How to Control the
Cooley Spruce Gall Aphid

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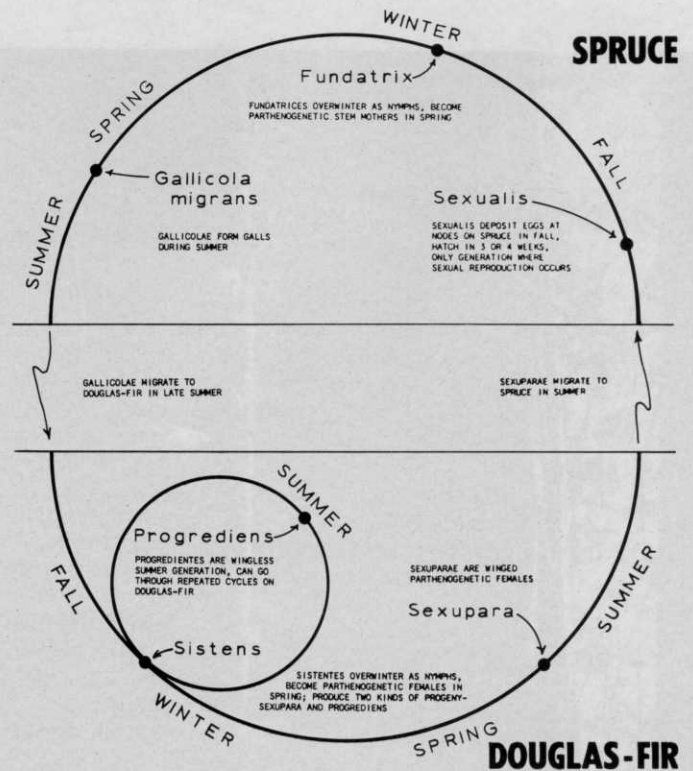Washington State University
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THE COOLEY spruce gall aphid, *Adelges cooleyi*, is both literally and figuratively a "wooly" problem on Douglas-fir and a "galling" problem on spruces as it is a challenge to people involved in pest control.

Most broadspectrum insecticides presently used for general pest management do not adequately control adelgids. Poor control is usually related to incorrect timing or treatment inadequacies that yield marginal control and thereby perpetuate the problem year after year. Increases in infestations have been noted where an insecticide is used that is selective for parasites and predators but does not kill the pest.

There are several reasons why the adelgids (more commonly known as "woolly aphids," "gall aphids," or *Chermes)* present such a perplexing problem and nearly all of these reasons involve a lack of understanding the pest. The adelgids are not true aphids and are not killed by some of our accepted aphicides. Their biology is among the most complex of all insects and at least a rudimentary knowledge of the various forms and life cycles is needed to formulate a control program.

The Cooley spruce gall aphid has at least five different morphological forms and requires two years and two host plants for these forms to complete their cycle. In addition to this "normal" cycle, there is a special form on spruce and another on Douglas-fir that, under some conditions, can live indefinitely on one host by producing progeny identical to the parent and thereby perpetuating its own kind. By piecing together bits of information from various sources a n d from our own knowledge, the life cycle may be presented generally as shown above.

Fortunately, it is not necessary for us to understand all of the intricacies of this cycle. With either host it is only necessary that we time spray applications to coincide with, or be just prior to, bud break. Properly timed applications kill the young nymphs when they are unprotected.

Attack on Douglas-fir is restricted to the needles and is usually most severe when the trees are young, i.e. in the "thicket" stage such as occurs in Christmas tree plantations. Severe damage occurs in the early spring when young nymphs attack and distort the newly elongating needles. Damage to spruce is most noticeable as cone-shaped galls formed by swelling of stems and needle bases. These galls are manifestations of host response to pest feeding. Nymphs are enclosed in chambers inside the galls and there is no known practical way of controlling the pest in this stage.

During 1967 and 1968, sprays, soil granules and bark paints of several pesticides were tested for Cooley spruce gall aphid control on Douglas-fir in western Washington. Thiodan (endosulfan) gave excellent control and is presently being recommended to Christmas tree growers, nurserymen and other professional people involved in pest management. Baygon also effectively controlled the pest both as a spray and a bark paint, but this product is not yet registered for use on ornamentals and Christmas trees. Several systemic insecticides were applied as bark paints to the basal portion of trunks. Baygon and Meta-Systox-R (oxydemetonmethyl) both gave good control when applied at one gram actual toxicant per inch diameter at the tree base. It should be noted that Meta-Systox-R spray at the same rate of actual toxicant per tree did not give significant control. If only a few trees are to be treated or if spraying is undesirable, apply-or if spraying is undesirable, bark paint might well be justified.

General coverage sprays with 0.5 lbs. actual Thiodan per 100 gal. water applied in the spring controls the young nymphs and is presently the most practical approach under most conditions. The trees should be sprayed to runoff and care taken to obtain complete coverage.