

Pests of *Elaeocarpus joga* in Guam

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The yoga tree, *Elaeocarpus joga* Merrill (Elaeocarpaceae) is endemic to Guam and Rota in the Mariana Islands. We have been conducting a survey of the pests of *E. joga* in Guam, and have previously reported on a psyllid and two thrips (Muniappan et al. 2000a, b). In this paper we report an additional ten pests that attack this tree in Guam, five of which are exotic. We also report on the natural enemies of two of the caterpillar pests.

The black citrus aphid, *Toxoptera aurantii* (Boyer de Fonscolombe) (Homoptera: Aphididae) is found mostly on tender stems of *E. joga*. It can be found at any time of the year, but we have never found it to be epidemic or to cause appreciable damage. This aphid has been recorded on *Annona muricata* L., *Citrus limon* L., *Citrus madurensis* Lour., and *Coffea arabica* L. in Guam (Pike et al. 2000). It is widely distributed throughout the tropics. It occasionally transmits tristeza disease of citrus, a virus disease causing leaf mottle (citrus infectious mottling virus) on *Citrus vulgaris* Risso, and little leaf and lemon ribbing virus of lemon. It also transmits two viruses of coffee, blister spot of arabica coffee and ring spot of excelsa coffee (Heinze 1977).

A mealybug, *Pseudococcus* nr. *microadonidum* Beardsley (Homoptera: Pseudococcidae) has been found feeding on the foliage of *E. joga*. This mealybug was sometimes found in the domatia of yoga leaves. It has been recorded on coconut, banana, and pandanus from Kiribati, Pohnpei, and Marshall Islands. This insect is a new record [JL1] on yoga and for Guam. As with the citrus aphid, there is little likelihood that this insect is a serious threat to the general health of the yoga tree population.

The armored scale, *Lepidosaphes rubrovittata* Cockerell (Homoptera: Diaspididae) was found feeding on leaves of *E. joga*. It has been reported from the Philippines, Rota, Guam, and Palau (Beardsley 1966, 1975), and is known to attack *Cycas* sp., *Eugenia javanica* Lam., and guava in Micronesia and okra, fern, citrus, and mango in the Philippines (Esguerra & Gabriel 1969).

The Indian wax scale, *Ceroplastes ceriferus* (Fabricius) (Homoptera: Coccidae) feeds on tender stems of *E. joga*. It is distributed in the USA, India, Indonesia, Japan, Fiji, Panama, Puerto Rico, and Virgin Islands (Gimpel et al.

1974). It was reported on *Ficus* sp. in Guam in 1982 (Schreiner & Nafus 1986) and on an unidentified vine in Palau (Beardsley 1966, 1975). We have also found it to attack neem, banana, rambutan, citrus, star apple, and seneguelas in Guam. Infestations of this scale were found on tender stems of the host plants except on banana, where it was found on the leaf midrib, peduncle, and unripe fruit.

The other scale insects reported on *Elaeocarpus* species from the South Pacific include *Coccus hesperidum* L. (Coccidae) in Fiji, *Eucalymnatus tessellatus* (Signoret) (Coccidae) in the Cook Islands, and *Milviscutulus mangiferae* (Green) comb. (Coccidae) in Papua New Guinea. *Icerya seychellarum* (Westwood) (Margarodidae) was reported on an *Elaeocarpus* species in the Cook Islands; and the armored scale, *Hemiberlesia lataniae* (Signoret) (diaspididae) was reported on an *Elaeocarpus* species in Tonga (William & Watson 1988, 1990).

The six spotted spider mite, *Eotetranychus sexmaculatus* (Riley) (Prostigmata: Tetranychidae) feeds on the lower surface of *E. joga* leaves. It is known to occur in Australia, China, Hawaii, India, Iraq, Japan, Korea, New Zealand, Okinawa, Taiwan, and the USA (Jeppson et al. 1975). This is a first report of occurrence of this mite on yoga and in Guam. This mite is known to attack many fruit trees such as citrus, avocado, guava and shrubs (Jeppson et al. 1975).

The caterpillars of *Adoxophyes* sp. probably *liberalis* Meyrick (Lepidoptera: Tortricidae) feed on the tender leaves of *E. joga* by webbing them. The damage caused by this pest is not significant. It is probably a polyphagous species (Kevin Tuck, personal communication) but its other hosts in Guam are not known.

