

New and Rare Understory Palms from the Península de Osa, Costa Rica, and Adjacent Regions

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ABSTRACT

Recent botanical expeditions to the Península de Osa and adjacent regions of southwestern Costa Rica have led to the recognition and characterization of two rare and poorly known species of understory palms, as well as two species new to science. Two enigmatic *Chamaedorea* species originally described by Hermann Wendland, *C. brachyclada* and *C. tenella*, are briefly recharacterized and reported from Costa Rica for the first time. *Desmoncus stans* and *Geonoma scoparia* are described as new. All four species are illustrated with photographs, and complete specimen citations are provided.

The Península de Osa, at the southwestern corner of Costa Rica in the Provincia de Puntarenas, is the last stronghold for primary lowland wet forest on the Pacific slope of this small Central American country. The impressive forests of this region, which have been described as "by far the most exuberant in Central America" (Hartshorn 1983), are by now world famous not only for the abundance of wildlife they harbor, but also for their floristic diversity. The flora of the Osa is further notable in comprising a relatively high percentage of endemic species and species not otherwise known from Costa Rica, and shows a surprisingly strong affinity with the flora of the Chocó region of Colombia, far to the south (Hartshorn 1983).

We have collected, photographed and studied three of the four species discussed in this paper in the unprotected yet still

relatively intact (as of March, 1986) forests lying between Rincón de Osa and the valley of Laguna Chocuaco, at the north-eastern corner of the Península de Osa. The number of permanent human residents in this region has increased rapidly in recent years, and, accordingly, so has the rate of deforestation. We can only hope that these rare palms and many other plant species of comparable interest will be adequately protected within the boundaries of nearby Corcovado National Park, which occupies roughly half of the peninsula. Thus, our excitement at having encountered these rare species must be tempered with our concern for their future survival in the wild state.

Species New to Costa Rica

Two rare species of *Chamaedorea* originally described by Hermann Wendland, *C. brachyclada* H. A. Wendl. and *C. tenella* H. A. Wendl., are here discussed and reported from Costa Rica for the first time.

Hermann Wendland, Director of the Royal Gardens at Herrenhausen, Hanover, Germany, from 1870 until his death in 1903 (Wittmack 1903), is a special figure in Central American botany. A skilled gardener as well as a respected taxonomist, Wendland had a particular fondness for large monocots such as palms, Araceae, and Cyclanthaceae. During his travels through Central America (Guatemala, El Salvador, and Costa Rica) in the years

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1856 and 1857, Wendland concentrated on making herbarium specimens and living collections of these intractable plants, which even today are frequently ignored by general collectors. As a result of this pioneering work, many familiar species in these groups are typified by Wendland specimens.

Most of Wendland's new species were ultimately described by other authors. Heinrich Wilhelm Schott, Wendland's counterpart and mentor at the Schönbrunn Gardens in Vienna, described most of Wendland's Araceae; today, there is hardly an aroid genus in Central America without a species called *wendlandii*. Wendland's Cyclanthaceae material was never worked up, although he collected most of the species in the areas he passed through. His palm collections were treated by various authors: *Geonoma* by Richard Spruce; *Bactris* by Max Burret; *Chamaedorea* by Udo Dammer and André Guillaumin.

Wendland himself had a lifelong interest in the genus *Chamaedorea*, and described many new species, though not from his own collections. As a well known personage at one of the most prominent gardens in Europe, he carried on a lively correspondence and seed-exchange not only with other European institutions, but also with botanists and collectors actively working in the tropics (such as Hartweg, Ortgies, and von Warscewicz, in the New World). Wendland described numerous species of *Chamaedorea*, especially in the early part of his career, from plants cultivated from such sources.

Although several of Wendland's *Chamaedorea* species are familiar at least in name (*C. ernesti-augusti*, *C. geonomiformis*, *C. pygmaea*), others have remained enigmatic for a variety of reasons. His descriptions were often published in obscure German-language journals; some of the descriptions are too brief, and most are unaccompanied by illustrations. Often the country of origin was unknown and, in a few cases, fertile material had not been

seen. Worse yet, Wendland's original "holotype" collections (now housed at the University of Göttingen, West Germany) disappeared early in the present century, and did not resurface until 1969 (Wagenitz 1972). The early dates of these Wendland names make them difficult to ignore, since they would usually have priority over competing synonyms.

