

Viburnum Leaf Beetle

Pyrrhalta viburni Paykull (Coleoptera: Chrysomelidae)

INTRODUCTION:

The Viburnum leaf beetle (VLB) is an invasive insect pest native to Eurasia that was probably brought into North America on imported nursery plants in the early 1900's. It was first detected in 1947 in the Niagara Peninsula of Ontario, Canada, and then in 1978 a breeding population was discovered in the Ottawa-Hull area of Canada. From there it spread southeast into the U.S., and was subsequently found in Maine (1994) and New York State (1996). In 2001 it was detected in British Columbia, and spread rapidly south into Washington State. VLB feeds voraciously on many species of viburnums, heavily damaging and defoliating this popular landscape shrub. VLB could readily become widespread in North America.



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VLB adult. Paul Weston, Cornell University, Bugwood.org

DISTRIBUTION/SPREAD:

The native range of VLB includes most of Europe and parts of Asia. Since its first detection in North America, it is now found in many areas of Ontario, the Canadian Maritime Provinces, and in parts of Maine, New York, Vermont, New Hampshire, Massachusetts, Connecticut, Pennsylvania, Ohio and Washington State. There is a high probability VLB will spread and become established throughout a wide region in North America due to climatic similarities with its native habitat and the wide use of viburnum species in ornamental plantings. However, recent studies indicate that its southern expansion may be limited by mild winters, as VLB eggs require a prolonged chilling period to hatch. The beetles spread naturally by flight, and artificially through people moving infested nursery stock into non-infested areas.

HOST PLANTS:

VLB adults and larvae consume native and exotic species of viburnum in natural and managed landscapes. Although they show a preference for species with little hair (pubescence) on the foliage, they severely damage many of the approximately 150 known species of viburnum. Dr. Paul Weston of Cornell University categorized commonly grown viburnums into highly susceptible (first to be attacked; generally destroyed within 3 years), susceptible (eventually destroyed), moderately susceptible (usually not destroyed) and resistant species (little or no feeding damage). Most species in all groups suffer more feeding damage when grown in the shade. Dr. Weston's list is summarized below, and may be accessed at: <http://www.hort.cornell.edu/vlb/suscept.html>.

Highly susceptible:

V. dentatum complex, arrowwood viburnums
V. nudum, possum-haw, smooth witherod viburnum
V. opulus, European cranberrybush viburnum
V. opulus var. *americana* (formerly *V. trilobum*), American cranberrybush viburnum
V. propinquum, Chinese viburnum, Taiwanese viburnum
V. rafinesquianum, Rafinesque viburnum

Susceptible:

V. acerifolium, mapleleaf viburnum
V. lantana, wayfaringtree viburnum
V. rufidulum, rusty blackhaw, southern black-haw
V. sargentii, Sargent viburnum
V. wrightii, Wright viburnum

Moderately susceptible:

V. alnifolium (syn. *V. lantanoides*), hobblebush
V. burkwoodii, Burkwood viburnum
V. x carlcephalum, Carlcephalum viburnum
V. cassinoides, witherod viburnum
V. dilatatum, linden viburnum
V. farreri, fragrant viburnum (except 'Nanum', which is highly susceptible)
V. lantanoides (syn. *V. alnifolium*), hobblebush
V. lentago, nannyberry viburnum
V. macrocephalum, Chinese Snowball Viburnum
V. x pragense, pragense viburnum
V. prunifolium, blackhaw viburnum
V. x rhytidophylloides, lantanaphyllum viburnum
V. tinus, laurustinus viburnum



Old viburnum twig with empty egg cavities, "caps" missing.
E. Richard Hoebeke, Cornell University, Bugwood.org



1st instar larvae feeding gregariously on bottom side of viburnum leaf. Paul Weston, Cornell University, Bugwood.org



2nd (left) and 3rd (right) instar larvae may feed on both sides of leaves. Paul Weston, Cornell University, Bugwood.org

Viburnum most resistant to the viburnum leaf beetle:

