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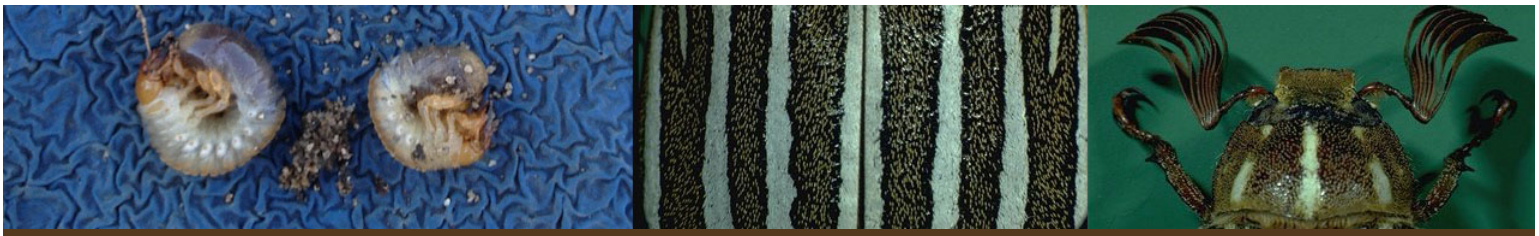

TENLINED JUNE BEETLE

Insect Pest Management in Hybrid Poplars Series

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Tenlined June Beetle

Polyphylla decemlineata Say (Coleoptera: Scarabaeidae: Melolonthinae)

Introduction

Immature grubs of the tenlined June beetle are establishment pests of poplar. Cuttings used to propagate and establish hybrid poplars on land used previously for pasture or irrigated crops often fail due to grub feeding behavior. Loss of one cutting is of no consequence because adjacent trees will fill in the canopy; however, grub populations are grouped, and loss of nine or more adjacent trees can cause an opening in the canopy for years or the entire length of the rotation.

Taxonomy

There are 36 species of *Polyphylla* in the US (Pinto n.d.). *Polyphylla decemlineata* and *P. sobrina* (Johnson et al. 2012) are both found in California and Nevada, whereas *P. decemlineata* has a more extensive range. Common names include watermelon beetle, hissing beetle, or June bug.

Hosts

Feeding of tenlined June beetle larvae (grubs) has been reported on almonds, apples, cherry, poplar, prune, walnut, and stone fruits in California (Johnson et al. 2012), apples and poplars in Washington, and various cane fruits, vegetables, berries, and row crops throughout its range (Beers et al. 2016).

Range

Populations of tenlined June beetles are widely dispersed in sandy soils west of (Beers et al. 2016) and near the eastern slopes of the Rocky Mountains in the US and Canada (Myers 2017).

Life History

Two most noticeable life stages are the adult males that are attracted to lights at night and the late instar grubs found in association with roots. Generally females have limited ability to fly and are rarely captured in light traps.

Females emit a sex pheromone allowing the male to locate them shortly after eclosion. Often females mate and subsequently lay approximately a dozen eggs in the soil near where they emerged. Therefore, the rather large (4 mm) oval-shaped, cream-colored eggs are seldom noticed. There are three larval instars. Larval development requires multiple years depending on latitude and site. In California two or three seasons are required, while in some northern sites the life span can be four years. In California the first instar hibernates. The following growing season the grub (Figure 1) completes its second instar and again overwinters as a third instar during the second year (Van Steenwyk and Rough 1989). Pupation and adult eclosion occurs in the third growing season. Pupation occurs within subterranean cells, so only adult males, near lights in June through September, are evidence of an existing population. Males use sense cells on their large tongue-shaped lamellate antennae to locate a female by following her sex pheromone (Lilly and Shorthouse 1971).

Figure 1. Second and third instar tenlined June beetle grubs (Photo by R. Andrew Rodstrom).

Damage

Belowground damage to newly planted poplars is often caused by the tenlined June beetle, *P. decemlineata* (Rodstrom 2013). This damage to the belowground portion of the stem is characterized by the stripping of the bark down to the woody part of the cutting (Figure 2). This damage is also visible aboveground with shriveled shoots and yellowing leaves (Figure 2).

Areas of damage are often spotty within a planting. When fewer than nine adjacent (3×3 block) trees are killed, growers can most likely recoup the economic loss of missing trees through increased growth resulting from less competition (D. Rice, pers. comm.), thus closing the canopy. Elateridae (wireworm) larvae can also cause belowground damage by attacking the buds below the soil crown and girdling the stem by feeding on the bark.

Figure 2. Belowground tenlined June beetle stick damage to a poplar cutting (Photo by R.A. Rodstrom).

Biological Control

Natural enemies do exist (UC Pest Management Guidelines 2009), but we have no evidence of biocontrol agents influencing *P. decemlineata* in poplars. Scoliid wasps, *Campsomeris pilipes* Saussure (Hymenoptera: Scoliidae) (Vereecken and Carriere 2003), and entomopathogenic nematodes (*Steinernema riobrave* and *Heterorhabditis megidis)* have been reared from grubs (Johnson et al. 2012; Thurston et al. 1993), and Tachinidae flies have been reported to parasitize adult tenlined (Figure 3) June beetles (Ritcher 1958).

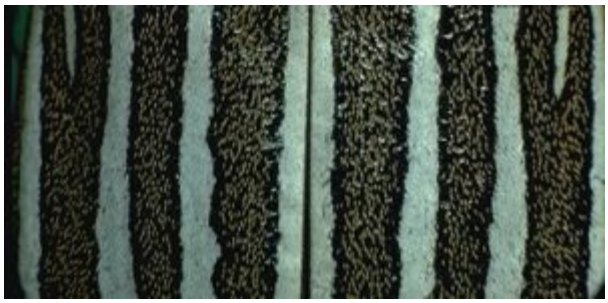

Figure 3. Elytra of beetle with ten stripes, hence the common name tenlined June beetle (Image courtesy of VWR International, LLC).

Monitoring

Light traps can be used to estimate the local population of beetles. Eventually a synthetic sex pheromone may be used to attract males (Figure 4) (Leal 2010). If groups of newly planted trees appear water- or nutrient-stressed, meaning the leaves have a yellowish color/shriveling appearance and growth is stunted compared to surrounding plants, then pest managers are encouraged to excavate and sieve through a cubic foot of soil next to the root collar for grubs and examine the belowground portion of the plant for damaged cambium (Figure 2).

Figure 4. Head and antennae of male beetle (Image courtesy of VWR International, LLC).

Management

In California almond groves, Ecozin 3%, an organic pesticide containing azadirachtin, caused larvae to cease feeding for several weeks, but mortality of tenlined June beetle larvae was low. A broad-spectrum treatment of the soil with diazinon 50W (registered for use on almonds in California, but not currently registered for use against tenlined June beetle) eventually killed the grubs in the top six-inch layer of soil (Johnson et al. 2006). Use of imidacloprid (Admire Pro 14 ounces shanked in per acre rate) can be an effective soil drench, but additional water to reach field capacity is recommended. Clothianidin (Clutch or Belay) has been reported to have promise in California (Johnson et al. 2012).

Azadirachtin, diazinon, and clothianidin were only used in California and are not currently registered for use on poplars in Oregon or Washington. Imidacloprid delivered through the drip system may control grubs after one year. If nine or more adjacent cuttings fail, we recommend replanting dead stems the following year with larger cuttings so that the canopy will eventually close.

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Use pesticides with care. Apply them only to plants, animals, or sites as listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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