The caterpillars of *Thiotricha* sp. (Lepidoptera: Gelechiidae) bore into *E. joga* flowers before and during anthesis. One caterpillar may damage more than one flower in an inflorescence, causing a marked decline in potential fruit set. We believe the damage by this moth is possibly the most serious cause of poor seed production by yoga trees in Guam. Between flowering seasons, the caterpillars feed by scraping the upper surface of the tender leaves in yoga trees. The caterpillar is parasitized by *Dolichogenidea* sp. (Hymenoptera: Braconidae) in Guam. In one of our samples collected [JL2] in February 2001, 85 out of 100 flowers were damaged by this insect. From this sample, 56 moths and 10 parasitoids emerged.

Epinotia sp. (Lepidoptera: Tortricidae) is another caterpillar pest, and it feeds on yoga leaves and flowers. It may be a minor pest of this tree as only a few of these caterpillars were encountered in our survey.

A caterpillar, *Herpystis* sp. (Lepidoptera: Tortricidae), bores into young yoga fruits. Damage from this caterpillar is not widespread, and it is parasitized by an ectoparasitoid, *Goniozus* sp. (Hymenoptera: Bethyridae).

The leaf cutter bee, *Megachile* sp. (Hymenoptera: Megachilidae) cuts semi-circular patches in the margins of leaves of *E. joga* and uses them as lining during nest construction. This damage does not reduce the photosynthetic capacity of the remaining leaf tissue, but it does reduce food-producing capacity of an entire leaf in proportion with the amount of leaf tissue removed. The damage has been extensive in some small seedlings in the field and in nursery settings.

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References

- Beardsley, J.W. Jr. 1966. Insects of Micronesia, Homoptera: Coccoidea. *Insects of Micronesia* 6: 377–562.
- Beardsley, J.W. Jr. 1975. Insects of Micronesia, Homoptera: Coccoidea, Supplement. *Insects of Micronesia* 6: 657–662.
- Esguerra, N.M. & B.P. Gabriel. 1969. Insect pests of vegetables. Department of Entomology, College of Agriculture, University of the Philippines, Technical Bulletin 25, 106 pp.
- Gimpel Jr. W.F., D.R. Miller, & J.A. Davidson. 1974. A systematic revision of the wax scales, genus *Ceroplastes*, in the United States (Homoptera; Coccoidea; Coccidae). Agricultural Experiment Station, University of Maryland, Miscellaneous Publications 841, 85 pp.
- Heinze, K. 1977. *Toxoptera aurantii* (B.d.F.). *In*, J. Kranz, H. Schmutterer & W. Koch (eds.), Diseases, Pests and Weeds in Tropical Crops, pp. 342–343. John Wiley & Sons.
- Jeppson, L.R., H.H. Keifer, & E.W. Baker. 1975. Mites Injurious to Economic Plants. University of California Press, Berkeley, 614 pp.
- Muniappan, R., H. Hirsh, & T. Marler. 2000. A psyllid pest of *Elaeocarpus joga* in Micronesia. *Micronesica* 33: 165–167.
- Muniappan, R., J.H. Lawrence, and T. Marler. 2000. Greenhouse and red banded thrips and two of their natural enemies on *Elaeocarpus joga* in Guam. *Journal of Hawaii and Pacific Agriculture* 11:61–63.
- Pike, K.S., R.H. Miller, & P. Starý. 2000. Aphid fauna (Hemiptera: Aphididae) and associated flora of Guam. *Micronesica* 33:179–207.
- Schreiner, I. & D. Nafus. 1986. Accidental introductions of insect pests to Guam, 1945-1985. *Proceedings of the Hawaiian Entomology Society* 27: 45–52.
- William, D.T. & G. W. Watson. 1988. The Scale Insects of the Tropical South Pacific Region Part 1. The Armoured Scales (Diaspididae). C.A.B. International Institute of Entomology, 289 pp.
- William, D. J. & G. W. Watson. 1990. The Scale Insects of the Tropical South Pacific Region Part 3. The Soft Scales (Coccidae) and Other Families. C.A.B. International Institute of Entomology, 267 pp.