

## DION TOMASELLII (ZAMIACEAE), A NEW SPECIES WITH TWO VARIETIES FROM WESTERN MEXICO

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De Luca, Paolo and Sergio Sabato (Istituto di Botanica, Università di Napoli, via Foria 223, Napoli, Italy) and Mario Vázquez Torres (Facultad de Ciencias Biológicas, Universidad Veracruzana, Xalapa, Veracruz, Mexico). *Dion tomasellii* (Zamiaceae), a new species with two varieties from western Mexico. Brittonia 36: 223-227. 1984.—*Dion tomasellii* sp. nov. occurs with an interrupted distribution from Guerrero to central Sonora. It is characterized by falcate to subfalcate leaflets. The populations from Sonora and northern Sinaloa are segregated as *D. tomasellii* var. *sonorensis* on the basis of their narrower and glaucous leaflets.

The genus *Dion* Lindley is an American cycad restricted to Mexico and Honduras. The populations of *Dion* that occur in the Sierra Madre del Sur and in the Sierra Madre Occidental from Guerrero northwards to Sonora are considered in this paper. In previous papers we have described new taxa, revised the genus throughout the rest of its range, and adopted the original spelling *Dion*. The proposed adoption of this spelling has been discussed by some of us (De Luca et al., in press).

The genus was known from the Sierra Madre Occidental by collections from Nayarit (Standley, 1920) and Sonora (Standley, 1920; Gentry, 1942). These collections were either misidentified as *D. purpusii* Rose or filed under unpublished names (Rose, in herb.). In our research, we found that *Dion* is well represented in this area but has a disjunct distribution from Guerrero to central Sonora in localities situated on the Pacific side of the cordilleras (Fig. 1). All populations examined by us belong to varieties of a new and distinctive species, *D. tomasellii*.

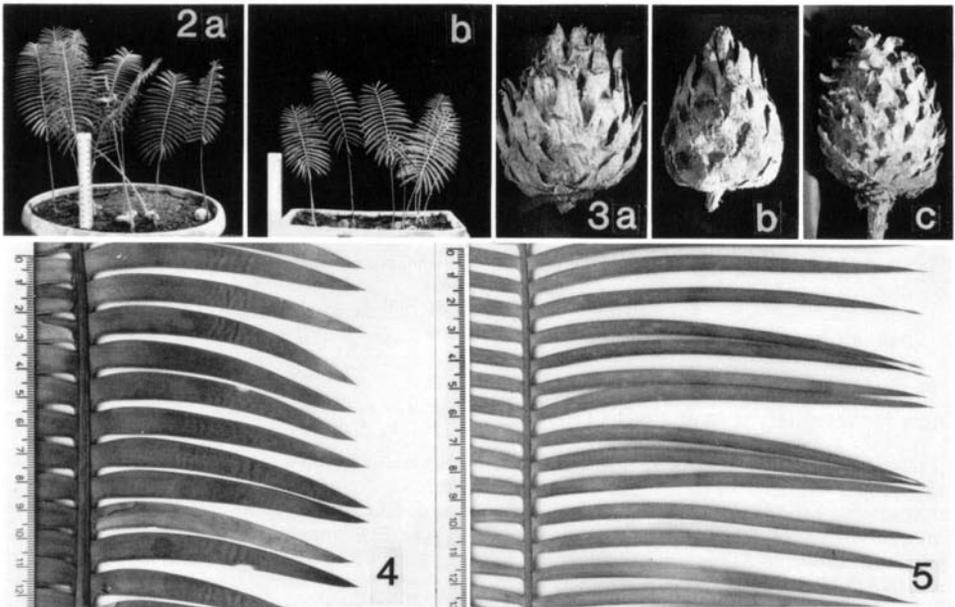
Falcate to subfalcate leaflets sharply characterize this new species within the context of total variation exhibited by this genus. This feature can occur, but only transiently, in young plants of *D. edule* Lindley and *D. holmgrenii* De Luca, Sabato & Vázquez Torres, whereas it occurs from the seedling stages through to adult plants of *D. tomasellii* (Figs. 2, 4, 5). However, in some populations of *D. tomasellii*, in particular those from Sonora, the curvature of the distal leaflets may disappear in older plants but it persists always in the proximal leaflets. Other vegetative characters such as leaflets length, width, and pubescence vary throughout the range of this species, although leaflet width is very reduced in plants from Sonora and northern Sinaloa. These populations also have glaucous leaves at maturity. Moreover, they have significant differences at the seedling level. Seedlings from Sonora are smaller, with very glaucous and narrow leaflets, whereas those from further south are larger, with wider and only slightly glaucous leaflets (Fig. 2).

