

ABSTRACT

Asian cycad scale (ACS), *Aulacaspis yasumatsui*, was first detected in Tumon, Guam in December 2003 in front of a hotel where *Cycas revoluta*, an introduced ornamental cycad and *Cycas micronesica*, an indigenous cycad were planted. The scale is believed to have been imported from Hawaii in 1998 on ornamental cycads. The scale currently infests introduced and indigenous cycads on about two thirds of Guam's 354 square kilometers. Severe infestations have been observed to kill both species within a few months. We fear that *C. micronesica* may be threatened with extinction should the scale spread to the few other Micronesian islands that harbor it.

Rhizobius lophanthae, a coccinellid introduced to Hawaii in 1894 for other scale insects, was imported from Maui to Guam in November 2004 and released on *C. micronesica* at the Guam National Wildlife Refuge at Ritidian point in February 2005. *R. lophanthae* populations have subsequently spread to other *C. micronesica*, and additional releases have been made throughout the island. However, *R. lophanthae* alone will not likely contain the infestation.

A Chinese strain of *Coccobius fulvus*, a hymenopteran parasitoid originating in Thailand and China, has recently been imported from Florida. Funds are being sought for exploration for additional biocontrol agents in Asia. IPM strategies using systemic insecticides applied to pruned cycad boles are also being developed.



Cycas micronesica is endemic to the Mariana Islands and is the most common tree species (DBH > 10 cm) on Guam with 1.5 million trees. All are at risk.



Male and female ACS cover the underside of leaves and reproductive organs of *Cycas micronesica*, locally known as "fadang."



Cycas revoluta becomes increasingly stunted with each regrowth of leaves and usually dies within one year if left untreated.

Too Little and Too Late????

Rhizobius lophanthae introduced against Asian cycad scale, *Aulacaspis yasumatsui*, on Guam

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Before Asian cycad scale arrived, cycads were the perfect low maintenance plants for Guam, being typhoon resistant and drought tolerant. Cycads are now high maintenance plants. Mortality of heavily infested, untreated *Cycas revoluta* and *Cycas micronesica* (shown above) is 100%.



Rhizobius lophanthae, a coccinellid obtained from Maui, Hawaii has been mass reared, released and redistributed throughout Guam. Predation rates approach 100% on some infested plants as monitored by counts of destroyed scales.

Asian Cycad Scale (ACS) Chronology

1972 – *Aulacaspis yasumatsui* described in Thailand

1996 – ACS detected in Florida

1998 – ACS detected in Hawaii

2003 – ACS detected on cycads used for landscaping in Guam's Tumon Bay hotel district

2004 – ACS spreads to *Cycas revoluta* and *C. micronesica* (fadang) throughout Guam

2005 – *Rhizobius lophanthae* and *Coccobius fulvus* released on Guam; Plans made to preserve *C. micronesica* germplasm from Guam on the nearby island of Tinian

Asian Cycad Scale Management

Biological Control Agents on Guam

Rhizobius lophanthae

- Introduced in Hawaii in 1894; Guam ??? 1930s
 - Adults collected on Maui Nov. 2004 by Hawaiian Department of Agriculture
 - Laboratory colonies established at UOG
 - Released at Ritidian Point on northern Guam in February 2005
 - Redistribution on Guam – April 2005 - present
- Coccobius fulvus***
Chinese strain from Florida released on Guam July 2005

Cultural Control

Replace cycads with less susceptible plants (avoid *Cycas*, *Stangeria*, *Dioon*, *Encephalartos* and *Microcycas*)

Chemical Control

Foliar spray with oil
Insect growth regulators & neonicotinoids
Systemic insecticides

Regulation of Movement of Cycads among Islands Within Micronesia

Cooperation with
USDA-APHIS, ARS
Secretariat of the Pacific Community (SPC)
and Micronesian Island PPQ Departments in

Guam
Republic of Palau
Republic of the Marshall Islands
Federated States of Micronesia
Commonwealth of the Northern Marianas



Release sites for *Rhizobius lophanthae* on Guam.