- V. bodnantense*, dawn viburnum
- V. carlesii*, Koreanspice viburnum
- V. davidii*, David viburnum
- V. x juddii*, Judd viburnum
- V. plicatum*, doublefile viburnum
- V. plicatum* var. *tomentosum*, doublefile viburnum
- V. rhytidophyllum*, leatherleaf viburnum
- V. setigerum*, tea viburnum
- V. sieboldii*, Siebold viburnum

BIOLOGY and DAMAGE:

VLB completes one generation each year and overwinters in the egg stage. Eggs require a chilling period of approximately five months before hatching. Immature larvae hatch in early to mid-May when leaf buds open, and feed gregariously between the veins on the underside of tender, newly expanded viburnum leaves. Larvae skeletonize the leaves, consuming leaf tissue, but leaving midribs and major veins intact. VLB is the only known pest that causes this type injury to viburnums.

Larvae pass through three instars during development, and as they get older they will also feed on the tops of leaves. Larvae may drop off the leaf if disturbed. By early to mid-June, mature larvae crawl down the plant stem and burrow into the soil to pupate. The pupal stage lasts about ten days. Development from egg hatch to adult emergence takes eight to 10 weeks. By early July, adult beetles start to emerge and begin feeding on viburnum foliage, leaving oblong shaped "shot" holes chewed through the leaves. Adults tend to fly away or drop to the ground when disturbed. Adult VLB actively feed, migrate to new bushes, mate, and lay eggs until the first killing frost.

Soon after emergence, adult females begin laying eggs and each may lay as many as 500 eggs. Females prefer small branches or terminal twigs of the current year's growth for oviposition sites. The female chews multiple small, round, pinhead-sized cavities ($\frac{1}{8} \times \frac{1}{8}$ " or 1x1 mm) into the underside of a twig, typically arranged in a straight row. Into each cavity she inserts an average of five eggs, then seals the oviposition site with a "cap" made of chewed bark, excrement and mucus, which hardens upon exposure. The cap protects the eggs and absorbs water to maintain the proper humidity for egg development. For several weeks there is a sharp contrast between the colors of the cap (brownish black) and the bark (green to brown).

Both VLB larvae and adults feed voraciously on the foliage of host plants. Larvae have even fed upon the inflorescences (flower clusters) when shrubs are defoliated. Plants heavily attacked by VLB can have every leaf skeletonized, causing dieback and eventual death. After near defoliation by spring feeding larvae, a plant may initiate second growth only to be defoliated by adults feeding in summer. Defoliation 2 to 3 consecutive years can be fatal, and consecutive feeding of larvae and adults within a season can hasten the death of the plant.

IDENTIFICATION:

- Adult VLB are 1/5 to 1/4" long (4.5-6.5 mm). Females are larger than males.
- The head, thorax and elytra (wing covers) are generally brown; the shoulders of the elytra are darker.
- Adults have a golden sheen due to dense golden-grey pubescence (hair) covering the dorsal surface.
- Newly hatched 1st instar larvae are tiny (~1/25-1/12", or 1-2 mm long), greenish-yellow to off-white, and lack spots.
- 2nd and 3rd instar larvae are sub-cylindrical, with legs, yellowish-brown with a pattern of dark spots along their backs, and about 2/5" long (10-11 mm).
- All stages of larvae feed gregariously on viburnum foliage.

WHAT TO LOOK FOR:

- Skeletonized viburnum leaves in spring (May-June) from larval feeding.
- Immature larvae feeding together on underside of young, tender leaves near empty egg-laying sites on dead twig tips.
- Older larvae feeding on both the bottom and top surfaces of leaves; the larvae may drop off if disturbed.
- Many oblong "shot" holes chewed through leaves in the summer and fall by adults.
- Small brown beetles dropping off or flying away from the host plant if disturbed.
- Characteristic egg "caps" arranged in straight rows on undersides of terminal twigs, seen throughout the summer, fall and winter months.

