



# *Dioon merolae*

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***Dioon merolae*** De Luca, Sabato & Vázquez-Torres - its history, ethnobotany and conservation

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## Introduction

*Dioon merolae* is the southernmost of all the Mexican dioons (only *D. mejiae* from Honduras occurs at a lower latitude). The species is distinguished from other dioons of southern Mexico by its relatively flat leaves with closely overlapping leathery leaflets that arise from the rachis at an acute angle. Leaflets are strongly arched and deflexed above and below the rachis, so that in cross section the leaf profile looks like a gull in flight with wings in the downstroke (Chemnick 2000).

In this article we summarize the history, ethnobotany, and conservation of this important species.

## History

In 1909 Edward Howard, a California plant collector, found a cycad population near Cerro Tres Picos, north-east of Tonalá and equidistant between Arriaga and Villa Flores in the western reaches of the Sierra Madre de Chiapas. He called this plant *Dioon dohnyi* to acknowledge the financial help of his expedition sponsor, E. L. Doheny of San Diego, although that name was never validly published. Howard arranged for up to 50 plants to be exported to California. Voucher specimens from some of these garden plants later became filed in several U.S. herbaria under the names *D. tomentosum* and *D. purpusii* Rose. Further, Carl Purpus himself collected material in 1925 from what seemed to be the same taxon near Las Minas in the mountains west of his base at Hacienda Montserrat in the Cintalapa district. His specimen bears an unpublished name (*D. pinoi*) attributed to Joseph Rose, honoring the Pino family who owned the land where the plants grew.

Investigations by the Italian cycad research group headed by Professor Paolo de Luca in the 1970s led to the conclusion that all these specimens referred to a single new species. Subse-

quent fieldwork revealed an additional population near Villa Flores and the species was finally published as *Dioon merolae* De Luca, Sabato & M. Vázquez-Torres in 1981. The epithet recognizes Professor Aldo Merola (1924-1980), former Director of the Botanical Garden of the University of Naples. The holotype, *Vázquez-Torres 2301*, collected near Tres Picos in May 1979, is filed at the herbarium of the University of Naples, Italy. At the time, it was thought that the species was confined to Chiapas and was geographically isolated from other *Dioon* populations in Oaxaca and Puebla by the low-lying Isthmus of Tehuantepec.

Fieldwork during the mid-1990s by Silvia Salas-Morales and Leo Schibli of the research institute Sociedad para el Estudio de los Recursos Bióticos de Oaxaca (SERBO) led to the discovery of three significant populations of *D. merolae* in Oaxaca; two in the southeastern foothills of the Sierra de Juárez and one in the northern foothills of the Sierra Madre del Sur (Chemnick et al. 1997). These stands are approximately 160km to the west of the nearest Chiapas populations but only about 30km east of a stand of *D. sp.* (El Camarón),

an allied species presently under investigation. Furthermore, Salas-Morales and Schibli have seen indications of an additional *D. merolae* population in the southern mountains of the Chimalapas region in Oaxaca (Chemnick & Gregory, pers. comm.). This highly disjunct distri-



The Italian botanist Professor Aldo Merola, for whom *Dioon merolae* was named in 1981. Reproduced by permission from archives of the University of Naples, Italy.



*Pinus oocarpa* occurs on steep slopes in the Sepultura Biosphere Reserve, Chiapas and affords shelter to some very large *Dioon merolae* specimens. Photo by Roy Osborne.



*Dioon merolae*. A plant in seasonally dry tropical forest on a west-facing slope at 1100m, near Santiago Lachiguiri, Oaxaca, with *Agave kerchovei* Lem. in the foreground. Photo by Roy Osborne.

bution implies that the Isthmus of Tehuantepec is not necessarily a barrier to species movement in southern Mexico.

#### Ethnobotany

*Dioon merolae* is known in *Chiapaneco*, a near-extinct native language of Chiapas, as *nimalari* (*nima* leaf + *lari* feather). In Spanish, the species has been referred to as *espadaña* (church steeple), *yerba sagrada* (sacred plant), *maíz viejo* (old maize), *morrito* (small tree gourd with spherical fruit), *Crescentia* sp.), *palma espinuda* (spiny palm) and *palmilla* (little palm) (Bonta & Osborne *in press*).

In common with other dioons from southern Mexico, leaves of this species are used ornamentally in religious events. For example, each year the menfolk (*espadañeros*) of Suchiapa and Terán villages in the central depression of Chiapas walk nearly 70km each way to collect over 20,000 *espadaña* leaves from a cycad population near Villa Flores—in preparation for the annual Santa Cruz Festival on 3 May (Pérez-Farrera & Vovides 2006). This practice appears to be a long-standing Chiapanec tradition that has become locally syncreted into Catholic religion.

*Dioon* leaves are also used during Easter week and other religious holidays, weddings and similar events. Churches prepare wreaths using cycad leaves, sometimes from plants that they have cultivated specifically for that purpose. The hollowed-out sclerotesta is used for children's games, bracelets and necklaces. When fried, the yellow sarcotesta is considered a delicacy by some, while the starch-rich megagametophyte has been used as an emergency foodstuff in the absence of corn supplies (Chemnick *et al.* 1997).

#### Conservation

The 2003 Cycad Action Plan lists *Dioon merolae* as 'vulnerable,' citing a conservative total population size of 3,000-5,000 mature individuals (Stevenson *et al.* 2003). The plants in La Sepultura Biosphere Reserve in Chiapas fall within a designated conservation zone, but most populations are in unprotected areas.

No other *Dioon* species from southern Mexico has been illegally collected and exported to the extent of *Dioon merolae*. As recently as the 1990s, hundreds of wild-collected stems of this species were smuggled into the USA for



*Dioon merolae*. An enormous female specimen with numerous reclining trunks, known to many as 'Loran's plant,' at 700 m on a steep east-facing slope in *Pinus oocarpa* forest near Las Minas. Photo by Jeff Chemnick.

sale in California and Florida. Nurseries in towns to the west of Tuxtla Gutierrez continue to collect plants from the local wild populations.

Another major threat to the *Dioon merolae* populations is habitat destruction to make way for field crops and for pasture for domestic animals. One population in Chiapas was irreversibly damaged several years ago when many of the mature plants, and all the younger specimens, were burned. Road construction projects result in plant losses and also make populations more accessible to illegal collecting.

As mentioned above, the use of *espadaña* leaves during religious events is extensive. However, only older leaves are taken and the practice does not seem to have any significant impact on the cycad population. Of greater concern is the fact that factions hostile to the Catholic religion have apparently set fire to plants so as to sabotage the leaf collection and subsequent festivities (Pérez-Farrera & Vovides 2006).

Attack by the larvae of the *Eumaeus* butterfly appears to be a problem in some years. Recruitment into existing populations is threatened by goats that graze on seedlings and by seed harvesting for sale to growers.

A positive development has been the cultivation of *Dioon merolae* seedlings by the *espadañeros* at a campesino nursery near Villa Flores in Chiapas. Pérez-Farrera & Vovides (2006) report that about 2,000 such seedlings have recently been



*Dioon merolae*. Leaf detail from a plant in the greenhouse at the Orto Botanico, Naples, Italy. Photo by Roy Osborne.

reintroduced to augment the local population.

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*Dioon merolae*. A female cone on 'Loran's plant' near Las Minas in Chiapas. Photo by Jody Haynes.



A dehiscent male cone of *Dioon merolae* on a cultivated plant in Brisbane, Australia. Photo by Roy Osborne.



A large *Dioon merolae* specimen burned during habitat clearance for agriculture in Chiapas. Photo by Miquel Angel Pérez-Farrera.