

Black Vine Weevil

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Black vine weevil (Fig. 1) is the Trojan horse insect pest of nurseries. The flightless, nocturnally active adults enter propagation areas from outdoors and often remain undiscovered. The soil-dwelling larvae are not easily found until they grow large enough to have caused economic loss, or are inadvertently shipped to customers. A non-exclusive list of favored hosts includes members of the Ericaceae, Pineaceae, Primulaceae, Rosaceae, Saxifragaceae, Taxaceae, and Vitaceae.

Black vine weevil develops through egg, six larval instars, pupa, and adult female life stages (they are parthenogenic). Larvae generally overwinter, however, adults may live more than 1 year and also can overwinter. In warm propagation areas, larval development is accelerated, so adults can emerge in February or March, whereas adults developing from overwintered larvae in field populations emerge in June and July. Adults require approximately 4 weeks of feeding before they can lay eggs. Because there are different populations developing at various temperatures, there is a risk of egg laying from March through September. To detect adult populations before they have a chance to lay eggs, workers should vigilantly check for characteristic feeding notches on the edges of leaves. If signs of adults are found, then application of adulticides are warranted. Only long-residual pyrethroids (cyfluthrin or bifenthrin) are suitable, along with acephate, bendiocarb, and cryolite.

Larval feeding on roots causes the most important damage. If adults were not adequately controlled, then larval infestation is likely. Initially, the legless, hunch-

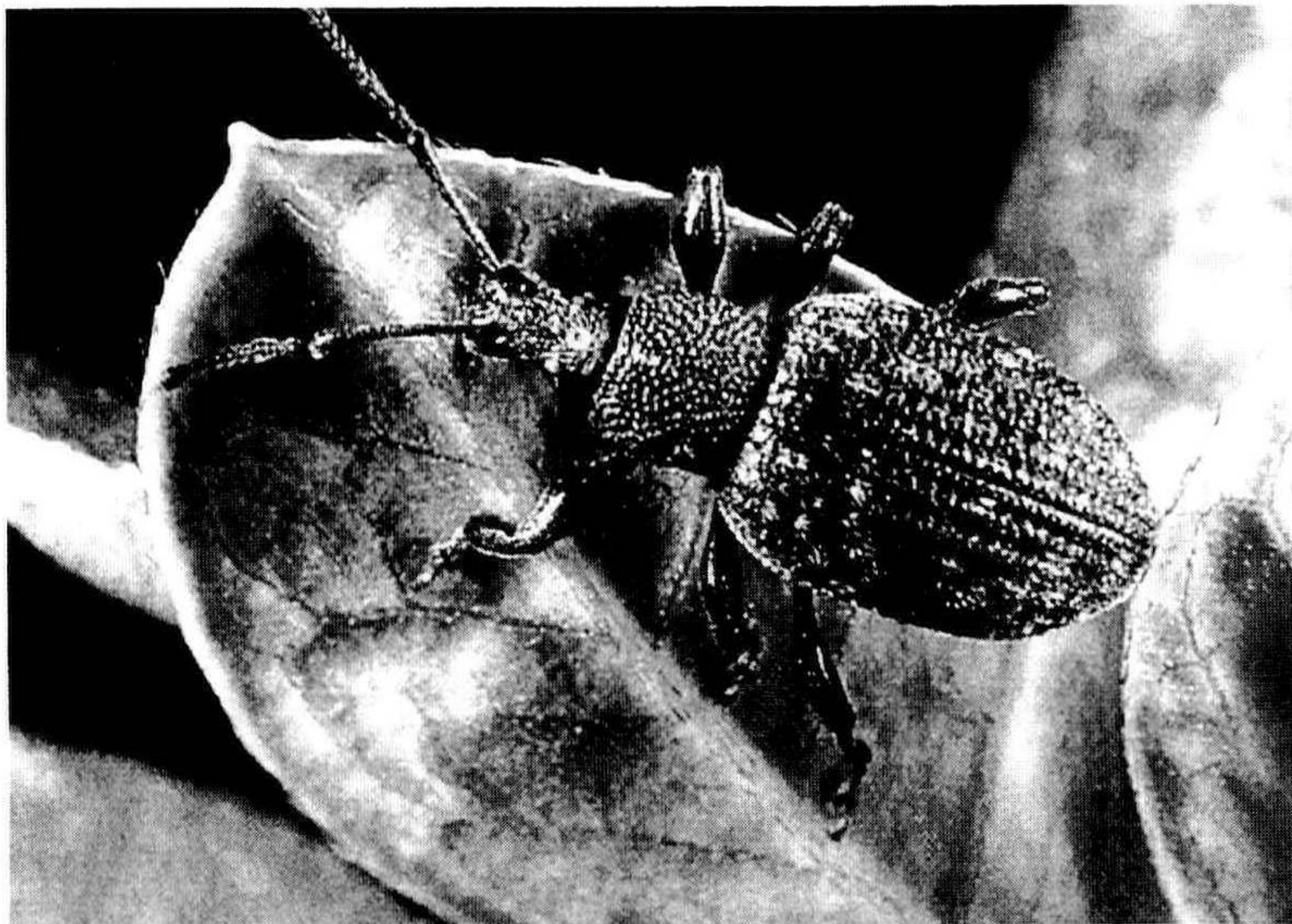


Figure 1. Adult black vine weevil.

backed, white grubs feed on fine roots. On certain plants, especially rhododendrons, the late instar (large) larvae move to the soil surface and girdle woody plants. Under the moist, warm soil conditions common to rooting benches, insect pathogenic nematodes are a good control option. Two effective species of nematodes are available, *Steinernema carpocapsae* and *Heterorhabditis bacteriophora*. Infective juvenile nematodes are approximately 0.5 mm long, and sold in quantities of millions or billions. They can be applied as a coarse spray or drench of the nematode suspension.

Preventative measures include demanding BVW-free propagation material, elimination of favored hosts adjacent to rooting areas, and installing exclusion barriers. Many nurseries become infested when potted liners containing larvae are shipped to them. Therefore, check shipments as they arrive for any signs of BVW activity, including leaf notches. Be especially wary of *Acer palmatum* (Japanese maple), *Rhododendron*, *Erica*, *Calluna*, and spruce shipped in liner pots from the Pacific Northwest, and of any perennials shipped from mail-order houses. Growers should demand that plants either be shipped as bare-root stock, or that effective treatment be done prior to shipment.

Eliminate hosts adjacent to rooting areas to remove the threat caused by local sources of beetles. Adults often seek out warm locations, including houses, for overwintering sites. Move old stock (such as mother plants in large tubs) away from propagation areas, since they can act as asymptomatic hosts from which adults emerge.

Exclusion barriers can prevent adults from climbing into an area. Bury the bottom edge of 6-in., aluminum-flashing strip 2 in. into the soil, then coat the upper 2 in. with grease. The coating needs to be reapplied every 3 to 4 weeks. This approach can also be used to establish on-site quarantine locations for questionably weevil-free plant material, or to divide nurseries into BVW management areas.

Future control methods that look promising are bait-formulated insecticides to control adults and suSCon Green, a 10% chlorpyrifos product that can give 2-years' control of larvae when incorporated into the soil. Both of these options are currently being investigated by the author and other workers in the U.S.