Four New Palm Species Records for Rhynchophorus palmarum (Coleoptera: Curculionidae) in California

Authors: Hoddle, Mark S., Johansen, Gregory, Kast, Erich, Lopez, Angel M., and Shaw, Magen M.

Source: Florida Entomologist, 104(2) : 143-144

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/024.104.0212
Four new palm species records for *Rhynchophorus palmarum* (Coleoptera: Curculionidae) in California

Mark S. Hoddle¹ *, Gregory Johansen², Erich Kast³, Angel M. Lopez³, and Magen M. Shaw³

*Rhynchophorus palmarum* (L.) (Coleoptera: Curculionidae) is a destructive pest of palms (Arecaceae) that is native to parts of Mexico, Central, and South America, and the Caribbean. Larval feeding damage to the meristematic region of the palm may result in palm death (Milosavlević et al. 2019). In the native range, *R. palmarum* is a plant pathogenic nematode, *Bursaphelenchus cocophilus* (Cobb) (Aphelenchida: Parasitaphelenchidae), the causative agent of a lethal palm disorder, red ring disease (Griffith 1987; Gerber & Giblin-Davis 1990). *Rhynchophorus palmarum* was first detected in San Diego County, California, USA, in 2011. Populations established in San Ysidro, southern San Diego County, sometime around 2015. Founding populations in San Ysidro likely originated from Tijuana, Baja California, Mexico, about 5 km south of San Ysidro, where this pest was first detected in 2010 (Hoddle & Hoddle 2017). Tijuana populations probably resulted from a gradual northward migration of weevils that were first reported from infested Mexican fan palms, *Washingtonia robusta* Wendl. (Arecaceae), in Todos los Santos in Baja California Sur, Mexico, in Nov 2000, about 1,500 km south of Tijuana (García-Hernández et al. 2003). It is notable that *B. cocophilus* has not been detected yet in California (Hoddle & Hoddle 2017).

Known host palms for *R. palmarum* include *Cocos nucifera* L. (coconut), *Elaeis guineensis* Jacq. (African oil palm), *Euterpe edulis* Mart. (juçara, grown for hearts of palm), *Metroxylon sagu* Rottb. (true sago palm), *Phoenix canariensis* Chabaud (Canary Islands date palm), *Phoenix dactylifera* L. (edible date palm), and *W. robusta* (Mexican fan palm) (all Arecaceae). The European and Mediterranean Plant Protection Organization (EPPO) (2020) provides a comprehensive list of known palm hosts for *R. palmarum*. Adult *R. palmarum* feed on a variety of ripe fruit, including avocado (*Persea americana* Mill.; Lauraceae), banana (*Musa* spp. L.; Musaceae), Citrus spp. (Rutaceae), mango (*Mangifera indica* L.; Anacardiaceae), and papaya (*Carica papaya* L.; Caricaceae) (EPPO 2020). These fruits are not reproductive hosts and *R. palmarum* is not considered a significant economic pest of these crops.

The 4 palm species that dominate the urban landscape in California are *P. canariensis*, *Washingtonia filifera* (Lindl.) Wendl. (the native California fan palm), *W. robusta*, and *Syagrus romanzoffiana* (Cham.) Glassman (queen palm) (all Arecaceae). Collectively, depending on how land area calculations are made, these 4 species account for about 0.7 to 2% of the urban forest canopy in southern California (Hodel 1996). The only species of these 4 most common palm species known to have been attacked and killed by *R. palmarum* in California is *P. canariensis*, and an estimated 10,000 *P. canariensis* have been killed by this pest in San Diego County (APC 2020). Even though flight mill studies indicate this pest is a very strong flier, its rate of spread throughout the urban environment appears to be slow (Hoddle et al. 2020; 2021). One possible reason for slow spread is the high abundance and diversity of ornamental palm species, especially the highly preferred host, *P. canariensis*, growing in residential, recreational (e.g., parks), commercial (e.g., shopping malls), and riparian wilderness areas (e.g., natural area preserves that have wilding *P. canariensis*).

