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Mark Hoddle: Smiting weevils

Mark Hoddle's [research article](#) in this issue documents a major achievement in invasive species control — a successful eradication, in this case of the Asian palm weevil, *Rhynchophorus vulneratus*, from Laguna Beach.

Hoddle, a UC Riverside-based entomology specialist and director of the Center for Invasive Species Research (CISR), is now working to address another weevil infestation.

This time, the invader is *Rhynchophorus palmarum*, the South American palm weevil. Over decades, the insect has steadily increased its range northward in Mexico, enabled by abundant

plantings of Canary Island palms which the weevil infests in irrigated desert areas. These unnatural oases have provided stepping stones for the weevil through inhospitable habitat all the way to California.

The South American palm weevil was first found in the United States in

2011, just north of the border near San Diego. After that detection, a two-year, federally supported trapping program concluded that the infestation hadn't spread beyond San Diego and Imperial counties.

After 2013, funding for the trapping effort ran out, leaving no system for monitoring the weevil. After a visit to Tijuana last May, Hoddle found 125 weevil-killed palms in a day of driving around the city with a colleague from Tijuana. After this he decided to take matters into his own hands. The following month, he and his wife, Christina — also an entomology researcher at UC Riverside and a co-author on the research paper in this issue — began a family mission to assess the state of the infestation in California.

"We are spending a significant amount of our spare time trapping in San Diego," he said. They bring along their three-year-old son, Nicholas, who likes hunting for the satisfyingly large black weevils.

"It was easy to get him on board, because we are looking for super cool big beetles," said Hoddle, who grew up in New Zealand and has loved hunting for bugs since he was a small boy.

Because Canary Island palms are such a ubiquitous part of the California landscape, they could provide food for weevil invasion all the way up to Northern California. Laboratory tests Hoddle has conducted using "flight mills" — treadmills for

flying insects — have shown that the weevils have the potential to fly tens of miles in a day. The weevil is also known to carry a pathogen known as the red ring nematode which also infects the Canary Island palm, making weevil infestations particularly deadly. The nematode hasn't yet been found on the weevils trapped in the United States, but Hoddle says it's probably only a matter of time until it appears.

So far, the Hoddle family monitoring program hasn't found any South American palm weevils north of San Diego County. But the insect appears to be well-entrenched in some areas, such as the Sweetwater River Trail, a natural area near Bonita in San Diego County where many palms grow wild and unmanaged, amidst thickets of willows. Areas like this provide reservoirs for the weevil population to grow and spread into new areas. As one part of their monitoring effort, the Hoddles have assigned GPS coordinates to 300 trees in and near the Sweetwater River Trail area, and are monitoring them to better understand the dynamics of the weevil's spread. Hoddle will be using drone-mounted cameras to do regular monitoring of the trees in infested areas, many of which are difficult to reach.

Hoddle has been working with the California Department of Food and Agriculture (CDFA) to draw attention to the infestation, yielding media coverage all the way up to an [article](#) in the New York Times. People finding a South American palm weevil



The South American palm weevil, *Rhynchophorus palmarum* (actual size), infests the Canary Island palm, a common landscape tree in California.



UC Riverside entomology specialist Mark Hoddle and his son, Nicholas, set weevil traps along the Sweetwater River Trail in San Diego County, a natural area where weevils have infested many unmanaged Canary Island palms.

are encouraged to report it via a dedicated [CISR website](http://cizr.ucr.edu/palmarum.html). More information on this pest and the invasion can be found at <http://cizr.ucr.edu/palmarum.html>.

There's currently no public funding for monitoring or controlling the weevil, however. Federal support likely won't be available until the adoption of the next Farm Bill, currently slated for 2018. Hoddle is also applying for funding through the CDFA Specialty Crop grant program, and plans to apply for research funding from UC Agriculture and Natural Resources.

While Hoddle radiates positive energy, he's also distinctly realistic about the prospects for eradicating the South American

palm weevil, given the large population in Tijuana, its flying ability, and the extent of the invasion already in the San Diego area. In the future, he said, control strategies may turn to defending selected, high-value trees using systemic insecticides that can kill weevil larvae. In Spain, he said, where the red palm weevil — native to Southeast Asia and a close relative of the South American palm weevil — are well-established, ornamental Canary Island date palms in public areas are commonly fitted with showerhead-type applicators that douse a tree with insecticide every few months. [CA](#)

— Jim Downing

Research news

Research to policy: Enabling oak woodland restoration

California black oak and Oregon white oak woodlands throughout California have been shrinking due to decades of [conifer encroachment](#), which has led to a loss of wildlife habitat, biodiversity and grazing land.

Many years of fire suppression have created conditions that enable conifers to invade oak woodlands. Slowing the process of encroachment is difficult, as trees need to be removed manually, which is expensive. Additionally, landowners have been hindered in removing conifers from oak woodlands by California's Forest Practice Rules, which require that owners replant conifer trees after harvesting trees even when the goal is to promote oak restoration.

A collection of policy changes adopted last year make it significantly easier for California landowners to manage this type of conifer encroachment. [AB 1958](#), authored by Assemblymember Jim Wood (D-Healdsburg), removes permitting hurdles for removing small-diameter conifers from oak woodlands

on a 7-year pilot-test basis starting January 1, 2018. Separately, the state Board of Forestry established a new timber-harvest rule for oak woodland restoration projects, effective January 2017, that allows landowners to remove conifers that have encroached on Oregon white and California black oak woodlands.

"AB 1958, developed with the expertise of UC Cooperative

Extension, allows private land owners to manage their land and preserve these valuable oak habitats," said Wood. "It's a great step forward in responsibly managing our environment."

UC Cooperative Extension (UCCE) worked directly with the Board of Forestry, the California legislature and interested stakeholders to facilitate these changes. UCCE also helped establish the scientific basis for the new rules by documenting the degree and nature of the encroachment in a [three-year study](#) completed in 2016. Under a UC Agriculture and Natural Resources competitive grant, UCCE Humboldt County director and forest advisor Yana Valachovic led a broad team of researchers that included area fire advisor Lenya Quinn-Davidson, UC Berkeley-based specialists Rick Standiford and Maggi Kelly and professor Matthew Potts, along with private landowners and collaborators from Humboldt State University and government agencies.

"This is an exciting time for oaks and it has been great to help create science-based policy," said Valachovic. "I am grateful for UC's support. This much-needed scientific assessment has helped to develop awareness of these important habitat types in need of restoration."

The team evaluated the impact and extent of Douglas-fir encroachment in 10 oak sites across Humboldt and Mendocino counties, and documented the age structure and tree health of these oak stands. The team learned that most of the encroachment began after 1940 and that the oaks are much older than the Douglas-fir trees. The researchers also studied factors that influenced encroachment, such as climate and moisture, and mapped oak woodlands and compared them to historic photos. The data collected directly informed and gave confidence to the policy-makers working on the rule changes. [CA](#)

—Debbie Thompson

UC and UCCE research on the impact of conifer encroachment helped facilitate policy changes that make it easier for California landowners to remove conifers from oak woodlands.

