

PRELIMINARY TAXONOMIC CONSIDERATION OF THE PORANEAE (CONVOLVULACEAE)

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The tribe Poraneae (Convolvulaceae) has been taxonomically evaluated, and some realignment of genera is necessary. *Metaporana* N. E. Br. is here reassigned to the tribe Cresseae. A new combination is made for a species endemic to Socotra; its diagnostic features are discussed. *Dactylostigma* D. Austin is reduced to synonymy with *Hildebrandtia* Vatke ex A. Braun of the tribe Hildebrandtieae. A new name is provided for the first Madagascan species of *Hildebrandtia*.

Eight genera had been assigned to the Poraneae Hallier f. (Convolvulaceae) (see TABLE) when I began an evaluation of the tribe in 1983. Of these, some were questionably placed because they appeared to lack the characters used by Hallier (1893) to establish the tribe—namely, an accrescent, winglike fruiting calyx enclosing a one-seeded, indehiscent fruit with a papery pericarp (utricle).

A comprehensive examination of all genera assigned to the tribe Poraneae is nearing completion. The present paper will provide an overview of the tribe and make necessary taxonomic combinations for two genera being removed from the Poraneae. The next paper will present a taxonomic revision of the genus *Porana* Burman f., which formed the bulk of my doctoral dissertation (Staples, 1987). The final one will recharacterize the tribe Poraneae and delimit the character states for the genera assigned to it; it will also include revisions for the genera *Cordisepalum* Verdc., *Cardiochlamys* Oliver, *Rapona* Baillon, and *Dipteropeltis* Hallier f. Within the genus *Calycobolus* the African taxa have been studied by Lejoly and Lisowski (1985) and the Neotropical taxa by Austin and Staples (in prep.). In addition, a comprehensive palynotaxonomic study of this genus and its close relative *Dipteropeltis* is nearing completion (D. Vernier, pers. comm.) and will perhaps further illuminate the relationships of these genera. These works account for most of the genera that had been assigned to the Poraneae prior to 1983, when I began this study.

Two genera, *Metaporana* N. E. Br. and *Dactylostigma* D. Austin, remain to be discussed. Based on morphological, palynological, and trichome characters, they are incorrectly referred to the Poraneae. They are here reassigned to other tribes, necessitating one new name and one new combination.

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A conspectus of the tribe Poraneae Hallier f.* ca. 1983.

GENUS	DATE OF FIRST PUBLICA- TION	NUMBER OF TAXA	PROVENANCE
<i>Porana</i> Burman f.	1768	ca. 25	Asia and Australia
<i>Calycobolus</i> Willd.	1819	ca. 20	W Africa and tropical America
<i>Cardiochlamys</i> Oliver	1883	2	Madagascar
<i>Rapona</i> Baillon	1891	1	Madagascar
<i>Dipteropeltis</i> Hallier f.	1899	2	W Africa
<i>Metaporana</i> N. E. Br.	1914	7	E Africa and Madagascar
<i>Cordisepalum</i> Verdc.	1971	1	SE Asia
<i>Dactylostigma</i> D. Austin	1973	1	Madagascar

*Adapted from Austin (1973).

METAPORANA

Nicholas Brown (1914) established *Metaporana* for two East African taxa. Since that time, the genus has variously been maintained as distinct (Myint & Ward, 1968; Verdcourt, 1969) or placed in synonymy with *Bonamia* Thouars (Meeuse, 1957; Verdcourt, 1963). Myint & Ward (1968), in their revision of *Bonamia*, concluded that *Metaporana* was distinct from *Bonamia*. Reexamination of *Metaporana* in terms of the characters used to define the Poraneae, however, revealed that its persistent but nonaccrescent calyx and tardily dehiscent capsule exclude it from that tribe. Overall morphology, trichomes, and pollen characters of *Metaporana* indicate that it is better placed in the tribe Cresseae Benth. & Hooker, a reassignment I here effect. The Cresseae, in need of careful systematic scrutiny, are at best loosely delimited at present by their branched style or two free styles, dehiscent capsules, nonaccrescent calyxes, and predominantly nonspinose, three-colpate pollen grains.

Verdcourt (1969) accepted *Metaporana* as a valid genus and lectotypified it with *M. densiflora* (Hallier f.) N. E. Br., simultaneously recognizing the first Madagascan species of the genus, *M. parvifolia* (K. Afzel.) Verdc. He later (1974) identified three varieties of the latter species, *M. parvifolia* var. *obovata*, var. *obtusata*, and var. *pilosa*, and described two additional species endemic to Madagascar, *M. conica* and *M. sericosepala*. Since his 1974 paper describes, illustrates, and lists specimens examined for the Madagascan taxa, such information is not repeated here. A description and illustration for *M. densiflora* are available in Verdcourt (1963, under *Bonamia poranoides*). I do include a list of representative specimens examined for this widely distributed African plant.

This brings to four the number of species in *Metaporana*, one in East Africa and three from Madagascar. To these I can add another, which was described as a species of *Porana*. *Porana obtusa* Balfour f. is endemic to the island of Socotra. Only one additional collection has come to light since Balfour's gathering of the type material. The slightly accrescent fruiting calyx and tardily

dehiscent, two-seeded capsule exclude the species from *Porana* and indicate a placement in *Metaporana*.

