

## California Pest Rating Proposal

### *Carpophilus truncatus* Murray: a sap beetle

Coleoptera: Nitidulidae

Current Rating: Q

Proposed Rating: B

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Comment Period: **05/01/2024 – 06/15/2024**

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#### Initiating Event:

*Carpophilus truncatus* is currently Q-rated. In September 2023, it was found in orchards in Madera, Kings, Merced, and Stanislaus counties. It is considered to be established in California. Therefore, a pest rating proposal is needed.

#### History & Status:

**Background:** *Carpophilus truncatus* is reported to be associated with stored products, including nuts, which is not unusual for the family Nitidulidae. However, this species was reported in Australia to be a pest of almonds and to infest nuts on the tree (Hossain, 2018; Semeraro et al., 2023).

The beetles found infesting almonds in Australia were originally referred to as *Carpophilus* near *dimidiatus* and were subsequently described as a distinct species, *Carpophilus jarijari* by Powell and Hamilton (2019). They were later determined to be *C. truncatus* (Semeraro et al., 2023).

In Australia, *C. truncatus* adults and larvae infest almonds (in trees and on the ground) that have undergone hull split; unsplit nuts are not reported to be attacked. The feeding damages the kernel. Damage of up to 30% of almonds (average of 2-5%) has been reported in Australia. The damage to

almonds in 2015 was estimated at \$11 million. In addition to the direct feeding damage, this beetle could vector aflatoxin-producing *Aspergillus* fungi (Hossain, 2018).

In an almond orchard in Madera County, California, *C. truncatus* larvae were observed tunneling through almonds on the ground (H. Wilson, pers. comm.). One grower in Merced County reported in 2022 that damage they attributed to what is likely this beetle affected 15% of almonds (S. Runyon, pers. comm.).

*Carpophilus truncatus* was found in walnuts in a warehouse in Italy; the larvae excavated tunnels in the kernels and in most (80%) of the cases, the nuts had a crack in the sheath between the two shells of the endocarp, which suggests that damages or shell splitting may be necessary for infestation of walnuts by this beetle. In addition, *C. truncatus* eggs were reported to be present on nuts on trees (de Benedetto et al., 2022).

In Mexico, this beetle was found in traps baited with rotting fruit and in sotol liquor; it is not apparent if the sotol was in a trap (Hernández-Torres et al., 2018).

There does not appear to be an effective chemical or trap-based treatment against this pest, but, as it is reported to overwinter in mummy nuts in Australia, sanitation could be an important part of control (Hossain, 2018).

**Worldwide Distribution:** **Africa:** Algeria, Botswana, Egypt, Madagascar, Morocco, Seychelles, South Africa, Tunisia; **Asia:** Arab Emirates, China, India, Iran, Iraq, Israel, Japan, Lebanon, Saudi Arabia, Syria, Taiwan, Turkey, Yemen; **Europe:** Croatia, Czech Republic, Cyprus, Estonia, Greece, Italy, Malta, Portugal, Spain; **North America:** Mexico, United States (California); **Oceania:** Australia, Caroline Islands, Cook Islands, Fiji, Gilbert Islands, Guam, Mariana Islands, Marshall Islands, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tuvalu, Vanuatu, West Papua; **South America:** Peru (de Benedetta et al., 2022; Brown, 2009; Cline et al., 2015; Hernández-Torres et al., 2018; Lasón

and Ghahari, 2013; Powell and Hamilton, 2019; Šefrová and Laštůvka, 2005; Süda, 2016). The native distribution is not known.

**Official Control:** *Carpophilus truncatus* is not known to be under official control anywhere.

**California Distribution:** *Carpophilus truncatus* was found in orchards in Kings (pistachio), Madera (almond), Merced, and Stanislaus counties in September and October 2023 (California Department of Food and Agriculture, 2023).

**California Interceptions:** *Carpophilus truncatus* has not been intercepted in California (California Department of Food and Agriculture).

The risk *Carpophilus truncatus* poses to California is evaluated below.

### **Consequences of Introduction:**

- 1) **Climate/Host Interaction:** *Carpophilus truncatus* is reported to feed on almonds and walnuts, including in storage. It is essentially cosmopolitan and evidently able to tolerate a wide variety of climate, including Mediterranean. It is already established in the Central Valley of California. Therefore, it receives a **High (3)** 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:** *Carpophilus truncatus* is reported to feed on almonds, pistachios, and walnuts, which represent three plant families. In addition, Brown (2009) reports it occurring in association with coffee, coconut, and rice, likely as stored products. Therefore, 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 Reproductive and Dispersal Potential:** *Carpophilus truncatus* could be moved via infested nuts and it can presumably fly. Therefore, it 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:** *Carpophilus truncatus* is reported to cause damage to almond crops in Australia. California almonds were worth \$3.5 billion dollars in 2022 (2023 California almond objective measurement report). Infestations in almond orchards could impact yield and require changes in sanitation practices. In addition, this beetle could vector *Aspergillus* fungi. Therefore, it receives a **High (3)** in this category.