Reproductive characters also appear diagnostically effective in distinguishing *D. tomasellii*. Megasporangiate strobili and seeds of *D. tomasellii* are much smaller than those of *Dion* species from Puebla, Oaxaca, and Chiapas. The megasporangiate strobili are most similar in size to those of *D. edule*, but differ significantly in that the megasporophyll tip is mostly peculiarly reflexed (Fig. 3). Also, the seeds of *D. tomasellii* have a volume range of 5 to 10 cc whereas those of *D. edule* have a volume range of 4 to 7 cc. Seed volume in *D. tomasellii* does vary with distribution. Thus, seeds from Nayarit populations in the center of the range have a volume of 8 to 10 cc, whereas those from Sonora, the northernmost populations, have a volume of 5 to 7 cc and those from Guerrero, the southernmost populations, have a volume of 6 to 8 cc.

FIG1. Distribution of *Dion tomasellii* var. *tomasellii* (triangles) and var. *sonorensis* (solid circles) in Mexico.

Both the vegetative and reproductive characters show in general continuous variation patterns that do not support specific segregation within the range of *D. tomasellii*, but the variation in the populations of Sonora and northern Sinaloa is such to warrant segregating them as a distinct variety.

Consequently, all specimens from Guerrero, Michoacán, Jalisco, Nayarit, and Durango are attributed to *D. tomasellii* var. *tomasellii* and those from Sonora and northern Sinaloa to var. *sonorensis*. Evolution appears to be in progress in these populations of *Dion* in western Mexico and moreover the variation pattern parallels that exhibited by *D. edule* in Sierra Madre Oriental (De Luca et al., 1982). The northernmost populations of both *D. edule* and *D. tomasellii* are characterized by glaucous, narrow leaflets.



**FIGS 2-5.** Seedlings, megasporangiate cones, and leaves of *Dion tomasellii*. 2. One-year-old seedlings of *D. tomasellii* growing at the Naples Botanical Garden. A. Var. *tomasellii* from Nayarit, from seed of Vazquez Torres 2332. B. Var. *sonorensis* from Sonora, from seed of Vazquez Torres 2333. 3. Megasporangiate cones of *D. tomasellii*,  $\times 0.1$ . A. Var. *tomasellii* from Jalisco, Vazquez Torres 2334. B. Var. *tomasellii* from Nayarit, Vazquez Torres 2332. C. Var. *sonorensis* from Sonora, Vazquez Torres 2333. 4. Middle portion of a leaf of *D. tomasellii* var. *tomasellii* from Nayarit, Vazquez Torres 2307. 5. Middle portion of a leaf of *D. tomasellii* var. *sonorensis* from Sonora, Vazquez Torres 2308.

