

## California Pest Rating

### *Oulema melanopus* (Linnaeus): Cereal Leaf Beetle

#### Coleoptera: Chrysomelidae

#### Pest Rating: B

#### Initiating Event:

During late summer 2013, populations of Cereal Leaf Beetle (CLB) were found in Siskiyou and Modoc counties. Nick Condos recommended a new pest rating proposal for CLB to help determine the path forward.

#### History & Status:

**Background:** CLB is a pest of grain crops that commonly feeds on the leaves of oats, wheat, and barley. It is also reported to feed on rye, millet, corn, and many types of wild grasses. Rice is also sometimes listed as a host, but there is no evidence that CLB causes damage to rice in the scientific literature nor is CLB included in IPM guidelines for rice-producing states. Most of the damage is caused by larval beetles, known as “slugs”, feeding in the spring. Damage to leaves results in reduced photosynthetic ability in the plants and can significantly reduce grain yield. When ready to pupate, larvae drop into the soil. Adults emerge in the summer and feed briefly before entering summer aestivation. The beetles then seek out overwinter sites among the shelter of protected places such as debris and leaf litter. Historically CLB has sometimes caused severe crop losses; however, in most of the United States CLB populations are so effectively managed by introduced biological control agents, especially *Tetrastichus julis*, that chemical treatment is seldom required.

**Worldwide Distribution:** CLB is native to Europe. It was detected in Michigan in 1962 and has since spread over much of the United States. It was detected in Oregon in 1999 and by 2013 had spread to within 11 miles of the California border.

**Official Control:** CLB is listed as a regulated quarantine pest in New Zealand<sup>1</sup>, Japan<sup>2</sup>, and possibly other countries.

**California Distribution:** CLB has been found in the environment of Siskiyou and Modoc counties.

**California Interceptions:** CLB is commonly intercepted at California's border stations on items such as beehives, potted plants, lumber, etc.

The risk CLB would pose to California is evaluated below.

### **Consequences of Introduction:**

**1) Climate/Host Interaction:** In California, climate models suggest that CLB will only find favorable conditions in Del Norte County, Humboldt County, and a small portion of the central San Joaquin Valley<sup>4</sup>. Conditions in the southern half of California are predicted to be especially unfavorable to establishment of CLB. CLB receives a **Medium (2)** in this category.

- **Low (1)** Not likely to establish in California; or likely to establish in very limited areas.
- **Medium (2)** may be able to establish in a larger but limited part of California.
- **High (3)** likely to establish a widespread distribution in California.

**2) Known Pest Host Range:** CLB feeds on six different varieties of field crops and wild grasses. It receives a **Medium (2)** in this category.

- **Low (1)** has a very limited host range.
- **Medium (2)** has a moderate host range.
- **High (3)** has a wide host range.

**3) Pest Dispersal Potential:** CLB only has one generation per year, but is capable of reaching damaging populations relatively quickly, in the absence of biological control agents. With help from the wind the beetles are thought to spread up to 10 miles/year on their own. They may move longer distances as hitchhikers on items such as lumber or beehives; however, evidence indicates that they are not likely to establish populations through this movement. According to NAPIS county records all CLB spread has been along the leading edge of the population from the original introduction, with the exception of one jump across the Dakotas<sup>3</sup>. Furthermore, wheat producing states such as Arizona and Texas do not have exterior quarantines against CLB and do not have the pest. The fact that CLB typically do not mate until after overwintering may help explain this, as mated females are unlikely to be transported while overwintering. CLB receives a **Medium (2)** in this category.

- **Low (1)** does not have high reproductive or dispersal potential.
- **Medium (2)** has either high reproductive or dispersal potential.
- **High (3)** has both high reproduction and dispersal potential.