Balboa Park in San Diego County is a 486 ha (4.9 km²) urban park that is renowned for its garden spaces (https://en.wikipedia.org/wiki/Balboa_Park_(San_Diego)#Gardens) in which 43 palm species in 24 genera encompassing 2,353 individuals are a defining landscape feature. The 4 most common palm species in California’s urban landscape, *P. canariensis* (*n* = 213 specimens at Balboa Park), *W. filifera* (*n* = 25), *W. robusta* (*n* = 274), and *S. romanzoffiana* (*n* = 401) are curated at Balboa Park. Currently, Balboa Park is situated within the epicenter of the *R. palmarum* invasion in San Diego County and 34 *P. canariensis* (about 16%) on park grounds have been killed by this weevil. High levels of weevil activity within and around the park have resulted in a large unplanned field experiment that provides opportunities for the development of new associations between palm species that have no natural biogeographic or evolutionary association with *R. palmarum*. Exposures of this kind provide opportunities for *R. palmarum* to encounter and exploit new host species for reproduction.

In mid–2020 through early 2021, *R. palmarum*-induced mortality of 4 palm species that were previously unknown weevil hosts was observed at Balboa Park. The 4 palm species that succumbed to *R. palmarum* infestation were: (1) *Brachia edulis* Wendl. (Guadalupe palm [*n* = 3 palms killed – about 6% of planted specimens]), native to Guadalupe Island, Mexico (https://en.wikipedia.org/wiki/Brachia_edulis); (2) *Jubaea chilensis* (Molina) (Chilean wine palm [*n* = 4 palms killed – about 10%]), endemic to central Chile (https://en.wikipedia.org/wiki/Jubaea; (3) *Phoenix reclinata* Jacq. (Senegal palm [*n* = 2 palms killed – about 3%]), native to tropical Africa, the Arabian Peninsula, Madagascar, and the Comoro Islands (https://en.wikipedia.org/wiki/Phoenix_reclinata); and *Sabal bermudana* Bailey (all Arecaceae) (Bermuda palm) [*n* = 1 palm killed – about 17%], endemic to Bermuda (https://en.wikipedia.org/wiki/Sabal_bermudana). These observed mortality rates indicate that *P. canariensis* is the more highly preferred palm host species for attack by *R. palmarum*.

Infestation of these 4 palm species by *R. palmarum* was confirmed by collection of adult weevils, pupal cocoons, and larvae. Adult weevils were identified and confirmed as *R. palmarum* by the California Department of Food and Agriculture (Pest Detection Record Number: ⁵¹⁴)})

---

¹Department of Entomology, University of California, Riverside, California 92521, USA; E-mail: mark.hoddle@ucr.edu (M. S. H.)
²City of San Diego Parks and Recreation Department, 2125 Park Boulevard, San Diego, California 92101, USA; E-mail: gjohansen@sandiego.gov (G. J.), EKast@sandiego.gov (E. K.), AngelL@sandiego.gov (A. M. L.), mmshaw@sandiego.gov (M. M. S.)
*Corresponding author; E-mail: mark.hoddle@ucr.edu
Four palm species, previously unknown hosts for *Rhynchophorus palmarum* L. (Coleoptera: Curculionidae), were killed by this invasive palm weevil in Balboa Park, San Diego County, California, USA. The 4 new palm species recorded as reproductive hosts for *R. palmarum* for the first time are *Brahea edulis*, *Jubaea chilensis*, *Phoenix reclinata*, and *Sabal bermudana* (all *Arecaceae*). *Phoenix canariensis* Chabaud (*Arecaceae*) is the most highly attacked palm species at Balboa Park, and importantly, no attacks on the edible date palm, *Phoenix dactylifera* L. (*Arecaceae*), have been observed. The edible date industry is an important specialty crop in California that may be at risk from *R. palmarum*.

**Key Words:** *Brahea edulis*; invasive pest; *Jubaea chilensis*; palm; *Phoenix reclinata*; *Sabal bermudana*