

The typification of *Zamia erosa* and the priority of that name over *Z. amblyphyllidia*

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Abstract The lectotype designation of *Zamia erosa* O.F. Cook & G.N. Collins by Eckenwalder (1980) is corrected to a neotype as it does not constitute original material on which Cook & Collins based their description. The neotype designation is itself superseded, as the specimen selected by Eckenwalder is in serious conflict with the protologue, a conclusion based on overlooked descriptive and geographic information in the protologue, and new collections recently made near the type locality. A new neotype is designated. We have further determined that *Z. erosa* is an earlier validly published name for the species currently known as *Zamia amblyphyllidia* D.W. Stev.

Keywords nomenclature; Puerto Rico; *Zamiaceae*

■ INTRODUCTION

Orator Fuller Cook and Guy Collins, then botanists at the United States Department of Agriculture (USDA), co-authored a paper on economic plants of Puerto Rico (Cook & Collins, 1903) which included the following description for *Zamia erosa* O.F. Cook & G.N. Collins:

Zamia erosa. MARUNGUAY. What appears to be a previously undescribed cycad was found in the forests covering the rough limestone hills to the south of Vega Baja. It is peculiar in having but one or two fronds with distant, broad, apically erose-dentate leaflets. The large fleshy root is hidden in crevices of the jagged rocks, but is dug out by the natives and used in the manufacture of starch.

In his review of the taxonomy of West Indian cycads, Eckenwalder (1980) designated a specimen collected in south central Puerto Rico as the lectotype of *Zamia erosa* (Ponce: Coamo Springs, 14 Jun–22 Jul 1901, *Cook s.n.*, lectotype: NY!, Fig. 1; isolectotype: NY!), placing the name into synonymy under *Z. pumila* L. subsp. *pumila*.

The specimen Eckenwalder chose as a lectotype for *Zamia erosa* was collected on the much drier south side of the island, at least 30 km away from the type locality on the northern side and separated by the Cordillera Central mountain range. Furthermore, it does not have the “distant, broad, apically erose-dentate leaflets” mentioned in Cook & Collins’s protologue, but rather has closely spaced, narrowly oblong leaflets with smooth leaflet tips consistent with Puerto Rican *Z. pumila*, as circumscribed by Acevedo-Rodríguez & Strong (2005). Moreover, the specimen itself was not labeled as *Z. erosa* by either Cook or Collins. Instead the specimen bears a printed label from L.M. Underwood and R.F. Griggs, with hand-writing that identifies it as *Zamia media* Jacq. *Zamia media* was not listed in Cook

& Collins’s (1903) treatment, nor was the locality where the specimen was collected mentioned as falling within the geographic range of either *Z. portoricensis* Urban or *Z. erosa*, the two species they treated.

However, Britton & Wilson (1926) assigned the name *Z. media* to plants with narrowly lanceolate or linear lanceolate leaflets from southern Puerto Rico, differentiating these from the wider leaflet plants from northern Puerto Rico which they treated as *Z. latifoliolata* Prenel. (with *Z. erosa* listed as a synonym), and from the narrower leaflet plants from southwestern Puerto Rico which they treated as *Z. portoricensis*.

Zamia latifoliolata was described as a plant with broad leaflets to 3 cm wide (Preneloup, 1872). The type locality is in the Dominican Republic, within present day Santo Domingo. However, all recent workers who have studied *Zamia* from that country, e.g., Zanoni (1982) and Stevenson (1987), have treated them as belonging to a single species, *Z. pumila*. *Zamia pumila* not only has priority over all other names assigned to *Zamia* in Dominican Republic, it also provides the type for the generic name. On the basis of Eckenwalder’s (1980) selection of Commelijn’s drawing as the lectotype, the type locality of *Z. pumila* is Hispaniola where the species is only known to occur in present-day Dominican Republic. Other *Zamia* populations occurring in southern Puerto Rico and Cuba are also currently treated as belonging to this species, e.g., by Stevenson (1987) and Sabato (1990).