***Dion tomasellii* De Luca, Sabato & Vázquez Torres, sp. nov. (Figs. 2-5)**

Truncus cylindricus, plerumque supra terram erectus interdum subterraneus. Folia plana, numerosa, rigide coriacea, adscendentia, in statu juvenili tomentosa, deinde glabra vel pubescentia, 100 cm vel ultra longa. Rachis semiteres vel subteres, recta. Foliola 70 et ultra utroque latere, subopposita, lanceolata vel lineari-lanceolata, falcata vel subfalcata, raro recta, recto vel rare acuto angulo inserta, laete viridia vel glauca, interdum deflexa, integemma vel dentibus spinosis praedita. Foliola mediana 10-18  $\times$  0.45-1.2 cm. Strobilus ♀ ovoideus 20-30  $\times$  15-20 cm; squamae lanceolatae 4-5  $\times$  7-8 cm, extus dense lanosae; semina ovoidea, 2-2.5  $\times$  2.5-3.5 cm. Strobilus ♂ elongato-cylindricus, 25-50  $\times$  6-10 cm; microsporophylla 2.5-4 cm longa.

*Stem* short (less than 100 cm), cylindric, covered by persistent leaf bases, aerial or raised only slightly above the ground, rarely with buds at base; *leaves* in crown, mostly numerous, 1-2 m long, tomentose when young, glabrous or pubescent at maturity; flat, rigid, ascending; *petiole* (6) 10-24 (35) cm long, unarmed, semiterete to subterete; *rachis* semiterete to subterete, straight; *leaflets* subopposite, 70 or more on each side, lanceolate to linear-lanceolate, falcate to subfalcate (rarely straight), inserted at right angles (rarely at an acute angle), 10-18 cm long and 4.5-12 mm wide in the middle portion of the leaf, spinulose or entire, light green or glaucous, horizontal (rarely deflexed); *microsporangiate cone* solitary, long-cylindric, 25-50 cm long, 6-10 cm in diameter; *microsporophylls* 2.5-4 cm long, exposed tip pointed above and rounded below; *megasporangiate cone* ovoid, solitary, 20-30 cm long, 15-20 cm in diameter; *megasporophylls* lanceolate, densely woolly, 4-5 cm long, 7-8 cm wide at the base, the outer part mostly reflexed; *seeds* cream or red, 2-2.5  $\times$  2.5-3.5 cm, 6-10 cc in volume.

TYPE: MEXICO. [REDACTED]

██████████ 12 Jun 1979, *Vázquez Torres* 2307 (HOLOTYPE: NAP; ISOTYPES: ENCB, MEXU, NY, XALU).

This species is named in memory of Dr. Ruggero Tomaselli, Professor of Botany at Università di Pavia, Italy, and former president of the Società Botanica Italiana, in recognition of his continuous encouragement and generous support of botanical exploration in Mexico.

#### Key to varieties

- 1 Leaflets light-green, 7–12 mm wide, lanceolate to linear-lanceolate, falcate to subfalcate, inserted at right angles; petiole and rachis semiterete ..... *Dion tomasellii* var. *tomasellii*  
 1 Leaflets glaucous, 4.5–6.5 mm wide, linear-lanceolate, falcate to subfalcate and inserted at right angles, rarely straight and inserted at an acute angle; petiole and rachis subterete .....  
 ..... *Dion tomasellii* var. *sonorensis*

#### *Dion tomasellii* var. *tomasellii* (Figs. 2A, 3A, B, 4)

Foliola 7–12 mm lata, laete viridia, lanceolata vel lineari-lanceolata, falcata vel subfalcata, recto angulo supra semiteretem rachin inserta.

PARATYPES: MEXICO. ██████████

██████████ 20 Mar 1972, *Breedlove* 24500 (CAS); ██████████  
 ██████████ Feb 1980, *Vázquez Torres* 2315 (NAP, XALU) and 7 Oct 1981,  
 2362 (NAP, XALU) ██████████ 1926, *Reko* 4969 (US); ██████████  
 ██████████ 7 Jun 1979, *Vázquez Torres* 2305 (NAP, XALU); ██████████  
 ██████████ 16 Oct 1980, *Vázquez Torres* 2335  
 (NAP, XALU). ██████████ Nov 1966, *Cleland s.n.* (US); ██████████  
 ██████████ 7 Mar 1970, *Anderson & Anderson* 6110 (ENCB, MICH); ██████████  
 ██████████ 10 Jun 1979, *Vázquez Torres* 2306 (NAP, XALU); ██████████  
 ██████████ 4 Oct 1980,  
*Vázquez Torres* 2334 (NAP, XALU). ██████████ 21  
 Mar 1981, ██████████  
 ██████████ 27 Feb 1982, *Vázquez Torres* 2366 (XALU).  
 ██████████ Sep 1968, *Lombardi s.n.* (US);  
 ██████████ 6 Aug 1897, *Rose* 2014 (F, NY, US).

