DEARNESS SCALE

Common Name: Dearness scale
Scientific Name: *Rhizaspidiotus dearnessi*
Order: Homoptera (aphids, leafhoppers, spittlebugs, cicadas, mealybugs, scale insects)
Family: Diaspididae (the armored scales)

Dearness scale is a tiny, sedentary insect that sucks sap from the stems of cranberry plants. It is usually under good natural control from naturally occurring tiny parasitic wasps. On rare occasions outbreaks can occur. When populations are large, the vines turn red, the stems become brittle, and production is lost.

Biology and Damage

Host Plants:
Cranberry, *Vaccinium macrocarpon*
Common ragweed, *Ambrosia artemisifolia*
Goldenrod, *Solidago* spp.
Boneset, *Eupatorium perfoliatum*
Joe-pye weed, *Eupatorium maculatum*
Horseweed, *Erigeron canadensis*
Leatherleaf, *Chamaedaphne calyculata*
Bugleweed, *Lycopus virginicus*
Grass-leaved goldenrod, *Solidago graminifolia*, has been the most common weed host in Wisconsin cranberry beds.

Description and Diagnosis:
The eggs are retained internally by the female, which gives birth to live young. The young "crawlers" are bright orange, oblong, very tiny – initially 0.25 mm - 0.33 mm, and mobile. After molting to the second instar, the female dearness scales remain stationary for the rest of their lives. A white protective wax coating is secreted and eventually mixes with the cast off skins after future moltings to cover the insect's body. It is unclear as to how many instars there are but the male dearness scale shell elongates while the female shell remains oval. The adult males are winged, white, elongate, 1.0 mm long, have well developed legs and antennae, and are free living. The females are wingless, pale gray, oval, 2.0 mm long, do not have eyes or legs, and are immobile, staying under their scale coverings. Heavily infested plants have numerous small white scales along the stems, which are easily seen against the dark background of the bark. By using a pin, the white upper scale covering can be lifted off, revealing the sac-like body of the insect within. There is also a lower scale covering attached to the plant, thereby giving the appearance of a tiny clam shell.

Dearness scale on cranberry stem.

Scale insect body with scale covering removed.

Economic Importance:
Heavy infestations can severely weaken the cranberry plants due to the loss of the plant's juices. Defoliation, reduced yield, and even death of the vines can occur if no corrective measures are taken. The area of infestation may continue to expand. However, this insect is rarely seen at any level in Wisconsin, and damaging populations are very rare.

Life Cycle:
The dearness scale overwinters as gravid (with fertilized eggs) female adults. The eggs hatch in the spring and the crawlers emerge from the parent female. This is the dispersal stage and they move short distances to adjacent vines by walking. Wind can carry the crawlers greater distances. Crawler activity normally occurs between early June and early July. After settling, the scales begin to feed and in 3 - 6 days molt to the second instar. They secrete a shell-like wax cover for protection. The adult males are winged and seek out the immobile females for mating. After mating, the males die and the gravid females prepare for overwintering. There is one generation per year.

Environmental Factors:
Since dearness scales remain immobile for much of their life cycle, predators and parasites can be effective in controlling the population. Tiny parasitic wasps are highly effective at controlling this insect (see Natural Control, below). It is thought that our occasional outbreaks may be related to the frequent use of broad spectrum insecticides that kill the parasites. The female adults overwinter on the vines and are not susceptible to flooding.

Damage/Symptoms:
Dearness scale insects attach themselves to the stems, leaves, and fruit of the cranberry and suck the juices. This feeding weakens the plant and causes early reddening of the vines. An infested stem becomes noticeably swollen at the site of scale attachment. The area of infestation within a bed turns reddish brown due to the defoliation and color of the dead leaves. The vines become brittle when an infestation is serious, and easily snap when walked upon.

Weak spots in beds are caused by many factors, in this case dearness scale, easily confirmed by closer inspection.

White spots are scale bodies. Red leaves indicate moisture stress to vines resulting from scale feeding.

Monitoring and Controls

Scouting Procedure/Economic Threshold:
The small white scales can easily be seen against the dark background of the bark of the uprights; this contrast is even more obvious when the vines are wet. During routine scouting, check the vines for infestation. Pay particular attention to weak areas where the leaves may have reddish coloration and the canopy appears thin when the vines should be green and in active growth.
No economic injury level has been established. But if vines appear stressed and scales are numerous, therapeutic action should be taken.

Natural Control:
Tiny, naturally-occurring parasitic wasps (*Coccidencyrtus dearnessi*) normally keep dearness scale at very low, almost undetectable levels. When the parasitic wasps emerge from their scale hosts, they leave a small but noticeable hole in the back of the scale covering. Insecticide applications during the adult flight period of these parasites probably contribute to scale outbreaks. However, adult parasites are known to be active from early June through September, suggesting several generations per year. Therefore, targeting specific "biological windows" to avoid sprays during periods of parasite activity may be difficult.

Cultural Control:
Do not use cuttings from infested beds to establish new plantings.

Biological Control:
No commercial biological controls are available. Reducing overall use of broad spectrum insecticides will help conserve the naturally occurring parasitic wasps.

Chemical Control:
Chemical controls should only be applied when populations are damaging, which is a rather rare occurrence. Over-use of insecticides may kill the parasitic wasps, resulting in even larger scale populations.

Although no insecticides are labeled for use against dearness scale, azinphosmethyl, acephate, and chlorpyrifos are very effective against the crawler stage. Infested stems should be checked weekly starting the first week in June. Apply treatments at the first sign of crawler activity. Continue to check for crawlers; a second application may be necessary about two weeks after the first if there is still considerable crawler activity.

References:

Eck, P. 1990. The American cranberry. Rutgers. New Brunswick, New Jersey.

Jackson, J. O., and C. F. Koval. 1977. Dearness scale, a vine pest of cranberry. Cranberries Magazine 43 (4): 16-17; (5): 14-15; (6): 10-13; (7) 12-13, 15.

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