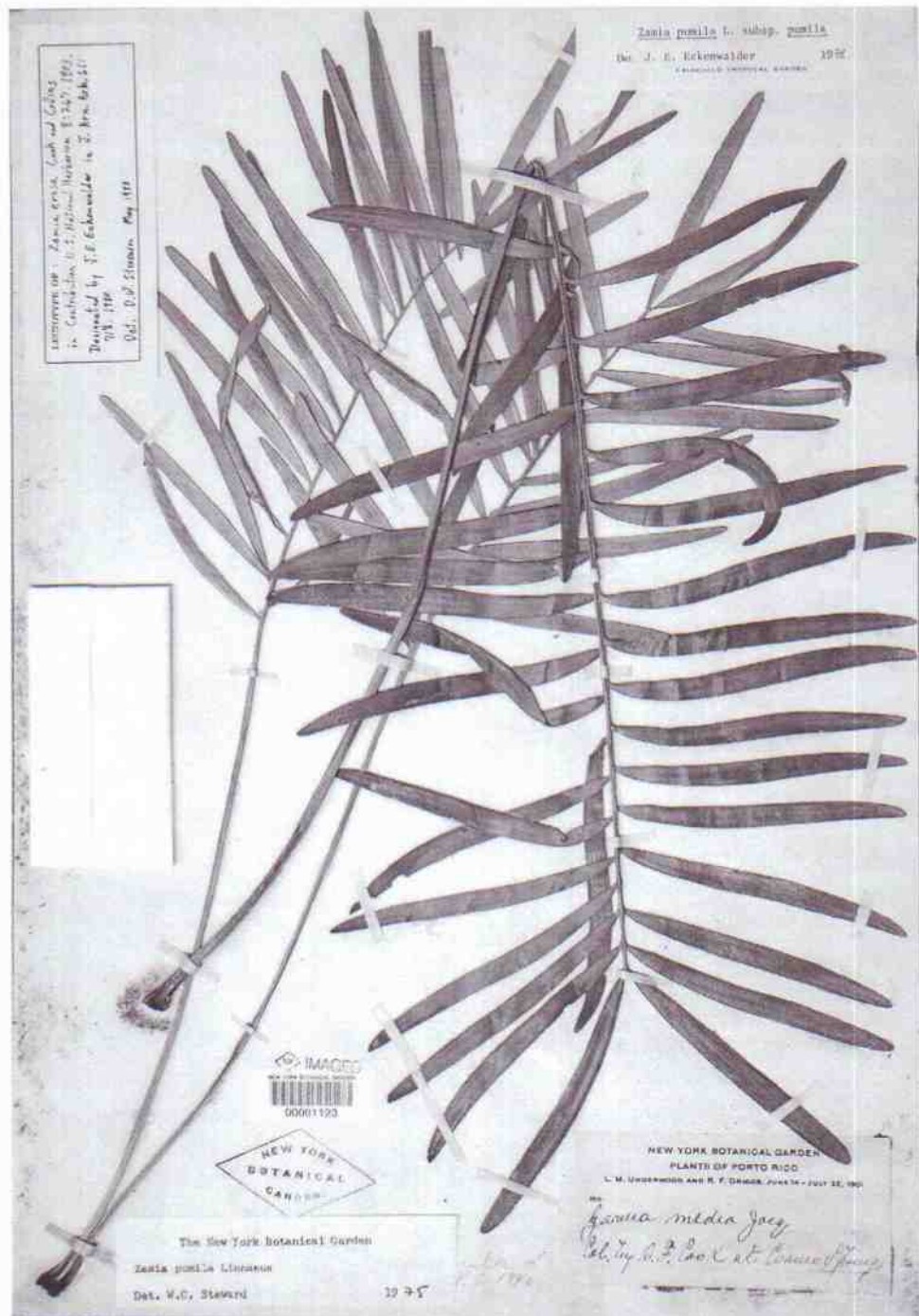
Fieldwork in the Dominican Republic by the first author in July of 2009 confirmed that wild *Zamia pumila* populations throughout the island were indeed morphologically similar and should be treated as a single species. Leaflet widths on plants within Santo Domingo and throughout the country typically ranged from 1–3 cm, confirming that the leaflet width attributed to Preneloup’s *Zamia latifoliolata* is not exceptional and falls within the natural range of variation for *Zamia pumila*. In contrast to the situation in Dominican Republic where individuals

from all known *Zamia* populations are morphologically similar and generally considered to belong to a single species, in Puerto Rico there are three taxa with distinct leaflet shapes that are easily distinguishable, morphologically uniform across their populations, and thus generally regarded as separate species, e.g., by Stevenson (1987) and Sabato (1990). The plant with the narrowest leaflets, occurring in southwestern Puerto Rico, is currently treated as *Zamia portoricensis*, the wider leaflet form from northern Puerto Rico is treated as *Zamia amblyphyllidia* D.W. Stev., and the intermediate form occurring in south-central

Puerto Rico is treated as *Zamia pumila*. The relationship between the Puerto Rican plants treated as *Zamia pumila* and *Z. pumila* in the Dominican Republic, is currently unclear, but should become clearer as a result of ongoing population genetic research led by the second author (Meerow & al., 2007).