Some light can now be shed on two of Hermann Wendland's enigmatic *Chamaedorea* species. By coincidence, *Chamaedorea brachyclada* and *C. tenella* were published in the same article (Wendland 1880), at a comparatively late date, and with detailed descriptions. By further coincidence (or perhaps there is a connection), these are also the only two Wendland *Chamaedorea* species for which the first author has been unable to locate verifiable type material at GOET. Both species are rare and endangered throughout their ranges, and should be seriously considered for protection under CITES and other appropriate statutes. The smaller species of *Chamaedorea* in general are considered choice ornamental subjects, and are much sought after by rapacious and acquisitive commercial collectors, some of whom show no hesitation to completely extirpate wild populations for their own selfish purposes.

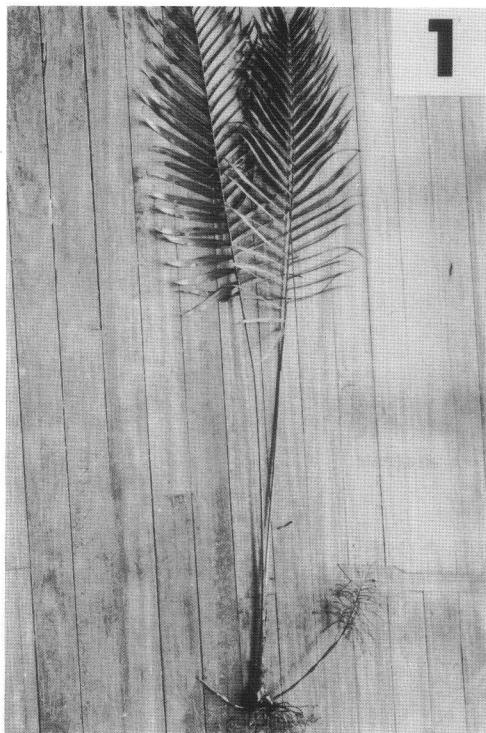
***Chamaedorea brachyclada* H. A.**

Wendl., Gartenfl. 29: 101. 1880.

TYPE: Unmounted, unlabeled specimen annotated as "HOLOTYPE?" by M. H. Grayum, 23 July 1987 (neotype, GOET). Figures 1, 2.

Additional Specimens Examined.
COSTA RICA. PUNTARENAS: vicinity of Las Cruces Botanical Garden (along Río Jaba, S of San Vito de Coto Brus), *de Nevers* 7763 (CAS, MO); *Grayum et al.* 3351, 3352, 3365 (MO); *Maas & McAlpin* 1387 (U); *Moore* 9995 (BH); Finca Salsipuedes, San Vito, *Hobbs* 0583CR-102 (CR).

Distribution and Phenology. *Chamae-*



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1. *Chamaedorea brachyclada* (de Nevers 7763, male plant). 2. *Chamaedorea brachyclada* (de Nevers 7763), closeup of inflorescence.

dorea brachyclada is currently known in the wild only from southern Costa Rica, in the vicinity of San Vito de Coto Brus, at elevations of 1,100–1,400 m, in primary forest and disturbed primary forest. It probably also still occurs in adjacent Panama, although Chiriquí has been as extensively deforested as the Coto Brus region of Costa Rica, and suitable habitats must be scarce. Clearly, this must be regarded as an extremely threatened palm species.

Fertile collections of *Chamaedorea brachyclada* have been made from May through July.

Discussion. *Chamaedorea brachyclada* was described by Wendland from a single female plant, raised from seed collected in Chiriquí, Panama. It seems to have disappeared from cultivation shortly thereafter, and from the literature as well. The species was included by Bailey (1943b)

in the *Flora of Panama*; however, no further collections were reported. Indeed, it apparently has not been recollected in Panama to this day. However, *C. brachyclada* can now be reported as locally common in the very restricted patches of forest remaining in the vicinity of the Las Cruces Botanical Garden, south of San Vito de Coto Brus, near the Panamanian (Chiriquí) border in southern Costa Rica. The species has recently been reintroduced to cultivation in Southern California, via seed from this population (D. Hodel, pers. comm.).

The Las Cruces palm is a very striking species, easily recognized by its acaulescent habit, pinnately compound leaves with narrow, scarcely sigmoid pinnae, and basal inflorescences with numerous (40–70), short and very slender, spreading rachillae. The male inflorescence (Fig. 2), not previously described, is similar to the female



3. *Chamaedorea tenella* (Croat & Grayum 59766A, male plant). 4. *Chamaedorea tenella* (Croat & Grayum 59766B, female plant).

inflorescence. We readily keyed this palm out to *C. brachyclada* in the *Flora of Panama*, then consulted the original description, which agreed in all details.

