Dioon merolae

Old Dioon merolae *plant in habitat in Chiapas, Mexico. Photo by Terrence Walters, courtesy of Montgomery Botanical Center.*

Dioon merolae *plant. Photo by Fred Elsea III.*

Closeup of female Dioon merolae *cones. Photo by Fred Elsea III.*

Growing *Dioon merolae* in Central Florida

Tom Broome

Dioon merolae is an excellent cycad for warmer areas of central Florida. All dioons seem to like the Florida weather and can tolerate the occasional four-inch rain events we have from time to time. It is a beautiful cycad, especially when the new leaves are emerging.

Dioon merolae is not the most coldhardy dioon, but can tolerate temperatures down to the lower twenties if it is growing under some cover. The leaves are not very frost tolerant. During the 1989 freeze, plants had their apices killed at 19F and some of the stems produced new offsets. There are many locations that didn't go below 24F here in central Florida, so in these places, *D. merolae* would have done just fine.

This species is not a very fast grower. Plants don't seem to react to fertilizer applications, so my plants usually produce only one flush of leaves each year. Some years, they don't produce leaves at all, but when they are in a pattern like this, the next year, they produce a very large flush of leaves. Because of this slow growth rate, larger plants can be very expensive.

All dioons seem to produce cones and become receptive during the same time period. The time period for receptivity can vary from mid-September to mid-November, depending on the weather. Dioons are becoming receptive most years during October. All dioons are somewhat difficult to pollinate because cones open at the bottom so you have to get the pollen up to the ovules somehow. In nature, they are pollinated by weevils that crawl up into the top parts of the cones. I have found that the best way to pollinate these cones is to remove the top portion of the cone and pour dry pollen down through the cracks. Using pollen mixed with water seems to work just fine, but sometimes, it can rot the cone, so I prefer the dry method. Seeds are held in the cone for 18 to 24 months, but when the cone falls apart, the seeds are ready to sprout at once.

Dioon merolae is one of my favorite cycads, and I would suggest it to anyone who wants to grow it here in central Florida.

Female Dioon merolae *plant with dehisced cone. Photo by Fred Elsea III.*

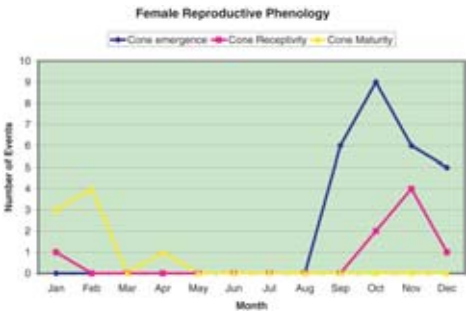
Dioon merolae *plant with Female cone. Photo by Fred Elsea III.*

Phenology of *Dioon merolae*

Michael Calonje

Montgomery Botanical Center has 20 *Dioon merolae* plants in its ground collection. Of these, 13 plants are male, five female, and two of unknown sex. The sex ratio is 2.6 : 1 (male:female).

Dioon merolae plants at MBC flush once a year and the peak in flushing occurs in July. Male cones take approximately three months from emergence to pollen release, which occurs primarily October through February. Female cones emerge from September through December and become receptive about 1.5-2 months later, between October and January. Four female cones have been manually pollinated at MBC to date, and the time from pollination to seed release has varied widely, ranging from 16-28 months, although seeds have always been ready during the first half of the year.



Female reproductive phenology of Dioon merolae *at Montgomery Botanical Center*

Male reproductive phenology of Dioon merolae *at Montgomery Botanical Center*

Vegetative phenology of Dioon merolae *at Montgomery Botanical Center*

My Personal Experience with *Dioon merolae* in Texas

R.L. Frasier

My experience with *Dioon merolae* began when my interest in cycads was in its infancy - I was taking any cycads I could get my hands on at the time. During the winter of 1969-1970, I acquired a nice trunked pair of happy *Dioon merolae* in 30 gal. containers.

