

Cycads threatened by invasive pest

The IUCN/SSC Cycad Specialist Group – Subgroup on Invasive Pests was formed in June 2005 to address the emerging threat to wild cycad populations from pests and pathogens. Of most pressing concern is the cycad aulacaspis scale (CAS) *Aulacaspis yasumatsui* Takagi, also known as the Asian cycad scale or sago palm scale. This aggressive pest is currently threatening two species of cycad – *Cycas micronesica* in Guam and *C. taitungensis* in Taiwan – with extinction in the wild, and most other species outside the natural range of CAS are also at risk.

In September 2005 the CSG Subgroup released a report and an accompanying pest alert notification on CAS, both of which were updated in November. The report includes recommendations on prevention and control measures, and case studies of CAS outbreaks.

The native distribution of CAS extends from the Andaman Islands across to Vietnam, and includes Thailand and probably Cambodia, Laos, peninsular Malaysia, Myanmar, southernmost China, and possibly India. The pest is spread via plants transported for cultivation, the three main user groups being botanic gardens, the commercial nursery industry and private collectors. In low numbers, the pest may be difficult to detect on imported cycads as it may be hidden away in roots and stems; however, badly infested plants appear to have whitewashed or snow-covered leaves, as they are covered in white scales. The pest's continuous removal of sap causes wilting of the leaves and the eventual death of the plant.

The first known outbreak of CAS outside its natural range occurred at the Bogor Botanic Garden in Java in the late 1980s, but because it was not widely publicised, no warning was given to avoid future outbreaks. In 1995, the

second known outbreak occurred in south Florida, possibly originating from plants collected in Vietnam. Since Florida is a major center of the commercial plant industry in the United States, the pest spread quickly to other parts of the country. A third case occurred in China in the mid 1990s, when wholesale quantities of *Cycas inermis* were imported from southern Vietnam to two botanic gardens in China.

CAS has since spread to several islands in the Caribbean, as well as Hawaii, Hong Kong and Singapore. In 2000 it was introduced through an unknown channel into northern Taiwan, where it killed 110 000 nursery cycads in its first year, and in 2004 invaded the Taitung Cycad Nature Reserve in the south. In late 2003 it was detected on cycads planted near hotels in Guam, where it is spreading rapidly, threatening the wild population of 1.5 million trees.

Biological control offers the most cost- and labour-effective method of controlling scale insect infestations, and a number of predatory beetles and parasitoid wasps are already being used as biocontrol agents, or have been identified as potential candidates. The ladybird beetle *Rhyzobius lophanthae* – a native of Australia – has been successfully used as a biocontrol agent in Hawaii, and since February 2005 has been released in Guam, where it seems to be spreading and taking hold. The predatory beetle *Cybocephalus nipponicus*, which has been shown to be successful in Florida providing it is re-released periodically, has been released in Taiwan since October 2005.

This article was compiled from the CSG Subgroup on Invasive Pests' report and recommendations on CAS. The full report and accompanying pest alert notification can be downloaded from: <http://www.iucn.org/themes/ssc/sgs/csg/pages/CAS.htm>. Additional information was obtained from the ISSG Global Invasive Species Database: <http://www.issg.org/database>

BELOW: Dead and dying *Cycas micronesica* on Guam. Photo: Anne Brooke, US Fish and Wildlife Service

INSET: CAS-infested *Cycas revoluta*. Photo: Holly Glenn, University of Florida Tropical Research & Education Center

