

What is *Ceratozamia fuscoviridis* ?

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Riassunto. Il nome della cicadea messicana provvisoriamente chiamata *Ceratozamia fusca-viridis* da D. Moore nel 1878 è da considerarsi invalido, secondo l'Articolo 34.1 del Codice Internazionale di Nomenclatura Botanica. In questo lavoro viene validato il nome *Ceratozamia fuscoviridis* D. Moore, citato il campione tipo, segnalata l'esistenza di esemplari in coltivazione e discusso il possibile luogo di origine della specie. Si ritiene che piante di una popolazione dello Stato di Hidalgo (Messico), informalmente note come "C. Molango", siano attribuibili a *C. fuscoviridis*.

Abstract. The name of the Mexican cycad provisionally called *Ceratozamia fusca-viridis* by D. Moore in 1878 is invalid under Article 34.1 of the International Code of Botanical Nomenclature. In this paper we validate *Ceratozamia fuscoviridis* D. Moore and cite the type specimen. We report on the location of extant specimens in cultivation and discuss the probable wild source of this cycad. We believe that a cycad population from Hidalgo, Mexico, informally known as "C. Molango", is assignable to *C. fuscoviridis*.

Key words: *Ceratozamia fuscoviridis*, Molango, Zamiaceae

In March 1878, Dr. David Moore (1808-1879), Director of the Royal Botanic Gardens, Glasnevin, Ireland, exhibited three cycad specimens, representing three genera, from the Gardens' glasshouses at a meeting of the Royal Society of Dublin. One of these was a female plant with a cone, which he provisionally named *Ceratozamia fusca-viridis* and which was described in the Society's Proceedings (MOORE 1878) as follows: "Finding that the plant on the table disagrees so materially in these instances from the descriptions of Regel and De Candolle, I incline to think it may prove to be a distinct species from *C. longifolia* (Miquel); and if so, I propose to name it, provisionally, *Ceratozamia fusca-viridis*". The epithet refers to the reddish-brown colour of the newly-emergent foliage. Because Moore used the word "provisional" in this publication, the name is not valid under Article 34.1 of the International Code of Botanical Nomenclature (MCNEILL *et al.* 2007).

For many years, this taxon suffered in obscurity due to the original collection locality being unknown, the nomenclatural issues, and the supposed absence of any herbarium material. However, a voucher has been recently located at Kew (K), which comprises a single cycad leaf mounted in sections on three oversize sheets with the annotation "*Ceratozamia fusca-viridis*, Hort. Bot. Glasnevin 1881" (Fig. 1a-c). One of these sheets has a photograph of the female cone attached. This material would have been sent to Dr William Thiselton-Dyer, then Assistant Director at Kew, who was working on cycad taxonomy and preparing a cycad treatment for the Biologia Centrali-America (THISELTON-DYER 1884) at the time. We hereby record the K specimen as the holotype for *Ceratozamia fuscoviridis* D. Moore.

It is interesting to note that THISELTON-DYER (1884), in his treatment of *Ceratozamia* for the Flora of Central America, placed *C. fuscoviridis* in synonymy with *C. mexicana* var.

