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Leader : Kerry Rathie, Lot 5, Salston Road, Greenbank 4124.
'phone : (07) 3200 0268
Email : krathie6@bigpond.com

Cycad Pests & Diseases : (1) Around February 2004 I visited a commercial cycad nursery on the Sunshine Coast which had just had a major visitation by the Cycad Blue butterfly, Theclinesthes onycha . I knew this existed but had no previous experience with it. The small reddish-brown (other colours exist ; see the text following) caterpillars had given a great chewing to a wide range of young cycad seedlings, including members of the genera Cycas, Macrozamia & Dioon. They don't seem to like Lepidozamia. A few of the small brown-&-blue butterflies were still on hand. The usual contact insecticides like Malathion control the larvae, as would things like Confidor. The attached article is from 'Butterflies of Australia' by Braby, which I then included in newsletter no. 88 , & now repeat.

Since that time, the butterfly has spread widely, including greater Brisbane & the Gold & Sunshine coasts. At my place it has killed a few seedlings near the house that I see frequently, so as I spray whenever I see the butterflies or their larvae, they can kill in a couple of days. I still have 70-plus mature Macrozamia mooreis in a back paddock, with trunks between 1 & 3.2 m tall, & each with dozens of 2 m fronds, so spraying them is more of a chore. I was ill recently for several weeks, with a relapse of Ross River Fever, & neglected them, & had several trees attacked, one so badly it has lost all leaves & is probably dead (hard to be sure with any cycad that still has firm tissue). None of these big cycads was flushing new leaves at the time, & the larvae had tunnelled among the leaf bases & adjacent crown tissue, detaching the fronds at the base.

In some places around Brisbane & the coasts, I have seen great devastation among cycads. It has been suggested that the S-E Qld. strain of *Theclinesthes onycha* , present in the wild in small numbers, only attacked *Macrozamia & Lepidozamia,* & appeared to only attack new leaves. In northern Qld. the local strain always attacked *Cycas,* & now attacks other genera, & it seems it has now migrated south, probably on plants from N. Qld. It certainly attacks Australian & exotic *Cycas* species, as well as *Dioon, Encephalartos & Stangeria*, & seems to prefer these to *Lepidozamia.* I am not sure about *Bowenia,* as they tend to die down spontaneously in dry &/or cold times anyway.

(2) A second less severe cycad pest I also mentioned in newsletter no. 88 in 2004. My big Macrozamia mooreis arrived as bare caudices, with all leaves & roots removed by chainsaw. All were saturated in Diazinon very soon after arrival, which should have killed any adult insects as well as larvae. Some of these coned soon after planting, & in several cases the new short fronds showed signs of attack, & some browning off. One plant later died. The apparent cause was weevils of the genus Tranes, which appear to 'hatch' as adults once the cycads cone. Either eggs or pupae must be able to lie dormant for months to a couple of years, as some caudices do not sprout leaves, or cone, for up to 2 years (or, in rare cases, longer). Can they detect chemicals secreted by the cones? I suspect so. The larvae chew the axis of male cones , in particular, & then pupate. They are probably the main pollinator in the wild : see for instance the 1994 article (Biotropica 26: 2:217-222) by Forster, Machin, Mound & Wilson. In plants with their full complement of leaves & roots, the weevils probably cause no damage of any note. Spraying with Diazinon has controlled them. I presume the timing of the first proper (a few cut fronds may also extrude a short length of frond, doubtless the base of a new leaf) leaf flush, & the average length of leaves (either a little less than usual, or a lot less), depends primarily on the plant's reserves of energy after removal & 'trimming'.

(3) Chemicals to control the above pests. One acquaintance, with just a few cycads, does a daily walk among them with a squash raquet, slaying the butterflies on the wing. Would not work with my big cycads, as most hide among the leaves until sprayed. I presume very frequent spraying with contact insecticides like Malathion would work, but be impractical. Two of my cycad wholesaler friends recommend using the 2 relatively new insecticides, Procide 80 SC & Crown, both marketed in Australia & the US by Scotts (www.scottsasiapacific.com), & used in rotation to avoid premature insecticide resistance buildup. Both are relatively benign for humans, but take the usual precautions. Both are expensive, for what you get, in retail packs, & a litre pack does a lot but may be $200 or so. Procide (sometimes sold as; 'Bugs be gone') is a very fast acting contact insecticide with some residual properties, & is a synthetic pyrethroid which is light stable & supposed to stay active for 2 weeks, presumably if not rained on heavily. It has miticide activity also, due to addition of Bifenthrin if my memory serves me.

Crown is a systemic insecticide based on a nicotine derivative (acetimide?), & acts faster than Confidor, which I had been mainly using, & so kills the grubs earlier. Originally Confidor was marketed just as a surface (knockdown) spray, & then it was found to be systemic also, but what the maker still never tells you is that the systemic action is only by root uptake, which is slow. Crown is absorbed by leaves & by roots, like Rogor. Rogor still works well, but I prefer to avoid members of that family (organophosphates) because of their possible effects on humans ; most of the others are worse. DDT, Dieldrin & their relatives are now all banned for horticulture, as they take decades to break down & are easily detected. A pity, as they are very effective, & as a group are remarkably harmless to all mammals. The U.S. should have been charged with genocide for preventing their use for over 20 years in the third world, (& selling less effective & much dearer alternatives), directly causing an easily preventable 500,000 deaths a year from malaria alone. It looks as if this catastrophic & self-serving decision may soon be reversed.
(4)I don't think this pest is attacking my cycads, but in 2004 found some grasstrees slowly declining, with some leaves dying, others going brown, & no obvious pest. Ex-DPI horticultural pest expert, David Hockings, told me the likely culprit was Banana Weevil Borer, or a close relative. A spray of Chlor Pyrifos seems to have done the trick, but I have used Rogor also, to be sure. I have since heard of other cases. I presume Crown would work well here also.

Best wishes to all, & may those of you in drought areas get the rain you so badly need. As I type this (10-6-07) I hear on the news of the 100-year floods around Newcastle & the Hunter Valley, & good rain over southern NSW & much of Victoria, but in S-E Qld. it has only gone 20 or so km inland round here, although it has rained enough on part of the Darling Downs for winter crops to now be sown (after 2 to 3 years of total crop failures in most areas) in some areas. That rain belt slid north, & watered the Sunshine Coast, which has been consistently wetter than Brisbane-&-S-to-the -border over the last 5 years. Still desperately dry here, & Brisbane's water supply is down below 20% of full ; enough to last until Christmas. Proposed pipelines from the north look unlikely to be finished in time, unless we get normal summer rains, which usually start in October, & have been non-existent for 2 years, & low for eight years before that.