During a recent trip to GOET, the first author discovered an unmounted, unlabeled specimen of the same species as the Las Cruces palm, mixed in a sheet with extraneous material and filed in Wendland's herbarium with other collections lacking labels. This specimen is in all likelihood the original, holotype collection of *Chamaedorea brachyclada*, although there is no way to be absolutely certain of this, or even of conveniently referring to the specimen. Even so, it establishes that Wendland had material of the Las Cruces species at his disposal, and removes any lingering doubts that the name *Chamaedorea brachyclada* H. A. Wendl. is correctly applied to it.

To obviate any suspicions that the GOET specimen may not represent the holotype, it has here been designated as the neotype.

***Chamaedorea tenella* H. A. Wendl.**, Gartenfl. 29: 103. 1880. TYPE: Provenance unknown: Kreuzpointner 1188, 14 Apr 1888 (neotype, M). Figures 3, 4.

Additional Specimens Examined.
COSTA RICA. PUNTARENAS: Rincón de Osa, Mata 501 (CR); between Rincón de Osa and Rancho Quemado, ca. 10 km W of Rincón-Puerto Jiménez road, Croat & Grayum 59766A, 59766B (MO); ridge between Río Riyito (valley of Laguna Chocuaco) and Quebrada Banegas, S of Cerro Rancho Quemado (ca. 7 km W of Rincón de Osa), Grayum et al. 7558 (MO); hills above Palmar Norte, 1,800 ft., Moore

6526 (BH). SAN JOSE (?): forêts de San Marcos, 200–250 m, Tonduz 7973 (BR).

GUATEMALA. IZABAL: mixed rainforest on calcareous slope and on open field at its base, 13 km E of jct. of CA 9 and road to San Felipe, 60 m, Harmon & Fuentes 1911 (MO).

PROVENANCE UNKNOWN: Hort. Kew 4/81 (K).

Distribution and Phenology. In Costa Rica, *Chamaedorea tenella* is mainly known from the northeastern corner of the Península de Osa, where it occurs sparingly in primary forest on slopes and ridges. There are two additional collections from somewhat further north, and it is probable that the species is of general distribution in the remaining lowland primary forests on the Pacific slope of southern Costa Rica. It appears to be strictly a lowland palm, occurring only below about 600 m.

C. tenella also occurs in the Atlantic lowlands of Guatemala and southern Mexico. The few Mexican collections of known provenance, not seen by us, are mainly from the Los Tuxtlas/Catemaco area of Veracruz (at 500–800 m) and some regions of Chiapas (Aguilar Amar 1986). It must be considered a rare and endangered species throughout its range.

The bicentric geographic distribution of *Chamaedorea tenella* may seem unusual, but, in fact, has numerous parallels in groups with which we are familiar. In Arecaceae, for example, *Philodendron popenoei* Standl. & Steyermark (T. Croat and M. Grayum, unpubl. data) and *Anthurium cubense* Engl. (Croat 1983) have similar distribution patterns. Moreover, at least two other species of *Chamaedorea*, *C. arenbergiana* H. A. Wendl. and *C. tepetjilote* Liebm., appear to be disjunct from the Atlantic slope of Mexico and northern Central America to the Pacific slope of southern Central America.

Flowering material of *Chamaedorea tenella* has been collected in Costa Rica in March, and fruiting material in February and May. The sole Guatemalan col-

lection, a fruiting specimen, was made in February.

Discussion. *Chamaedorea tenella* was described by Wendland from cultivated material introduced from Mexico by Ortigies. An ornamental, dwarf species with simple leaves, *C. tenella* was already rare in cultivation by the turn of the century (Dammer 1904), and, like *C. brachyclada*, has since all but vanished from the annals of horticulture and systematic botany. We now take the unusual step of resurrecting this name for a palm we have collected in the Península de Osa, and which may be generally distributed in what remains of the lowland forests of southern Costa Rica.

We had originally intended to describe the Osa *Chamaedorea* as a new species, and had included with it a collection (Harmon & Fuentes 1911, MO) from the Atlantic lowlands of Guatemala. These specimens agree *inter se*, and differ from all other dwarf, simple-leaved *Chamaedorea* species described from Central America, in the following characteristics: a clearly caulescent habit, with relatively long (1.5–2.4 cm) internodes; stiff, glossy leaves with obscurely toothed margins; inflorescences of both sexes spicate (unbranched) and borne on slender, wiry peduncles; and relatively large (0.8–1.3 cm diam., dried), glossy fruits. Although our material keyed roughly to *Chamaedorea geometromorpha* H. A. Wendl. in the *Flora of Guatemala* (Standley and Steyermark 1958), the latter comprises taller plants, with longer and broader leaves and branched staminate inflorescences (see original description of Wendl 1852, or the English translation of Dammer 1904). The holotype of *C. geometromorpha* (GOET!) differs in other details as well, and we felt amply justified in rejecting this epithet for the entity under discussion.

