

will also limit insect numbers to a degree. In urban areas where trees are grown in more isolated, artificial conditions, aphids can be more damaging to the trees health than in forest settings, and the homeowner may need to select one of the following control alternatives.

Low to Moderate Damage:

If aphid feeding is low to moderate and birch trees are vigorous and showing little leaf discoloration, damage is minimal. The use of pesticides is usually not warranted, but the following steps should be taken:



Figure 3. Leaves damaged by birch aphid.

Care should be taken to avoid damaging the trunk, injuring the roots, altering the drainage patterns, or severely compacting the soil. Make sure that trees receive adequate water throughout the growing season. Excess soil should not be placed on top of or removed from the area over the root zone. Such actions can cause water stress and/or soil oxygen depletion to the tree.

Spring fertilization helps promote tree vigor. The UAF Cooperative Extension Service recommends that approximately 1 pound of fertilizer per inch of tree diameter be applied by making a concentric series of holes 8 to 10 inches deep around the tree starting 2 feet from the trunk and extending a few feet beyond the drip-line of the tree. Any complete lawn or garden fertilizer high in phosphorus is adequate. Fertilization should begin in the spring and continue through the summer. Stop fertilization before the tree goes into fall dormancy. This feeding program may not be necessary every year. Fertilizer uptake, soil type, rainfall, weather, and grass cover all will determine the frequency of reapplication.

A high velocity spray of water is effective in dislodging aphids. It won't get them all, but it will reduce their numbers. A mild (2 percent) solution of dishwashing detergent in water or insecticidal soap is effective in reducing low to moderate aphid populations. This solution will kill aphids on contact but has no residual effect.

Heavy Damage:

If birch shows signs of heavy aphid feeding (leaf discoloration, leaf drop, etc.), chemical control may be warranted. Contact insecticides will kill aphids quickly but have a residual effect for only a week or so. Thus, more than one application in a season may be needed. Systemic insecticides are longer lasting but take longer to become effective. Foliar systemics are applied according to label directions and absorbed by the leaves. Soil systemics are applied according to label directions, absorbed by the roots, and transported to the leaf tissue. When using insecticides it is important to read and follow all label directions.

Contact the UAF Cooperative Extension Service for recommended insecticides.

References

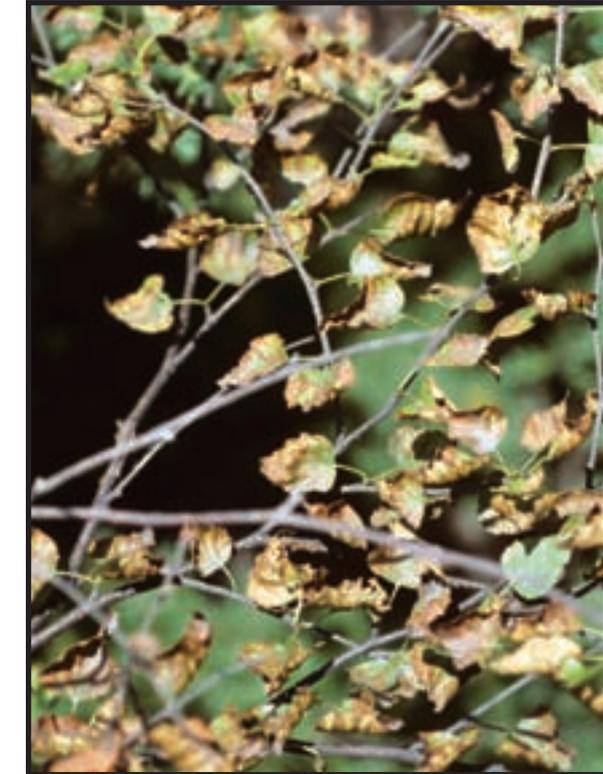
Hajek. Ann E. and Donald L. Dahlsten. 1986. Coexistence of three species of leaf-feeding aphids (Homoptera) on *Betula pendula*. *Oecologia* (Berlin) (1986) 68:380-386.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants and fish, or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Since approved uses of a pesticide may change frequently, it is important to check the label for current approved and legal use. Follow recommended practices for the disposal of surplus pesticides and pesticide containers. Mention of a pesticide in this publication does not constitute a recommendation for use by the USDA, nor does it imply registration of a product under Federal Insecticide, Fungicide, and Rodenticide Act, as amended. Mention of a proprietary product does not constitute an endorsement by the USDA.

