

Miconia foes gather to share strategies

Kia'i Moku

By Lloyd Loope and Adia White



When it comes to quickly-spreading invasive plants, *Miconia calvescens* is the cheetah of weeds. Once miconia invades, the forest understory withers under the shade of its three-foot purple leaves. From introduction in 1937 of just two trees to a Tahitian botanical garden, miconia came to dominate 70% of the island's rainforest and pushed 40-50 endemic plant species to the brink of extinction in just 55 years.

Since Hawaii's miconia problem was widely realized about 1992, four Hawaiian Islands (Maui, Hawaii, Oahu, and Kauai) have developed programs to eliminate this enormous threat to biodiversity and watersheds.

Meanwhile, miconia has continued to spread in French Polynesia and surfaced in other vulnerable locations.

In early May, Maui Invasive Species Committee hosted an International Miconia Conference, with the theme "Pulling It All Together," to address such questions as "Is miconia really as potentially damaging as we say it is?" and "How can we sustainably contain miconia?"

Scientists and land managers dedicated to stopping the miconia invasion came from Australia, French Polynesia, New Caledonia, Brazil, Costa Rica, Canada, Ecuador, California, Florida, and Hawaii. They discussed the biology, impacts, management, and potential biological control agents of miconia. Information shared at the conference verified the threat miconia poses and suggested potential refinements for strategies controlling it.

Dr. Tom Giambelluca from University of Hawaii presented initial findings from his research team's analysis of miconia's impact on watersheds. A remarkable new twist they found was that raindrops falling from the huge leaves of miconia canopies reached the largest raindrop size ever recorded-- 50% larger in diameter (at 5.5mm) than



Maui Invasive Species Committee photo

drops from ordinary forest canopies. Larger raindrops hit the bare soil under a miconia canopy with great momentum, contributing to soil compaction, increased runoff and erosion.

Miconia's notorious reputation has motivated New Caledonia and Australia to put this weed at the top of their invasive plant priority list. Miconia was brought to New Caledonia, probably from Tahiti, in the 1970's by a plant connoisseur who considered it "harmless." The invasion was discovered a few years ago, by which time it covered 300 acres. A major public education and control campaign is now underway.

In northern Queensland, Australia, three infestations of 1000's of plants cover over 25 acres of land and 20 smaller infestations (100's of plants) cover a smaller area. In contrast, on Maui last year, crews removed more than 80,000 plants and surveyed more than 35,000 acres. Australia has a rigorous research program underway, including a modeling effort that holds promise for assisting with formulating management approaches elsewhere. In Australia, poisonous insects, stinging plants, and snakes complicate removal of miconia. We're lucky those species haven't been introduced here!

When Professors Robert Barreto (Brazil) and Paul Hanson (Costa Rica) were taken on a

field trip into the original "miconia core area" of East Maui forest, they were impressed by how dominant miconia can be. In the native range of miconia in Central and South America, many pathogens and insects attack miconia leaves, branches, and/or fruits. Due in part to such natural enemies, miconia grows sparingly in the forest without dominating the landscape. Barreto and Hanson reported on 10-15 years of researching potential biocontrol pathogens and insects of this weed tree.

One biocontrol pathogen, originally discovered by Barreto and students, released in Tahiti in 2000, is proving effective at increasing sunlight through the dense miconia forest canopies, allowing some endangered plant recovery. Testing of other potential biocontrol agents is underway. Tracy Johnson of U.S. Forest Service and Darcy Oishi of Hawaii Department of Agriculture estimate that promising new biocontrol agents could be released and carefully monitored in Hawaii over the next 5-20 years, given adequate funding. If all goes well, the miconia containment program could undergo a gradual transition from manual and chemical control to biocontrol, providing an enormous economic benefit.

The conference provided a unique opportunity for miconia professionals to share knowl-



Photo courtesy of The Nature Conservancy of Hawaii

Above: Road construction in the early 1980s and the ecological effects of miconia contributed to serious landslides in Tahiti. A tunnel was used to complete the road through the pass.

Left: Paul Hanson (left) and Alec McClay have studied miconia in Central and South America. Hanson has a doctorate in entomology and McClay is a doctor of zoology. They were photographed as they entered the "miconia core area" of East Maui during a field trip at the International Miconia Conference. Also visible in this picture are (from rear) Maui Invasive Species Committee member Sam Akoi III (with backpack, Chelsea Arnott of the Oahu Invasive Species Committee and volunteer Richard McPherson.

edge and strengthen collective resolve to contain the weed infamous for sprinting across the landscape. Proceedings will be posted later this year at

www.hear.org/conferences/miconia2009.

This conference allowed a free-wheeling meeting of the minds of scientists, managers and control crew that provided ample intellectual food for thought and action. The international collaboration to stop the miconia invasion is a true testament to any burden being easier when shared.

- "Kia'i Moku," (*Guarding the Island*) is prepared by the Maui Invasive Species Committee to provide information on protecting the island from invasive plants and animals that can threaten the island's environment, economy and quality of life. This month's article was co-authored by Lloyd Loope and Adia White. Loope is a research scientist with the U.S. Geological Survey stationed at the Haleakala Field Station. He holds a doctorate in botany from Duke University and is an active member of the Maui Invasive Species Committee. Whit is an AmerCorps Hawaii intern with MISC. She is a 2007 Seabury Hall graduate who will be a sophomore at the University of Puget Sound in Tacoma, Wash.