Chamaedorea tenella is not treated in the *Flora of Guatemala*; presumably, any specimens that might have been seen by the authors were included in a broadly

circumscribed *C. geonomiformis*. We did not consider the name as potentially applicable to the Osa palm until chancing upon a specimen (*Kreuzpointner 1188*) so identified at M. The latter specimen matches the recent Osa and Guatemala collections in all respects, and all of this material agrees in all important details with Wendland's description of *C. tenella* (there is some variation in the degree of marginal serration of the leaf-blades; however, we do not regard this as significant at the species level).

It is extremely likely that Kreuzpointner's plant came from the same source as Wendland's material, or, indeed, even from Wendland himself. The label gives no such indication; however, the collection was made in the same country, and only a few years following the publication of Wendland's description. Since Kreuzpointner's specimen is, moreover, well prepared and representative of our concept of *Chamaedorea tenella* (and, more importantly, of Wendland's concept), we have chosen to designate it as the neotype (no material of this species having been located at GOET).

Complete descriptions of the preceding two *Chamaedorea* species will be presented in a forthcoming treatment of the Palmae for *Flora Costaricensis* (W. C. Burger, ed.).

Species New to Science: *Desmoncus*

The remarkable new species of *Desmoncus* described below was first collected by Guillermo Mata Ulloa, of Guadalupe de Goicoechea, Costa Rica, in 1964:

***Desmoncus stans* Grayum & de Nevers, sp. nov.** TYPE: Costa Rica. Punta-reñas: 7 km W of Rincón de Osa, ridge between Río Riyito and Quebrada Bangas, 8°41'N, 83°32'W, 200–300 m, *de Nevers et al. 7760* (holotype, MO; isotypes, CAS, CR, NY). Figures 5–8.

Planta caespitosa; caules infirme stantes, nunquam scandentes, 2–2.5 m alti; petiolus 5.5–12 cm longus; petiolus et rhachis spinis rectis 0.6–4.5 cm longis sparsim armata; rhachis folii 18–41 cm longa, in filamentum gracile inerme 1.3–14 cm longum apice prolongata; lamina pinnata pinnis in quoque latere 3–7; pinnae pro parte maxima 11–19 cm longae, 3–5 cm latae, anguste ellipticae, ad apicem piliferae vel cirrhosae; prophillum 13–15 cm longum vagina folii prominenter exsertum; pedunculus ca. 19–22 cm longus; pedunculus et bractea pedunculi inermis; bractea pedunculi 13–18.5 cm longa, ca. 2 cm lata ubi expansa, ad pedunculum supra medium et ca. 2–4 cm subter inflorescentiam affixa; inflorescentia spiciformis, 6–12 cm longa, rhachillae nullae; triens infima inflorescentiae floribus aggregatis ternis, flos femineus unus cum floribus masculinis duobus; trientes superae inflorescentiae solum flores masculinos ferentes; bractae florium scariosae, margine remotiuscule villosodentatae; flores masculini calyce scarioso, 1–1.8 mm longo, calyci florum femineorum simili; flores masculini petalis tribus, lanceolatis, cremeis, in aestivatione imbricativis, 6–9 mm longis, 1.5–2 mm latis; antherae ca. 2 mm longae, basi sagittatae, basifixae, filamentis ca. 1 mm longis; flores feminei petalis connatis per duos longitudinalis trientes, pisinis, ca. 3 mm longis; staminodia sex, linearia, minuta; fructus maturi scarlatini, obovoidei, 1.9–2.1 cm longi, 1.4–1.6 cm lati.

Plants cespitose with 3–5 stems, these 2–2.5 m tall, 5–12 mm in diameter, erect or leaning on surrounding vegetation. Leaves 4–7; sheath tubular 21–29 cm long, with remote, straight spines ca. 5–6 mm long; petiole arising 7–13 cm below the apex of the sheath, channeled above, 3–4 mm diameter, 5.5–12 cm long; petiole and rachis closely brownish-pannose, with 1–12 dark brown, straight, somewhat flattened spines 0.6–4.5 cm long; lamina pinnate with pinnae 3–7 per side, mostly 11–19 × 3–5 cm, narrowly elliptic, nar-



5. *Desmoncus stans* (Grayum et al. 8115); apex of leaf, showing unarmed filamentous extension (barely visible) of rachis. 6. *Desmoncus stans* (Grayum et al. 8115); unopened inflorescence, showing long peduncle, with peduncular bract (thickened portion) inserted distally.

rowly acute at the base, long-acuminate to piliferous or cirrhouous at the apex, the margins somewhat undulate; midrib of pinnae below with 0–2 straight spines to ca.