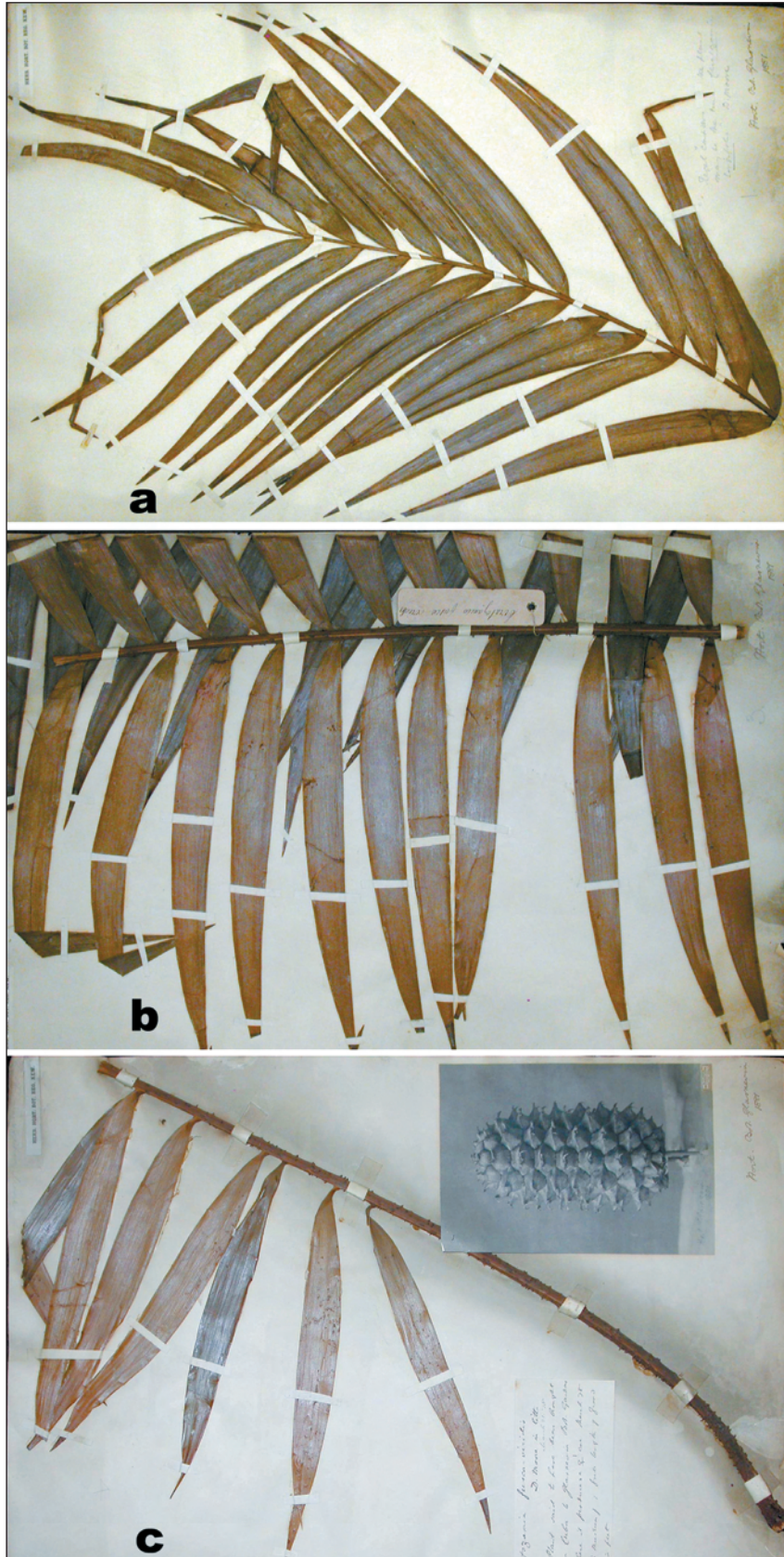


Fig. 1a-c - The holotype for *Ceratozamia fuscoviridis* D. Moore (K), comprising 3 sheets annotated “*Ceratozamia fusca-viridis*, Hort. Bot. Glasnevin 1881”. Photo: Dennis Stevenson.

longifolia, while noting “*C. fusca-viridis* seems only a form with dark-brown under surface to the leaflets”. This assignment to a form was subsequently adopted up by SCHUSTER (1932) who also made the orthographic correction in his *C. mexicana* var. *longifolia* forma *fuscoviridis*.

