

HEMLOCK WOOLLY ADELGID

[*Adelges tsugae* (Annand)]



Fig. 1

UGA 3225077

Problem: A native of Asia, the hemlock woolly adelgid (HWA) (Fig 1.) damages and kills native eastern and Carolina hemlocks [*Tsuga canadensis* (L.) Carr., *T. caroliniana* Engelm.].^{1,3} Injury is caused when immature nymphs and adults feed on young twig tissue and starch reserves.¹ Starch reserves are critical to tree growth and long-term survival. Other stressors such as elongate hemlock scale (*Fiorinia externa* Ferris), drought, needlerust [*Melampsora farlowii* (Arthur) Davis] and hemlock borer [*Melanophila fulvogutta* (Harris)] can exacerbate the damage caused by HWA, resulting in little or no chance of tree survival.¹

Identification: HWA is parthenogenetic (all individuals are female with asexual reproduction) and has six stages of development: the egg, four nymphal instars, and the adult.^{1,4} It also completes two generations per year on hemlock. The aphid-like, oval-shaped insect is less than 1.5 mm ($1/16$ in) long, and varies in color from dark reddish-brown to purplish-black.¹ Adults and nymphs are hard to distinguish without a hand lens. Most notably, the egg sacs (ovisacs) are covered in cotton-like wax filaments for protection¹ and are generally 3 mm ($1/8$ in) or more in diameter.⁴

Signs and Symptoms: Crawler stage nymphs (Fig.2) produce “wool,” which cover their bodies and ovisacs and are most visible from late fall to early summer. The white masses generally occur on twigs at the base of needles.^{1,3,4} Other symptoms include premature needle drop and discoloration (Fig. 3), twig and crown dieback (Fig. 4), and eventually complete defoliation and death.^{3,4}

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Fig. 2

UGA 5018073



Fig. 3

UGA 5125062



Fig. 4

UGA 2167012

Similar Species: Frequently, elongate hemlock scale (Figs. 5 and 6) is present alongside HWA.^{2,5} The waxy cover of this species occurs on the lower needle surface as well as on new cones.^{2,5} The flattened, elongate, light yellow to brownish orange waxy cover of the adult female is about 1.5 mm ($1/16$ in) long.^{2,5} Spider egg sacs and oak skeletonizer (*Bucculatrix ainliella* Murtf.) can also be confused at first glance with HWA, but do not produce the same signs and symptoms as HWA. Spider sacs are also usually associated with webbing.



Fig. 5

UGA 1122010



Fig. 6

UGA 1122011