1.5 cm long; rachis 18–41 cm long, extending beyond the pinnae as a slender, naked filament 1.3–14 cm long (occasionally bearing a terminal reduced pinna).



7. *Desmoncus stans* (Grayum et al. 8115); opened inflorescence (past anthesis), showing spicate (unbranched) rachis. Note undulate pinna margins. 8. *Desmoncus stans* (Grayum et al. 8115); mature fruits (note persistent peduncular bract).

Inflorescences axillary, produced from 15 cm above the ground to the stem apex; prophyll 13–15 cm long, exserted 5–13 cm from the leaf sheath; peduncle ca. 19–

21.5 cm long; peduncular bract 13–18.5 cm long, attached well above the middle of the peduncle and ca. 2–4 cm below the spadix, striate when dry, unarmed,

expanding to ca. 2 cm wide at anthesis, whitish within, with a rather flattened apex ca. 1.5–3 cm long, persistent to the fruiting stage; rachis of inflorescence 6–12 cm long, spicate (unbranched); proximal third of rachis with triads of 1 pistillate and 2 staminate flowers; central third with pairs of staminate flowers; distal third with solitary staminate flowers; floral bracts scarious, the lower ca. 1 × 2.5–3 mm, the upper ca. 1.5 × 1 mm, the margins villose-toothed. Staminate flowers with the calyx 1–1.8 mm long, the sepals scarious, with prominently thickened veins externally, connate into a trilobed cup; petals 3, distinct, imbricate, cream-colored, lanceolate, mostly 6–9 mm long and 1.5–2 mm wide, basally adnate to the receptacle; stamens 6, erect, arising from the receptacle, filaments ca. 1 mm long, anthers ca. 2 mm long, sagittate at the base, basifixed; pistillode minute. Pistillate flowers with calyx as in staminate flowers; petals light green, connate in a prominently veined, ovoid cup enveloping the ovary, apically trilobed to ca. ⅓ the distance to the base, 3 mm long, persistent and spreading open in fruit; staminodes 6, linear, minute, basally adnate to the petals; stigmas 3, linear, sessile, ovules 3, basal, only one developing. Ripe fruits (*Grayum et al.* 8115) bright red, obovoid, 1.9–2.1 × 1.4–1.6 cm; endocarp marked with radiating fibers, rather thin; endosperm homogeneous.

Additional Specimens Examined.
COSTA RICA. PUNTARENAS: Rincón de Osa, Mata 483 (CR); cultivated in Las Cruces Botanical Garden, ca. 4 km SE of San Vito de Coto Brus, *Grayum et al.* 8115 (MO, CR).

Distribution and Phenology. *Desmoncus stans* is known in the wild only from the type locality, in primary forest on slopes and ridges between the valley of the Quebrada Banegas and that of the Río Riyito (Laguna Chocuaco), at the northeastern

corner of the Península de Osa, Costa Rica. Elevations in this region are in the 200–300 m range. Here it is locally common.

Interestingly, we encountered, immediately after our discovery of *Desmoncus stans* on the Osa, two healthy clumps of this species (correctly identified to genus!) in cultivation on the grounds of the Las Cruces Botanical Garden. This site, previously discussed under *Chamaedorea brachyclada*, is located at about 1,100–1,200 m elevation, on the Pacific slope of mainland Costa Rica just opposite the Península de Osa. Although it is not uncommon for plant species to span the elevational and geographical range between San Vito and the Osa, we have been unable to locate natural populations of *D. stans* in the forests adjacent to the Garden, and the species is apparently not native in the immediate vicinity of Las Cruces. To the best recollection of the Garden's founder and patriarch, Mr. Robert G. Wilson, his material was originally collected on the Atlantic coast! We have as yet seen no herbarium material from the Atlantic slope of Costa Rica, but this sort of disjunction is quite plausible and is seen in many other plant species.

Desmoncus stans, currently known to occur naturally in only one small, unprotected area, must be regarded as an extremely threatened species.

Our single wild collection of *Desmoncus stans*, which is slightly pre-anthesis, was made in late May. Mata's original collection, representing a fruiting individual, is from early January. Plants in cultivation at the Las Cruces Botanical Garden were at anthesis and bore ripe fruits in early March.

Discussion. *Desmoncus* is a notorious genus among palm specialists in that a great many species have been described on the basis of relatively few dried (and sometimes sterile) specimens, with little or no understanding of the actual biological entities in the field. Nevertheless, we feel confident in describing *D. stans* as new,

since it exhibits a unique combination of several highly unusual features.

