Scale insects on Blueberries, what you should know

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Introduction

During the past season Oregon State Extension faculty and producers have reported the presence of what looked like scale insects in their fields. Scientists at Oregon State University have subsequently made preliminary identifications of the pest insects, and have found what we believe to be the Azalea bark scale (*Eriococcus azaleae*) that have colonized several blueberry fields in northern Oregon blueberry growing areas. The main concern for producers is that pest infestations may spread from the canes to the fruit thus causing direct crop loss due to unsightly ovisacs (egg sacs) and honeydew occurring on the fruit. It is believed that these initial infestations may cause future problems if pest populations are left unchecked. Producers are urged to scout for the presence of these insects in their fields. This will limit spread to surrounding areas and may prevent this pest from becoming a recurring problem in future seasons.

Literature review has shown that three scales are currently found to attack blueberries in the United States including: Putnam scale, Lecanium scale, and Terrapin scale (Figs. 1 a, b, & c respectively). Several databases were searched and none of the scales matched what we found in Oregon. Dr. Cynthia Wescott, in The Gardener's Bug Book, however lists additional scale species attacking blueberry and these include azalea bark, cottony maple, European fruit Lecanium, Japanese wax, and oak scale. Azalea bark scale most closely matched what we found in Oregon fields.

Description and Biology

The adult female azalea bark scale can be described as dark red with short legs and antennae and long, sucking mouthparts. The insect is hidden from view by the egg sac (ovisac), a covering of felted/matted waxy threads (Fig. 2). The sac is about 3 mm long and 1.5 mm thick. The red eggs are laid within the egg sac, occupying the void left by the female's shrinking body. The crawlers hatch from the egg and venture out of the egg sac. As soon as crawlers find a suitable feeding site, they soon penetrate the bark with their long, sucking mouthparts and begin to feed. The nymph (crawler) is inconspicuous and practically free of any waxy covering.

The azalea bark scale has been recorded in the eastern United States and also in Belgium, Germany, and Russia.

Host Plants: – These insects have been found on more than twenty different plant species including blueberry, andromeda, arborvitae, azalea, hackberry, hawthorn , maple, poplar, rhododendron, sweetgum and willow.

Damage: It is believed that damage will be direct crop losses due to unsightly honeydew and sooty mold, a black fungus that grows in the honeydew excreted by the azalea bark scales as they feed. Ovisacs and various other developmental stages on the fruit may result in the fruit being unmarketable or lower in value. We also believe that heavy infestations will lead to premature leaf drop due to inefficient photosynthesis and will lead to weaker growth, resulting in a smaller crop next season.

Life History: As the female azalea bark scale reaches maturity, it starts to secrete white, waxy threads, which become felted or matted into a thick covering over its entire body (Fig. 2). This covering is called the egg sac, where eggs are laid after mating (Fig. 3a, b). As the female lays eggs, its body shrivels gradually up to the point where the egg sac is almost completely filled with eggs. Egg sacs were visible from April in blueberry fields in Oregon and we found that the first crawlers hatched during May and June (around 21 days after eggs are laid) depending on temperature. The next generation matures during the summer period, and over winters in the adult form. Some adults are believed to lay eggs and these eggs may also be suitable to over winter.

The preferred feeding sites are usually in areas of the plant which make the presence of the pest inconspicuous (Fig. 4). These areas include crotches, pruning wounds and under bark. Here the insects are more protected from harsh environmental conditions, natural enemies and direct contact of pesticides. We believe that older plantings of blueberry are more susceptible to scale invasion due to readily available and suitable feeding and refuge sites (Fig. 5).

Monitoring

Monitoring should be done by thorough searching of the old wood areas and the presence of egg sacs, ants and sooty mold should give the first indications of presence. Double-sided sticky tape (Fig. 6) should be put around canes during the late dormant period in fields where active pest populations are suspected. These can be put in close proximity to the eggs sacs in a grid pattern throughout the field. Tape should be removed during the start of bud break and when temperatures start to increase. Tape should be changed at least every second week and investigation under the stereo microscope (Fig. 7 a, b & c) should give an indication of activity levels.

Control

Control of scales is a much greater problem if bushes are not frequently pruned. The best strategy for management of scale insects is an annual pruning of old wood. Scales that attack blueberries are mainly stem feeders and do not thrive on strong, vigorous wood which does not have layers of bark. Dormant pruning of old, weak canes and scale-infested wood prevents the scales from increasing, and removes a large pool of eggs. We know that most scale insects are susceptible to biological control and many ovisacs can be found with emergence holes of parasitoids (Fig. 8). Adult females and eggs are protected by the egg sac from virtually any pesticide, and pesticide applications rarely result in 100% control. We believe that correct pruning will enhance biological control and help minimize the reliance on pesticides. If pesticide applications are necessary, these should be done during the dormant period when the impact on natural enemies is minimized.

When pest pressure is high, winter pruning should be followed by dormant oil applications (before bloom). Oil applications can be combined with growth regulators during the early part of the season. Remember that growth regulators work best at temperatures where development of insects is evident (see 'sticky traps' in monitoring section). These temperatures are typically found during the spring period when crawlers are active. Growth regulators applied during cold winter will have little to no effect, because insects undergo virtually no development during these periods. The crawler stage is a very susceptible stage and therefore, chemical applications are targeted during this late spring period. Usually two applications with registered growth regulators spaced 10 days apart are allowed. We do not recommend application of chemical pesticides during the latter part of the season as natural enemies are most active during this period.