The larger of the two was female, with a trunk 38" tall and 12" in diameter. The other plant had 19"of trunk with a 10" diameter. I decided to plant the female in the ground due to its weight and difficulty in moving around; I kept the the smaller unsexed plant in a container at my parents' house.

The old family place is in Goliad county, south Texas, about 65 miles north of Corpus Christi and about 40 miles north of the closest bays of the Gulf of Mexico.

The soil is a reasonably good sandy loam with a clay subsoil, so care must be taken to plant either on a mound or where the sandy loam is pretty deep for optimum drainage. Winters are generally mild and summers hot.

For several years everything went well, the female regularly putting up a cone or a new flush of fronds. The unknown plant in the pot always looked great but rarely grew a set of leaves more than every third year. I'm sure it was longing to be in the ground and punished me with extremely slow growth. Then along came the winter of 1983. As luck would have it, I was in sunny Mexico botanizing and no doubt throwing an international friendship party or two when "the call" came from my dad that I'd "best get myself back home 'cause the bluest norther in years was headed straight to south Texas." I was in Poza Rica, about halfway between Tampico and Veracruz with a blown engine, waiting for parts coming from Mexico City by bus. My dad and his helpers moved everything in containers into the greenhouse, garage or barn (depending on size), but everything planted in the ground was on its own. The arctic blast was preceded by about an inch and a half of rain according to the official ranch dog bowl - not necessarily good for cycads. My dad's hi/lo thermometer recorded 26F the first night, 13F the second, 16F the third and 19F the fourth. From about 10pm on the first night until mid-afternoon on the third day, it was below freezing....and at that, the third day high was only 33F. Many things were killed outright, but everything was damaged to some extent. Tragically, my grand female *Dioon merolae* had frozen to the ground! The whole event made me physically ill, but this was a particularly nasty blow. After about eight weeks nearly everything had been cut back, cut off, dug out and hauled off to the burn pile....except the *D. merolae*. I just couldn't do it. After a few months the trunk fell over right at ground level. I got rid of it and then went to poking around on the old underground stem. It was still alive an inch or so down so I halfheartedly scraped it clean and dumped about three lbs. of horticultural sulfur on top of it and walked away. This was about late April. One day in early summer my mother called to say she was working in the flower bed when she noticed a two-inch leaf coming from the highest edge of the rotted stump. I was nonplussed, I mean really, a two-inch leaf from a trunk that was formerly around 42 inches tall.

As time passed, the little "bulblet" started to grow and at a pretty rapid clip! I can only attribute this to its massive root system. All of a sudden it was winter, 1989, and the alarm goes off again. This time I was there and dug up the resurrected *Dioon merolae*. It went back into a 30 gal. pot; the large grapefruit-sized caudex was growing from the old trunk. It looked overpotted but the root mass filled that container and I even had to do some root pruning to get it to fit properly. And there it stayed for another 13 years or so.

All this time, the unsexed plant continued growing slowly, looked great, but never coned; the female continued its rapid regrowth. A few years ago, both of these majestic plants were put in the ground in a large private conservatory, and they have never looked better. The female plant now has a stem height of just over 12 inches with a diameter of eight inches. It has flushed three times and coned twice in the last five years. The unsexed plant now has a 24 inch trunk and is ten inches in diameter, but has still been contrary and only flushed twice in the last few years....but looks great. They are planted next to each other and I continue to hope that the unsexed plant will be a male. I see these plants nearly every day and am just as thrilled to see them now as when I first spotted them over 37 years ago!

Future "Cycad Focus" Species

Encephalartos turneri (June)
Cycas taitungensis (September)
Microcycas calocoma (December)

Cycad Focus Focus Focus Focus

Dioon merolae

(continued from last issue - TCS Newsletter 30(1), March 2007)

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

Jeff Chemnick and
Miguel Angel Pérez-Farrera

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 dohenyi* 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 Montserrate 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. Subsequent fieldwork revealed an additional population near Villa Flores and the species was finally published as *Dioon merolae* De Luca, Sabato & M. Vázq.-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 south-eastern 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 Guttierez 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 reintroduced to augment the local population.

Acknowledgements

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

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

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

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