Desmoncus stans is remarkable in lacking all the vegetative features normally serving to distinguish *Desmoncus* from the closely related genus *Bactris*: the new species comprises erect, self-supporting, altogether non-scandent understory plants that never develop spines or retrorse hooks (representing modified pinnae and properly termed "acanthophylls") on the filamentous extension of the leaf rachis. A scandent habit and the possession of acanthophylls are so fundamental to the generic concept of *Desmoncus* that most generic keys (Standley 1920, Macbride 1936, Bailey 1943b, Standley and Steyermark 1958, Wessels Boer 1971, Read 1979, Moore and Chazdon 1985, Galeano and Bernal 1987) allude to these features alone, omitting any reference to floral or fruit differences between *Desmoncus* and *Bactris*.

According to contemporary circumscriptions of *Desmoncus* (e.g., Galeano and Bernal 1987, Uhl and Dransfield 1987), *D. stans* is also highly unusual in having unarmed peduncular bracts, and unique in its spicate inflorescences (Fig. 7) and, perhaps, its prominently exserted prophylls. Thus, although the new species strikes one immediately as a *Desmoncus* on the basis of "gestalt" characteristics, our assignment of it to that genus appears to require some defending.

The filamentous extension of the leaf rachis (Fig. 5) in the new species might be adduced as evidence that we are dealing with a *Desmoncus*, even in the absence of acanthophylls; this feature occurs regularly, however, in species of unrelated genera, such as *Geonoma seleri* Burret (MHG, pers. observ.), and at least occasionally in some *Bactris* (e.g., *Ocampo* 1895, CR; species unknown).

Fortunately, however, *Bactris* and *Desmoncus* do exhibit important floral differences (Uhl and Dransfield 1987) that permit an objective and unequivocal assignment of the new species to the latter

genus. Especially significant in this regard are the distal insertion of the peduncular bract and the basifixed, erect anthers with stamen filaments erect in bud.

Actually, in spite of most recent characterizations of *Desmoncus*, it turns out that none of the "aberrant" features of *D. stans* is unique within the genus; rather, it is the possession of all these features in combination that delimits the new species. *Desmoncus prostratus* Lindm., from the Mato Grosso (holotype S!), also lacks acanthophylls; in fact, this species may be non-scandent as well, according to the original description (Lindman 1900), in which the word "arbuscula" (a small tree) is used to describe the habit. *Desmoncus prostratus* differs from *D. stans* in many respects, however, most notably in its branched inflorescence. An unidentified *Desmoncus* from Goyaz Province, Brazil, represented by Glaziou 22278 (BR, G), likewise lacks acanthophylls, but differs from *D. stans* in having curved spines on the leaf rachis, a densely spiny peduncular bract and a branched inflorescence.

An unidentified *Desmoncus* from Bahia, Brazil, represented by Lewis & de Carvalho 813 (K), has unarmed peduncular bracts, but differs from *D. stans* in having acanthophylls and a branched inflorescence. Finally, *Desmoncus vacivus* L. Bailey, as represented by Tessmann 5236 (G) from Amazonian Peru (det. Medeiros-Costa), has a spicate inflorescence; however, it possesses acanthophylls and has curved spines on the leaf rachis.

Due to its exclusive possession of straight rather than curved spines, *Desmoncus stans* is here assigned to Burret's (1934; see also Bailey 1943a) section *Orthacanthium* (his other section, *Campylacanthium*, is characterized by having curved prickles). Although we had considered erecting a new section for this aberrant species, the other exceptional species discussed in the preceding paragraphs argued against any modification of the existing infrageneric classification of *Desmoncus*.

In spite of being, all things considered, the most anomalous *Desmoncus* yet described, *D. stans* is surprisingly unprepossessing in the field. Had the Osa population not been in fertile condition during our most recent visit, we would undoubtedly have passed the plants over as juveniles of some more typical (i.e., high-climbing) species, as was presumably done during several previous excursions to the same site. Could these plants, indeed, simply be precociously flowering juveniles that would ultimately become scandent? We consider this exceedingly unlikely. The Las Cruces clones have been in cultivation there for about 10 years, and are thriving, flowering and setting fruit. However, they show absolutely no tendency toward climbing, nor toward the production of modified terminal pinnae.

Certain typically scandent (as adults) species of *Desmoncus* are known to have a free-standing juvenile stage (e.g., in the Amazon basin; A. Henderson, pers. comm.). Thus, the small stature and non-scandent habit of *Desmoncus stans*, as well as the production of inflorescences to near ground level, suggest that neoteny may have played an important role in the evolution of this species. Under this scenario, these unusual features would have to be regarded as derived within the genus. Other characteristics (lack of modified distal pinnae, unarmed peduncular bracts, spicate inflorescences, etc.) may be subject to the same considerations.