**Economic Impact: A, B, D, E**

- 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.

**Economic Impact Score: High**

- 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:** Infestations of *C. truncatus* could trigger treatments, although effective treatments do not appear to have been identified at this time. Therefore, *C. truncatus* receives a **Medium (2)** in this category.

**Environmental Impact: D**

- 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.

**Environmental Impact Score: Medium (2)**

- 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 *Carpophilus truncatus*: Medium (12)**

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:** *Carpophilus truncatus* is established in Kings, Madera, Merced, and Stanislaus counties in the Central Valley. It 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:**

7) The final score is the consequences of the introduction score minus the post-entry distribution and survey information score: Medium (11)

### **Uncertainty:**

This beetle is likely more widely established in California. The limited reports used in this proposal are thanks to the efforts of University of California Cooperative Extension personnel (including Dr. Houston Wilson and Dr. Jhalendra Rijal) and cooperating counties. It may be confused with other *Carpophilus* species. The lack of reports of widespread, significant damage to almonds on trees in areas other than Australia and possibly California raises the possibility that this may be a complex of cryptic species with different behavior or that the behavior of this species may be dependent on some conditions present in Australia (and California?) and not elsewhere. The damage caused by this beetle could be confused with that caused by other pests. Lastly, the environmental impacts may be overestimated in this proposal because effective chemical treatments do not appear to have been identified, so the possibility of such treatments being triggered may be low.

## Conclusion and Rating Justification:

*Carpophilus truncatus* is a pest that is reported to impact (though unevenly on a geographic basis) almonds and walnuts. It is considered well-established in the Central Valley of California. For these reasons, a B rating is justified.

## References:

Brown, S. D. J. 2009. Molecular systematics and colour variation of *Carpophilus* species (Coleoptera: Nitidulidae) of the South Pacific. M.S. thesis. Lincoln University.

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California Department of Food and Agriculture. Pest and damage record database. Accessed October 4, 2023.

De Benedetta, F., Gargiulo, S., Miele, F., Figlioli, L., Innangi, M., Audisio, P., Nugnes, F., and Bernardo, U. 2022. The spread of *Carpophilus truncatus* is on the razor's edge between an outbreak and a pest invasion. Scientific Reports <https://doi.org/10.1038/s41598-022-23520-2>

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Hernández-Torres, H., García-Martínez, O., Romero-Nápoles, J., Sánchez-Valdez, V. M., Aguirre-Uribe, L. A., Sánchez-Peña, S. R. 2018. Escarabajos de la savia de Coahuila, México y atrayentes efectivos para su recolecta. Southwestern Entomologist 43:

Hossain, M. 2018. Management of *Carpophilus* beetle in almonds. Hort Innovation, Sydney, Australia.

Lasón, A. and Ghahari, H. 2013. A checklist of the Kateretidae and Nitidulidae of Iran (Coleoptera: Cucujoidea). Zootaxa 3746:101-122.

Powell, G. S. and Hamilton, M. L. 2019. Notes on the *Carpophilus* Stephens (Coleoptera: Nitidulidae) of Australia, with a new species from Victoria. Zootaxa 4701:192-196.

Šefrová, Z., Laštůvka, Z. 2005. Catalogue of alien animal species in the Czech Republic. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis 53:151-170.

Semeraro, L., Blacket, M. J., Rako, L., Cunningham, J. P. 2023. The pest sap beetle *Carpophilus (Myothorax) truncatus* Murray, 1864 (Coleoptera: Nitidulidae) – a new synonymy and a related new species of *Carpophilus*. Zootaxa 5301:051-074.

Süda, I. 2016. New woodland beetle species (Coleoptera) in Estonian fauna. Metsanduslikud Uurimused 64:51–69.

### Responsible Party:

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**\*Comment Period: 05/01/2024 – 06/15/2024**

### \*NOTE:

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at [permits\[@\]cdfa.ca.gov](mailto:permits[@]cdfa.ca.gov).

### Comment Format:

- ❖ Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

### Example Comment:

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to “Climate/Host Interaction” here.]

- ❖ Posted comments will not be able to be viewed immediately.

- ❖ Comments may not be posted if they:

Contain inappropriate language which is not germane to the pest rating proposal;

Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

Violates agency regulations prohibiting workplace violence, including threats.

- ❖ Comments may be edited prior to posting to ensure they are entirely germane.



- ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

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**Proposed Pest Rating: B**