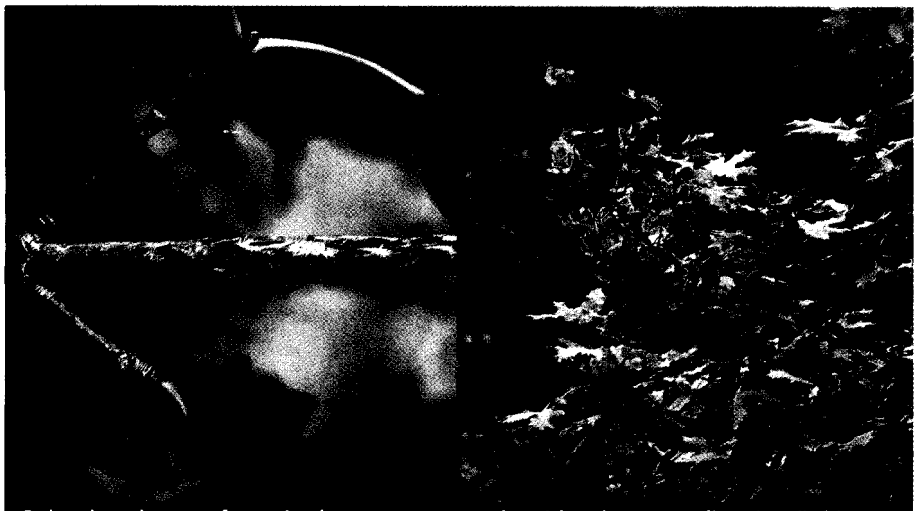

Ovipositor damage from cicada on canyon maple with subsequent flagging (left). Flagging is the result of cicadas laying eggs inside small terminal branches; these branches eventually die and break off (right).

This difference allows active meristems and new leaf tissue of nursery-grown plants to be exposed to stress in July, while wild plants have long since ceased growth before such stress can occur. For example, we commonly see leaf tatter on canyon maple in the nursery, but rarely so in the wild. We have noticed that thrips are present at that time in the nursery, and it is reasonable to conclude they are the cause of the tatter; they are not present when uncultivated plants are actively growing earlier in the spring. On the other hand, we have never noticed ovipositor (insect part that facilitates egg-laying) damage from cicadas in the nursery, while it is a common occurrence in the wild.

Nursery best management practices require an effective weed-control program. The weeds we find in our nurseries are typical of those found in most agricultural production settings in northern Utah. However, in situations where we have grown plants under low-volume or drip irrigation, it is possible to see a shift in the species of weeds present.

For example, weeds, such as *Amaranthus retroflexus* (redroot pigweed), may disappear, while others, such as *Salsola kali* (Russian thistle), may begin to invade. One weed may not be worse than another, but it is important to realize that weed-control strategies may need to change with the change in weed species. And herbicides must be selected that are not phytotoxic to the native plants being grown.

Finally, native plant species have varying degrees of susceptibility to pesticides and show phytotoxicity to chemicals that are not a problem for more common horticultural varieties. Unless cultivated varieties are available, most native plant species have not been tested for potential toxicity to pesticides. For this reason, we recommend cautious use of pesticides on native plant crops, with an emphasis on "soft" controls, such as insecticidal soaps and horticultural oils, and use of weed barriers in planted areas. Cultural controls also can be effective. We recently redesigned our outdoor plant-holding area with separate irrigation zones for optimal care of plants with different water needs, and we stock planting substrates with various levels of organic matter for optimizing the plant root-zone environment.

Including native plant species in your stock is a great way for smaller nurseries to develop a niche market and for all nurseries to diversify their inventory to respond to the increasing demand for regional native plants. A little extra attention to potential changes in pest populations can help you to protect your investment.

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