By virtue of its erect habit, manageable size, relative spinelessness and showy fruits (Fig. 8), *Desmoncus stans* is highly suitable for cultivation as an ornamental; it may well be the only species of its genus in this category.

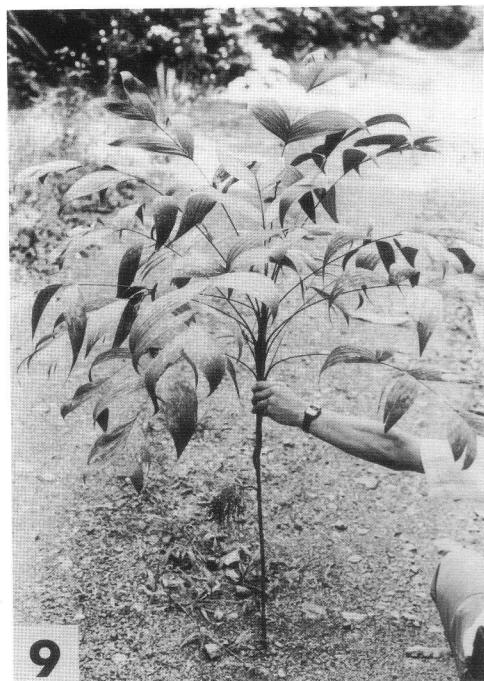
Geonoma

The following distinctive *Geonoma*, which we first encountered in the Osa in October, 1984, represents an undescribed species which had not been previously collected:

Geonoma scoparia Grayum & de Nevers, sp. nov. TYPE: Costa Rica. Puntarenas: 7 km W of Rincón de Osa, ridge between Río Riyito and Quebrada Bane-gas, 8°41'N, 83°32'W, 200–300 m, *de Nevers et al.* 7757 (holotype, MO; isotypes, CAS, CR). Figures 9, 10.

Caulis solitarius, gracilis, ca. 1.5–3 m altus, usque 0.9 cm diametro; petiolus 21–59 cm longus; lamina semper trijugata, late ovata; rachis laminae 27.0–31.5 cm longa; pinnae late sigmoidae, 14–26 cm longae, 4.9–9.5 cm latae; prophyllum ca. 6–8 cm longum; bractea pedunculi prophyllum subaequilonga, extus ferrugineo-pannosa; pedunculus ca. 2.3–3.8 cm longus; inflorescentia paniculata, 16–22 cm longa, 21–38 cm lata; rhachillae inflorescentiae tenuissimae, minute exasperatae, ca. 0.5 mm diametro, 8.5–11 cm longae, apice aristatae; foveae florales distantantes, quam rhachillae latiores, bilabiatae, intus glabrae, orificio ca. 1.2 mm lato; labium superum foveae angustum obsolescensque, labium inferum vade emarginatum vel acute retusum; flores masculini ca. 2 mm longi; stamina sex, loculus antherarum valde inflexis; flores feminei ca. 1.5 mm longi, tubo staminodiorum apice crenato; fructus maturi nigri, subglobosi, in sicco ca. 5 mm diametro, tessellati.

Stems slender, solitary, ca. 1.5–3.0 m tall, 0.9 cm diam. Leaves consistently trijugate, 19 counted on one plant; petiole (including sheath) 21–59 cm long, channeled adaxially, rounded abaxially; sheath 7–11 cm long ($\frac{1}{6}$ – $\frac{1}{3}$ total length of petiole); lamina broadly ovate in outline, the pinnae broadly sigmoid, ca. 14–26 × 4.9–9.5 cm (the proximal pair narrowest), the primary ribs ca. 23–27 (6–8 per pinna), diverging from the rachis at an angle of 50–58° on the two distal pairs of pinnae, 73–75° on the proximal pair, prominent and narrowly raised adaxially, convex abaxially; rachis 23.0–31.5 cm long and essentially glabrous. Inflorescences infractori, paniculate, 16–22 cm long, 21–38



9



10

9. *Geonomia scoparia* (de Nevers et al. 7757); apical portion of plant, showing trijugate leaves and a single infructescence. 10. *Geonomia scoparia* (de Nevers et al. 7757); closeup of infructescence with fruits. Note three immature inflorescences above, still enclosed in prophylls.