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Birch Aphid



Throughout most of south-central and interior Alaska, birch (*Betula* spp.) trees are commonly encountered in the forest and are one of the most widely used ornamentals in residential areas. Alaskan homeowners have encountered greenish aphids (*Euceraphis betulae* (Koch.)) in the summer on birch (Figure 1).



Figure 1. Birch aphids and their castoff exoskeletons on a birch leaf (photo by Michael Rasy).

Associated with the aphids is sticky honeydew that rains down on cars, walkways, flowers, etc., and sooty mold that grows on the honeydew and causes it to turn black.

Overall, aphid damage to Alaska birch forests is negligible. Trees in a yard or landscape situation are often damaged or weakened because of the stresses associated with the location and condition of landscape trees.

Damage

Aphids are sap-sucking insects. Their mouthparts are developed for piercing plant phloem cells and sucking juices from which they derive their nutrition. Birch aphids feed on the largest leaf veins of Silver Birch (*Betula pendula* Roth), thereby tapping the maximum flow of phloem sap in a leaf (Hajek and Dahlston 1986). In spring adults feed on new leaves and in the fall on senescent leaves. Aphid feeding causes a loss in plant vigor and, at times, tree death. Associated with high aphid populations is honeydew, a sticky substance excreted by the aphids. Honeydew is nothing more than excess plant juices, mostly water and sugars that the aphids secrete. This sticky material is quite attractive to ants and other insects, and it forms a medium for the growth of a fungus known as sooty mold. Honeydew is not permanent and is easily washed away.

Healthy, vigorous birch trees can usually sustain two to three years of moderate to heavy aphid feeding with only minor effects. The most common effects of heavy aphid feeding are leaf discoloration and premature leaf fall (Figure 3); temporary growth reduction; occasional branch dieback; and, sometimes, tree death. If a birch tree is not vigorous, its chances of death increase with two or more consecutive years of heavy infestation.



Figure 2. Winged birch aphid (photo by Jarmo Holopainen).

Life History

Birch aphids are dull green and about 1/8-inch long (Figure 2). Aphids can be recognized by their soft, pear-shaped body, long legs, and a pair of cornicles (tubular structures) at the posterior end of the abdomen. Cornicles serve as wax-secreting tubes, and in some aphid species, the body is virtually covered with white, waxy fibers. Antennae are prominent and threadlike. Wings, when present, are delicate, membranous and greenish white and are generally held roof-like over the body.

The life cycle of most aphids is unusual and complex. Most aphids overwinter in the egg stage. The eggs hatch in spring into females that can reproduce without mating (parthenogenetically) and give birth to living young.

Several overlapping generations may be produced quickly during the spring and summer, with only females being produced. The first generation or two usually consists

of wingless individuals, but eventually winged aphids appear. In the latter part of the season, a generation of winged males and females appears. The individuals of this generation mate, and the females lay eggs that overwinter.

Aphids are coldblooded and are very responsive to changes in temperature. During warm, dry summers, enormous aphid populations appear in a relatively short time. The fact that aphids can reproduce without mating produces this population explosion.

Birch trees located in urban settings are, for the most part, less vigorous than their forest counterparts because microclimatic conditions are different. For example, temperatures near a dwelling or a road are usually higher than temperatures in forest settings. Increased temperatures can cause a water stress in trees and provide optimum conditions for aphid reproduction. Other stresses associated with urban situations include soil compaction, root and trunk damage, water and nutrient stress, and excessive soil over the root system.

Guidelines for Reducing Aphid Damage

Aphid suppression is usually not warranted on forested lands; they are a natural feature in Alaskan forests and cause little permanent damage to the host tree. Aphids would be a great deal more destructive to trees and other vegetation were it not for their numerous parasites and predators, such as small wasps, syrphid flies, two-spot ladybird beetle (*Adalia bipunctata* (L.)), and birds. Climatic conditions

Birch Aphids

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Additional information on this insect can be obtained from your local UAF Cooperative Extension Service office, Alaska State Forestry office, or from:

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Or:

www.fs.fed.us/r10/spf/fhp

Cover photo. Leaf and tree damage by birch aphid (photo by Ed Holsten).