In view of the fact that the specimen Eckenwalder selected as a lectotype for *Zamia erosa* was labeled as *Zamia media* rather than *Z. erosa*, there is no indication that this specimen constitutes “original material” upon which the description of *Z. erosa* was based as required by Art. 9.2 of the ICBN (McNeill

Fig. 1. Eckenwalder’s “lecto-type” for *Zamia erosa*, correctly a neotype, but superseded here.



& al., 2006). Therefore, Eckenwalder's lectotype designation must be corrected (under Art. 9.8) to a neotype.

Furthermore, even when corrected to a neotype, the specimen selected by Eckenwalder remains problematic, as it was collected on the opposite side of the island, over 30 km away from the type locality and separated by the Cordillera Central mountain range. Moreover, it has closely-spaced, narrow, and entire leaflets that do not match the "distant, broad, apically erose-dentate leaflets" described in the protologue. Therefore, the specimen is in serious conflict with the protologue and can thus be superseded under Art. 9.17(b).

■ NEOTYPIFICATION OF *ZAMIA EROSA*

Although no herbarium specimens of *Zamia* collected by Cook & Collins near the type locality of *Z. erosa* have been found, two preparations of photographs labeled as "*Zamia integrifolia* Ait." and listing *Zamia erosa* as a synonym were

found at the National Arboretum Herbarium. Both preparations include the names of Cook & Collins and depict live plants that appear to have been brought into cultivation. One preparation contains two photographs of a female plant (Puerto Rico, Vega Baja, 1899, *Cook & Collins s.n.*, NA! Sheet #88468; Fig. 2), the other contains two photographs of a plant with a microsporangiate strobilus (Puerto Rico, Utnado Road, between Utnado and Arecibo, 1901, *Cook & Collins s.n.*, NA! Sheet #88477; Fig. 3).

Both preparations include photographs of plants with apically erose-dentate broad leaflets matching Cook & Collins's protologue description of this species. The preparation of the female plant bears the date "1899", and the preparation of the male plant bears the date "1901". These years are the only two years in which Cook & Collins specifically state that they travelled to Puerto Rico to conduct research for the book in which *Z. erosa* was described (Cook & Collins, 1903). This book, focusing on economic plants of Puerto Rico, was prepared as a volume of *Contributions from the U.S. National Herbarium*.

