

Japanese Maple Scale

A Pest of Nursery and Landscape Trees and Shrubs

Over the past several years, nursery crop producers and landscape managers in Maryland and the eastern U.S. have become increasingly concerned about the pest insect, exotic Japanese maple scale (JMS), *Lopholeucaspis japonica* (Cockerell) (Hemiptera: Diaspididae). JMS is difficult to control and monitor because of its wide host plant range (over 45 genera of plants in 27 families), extended crawler emergence period, small size and coloration that blends in well on trees with light bark (figure 1). Unless JMS is monitored carefully and controlled early, populations of this armored scale can spread throughout a nursery or landscape to many species of woody plants and build up to levels that cause dieback and even death of infested plants.

In the United States, JMS was first detected in Connecticut in 1914 (Miller et al. 2005), and it has since been reported in Washington DC, and 15 states (AL, DE, GA, IN, KY, LA, MD, NC, NJ, NY, OH, PA, RI, TN, and VA) (Miller and Davidson 2005). JMS is not a quarantined pest on the East Coast, but several states in the Midwest have quarantines on JMS and states that previously have received infested plant material have rejected shipments.

JMS is a member of the armored scale family Diaspididae. The presence of a waxy cover that is not attached to the soft body underneath is a good field characteristic to distinguish armored scales

Figure 1. JMS can reach high populations before it is detected on trees with light bark



from other families of scales. JMS is one of the smaller armored-scale pests of ornamentals with adult female covers only about 1 mm in length. The cover of JMS is irregularly oyster-shell shaped.

Adult females have a thicker, dark brown cover (pupillarial) that is the enlarged second instar (an immature stage) shed skin entirely covered with white wax (figure 2). When the white wax is rubbed, or treated with oil, the brown cover appears. Since the newly formed outer cover is white, JMS is relatively easy to see on dark bark plants but harder to see on trees with light bark. The male and female covers look very similar. Eggs, soft bodied immatures and adult females under the wax covers are usually light purple, but sometimes yellow-white (figure 3).



Figure 2. Female Japanese maple scales with a wax covering are white...



...but females without wax are dark brown



Figure 3. Eggs under female cover are purple or yellow-white



Figure 4. Newly emerged crawlers are purple

Newly emerged crawlers are extremely small, oval, and purple (figure 4). Within hours of emergence, crawlers settle on the wood and begin to produce a light covering of white wax (settled crawler). JMS is normally on the bark, both trunk and branches, of host trees but in heavy infestations, have been observed on leaves.

Number of Generations Produced in a Year Depends on Climate

The limited published literature on JMS indicates there is one generation per year in cold climates such as Pennsylvania, where fertilized females overwinter. In the warmer climates of Maryland and Virginia, two generations per year with second instar males and females overwintering were reported (Miller and Davidson 2005).

Research conducted in 2009-2013 in Maryland further examined the life cycle of JMS. Studies confirmed that in Maryland, JMS has two generations per year and overwinter as immature 2nd instar males and females. In the spring, JMS continue to develop and mate. The date of egg laying and crawler emergence can vary widely as temperatures fluctuate between years. Adult females with eggs have been seen in late April to early May. In late cool seasons such as 2013, Extension specialists saw females with eggs in May through early June.

Egg laying and crawler emergence periods can extend over long periods of time, making management of JMS challenging. Therefore, it is best to use degree day (DD) accumulations to predict scale activity. Table 1 lists crawler activity period and DD accumulations (using base 50°F from Jan. 1; averaged over 5 years for 1st generation crawlers and 2 years for other DD estimates) for the beginning of crawler activity and peak crawler activity. These degree days occurred around mid-May / early June for 1st generation and early August for 2nd generation.

Additional information on degree days is available at <http://extension.umd.edu/ipm/growing-degree-days-getting-them-and-how-use-them>

Cotinus coggygrias (Smokebush) and *Syringa chinensis* (Chinese lilac) were in full bloom at the time of first generation crawler activity and can be used as phenological indicators. *Aralia spinosa* (devil’s walkingstick) was in bud at the time of second generation activity.

Table 1. Use degree days to detect the start and peak of JMS crawlers for optimum timing of control measures

1 st Generation			2 nd Generation		
Start (DD)	Peak (DD)	# Weeks Active	Start (DD)	Peak (DD)	# Weeks Active
815	1,144	7.5	2,220	3,037	8.5

Scales are Sucking Insects that Can Kill Trees

Scales remove plant sap and high populations can cause premature leaf drop, branch dieback, and



Figure 5. Japanese maple scale can result in defoliation

ultimately, tree death. In addition, white scale covers that accumulate on the bark and branches of plants often remain for a period of time following control measures, are unsightly, and can lead to rejection of plant shipments by landscapers and nursery growers.

It is important to monitor potential hosts closely for JMS and try to identify infestations early. Examine plants showing any level of leaf loss or dieback. Light infestations often start in the cracks and rough areas of the bark and branches. Look on bark for the small white, elongated, narrow scale covers.

To determine if the scale is JMS, gently rub the white wax to expose the underlying dark brown second instar shed skin. Squeeze or remove the scale covers and using a hand-held magnifier or a microscope, look for signs of the purple, soft-bodied insect or eggs. Closely monitor for crawlers during expected mid- to late spring emergence.

Look for discrete circular holes in scale covers that indicate parasitoids are attacking the JMS population. Parasitoids are organisms that live in or on the body of a single host such as a scale insect, eventually killing it. At least four species of parasitoids are known to attack JMS in the mid-Atlantic area.

Mechanical and Chemical Control Methods are Used to Manage JMS

Mechanical: Use a high pressure water spray or gentle scrub brush with water to remove scale covers from tree trunks to improve aesthetic appearance and/or reduce populations. Prune out dead branches with scales.

Chemical: Dormant applications of horticultural oil should be applied at 2-3% rates in the fall after leaves drop or in spring before bud break. In fall or spring, apply when temperatures are above 50-60 °F for 4 to 5 days. During the growing season, target the crawler stage for optimal control. Horticultural oil at a summer rate of 2.0 % can be applied when crawlers (active and settled = 1st instars) are present. Do not apply horticultural oils to drought-stressed plants.

When 1st instar crawlers are present and at peak activity, one of the two insect growth regulators (IGRs), pyriproxyfen (Distance) or buprofezin (Talus) can be applied. Adding 0.5 or 1% horticultural oil improves coverage. IGRs prevent the crawlers from developing, resulting in death of the insect. IGRs are slow acting, so be patient. Two to three applications may be necessary because of the extended crawler emergence period.

UMD studies evaluated two systemic neonicotinoid insecticides, dinotefuran (Safari, Transtect) and clothianidin (Arena). Clothianidin provided somewhat greater control than dinotefuran. In trials conducted in 2013, dinotefuran performed well in controlling Japanese maple scale on infested

crabapple trees. Systemic insecticides should be applied at the very first sign of crawler activity and should provide control of 1st and 2nd generation JMS. Clothianidin is labeled for landscape use only, while dinotefuran is recommended for landscape and nursery use. Read and follow pesticide label directions carefully.

References

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Stanton Gill (sgill@umd.edu) and Paula Shrewsbury (pshrewsb@umd.edu)

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