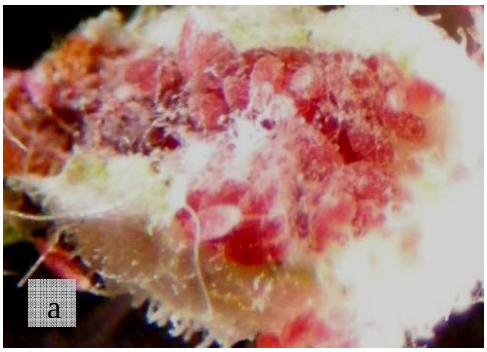
Growers are cautioned to not use an oil application after fruit set as the bloom will be removed and the resultant spotted berries will be unmarketable for fresh markets. Thorough spray coverage of all stems and branches is essential and large volumes of spray, 200 to 300 gallons per acre, are needed under heavy scale infestations. High pressure sprays will also ensure proper penetration and ensures that plants are well soaked. It is not advisable to apply oil sprays at or below 32^{o}F, but rather at temperatures above 50^{o}F under calm conditions.

Conclusions and acknowledgements

We believe that the current scale colonies found in blueberry fields can be adequately controlled by proper pruning techniques, monitoring, biological control and limited but appropriately-timed pesticide applications. We would like to thank producers, field representatives, and other blueberry industry personnel for swift action to note the presence of the pest.

Figs. 1 a, b and c. From top to bottom; a, Putnam scale (Photo J. Payne); b, Lecanium scale (Photo K. Gray); and c, Terrapin scale (Photo J. Payne)

Fig. 2. White waxy threads form the ovisac which becomes felted and can protect the adult females and eggs from pesticides (Photo: Walton).



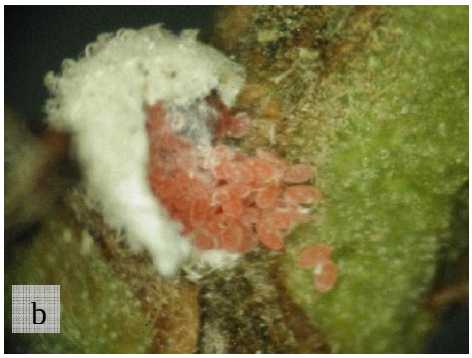


Fig. 3 a, b. Eggs and crawlers inside the egg sac are red in color (Photo's: a, Walton; b, Rosetta).

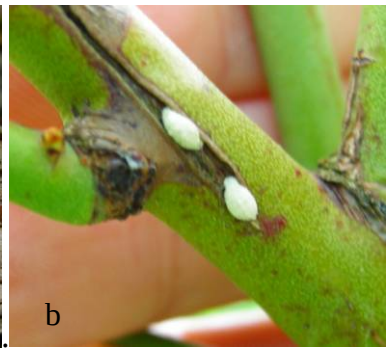


Fig. 4 a, b and c. Feeding sites are under the bark, and in pruning wounds and dead wood . (Photo's: Walton).

Fig. 5. Older wood on blueberries were susceptible to Azalea bark scale colonization. (Photo: Yang).

Fig. 6. Monitoring can be done with double-sided sticky tape. (Photo: Walton)

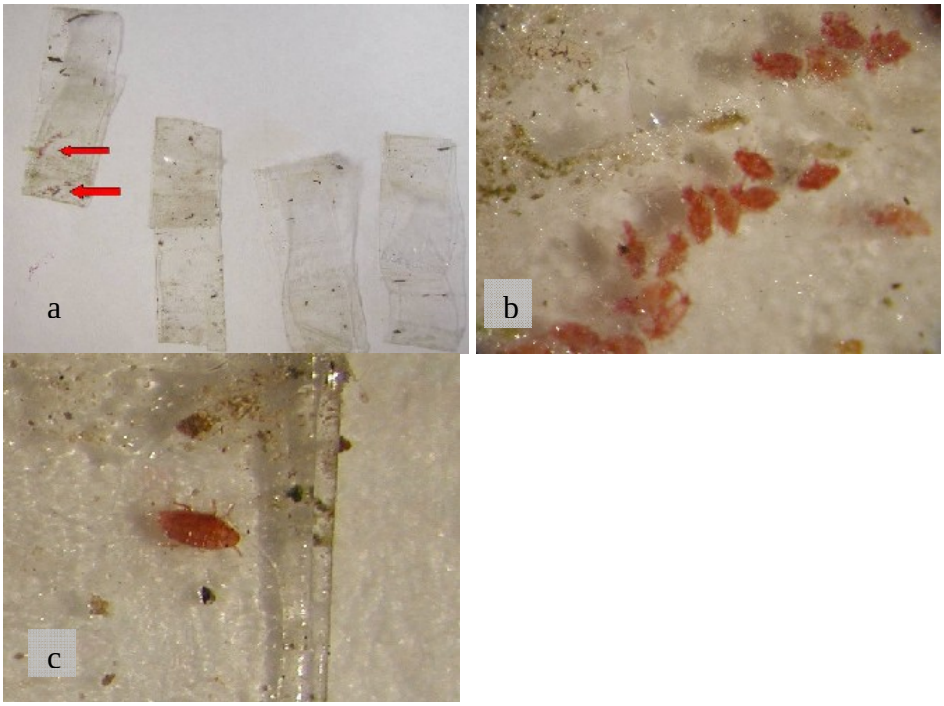


Fig. 7 a, b and c. Images of crawlers under a stereo microscope. (Photo's: Rosetta)

Fig. 8. Parasitized insects have emergence holes in the egg-sac surface. (Photo: Walton)