MONITORING:

Monitoring is done by visually inspecting viburnum twigs and foliage for VLB egg caps, larvae, adults, and damage. Begin monitoring small branches and twigs for eggs after the first frost in fall. Monitor new growth and terminal twigs for newly hatched larvae when the first leaves begin to form in spring.

MANAGEMENT:

Cultural Control

To reduce the potential for VLB infestation, plant less susceptible viburnum species or cultivars (see list above).

Mechanical/Physical Control

The most effective means of control is to prune out and destroy infested twigs after egg laying has ended. Check twigs for egg caps after the first frost in fall; prune out and destroy infested twigs anytime from late autumn prior to egg hatch in spring (by late April). Begin monitoring for larvae when the first leaves begin to form; pick off and destroy any larvae found. Continue to regularly inspect bushes and remove larvae through June. Adults can be removed and dropped into a container of soapy water if you can catch them. Adults are least active in the morning, but tend to drop off or fly away if disturbed.



UGA900505
Typical VLB larval feeding damage (skeletonized). Paul Weston, Cornell University, Bugwood.org



UGA9005047
Typical VLB adult feeding damage (oblong shot holes). Paul Weston, Cornell University, Bugwood.org



UGA9005049
VLB "capped" egg masses on a twig, prior to larvae hatching out in late spring. Paul Weston, Cornell University, Bugwood.org

Trapping mature larvae with a sticky barrier wrapped around the base of the plant as they crawl down the stem to pupate in the soil has been suggested, although studies have not been done to confirm the efficacy of this method.

Biological Control

Some bird species and predaceous insects feed on VLB. Although natural enemies likely can not control a significant VLB infestation, they can be used as part of an IPM approach to suppress VLB populations. Predaceous insects like the larvae and adults of *Harmonia axyridis* lady beetle, larvae of green lacewings (*Chrysoperla carnea*), and spined soldier bugs (*Podisus maculiventris* Say) are good general predators of VLB larvae and adults, and these beneficial insects are commercially available for purchase and can be released onto viburnums infested with VLB.

Chemical Control

If pruning and picking off VLB is not practical, there are a number of pesticides that may be used to control this pest. Chemical control is most effective applied in early May when larvae are young. Most of the chemicals available to the home gardener provide only short term protection, necessitating additional applications later in the season if the VLB infestation is severe. However, spraying against adults alone is considered ineffective as a control strategy. Soil applications of certain systemic insecticides are very effective, but many are restricted-use and can only be applied by certified pesticide applicators. Some systemic insecticides have a long residual life in the shrub and may provide protection for more than one season. Because pesticide use and restrictions change frequently, it is best to contact your local Cooperative Extension Service office for current information.

LOOK-ALIKE INSECTS and DAMAGE:

VLB resembles the elm leaf beetle (*Pyrrhalta luteola* Müller) in overall appearance except for minor differences in size and color. Generally, the elm leaf beetle is slightly larger (~ ¼", or 5.8-6.8 mm); has a light brown body with a dark stripe on the edge of each forewing almost reaching the apex (tip of wing); and is found feeding on elm, not viburnum.

How to Report a Possible Sighting/Infestation

In Maryland:

University of Maryland Cooperative Extension Exotic Pest Threats Website:
http://www.PestThreats.umd.edu/content/pestreport_form.cfm

Maryland Department of Agriculture: call 410-841-5920 to report suspect pests; visit http://www.mda.state.md.us/plants-pests/invasive_species.php for information.

Nationally: USDA-Animal and Plant Health Inspection Service (APHIS)
http://www.aphis.usda.gov/services/report_pest_disease/report_pest_disease.shtml



Where to Get More Information:

UMD Cooperative Extension Exotic Pest Threats Website: <http://www.PestThreats.umd.edu/index.cfm>

Cornell University, VLB ID website: <http://www.hort.cornell.edu/vlb/id.html>

Washington State University: <http://whatcom.wsu.edu/ag/homehort/pest/VLB.htm>

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