

Progress in controlling cycad scale in Miami, April 1997

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The cycad aulacaspis scale, *Aulacaspis yasumatsui* Takagi, has spread throughout a large area of southern Miami, attacking cycads grown as ornamental plants. The species was originally described on cycads in Southeast Asia (Takagi 1977) and was probably accidentally introduced into Florida. So far, the cycad aulacaspis scale has been observed only on plants of the cycad family (Cycadaceae).

We have initiated a research project to elucidate the bionomics of this insect and develop pest management methods for it. Our long-range objective is to develop an integrated pest management technique incorporating biological, cultural and other control tactics. A more urgent objective is to find chemical control methods that can bring the cycad aulacaspis scale under control as soon as possible. Thus, the first phase of our project involves evaluating the effectiveness of different pesticides for controlling it.

We conducted the first test of chemicals against cycad aulacaspis scale from December 1996 to the end of March 1997, and are currently conducting a second test with some additional chemicals. The tests are being conducted within the infested area. A complete report of the results will be made when the second test is completed. Thus far, we have obtained encouraging results with methidathion, imidacloprid and a combination of garlic oil and fish oil emulsion.

Methidathion, marketed as Supracide by Novartis Crop Protection (formerly Ciba-Geigy), is a systemic insecticide known to be effective against many scales, including magnolia white scale, *Pseudaulacaspis cockerellii*, on cycads (Howard 1989). We sprayed methidathion on cycads that were highly infested with cycad aulacaspis scale and left others untreated for comparison. Samples observed 20 days after the application revealed that the treatment killed almost 100% of the mature females and eggs of the cycad aulacaspis scale.

Imidacloprid, marketed as Merit, Marathon, and Premise for various uses is manufactured by Bayer. It is a unique compound that has extremely low mammalian toxicity. Advantage, also made by Bayer and applied to dogs and cats for flea control, contains imidacloprid as an active ingredient. We applied imidacloprid to cycads by slowly denching it into the plant's root zone. Imidacloprid is known to be taken up slowly by plants. In our test, it completely prevented crawlers (recently hatched immature) of cycad aulacaspis scale from becoming established on the plant. Treated plants remained free of the scale after more than 14 weeks of exposure to the scale insect infestations. Different results may be anticipated under different conditions. For example, scale insect activity is generally more intense in summer, and thus could be harder to control at that time. We do not yet have data indicating the effect of imidacloprid on adult scale insects.

We have had encouraging results with a mixture of Garlic Barrier AG, an insect repellent made by Garlic Research Labs of Glendale, California, and Crocker's Fish Oil, a sticker-spreader distributed

by the same company. These are natural products with low mammalian toxicity. Applied as a foliar spray to cycads, this mixture appears to curtail the establishment of the crawlers of the cycad aulacaspis scale and has the advantage of being relatively benign to the environment. However, further tests are necessary to show conclusively that it controls the scale insect.

The [cycad aulacaspis scale](#) is in the group known as armored scale insects ((Diaspididae) Fig. 2). The insects in this group are usually about 1 millimeter long at maturity, i. e., smaller than "soft" scale insects (Coccidae). First stage "crawlers" crawl over the host plant seeking sites to settle. There are sometimes tremendous numbers of crawlers, and because they are light and buoyant in air, many are carried by air currents and thus spread to new host plants. Once a crawler settles, it begins to produce a shell-like waxy scale over its body. When females become mature, they remain beneath the scale. Males emerge from their scales and fly until they mate with a female. The eggs produced by the female accumulate beneath the scale. Crawlers that hatch from the eggs remain for a time beneath the scale and then wander out over the plant surface.

The scale provides protection and a stable environment for the insect living beneath it. For this reason, contact insecticides are rarely effective against mature scale insects, but can be used to control crawlers if timed to their emergence. This is most effective in temperate regions where in some species there is pronounced seasonal emergence of crawlers. Systemic insecticides, including methidathion and imidacloprid, have the advantage that they circulate in the sap stream. Scale insects take up these insecticides as they imbibe sap.

The effect of insecticides on scale insects is sometimes difficult to evaluate. The scales of many species of armored scale insects are cemented firmly to the plant surface, so that even after the insect has been killed the scale remains for long periods. Additionally, mature scale insects are legless, wingless and immobile. The results are that even if an insecticide is effective, the plant may remain covered with scales for a prolonged period, and if the scale is lifted to observe the insect beneath it, dead scale insects may appear to be alive. For this reason, we make observations to evaluate the effectiveness of insecticides on scale insects at least two weeks after the application. Scales are lifted with a needle and the female observed under a stereoscopic microscope, which we feel enables more reliable observations than a 10X hand lens. Live female cycad aulacaspis scale insects are turgid, pale yellow to orange, and glistening. Dead scale insects become deflated then shriveled, and eventually parchmentlike. Older insect carcasses are yellow to dark brown and brittle.

Use pesticides safely. Always read and follow label directions. This article is a progress report on research only. Mention of a proprietary product does not constitute endorsement of recommendation for its use by the University of Florida.

References cited:

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