LILY LEAF BEETLE (*LILIOCERIS LILII*) IN WASHINGTON STATE

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Lily leaf beetle (LLB), *Lilioceris lilii* (Scopoli) (Coleoptera: Chrysomelidae), indigenous to Eurasia, is a pest of lilies (*Lilium* spp.), fritillaries (*Fritillaria* spp.) and giant lilies (*Cardiocrinum* spp.) (Salisbury 2008). Though largely a horticultural pest, LLB also feeds and reproduces on native lilies (Cappuccino et al. 2013). In Eurasia LLB ranges from North Africa to Siberia, and from the United Kingdom to China (Bouchard et al. 2007). Likely introduced to North America with imported Asiatic lilies, LLB was first discovered in North America in the 1940s in Montreal, Canada, and was detected in Cambridge, Massachusetts in 1992 (Bouchard et al. 2007). Populations are now established throughout central and eastern Canada and seven northeastern states (Cappuccino et al. 2013). There are no *Lilioceris* native to North America (White, 1993). *Lilioceris cheni*, introduced to control air potato (*Dioscorea bulbifera*) in Florida is the only congener in the United States (White 1993, Center et al. 2012). The first reported occurrence of LLB on the west coast was detected by an alert gardener in Bellevue, Washington, in 2012.

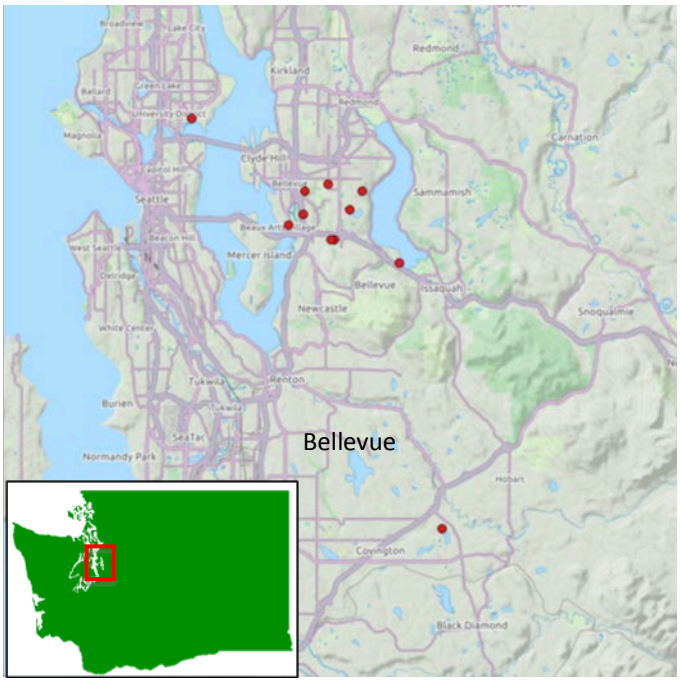
Adult lily leaf beetles in Bellevue, Washington. (E. LaGasa, WSDA)

LLB is active from April-August. Overwintering adults emerge in the spring, feed for several weeks, mate, then begin to lay eggs. Females lay 200–300 eggs throughout the season (Ernst 2005). Newly hatched larvae feed on the undersides of leaves, covering themselves with a layer of excrement. This "fecal shield" is likely a form of protection or disguise from generalist predators (Bouchard et al. 2007). The larvae feed for several weeks, then pupate in the soil for 3–4 weeks. Newly hatched adults feed until the fall and then overwinter in the soil (Cappuccino et al. 2013).

LLB is known to feed on 87 species of *Lilium*, 5 species of *Fritillaria* and one species of *Cardiocrinum* (Salisbury, 2008). It has also been observed feeding on Twistedstalk *(Streptopus lanceolatus*) in natural settings (Cappuccino 2015, Salisbury 2008) and Solomon's Seal *(Polygonatum*) in the lab (Cappuccino et al. 2013). Adults and larvae are voracious feeders that can cause complete defoliation of plants and damage to buds and flowers (Cappuccino et al. 2013). LLB have been observed feeding on the native lilies *L. candense* in Canada and *L. superbum* in Rhode Island (Cappuccino et al. 2013). As the beetles' range continues to expand in North America, more native lilies (half of which are

LLB larvae feeding on underside of lily leaf. (E. LaGasa, WSDA)

already threatened or endangered) may be at risk (Cappuccino et al. 2013). LLB can cause home and community gardeners to stop growing lilies and fritillaries. The beetle poses an economic threat to lily and fritillary producers, the cut flower industry, and native plant nurseries in terms of production costs and how the pest affects the consumer market.



Lilioceris lilii detections in Washington

Hand removal can effectively control the beetle, although this is time consuming and the feces covered larvae can be repulsive to gardeners. Effective organic and conventional pesticides must be reapplied throughout the season, with potential risk to natural enemies and pollinators (Capuccino et al. 2013). In Eurasia a wide array of parasitoids target *L. lilii,* with parasitism rates reaching 78% in some wild populations (Cappuccino et al. 2013). Three parasitoid wasps (*Tetrastichus setifer* Thomson, *Diaparsis jucunda* Holmgren and *Lemophagus errabundus)* have been screened and released on the East Coast and in Canada. The most effective of these is *T. setifer*, with field parasitism rates of up to 100% (Cappuccino et al. 2013).

As of 2015 there are 11 known populations of the beetle within about a 60 square mile vicinity of central Bellevue. LLB is already causing major plant destruction at home and community gardens in the Bellevue area. Some gardeners in the area have reported "giving up" on trying to grow lilies, and one botanical garden states "We don't plant lilies anymore (A Wright in litt., November 2015). At least one regional nursery will not buy or trade lilies from King County.

Washington State Department of Agriculture and Washington State University are preparing a grant proposal seeking funds to develop a regional biological control program targeting this pest. If funded, the biological control agent *Tetrastichus setifer* will be released in affected areas to help control beetle populations. Successful establishment would provide permanent control of LLB, protecting lilies and fritillaries in home gardens, natural ecosystems, and commercial operations.

Sources:

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