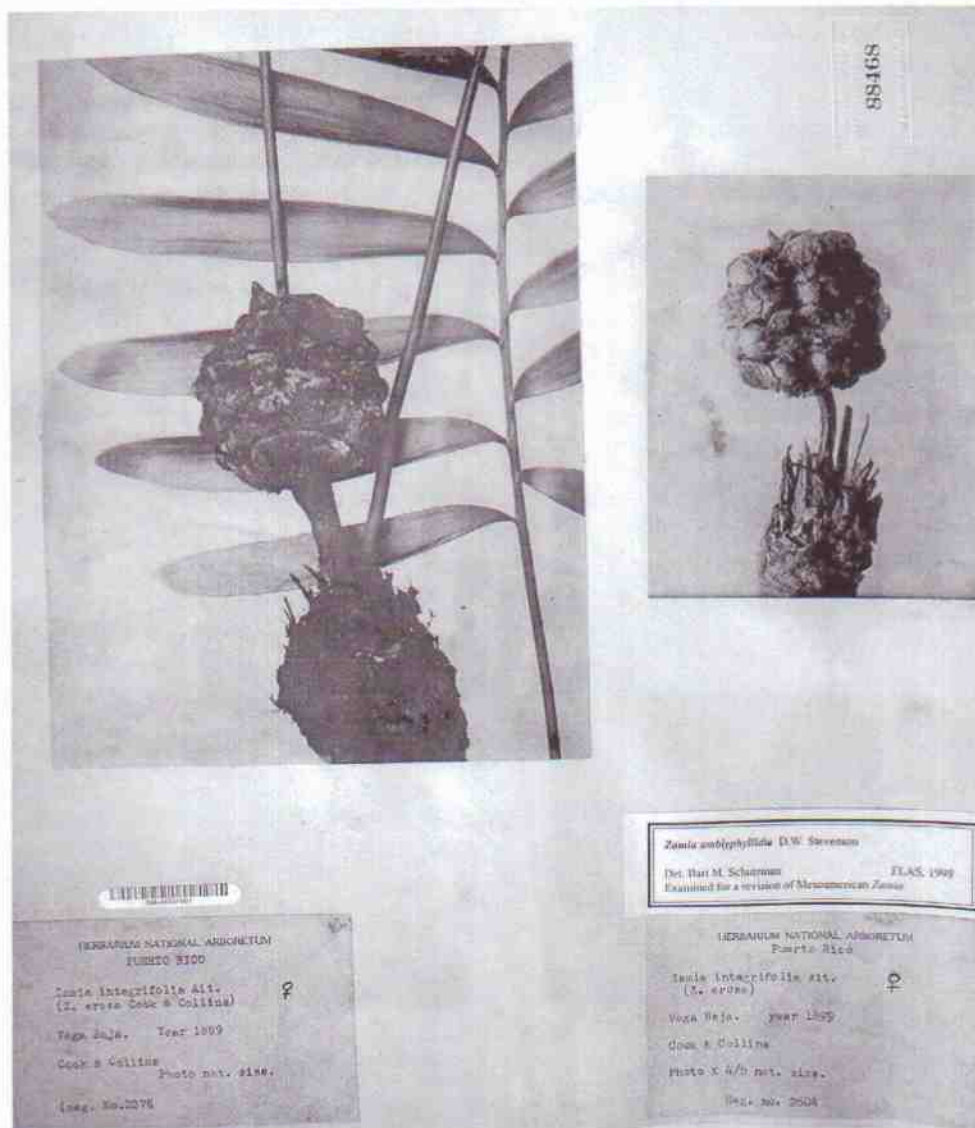


Fig. 2. New neotype for *Zamia erosa* (neg. #2376).

Considering these preparations were mounted and deposited at the National Arboretum Herbarium, and the fact that they bear the names of Cook & Collins in addition to the two specific years when they travelled to Puerto Rico for research on their book, we feel that the evidence is better than circumstantial that these are photographs of the original material collected by Cook and Collins on which they based their description of *Zamia erosa*. The existence of these photographs was possibly unknown to Eckenwalder (1980) when he searched for an appropriate type for this species, as the National Arboretum Herbarium in Washington, D.C. is not

on the list of herbaria consulted for his taxonomic review of West Indian cycads.

On the sheet depicting the female plant (Fig. 2), one photograph depicts a plant with broad leaflets carrying a megasporangiate strobilus (negative #2376); the other appears to be the same plant but with a more mature strobilus and without leaves (negative #2604). Both are labeled “Vega Baja,” which is the type locality for *Z. erosa*. The photograph with the partial leaf and megasporangiate strobilus is here designated as a neotype for *Zamia erosa* (Puerto Rico, Vega Baja, Cook & Collins s.n. 1899, NA! Sheet #88468, Negative #2376).

Fig. 3. Cook and Collins's photograph of *Z. erosa* from near the type locality of *Z. amblyphyllida*.



Zamia erosa O.F. Cook & G.N. Collins in Contr. U.S. Natl. Herb. 8: 267. 1903 – Neotype (designated here): Puerto Rico, Vega Baja, Cook & Collins s.n. 1899, NA! Sheet #88468, Negative #2376).

= *Zamia amblyphyllidia* D.W. Stev. in Fairchild Trop. Gard. Bull. 42(3): 26. 1987 – Type: Puerto Rico: Bosque de Rio Abajo, Utuado, 30 Jan 1985, P. Acevedo R. 576 (holotype: NY!; isotypes: FTG!, NY!)

It is not clear exactly when the photographs were taken or when they were mounted, but the fact that they are labeled as *Z. integrifolia* with *Z. erosa* as a synonym, suggests they were possibly mounted and labeled after Cook & Collins's publication. *Zamia integrifolia*, a species with much narrower leaflets, is today considered to be either a species restricted to Florida and Georgia, or an illegitimate name (see Ward, 2009)

■ PRIORITY OF *ZAMIA EROSA* OVER *Z. AMBLYPHYLLIDIA*

In a subsequent review of West Indian *Zamia*, Stevenson (1987) accepted Eckenwalder's lectotypification of *Z. erosa*, considering the name a synonym of *Zamia integrifolia* instead of *Z. pumila* subsp. *pumila* (sensu Eckenwalder, 1980). In the

