

California Pest Rating

Phenacoccus hakeae Williams: A Protea Mealybug

Hemiptera: Pseudococcidae

Pest Rating: C

Initiating Event:

In March 2013, a visual delimitation survey was conducted in a 400m radius in Los Osos (San Luis Obispo County) following the first detection of the mealybug *Delottococcus confusus* in California. Mealybugs collected on 10 residential properties during this survey were identified as *Phenacoccus hakeae* by Drs. Gillian Watson and Natalia von Ellenrieder on March 29, 2012, a new continental record.

History & Status:

Background: *Phenacoccus hakeae* was described from specimens collected on *Hakea sericea* (Proteaceae) in New South Wales, Australia¹. It has also been intercepted by USDA-APHIS on cut flowers (*Persoonia* sp., *Leucospermum* sp., and other Proteaceae) imported from Australia and also on cut flowers (presumably Proteaceae) in shipments from the Netherlands². In San Luis Obispo County, the mealybugs have been collected on *Leucadendron* sp. (PDRs FROP06009425, FROP06009426, and FROP06009430), *Protea* sp. (PDRs FROP06009383, FROP06009384, FROP06009386, FROP06009387, FROP06009389, FROP06009400, FROP06009401, FROP06009421, FROP06009423, FROP06009427, FROP06009429, FROP06009431, FROP06009433, and FROP06009434), and *Grevillea* sp. (PDR FROP06009428). Because the host plants (Proteaceae) are commonly grown for both cut flowers and landscape plants, *Phenacoccus hakeae* may be spread through international plant trade. The biology of the mealybug is unknown.

Worldwide Distribution: *Phenacoccus hakeae* is native to New South Wales, Australia. Its presence in shipments from the Netherlands suggests that it may also be present in some other countries that trade in Proteaceae.

Official Control: *Phenacoccus hakeae* is listed as an injurious animal on Japan's plant pest quarantine list³.

California Distribution: In California, *Phenacoccus hakeae* was first known from an incursion into the environment of Los Osos, San Luis Obispo County. A follow-up survey indicates that the mealybug should be considered “established by survey” in San Luis Obispo County. In addition to Los Osos, populations have been found in the cities of Morro Bay, Shell Beach, Arroyo Grande, San Luis Obispo, Grover Beach, Cayucos, and Pismo Beach.

California Interceptions: *Phenacoccus hakeae* has been found in nurseries in both San Luis Obispo and Santa Barbara counties.

The risk *Phenacoccus hakeae* would pose to California is evaluated below.

Consequences of Introduction:

1) Climate/Host Interaction: Proteaceae are commonly grown as ornamental plants in California and are common in the nursery industry. *Phenacoccus hakeae* is expected to be able to establish wherever these plants are grown. The mealybug receives a **High (3)** rating 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: *Phenacoccus hakeae* is only known to feed on plants in the family Proteaceae. *P. hakeae* 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: *Phenacoccus hakeae* has demonstrated its ability to disperse long distances through the trade of ornamental plants and flowers. Mealybugs may also be dispersed by wind. They are capable of rapid reproduction. *Phenacoccus hakeae* 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: *Phenacoccus hakeae* is not documented as a pest anywhere in scientific literature. However, mealybugs may cause significant problems for protea grown for cut flowers by contaminating flowers by their presence, honeydew, and sooty mold⁴. Cut flowers are a \$477 million industry in California; other states and nations might reject infested flowers. Since *Phenacoccus hakeae* may increase production costs and trigger the loss of markets for proteas, the mealybug receives a **Medium (2)** rating 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: There are no plants listed as threatened or endangered in California that are expected to be hosts of *Phenacoccus hakeae*. Populations of the mealybug have been found established in residential areas and a botanical garden and do not appear to be triggering any additional treatment programs. Furthermore there is no evidence that any residents are replacing infested plants with alternative species. Since *Phenacoccus hakeae* appears to be established in the environment and is not causing any significant environmental impacts it receives a **Low (1)** rating 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 *Phenacoccus hakeae*: 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: *Phenacoccus hakeae* is widely established in the environment of San Luis Obispo County. The mealybug receives a **Medium (-2)** 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.

Final Score:

The final score is the consequences of introduction score minus the post entry distribution and survey information score: **Low (8)**

Uncertainty:

Several species of *Hakea* plants are considered invasive weeds in some places; *Phenacoccus hakeae* may be a valuable natural enemy of these weeds or an indicator of their presence. Some mealybugs in one sample collected from Los Osos had been parasitized (PDR FROP06009429). It is possible that parasitoids, either native to California or introduced along with the mealybugs, are helping to mitigate impacts of this new pest. It is also possible that species present in additional nations may be junior synonyms of *Phenacoccus hakeae*, and that the worldwide distribution of the mealybug may be greater.

It is possible that the natural habitat of *Phenacoccus hakeae* is sufficiently remote that its host range is not well documented. It is possible that it could colonize many other plants. High populations of the mealybug might trigger additional treatment programs in the nursery industry or by residents who find infested ornamental plants unacceptable. Large infestations of the mealybug could cause minor alterations of urban landscaping as residents and landscapers replace infested plants with alternative species.

Conclusion and Rating Justification:

Phenacoccus hakeae has established a widespread distribution on Proteaceae in San Luis Obispo County. It does not appear to be having any significant economic or environmental impacts. Therefore, a C rating is justified.

References:

¹<http://www.sel.barc.usda.gov/catalogs/pseudoco/Phenacoccushakeae.htm>

²http://www.aphis.usda.gov/import_export/plants/plant_imports/federal_order/downloads/2010/NetherlandsCutFlowersRevised.pdf

³http://www.ippc.int/file_uploaded/1359088733_qp_list_25July2012.pdf

⁴Mazzeo, G., J. C. Franco, and A. Russo. 2009. A new Paracoccus species from Palaearctic region (Hemiptera, Sternorrhyncha, Coccoidea, Pseudococcidae). *Zootaxa* 2274: 62–68 <http://www.mapress.com/zootaxa/2009/f/zt02274p068.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.