*Dion tomasellii* var. *tomasellii* ranges from Guerrero to Durango. Its common names are "Palma de la Virgen" (Durango), "Palma," and "Palmita" (Guerrero, Michoacán, and Nayarit). The habitat is oak and oak-pine forest.

Plants from Nayarit, located in the center of range, were selected for the type because they are more representative of the total variation. Rose's collection from Nayarit (2014, F, NY, US) was referred to *D. purpusii* by Standley (1920) but by Rose himself to an unpublished species. These specimens do not show even a superficial resemblance to *D. purpusii* and their misidentification was probably caused by the poor description of the latter (De Luca et al., 1979).

#### *Dion tomasellii* var. *sonorensis* De Luca, Sabato & Vázquez Torres var. nov. (Figs. 2B, 3C, 5)

A var. *tomasellii* foliolis glaucis et angustioribus, 4.5–6.5 mm latis, lineari-lanceolatis, et supra rachin subteretem insertis differt.

TYPE: MEXICO. ██████████

██████████ 15 Jun 1979, *Vázquez Torres* 2308 (HOLOTYPE: NAP; ISOTYPES: ENCB, MEXU, NY, XALU).

PARATYPES: MEXICO. ██████████

██████████ 1939-1941, *Edmunds s.n.* (F). ██████████  
 ██████████ 1954, *Felger* 135 (LA); ██████████ Oct–Nov 1934,  
*Gentry* 1136 (LAM); ██████████ 28 Oct 1934, *Gentry* 1136 (F);  
 22 Oct 1936, *Gentry* 2955 (AKIZ, F, GH, K, MO, S, UC, US); ██████████

6 Apr 1940, *Gentry 5957* (CAS, MICH, NA, NY); [redacted] 12 May 1957, *Gentry 16596* (US); [redacted] 28 Oct 1934, *Gentry s.n.* (NA); [redacted] 9 Mar 1910, *Rose et al. 12549* (NY, US), 12550 (US); [redacted] 30 Apr 1967, *Rees 1607* (XAL); [redacted] 17 Jun 1979, *Vázquez Torres 2309* (NAP, XALU); [redacted] Feb 1980, *Vázquez Torres 314* (NAP, XALU); [redacted] 1 Oct 1980, *Vázquez Torres 2333* (NAP, XALU); [redacted] 8 Jan 1978, *Warren & Gibson s.n.* (MEXU).

Variety *sonorensis* differs from var. *tomasellii* in its narrow and glaucous leaflets and ranges from central Sonora to northern Sinaloa. We were unable to locate it in northern Sinaloa despite prior collections. Its vernacular name is "Palma de la Virgen" (southern Sonora) or "Peine" (central Sonora). Its habitat is transitional between selva baja caducifolia and oak forest.

The Mazatan population, growing at the northernmost limit of the variety, exhibit a very distinctive habit characterized by leaflets that are straight and inserted at an acute angle on the rachis. The *Rose et al.* collections (12549, NY, US; 12550, US) which show this variation were identified by Standley (1920) as *D. purpusii*, whereas Rose attributed them, to an unpublished species. Although adult specimens may appear to be morphologically convergent at least in some features with *D. purpusii*, they are in reality not all closely related and diverged significantly in that both seedlings and young plants of *D. tornasellii* var. *sonorensis* have typically falcate leaflets. There is no doubt that these northern populations represent an extreme of the variety; however, the designation of a taxonomic rank is contingent on further investigation.

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