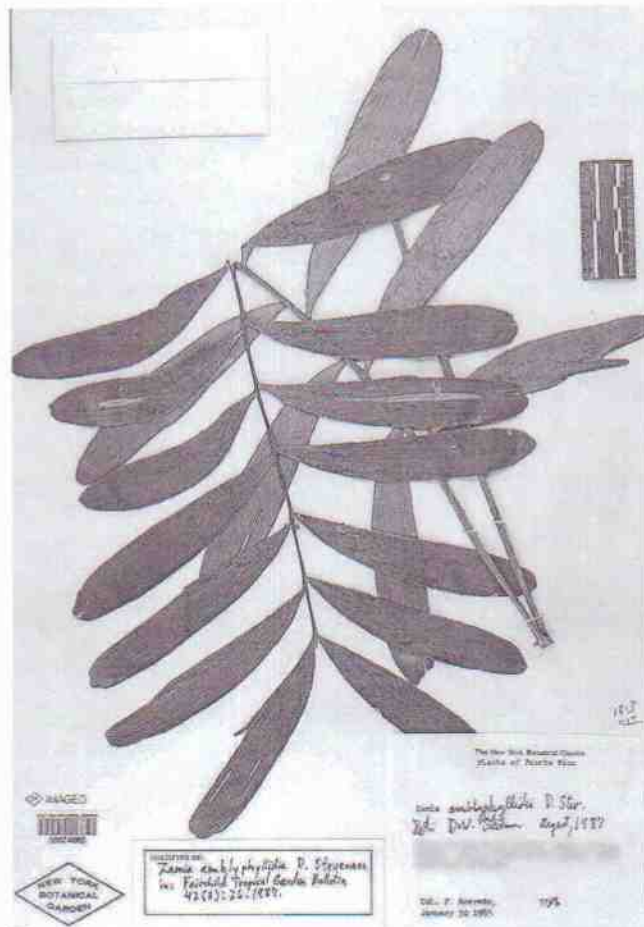


Fig. 4. Holotype of *Zamia amblyphyllidia*.

same paper he described *Zamia amblyphyllidia* from an inland population in the mountains of the north central part of the country. In this review, Stevenson characterizes *Z. amblyphyllidia* as having “obovate to ovate leaflets that are strongly toothed in the upper third” and “2–6 cm wide”.

While conducting field research on native *Zamia* populations in Puerto Rico in 2003 and 2005, the first two authors visited four populations of this broad-leaflet *Zamia* throughout the northwest and north central coast of the island, including a location approximately 4 km south of Vega Baja. This location corresponds closely to the type locality mentioned in Cook & Collins's (1903) protologue for *Z. erosa*. Close inspection by the authors of the holotype (Fig. 4) and isotypes for *Z. amblyphyllidia* (Bosque de Rio Abajo, Utuado, 30 Jan 1985 P. Acevedo R. 576, holotype: NY!; isotypes: FTG!, NY!) and a comparison of the protologue descriptions for both species, leaves little doubt that the species described by Cook and Collins as *Z. erosa* is one and the same as Stevenson's *Z. amblyphyllidia*. Therefore the name *Z. erosa* takes nomenclatural priority over *Z. amblyphyllidia*. Moreover, the sheet with two pictures of a male plant of *Z. erosa* discussed previously is labeled “Utnado [now Utuado] Road, between Utnado and Arcibo”, (Puerto Rico, Utnado Road, between Utnado and Arcibo, Cook & Collins s.n. 1901, NA! Sheet #88477, Fig. 3). This road, currently known as PR-123 and running alongside PR-10, passes right next to Rio Abajo Forest Reserve, the type locality for *Zamia amblyphyllidia*.

Although this broad-leaflet species from northern Puerto Rico was recognized as distinct in 1903 and has been well studied (see Newell, 1983; Negrón-Ortiz & Breckon, 1989; Negrón-Ortiz & al. 1996), its taxonomy has been in a confused state for a long time. It has been called *Z. latifoliolata* Prenel. (Britton & Wilson, 1926), *Z. pumila* (Eckenwalder, 1980), and *Z. debilis* L.f. (Lioger & Martorell, 1982) prior to Stevenson's description of the species as *Zamia amblyphyllidia* (Stevenson, 1987).

The taxonomy and nomenclature of Caribbean *Zamia*, all belonging to the *Zamia pumila* clade (Caputo & al., 2004) is far from resolved, but it is hoped that ongoing genetic studies (Meerow & al., 2007) will lead to a greater understanding of the relationships between populations of *Zamia* within this clade. Until future taxonomic work leads to a greater consensus of the species delineation and number of species within this clade, we propose that the wide-leaflet taxon occurring in northern Puerto Rico, presently known and generally accepted as *Zamia amblyphyllidia* should be referred to as *Zamia erosa*, an earlier validly published name for the same taxon.

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