cm wide; prophyll ca. 6–8 cm long at maturity, ca. 1.5–2 cm wide; peduncular bract about equaling the prophyll, thinner, closely brownish-pannose externally; peduncle ca. 2.3–3.8 cm long; rachis 3.5–6.5(–8.0) cm long, usually not well distinguished; lower branches 4–7-branched into very slender rachillae ca. 0.5 mm wide and 8.5–11 cm long; rachillae glabrous but with the axes minutely tuberculate-roughened, reddish at anthesis and especially in fruit, awn-tipped (the awns variously curved or bent, 0.9–1.8 cm long), with distantly separated pits ca. twice as thick as the rachillae; pits bilabiate, the upper lip narrow and obsolescent, the lower lip shallowly emarginate to sharply retuse, the orifice ca. 1.2 mm wide, glabrous within. Staminate flowers (*Croat & Grayum* 59888) ca. 2 mm long, the petals and sepals subequal; stamens 6, the filaments connate to nearly halfway up; anther loc-

ules strongly inflexed, the sterile base ca. $\frac{1}{3}$ the total length. Pistillate flowers (*Croat & Grayum* 59767) ca. 1.5 mm long, the petals slightly exceeding the sepals and staminodial tube (the latter being subequal); staminodial tube crenate. Ripe fruits black, subglobose and ca. 5 mm in diameter when dry, the surface tessellate.

Additional Specimens Examined.
COSTA RICA. PUNTARENAS: ridge between Quebrada Banegas and Río Riyito, ca. 7 km W of Rincón de Osa, *Grayum et al.* 4088 (MO); along ridge between Rincón de Osa and Rancho Quemado, ca. 10 km W of main Rincón-Puerto Jiménez road, *Croat & Grayum* 59767 (MO); along road between Chacarita and Rincón de Osa, 10 km W of Chacarita, *Croat & Grayum* 59888 (MO).

Distribution and Phenology. *Geonomia scoparia* is known only from our four

collections, three of which are from the northeastern corner of the Península de Osa between the valley of Quebrada Bangas and the Río Riyito (Laguna Chocuaco). The fourth collection (*Croat & Grayum 59888*) is from the area at the head of Golfo Dulce, along the new road connecting Rincón de Osa with the Carretera Interamericana at Chacarita.

All collections are from slopes and ridges in primary forest, between 100 and 300 m elevation. *Geonoma scoparia* is not a common species; the plants seem to be few and widely scattered. We have had difficulty finding specimens even during concerted searches in areas where the species is known to occur, and three of our four collections are, as a result, unicates.

Confined as it is to a small and unprotected area, and being rare even within that area, *Geonoma scoparia* is probably the most gravely endangered of the four palm species discussed in this paper.

Flowering collections of *Geonoma scoparia* have been made in March (at the peak of the dry season) and October (at the peak of the rainy season); the single fruiting collection was made in late May.

Discussion. *Geonoma scoparia* (Fig. 9), with its delicate and intricately branched, broomlike inflorescences (Fig. 10), does not resemble any other species known from Costa Rica. The new species will key out roughly to *Geonoma deversa* (Poir.) Kunth in the generic monograph of Wessels Boer (1968). It differs markedly from that species, however—most notably, vis-à-vis the aforementioned key, in its non-verticillate floral pits. *Geonoma deversa* (which occurs sympatrically with *G. scoparia*) differs additionally in having the secondary veins immersed above, a longer (5–15 cm) peduncle, thicker (1.5–2.5 mm) inflorescence rachillae and larger (3 mm) male flowers.

Geonoma gastoniiana Glaziou ex Drude, a Brazilian species, also seems to agree rather well with *G. scoparia*; the inflorescences of the former species are, however,

larger in every respect: the peduncle is about 10 cm long, and the rachillae are much longer (20–25 cm) and thicker (1 mm) than in the new species.

Actually, the new species is probably most closely related to *Geonoma tenuissima* of Ecuador, posthumously described by Harold E. Moore, Jr. (1982) and apparently the last palm species to have been described by that venerable and prolific authority. The inflorescence of the latter species bears a striking resemblance to that of *G. scoparia*; *G. tenuissima* differs, however, in its cespitose habit, simple leaf blades and truncate staminodial tube. Additional, less significant differences include a more clearly defined inflorescence rachis, primary veins depressed or weakly raised above, pits with a prominent upper lip and an entire lower lip, and shorter apical rachillar setae.

Another seemingly close relative of *Geonoma scoparia* is an undescribed central Panamanian mid-elevation species, represented by the following specimens (at MO) determined as “*Geonoma* sp. nov.” by H. E. Moore: *Hammel 3459* (Prov. Coclé); and *Nee 11252* (Prov. Veraguas). Although likewise possessing an inflorescence similar to that of *G. scoparia*, this species differs in its cespitose habit, leaf blades divided into many narrow pinnae, and truncate staminodial tube. In addition, it has somewhat longer prophylls and peduncles, and a more definite inflorescence rachis.

Geonoma scoparia and the two species just discussed are here assumed to be intimately related, and to form a natural group within *Geonoma*.

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