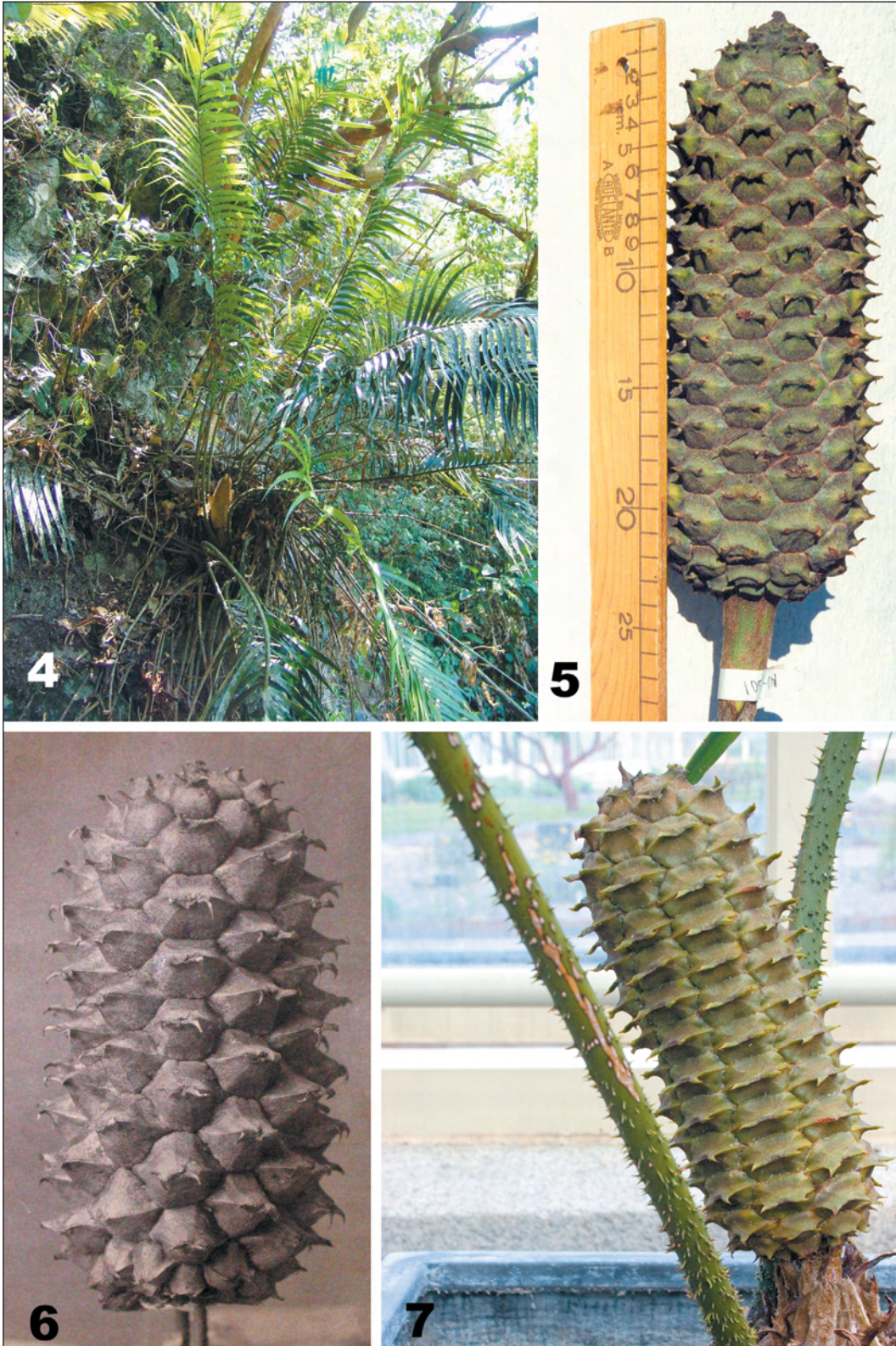
Our further investigations lead us to believe that Moore sent live specimens of *C. fuscoviridis* to the plant collector and physician Dr G. Garbari of Trento, in northern Italy. Evidence for this is provided by Garbari’s undated voucher under the name *C. fuscoviridis* D. Moore at Geneva (G-Bois). In 1907 the Garbari collection of extant cycads was donated to the Botanical Garden of the University of Florence (DE LUCA 1990). The collection included seven specimens under the name *Ceratozamia mexicana* Brong. f. *fuscoviridis* D. Moore ex J. Schust. Leaf samples from these plants were subsequently used by

the late Prof. Franco Cardini and his colleagues at the University of Florence in the analyses of leaf carotenoids. Interestingly, the most recent work on these compounds has shown marked cytological and biochemical differences between *C. mexicana* and “forma *fuscoviridis*”, resulting in CARDINI & MORASSI BONZI (2005) suggesting a taxonomic re-evaluation of the latter. Contact with the Florence garden in 2008 has established that all seven plants are still extant (Fig. 2) (A. Moretti and L. Di Fazio pers. comms.), a testimony to the longevity of the specimens and the curatorship skills of the Florentine gardeners.

“*Ceratozamia mexicana* f. *fuscoviridis*” is still extant in the Palm House at the (now) National Botanic Gardens, Glasnevin, and it appears that the original specimen has been divided on several occasions so that all the material at Glasnevin derives from the original mother plant (Fig. 3, 7) (Wyse Jackson pers.



Figs. 2-3 - 2. One of the seven *C. fuscoviridis* specimens present at the Botanical Garden of the University of Florence in 2007. Photo: Luciano Di Fazio. 3. The original *C. fuscoviridis* specimen photographed at Glasnevin National Botanic Gardens in 1878. This specimen may be the source of all extant plants at Glasnevin. Photo sourced by Ciaran Moloney.



Figs. 4-7 - 4. A representative specimen of “*C. Molango*” in habitat. Photo: Sergio Avendaño. 5. Female cone of “*C. Molango*” from habitat collected specimen (*A.P. Vovides 1301 XAL*). Photo: Andrew Vovides. 6. The ovulate cone image of *C. fuscoviridis* attached to the holotype at K. Detail from Fig. 1c. 7. An ovulate cone produced on the Glasnevin plant in 2007. Photo: Ciaran Moloney.

comm.). However, NELSON (1993) discovered an entry in accession books at Glasnevin that indicates that another specimen of *Ceratozamia fuscoviridis* was purchased by the Gardens in 1903 (half a century after the original acquisition *vide* Moore 1878) from rare plant dealers Messrs William Bull & Sons, for two guineas. It is not known if this latter plant is extant in the Irish collection or may have given rise to other plants. Moreover, the Bull material may in any case have descended from the original Glasnevin specimen.

