Invasive Insects: Risks and Pathways Project

CYCAD AULACASPIS SCALE

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Invasive insects are a huge biosecurity challenge. We profile some of the most harmful insect invaders overseas to show why we must keep them out of Australia.

Species

Cycad aulacaspis scale / *Aulacaspis yasumatsui*. Also known as Asian cycad scale.

Main impacts

Decimates wild cycad populations, kills cultivated cycads.

Native range

Thailand.

Invasive range

China, Taiwan, Singapore, Indonesia, Guam, United States, Caribbean Islands, Mexico, France, Ivory Coast[1,2]. Detected in New Zealand in 2004, but eradicated.[2]

Main pathways of global spread

As a contaminant of traded nursery material (cycads and cycad foliage).[3]

WHAT TO LOOK OUT FOR

The adult female cycad aulacaspis scale has a white cover (scale), 1.2–1.6 mm long, variable in shape and sometimes translucent enough to see the orange insect with its orange eggs beneath. The scale of the male is white and elongate, 0.5–0.6 mm long.

Photo: Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org | CC BY 3.0

ENVIRONMENTAL IMPACTS OVERSEAS

The cycad aulacaspis scale has decimated cycads on Guam since it appeared there in 2003. The affected species, *Cycas micronesica*, was once the most common tree on Guam, but was listed by the IUCN as endangered in 2006 following attacks by three insect pests, of which this scale is the worst[4]. A reference population declined from 686 plants prior to the cycad reaching it to 87 individuals just three years later[5]. In 2010 a Taiwanese cycad, *Cycas taitungensis*, was also listed by the IUCN as endangered because of this scale[6], and scientists have written of its 'imminent extinction'[7]. After the scale appeared in Florida in 1996, cycads in a botanical garden suffered attacks that threatened the survival of several rare and endangered species in its collection[8].

The cycad aulacaspis scale attacks species in all three cycad families, and has been recorded on plants from eight of ten cycad genera[1,9]. There are concerns it will cause cycad extinctions around the world, including in India[10] and Indonesia[11]. The continuous removal of plant sap by the scale depletes cycads of carbohydrates[4,9]. Highly infested cycads become almost completely coated with a white crust (as if covered in snow) made up of the scales (protective waxy coverings) of live and dead insects[8]. Once established, the scale is 'unusually difficult' to control[9].

HUMAN AND ECONOMIC IMPACTS OVERSEAS

Cycads are important ornamental plants, and unsightly infections in gardens and deaths in nurseries are problems for the gardening industry. In one of the world's leading exporters of cycads, a nursery in Taiwan, 100,000 cycads were destroyed by an outbreak of the scale[7]. It is difficult to control in cultivation because of high fecundity, and because it infests roots, where it escapes insecticides.

AUSTRALIAN CONCERNS

The broad host range of the cycad aulacaspis scale suggests that all of Australia's cycad species could be at risk. Australia has a very diverse, mostly endemic, cycad flora, with many species inherently vulnerable to extinction due to their small populations. They include six cycads listed as nationally endangered (two *Cycas* and two *Macrozamia* species) and eight listed as vulnerable (three *Cycas*, five *Macrozamia*)[12]. Additional

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Cycad scale on sago palm leaf. Photo: Scot Nelson

species are listed as threatened in Queensland and New South Wales. The cycad aulacaspis scale could cause extinctions even without killing plants if it sends populations into permanent decline by reducing their seed output and seedling vigour. In Florida, one of the cultivated cycads attacked by the scale is an Australian species (*Cycas media*)[8].

The scale has wide climatic tolerances, judging by its success in locations as varied as Singapore, France, Taiwan and Texas. Climatic modelling indicates that much of Australia, including in eastern Queensland, which is rich in cycad species, is suitable[1].

Australia allows the importation of cycad foliage for the florist trade from all countries, subject to fumigation[13]. In 2015 the Interim Inspector-General of Biosecurity examined the effectiveness of biosecurity for imported flowers and foliage and found that some staff weren't inspecting imports at the required rate, some insects were surviving fumigation, and some flower boxes had ventilation holes that pests could escape through before treatment[13]. In France the scale was detected on cycad foliage imported from Africa[2].

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ABOUT THIS PROJECT

The Invasive Insects: Risks and Pathways Project is a partnership between Monash University and the Invasive Species Council. To find out more visit invasives.org.au/risks-and-pathways.