

California Pest Rating

Pagiocerus frontalis (Fabricius): A Scolytid Weevil

Coleoptera: Cucurlionidae

Pest Rating: B

Initiating Event:

On May 21, 2014 Dr. Andrew Cline identified a beetle collected in Escondido, San Diego County, as *Pagiocerus frontalis* (PDR SJOP06003026). This beetle was also reported from San Diego County in 2010. The beetle presently has a temporary rating of Q, so Dr. Kevin Hoffman recommended a pest rating proposal to determine future direction.

History & Status:

Background: *Pagiocerus frontalis* feeds and reproduces on the seeds of fallen avocado fruit and both fresh and dry corn. The species is considered a major pest of stored corn in the highlands of the Andes^{1,2}. Beetles infest corn cobs in the field before harvest and continue feeding in storage, destroying the corn within several months¹. The beetles have also been found on several other plants including coffee; however, a laboratory experiment found that these other plants were not suitable hosts for reproduction and development¹. *Pagiocerus frontalis* is not known to have ever been intercepted, but could presumably spread long distances when infested fresh or dry corn or ripe, damaged avocados are moved.

Worldwide Distribution: *Pagiocerus frontalis* is a Neotropical beetle whose range extends from South America, through Central America and Mexico, into the southeastern United States.

Official Control: *Pagiocerus frontalis* is listed as a quarantine pest by Japan⁴ and New Zealand⁵.

California Distribution: In California *Pagiocerus frontalis* has only been found in San Diego County.

California Interceptions: *Pagiocerus frontalis* has never been intercepted in any regulatory situations in California.

The risk *Pagiocerus frontalis* would pose to California is evaluated below.

Consequences of Introduction:

1) Climate/Host Interaction: *Pagiocerus frontalis* has a widespread distribution across a wide variety of climates from the Andes in South America to North Carolina. It can be expected to establish wherever it can find suitable host material in California. The beetle receives a **High (3)** in this category.

Evaluate if the pest would have suitable hosts and climate to establish in California. Score:

- **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: *Pagiocerus frontalis* is only known to be able to complete its reproductive cycle on corn and the seeds of fallen avocados. It receives a **Low (1)** in this category.

Evaluate the host range of the pest. Score:

- **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: *Pagiocerus frontalis* has high reproductive potential; females lay many eggs and it can complete its entire life cycle in 3 to 4 weeks¹. The beetles may theoretically disperse long distances through the movement of infested corn or inside the seeds of ripe, damaged avocados. The beetle receives a **High (3)** in this category.

Evaluate the natural and artificial dispersal potential of the pest. Score:

- **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: The value of corn produced in California was approximately \$812.1 million in 2012. This includes \$234.7 for grain, \$454.4 for silage, and \$123 million for sweet. *Pagiocerus frontalis* might increase production costs in these crops, especially organic sweet corn. The beetle is considered a quarantine pest by some nations. The beetle therefore has the potential to disrupt markets by contaminating corn or as a hitchhiker on other commodities. *Pagiocerus frontalis* 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: *Pagiocerus frontalis* is not expected to lower biodiversity, disrupt natural communities, or change ecosystem processes. The beetle is not likely to directly affect threatened or endangered species or disrupt critical habitats. Large populations of the beetle might trigger new chemical treatments in corn when the crop is in the field or storage. *Pagiocerus frontalis* is not expected to significantly impact cultural practices, home/urban gardening, or ornamental plantings. The beetle receives a **Medium (2)** in this category.

Evaluate the environmental impact of the pest on California using the criteria below.

- 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 *Pagiocerus frontalis*: Medium(11)

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: In California, *Pagiocerus frontalis* is only known to be established in San Diego County. The beetle receives a **Low (-1)** in this category.

Evaluate the known distribution in California. Only official records identified by a taxonomic expert and supported by voucher specimens deposited in natural history collections should be considered. Pest incursions that have been eradicated, are under eradication, or have been delimited with no further detections should not be included.

- **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.

The final score is the consequences of introduction score minus the post entry distribution and survey information score: **Medium (10)**

Uncertainty:

There are a wide variety of pests that feed on both fresh and dry corn. It is possible that existing treatments, cultural practices, and modified genes will preclude any economic damage from this pest in California. *Pagiocerus frontalis* also feeds on the seed of fallen avocado. These avocados are not likely to be distributed commercially; nevertheless, the presence of this beetle might disrupt markets.

Conclusion and Rating Justification:

Pagiocerus frontalis is only known from San Diego County and has the potential to have limited economic and environmental impacts. A “B” rating is justified.

References:

¹ Eidt-Wendt, J. and F.A. Schulz. Studies on the biology and ecology of *Pagiocerus frontalis* (Fabricius) (Coleoptera: Scolytidae) infesting stored maize in Ecuador. Technical University Berlin, Department of Phytomedicine, Berlin, FRG. <http://spiru.cgahr.ksu.edu/proj/iwcspp/pdf2/5/61.pdf>

² Gianoli, E., I. Ramos, A. Alfaro-Tapia, Y. Valdéz, E.R. Echegaray, and E. Yábar. 2006. Benefits of a maize-bean-weeds mixed cropping system in Urubamba Valley, Peruvian Andes. *International Journal of Pest Management*. 52(4):283-289. <http://www2.udec.cl/~egianoli/06gianintjpestman.pdf>

⁴https://www.ippc.int/sites/default/files/documents/20130423/1309849796_qp_list_2013042321%3A18En.pdf

⁵ <http://piorin.gov.pl/cms/upload/seed.pdf>

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.