**4) Economic Impact:** Provided that biological control agents are introduced in California, CLB is not expected to significantly lower crop yield. CLB may increase crop production costs as fields will need to be scouted for the slugs to assess parasitism rates and growers may occasionally need to treat. CLB is considered a quarantine pest in some nations and could therefore, in some cases, trigger interruptions to trade or the implementation of new phytosanitary measures. CLB is not expected to negatively change normal cultural practices. CLB does not vector any other organisms, is not injurious or poisonous to agriculturally important animals, and does not interfere with water supplies. CLB receives a **Medium (2)** in this category.

Evaluate the economic impact of the pest to California using the criteria below. Score:

- A. The pest could lower crop yield.
- B. The pest could lower crop value (includes increasing crop production costs).**
- C. The pest could trigger the loss of markets (includes quarantines).**
- D. The pest could negatively change normal cultural practices.
- E. The pest can vector, or is vectored, by another pestiferous organism.
- F. The organism is injurious or poisonous to agriculturally important animals.
- G. The organism can interfere with the delivery or supply of water for agricultural uses.

- **Low (1)** causes 0 or 1 of these impacts.
- **Medium (2)** causes 2 of these impacts.
- **High (3)** causes 3 or more of these impacts.

**5) Environmental Impact:** CLB may require some new private treatment programs in California in the absence of biological control agents or in cases where the parasitism rate is found to be low. CLB is not expected lower biodiversity, disrupt natural communities, or change ecosystem processes. CLB is not expected to directly impact threatened or endangered species. CLB is not expected to disrupt critical habitats. CLB is not expected to significantly impact cultural practices, home/urban gardening, or ornamental plantings. CLB receives a **Medium (2)** in this category.

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.
- B. The pest could directly affect threatened or endangered species.
- C. The pest could impact threatened or endangered species by disrupting critical habitats.
- D. The pest could trigger additional official or private treatment programs.**
- E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.

Score the pest for Environmental Impact. Score:

- **Low (1)** causes none of the above to occur.
- **Medium (2)** causes one of the above to occur.
- **High (3)** causes two or more of the above to occur.

### **Consequences of Introduction to California for CLB: Medium (10)**

Add up the total score and include it here.

- **Low** = 5-8 points
- **Medium** = 9-12 points
- **High** = 13-15 points

**6) Post Entry Distribution and Survey Information:** Well established populations of CLB have been found in Siskiyou and Modoc counties. CLB receives a **Low (-1)** in this category.

- **Not established (0)** Pest never detected in California, or known only from incursions.
- **Low (-1)** Pest has a localized distribution in California, or is established in one suitable climate/host area (region).
- **Medium (-2)** Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.
- **High (-3)** Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

### **Final Score:**

The final score is the consequences of introduction score minus the post entry distribution and survey information score: **Medium (9)**

### **Uncertainty:**

It is possible that CLB will attain a wider distribution within California than is predicted by climate models. It is also possible that several species of threatened and endangered native grasses could be favorable hosts for CLB, leading to additional environmental impacts. Furthermore, CLB populations may have established in other parts of California.

## **Conclusion and Rating Justification:**

Provided that biological control agents are introduced to California, economic impacts from CLB are expected to be limited at most to additional pest scouting, occasional treatment, and possibly limited impacts on international trade. Environmental impacts are expected to be limited to occasional chemical treatments in cases where CLB parasitism rates are found to be low. CLB that are transported in trade nearly always fail to establish populations, showing that quarantines do not play much of a role in limiting CLB dispersal. A “B” rating is justified.

## **References:**

<sup>1</sup> <http://www.mpi.govt.nz/biosecurity-animal-welfare/pests-diseases/boric.aspx>

<sup>2</sup> <http://www.pps.go.jp/english/law/list1.html>

<sup>3</sup> <http://pest.ceris.purdue.edu/map.php?code=INAMCMA#>

<sup>4</sup> Risk assessment for cereal leaf beetle in California through the movement of small grains, Christmas trees, and farm equipment. USDA-APHIS. 2007.

## **Responsible Party:**

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## **Comment Period:**

The 45-day comment period was opened on Monday, March 16, 2015 and closed on Thursday, April 30, 2015.