In his 1878 publication, MOORE mentioned that his *Ceratozamia fuscoviridis* had been brought to Ireland from Havana some 30 years earlier, but had probably originated in Mexico. It appears that Thomas Coulter (1793-1843), an Irishman who served in Mexico from 1824-1829 as medical doctor to the Real de Monte mining company in Hidalgo, sent a significant quantity of living plants, mainly cacti, to the Trinity College Botanical Garden in Dublin. Coulter also sent seeds to Glasnevin before returning to Ireland in 1834 to take up the position of Curator of the Herbarium at Trinity College (COVILLE 1895, Wyse Jackson pers. comm.). It is possible that cycad material reached Ireland through this route, but this cannot be established with certainty.

There are several *Ceratozamia* populations in Hidalgo, many with range extensions into Querétaro to the west, San Luis Potosí to the north, and Veracruz to the east. The taxonomy of this group is not yet complete. Of the various candidates that may have been the source of the material that reached Moore, we believe the most likely is the taxon known informally as “C. Molango”, a population comprising some 250 mature plants in two localities near the town of Molango. The plants occur in cloud forest habitat and grow exclusively on basalt.

Our inclusion of “C. Molango” within the concept of *C. fuscoviridis* is based on the following evidence. Firstly, plant collectors in the mid 1800s would have had road access to this population. Secondly, the median leaflet measurements of 20-25 cm by 17 mm from Moore’s description and type are consistent with the 16.5-(24.5)-36 cm long by 14-(18)-22 mm

wide ($n = 6$) measurements on wild-collected “C. Molango” (Fig. 4) with vouchers at XAL as cited below. Thirdly, the plants at Molango are often (but not always) well-armed on the petiole and lower portion of the rachis, consistent with Moore’s statement of his specimen being “beset with numerous, short, sharp, strong prickles ... especially near the base”, as well as the type specimens at Kew. Finally, the relatively large size and elongate-cylindrical morphology of the “C. Molango” female cone (Fig. 5) is consistent with the 15-20 cm length (excluding the peduncle), pictorial evidence recorded for the Glasnevin plant (Fig. 6, 7), and voucher *A.P. Vovides et al. 1301* (XAL).

We therefore believe that the population informally known as “C. Molango” is assignable to *Ceratozamia fuscoviridis* D. Moore, as validated below. The species appears to fall within the “*Ceratozamia mexicana* group” of VOVIDES *et al.* (2004). A detailed assessment of the wild population will be published elsewhere.

Ceratozamia fuscoviridis D. Moore (Fig. 1a-c)

TYPE: Hort Glasnevin, 1881, *D. Moore s.n.* (HOLOTYPE: K - 3 Sheets!)

Trunk globose, dark brown, more or less clothed with fuscous hairs and the bases of old leaves, dividing occasionally from apex to base into secondary trunks; bases of the leaves broadly ovate, and adhering closely to the trunk, mixed with perules, ovate at the base, tapering gradually from base to apex into a sharp point, which is slightly reflexed and spreading, clothed with silky fuscous down. Leaves rather slender, erect at first, ultimately spreading and recurved at their points; from eight to ten feet long. Petiole roundish, clothed with dark fuscous pubescence, and beset with numerous short, sharp, strong prickles, more especially near the base; rachis, with two rather deep channels, one on each side of the upper surface, and more or less covered with scattered prickles. Leaflets alternate or opposite, sessile, with slightly decurrent bases at point of attachment, from thirty to forty pairs, eight to ten inches long, two-thirds of an inch wide in the central portion, where the margins

are slightly raised, entire, fuscous on the under side, dull green on the upper side, subfalcate, tapering to a sharp point, which is slightly reflexed, nerved with eighteen to twenty obscure nerves. Female cones on brown scurfy stalks, two or more inches long; cone six to eight inches long from base to apex, with protruding furcate horny scales, in ten to twelve spiral series, furcate points, acute and widely spreading, the whole cone covered with short brown fuscous hairs.

Species *Ceratozamia mexicana* affinis; foliola fuscous abaxialis, apice attenuata.

Other specimens examined: ITALY: Trento, Cultivated plant, *G. Garbari s.n.* (G-Bois!).

MEXICO: Hidalgo; Tlanchinol-Molango, 29 May 1999, *A.P. Vovides, S. Avendaño* and *V. Luna 1300-1301* (XAL!); Tlanchinol-Molango, 1 May 2005, *S. Avendaño 5726-5731* (XAL!).

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