***Metaporana obtusa* (Balf. f.) Staples, comb. nov.**

Porana obtusa Balf. f. Proc. Roy. Soc. Edinburgh **12**: 83. 1883; Trans. Roy. Soc. Edinburgh **31**: 192. t. 57. 1888. TYPE: Socotra, "inter scopulos ad extremitatem campi Kadhab scandens," Feb.–March 1880, *Balfour, Cockburn, & Scott 355* (holotype, K!; isotypes, BM!, E!, LE!; fragment, GOET!).

Little can be added to the 1888 description published by Balfour, which in conjunction with his plate, adequately characterizes the species. *Metaporana obtusa* is an erect shrub 3–10 m tall, with leathery, dull-colored, oblong leaves having an obtuse to emarginate apex and 12 to 14 pairs of secondary veins. The corolla lobes are marked with dark, elliptic (? glandular) dots, and the capsule has a glossy, resinous-looking surface, much like that of *M. sericosepala* Verdc. Overall, *M. obtusa* has the largest fruiting calyx of any species in the genus due to the slightly accrescent nature of the sepals.

DISTRIBUTION. Endemic to the island of Socotra in the Indian Ocean.

ADDITIONAL SPECIMEN EXAMINED. **Socotra Island**: Ras Kattomahan, *G. Popov So/136* (BM).

***Metaporana densiflora* (Hallier f.) N. E. Br. Bull. Misc. Inform. **1914**: 168. 1914.**

Porana densiflora Hallier f. Bot. Jahrb. Syst. **18**: 93. 1894; in Engler, Abh. Preuss. Akad. Wiss. **26**, **34**. 1894. TYPE: East Africa, 1885–1886, *Fischer 284* (holotype, B, destroyed; fragment, GOET!).

Bonamia poranoides Hallier f. Bull. Herb. Boissier **5**: 1007. 1897, nom. nov., non *B. densiflora* (Baker) Hallier f. (1894).

DISTRIBUTION. Widespread in equatorial Africa, from northeastern Zaïre eastward through Uganda, Tanzania, and Kenya to the Indian Ocean.

REPRESENTATIVE SPECIMENS EXAMINED. **Kenya**. COAST PROV. Kilifi distr.: Kilifi, *G. M. Jeffrey K307* (K), *Graham 1923* (K); Mnarani, *Lavranos 11899* (M); Mtawapa, *Williams Sangrai 840* (K); Sabaki, 4 mi N of Malindi, *R. Polhill & Paulo 734* (K, P). Kwale distr.: behind Diani Beach, *J. B. Gillett 18645* (K, P); Diani Forest, *J. B. Gillett & Kibuma 19879* (K). Mombasa distr.: Bamburi–Shimo la Tewa, *Bally & A. R. Smith 14380* (K); Mombasa, *Sacleux 2208(#1)* (P), *2208(#2)* (P). Distr. not indicated: Jardini Forest, *Foden & A. Evans 70/409* (K); Kibarani, *G. M. Jeffrey K53* (K); N of Mombasa to Lamu and Witu, *A. Whyte s.n.*, 1902 (BM); Mombasa to Takaungu, *A. Whyte s.n.*, 1902 (K); S of Mombasa, *H. M. Gardner 1413* (K); Mwachi, 3 mi S of Mazeras, *R. B. Drummond & J. H. Hemsley 4245* (K); Rabai Hills, Mombasa, Mlima von Riali, Rabai, *W. E. Taylor s.n.*, Sept. 1885 (BM); Shanzu, *E. Polhill 408* (K, P); Takaungu, *Thomas s.n.*, Feb. 1867 (WU). SOUTHERN PROV., distr. not indicated, Kitui, Endau forest, *J. Mbonze 31* (K). **Tanzania**. EASTERN PROV. Dar es Salaam, Wazo Hill, *Batty 37* (P), *1071* (P). Kisarawe distr.: Kazimzumbwe, *Proctor 6* (K); Nyaburu, *T. H. Fundi s.n.*, 18 May 1954 (K); Pugu Hills, forest reserve, *O. J. Hansen 431* (C), *J. H. Vaughan 2342* (BM). TANGA PROV. Pangani distr.: Bushiri Est., *Faulkner 590* (BM, K, P, S); Mecca Parish, Mseko section, Mwera chiefdom, *Tanner 2943* (UC); Pangani, *Stuhlman 594* (HBG). Distr. not indicated: Kigombe, *Geilinger 897* (K); Kirindani, *H. Faulkner 3612* (BR); 4 mi SE of Ngomeni, *R. B. Drummond & J. H.*

Hemsley 3608 (κ); Usambara Mtns., Büiti, *Holst 2379* (κ, м); Usambara Mtns., Duga, *Holst 3205* (BM, G, HAM, K, LE, M, P, S, US, w); Usambara Mtns., Maramba, Mwele, *Peter 51724* (B, GOET); Usambara Mtns., bei Masbura, *Peter 51624* (GOET); Usambara Mtns., Mkumbora, *Doughty 2* (κ). Prov. not indicated, Krogwe distr., Magewga Est., *Faulkner 1335* (κ). **Uganda.** EASTERN PROV. Busoga distr.: Butembe-Bunya Co., 12 mi N of Jinja, Kagoma Forest Reserve, *G. H. S. Wood 321* (κ); Wandago Mutalla, ca. mi 10 on new Iganga road, *G. H. S. Wood 18* (κ); without further locality, *E. Brown 369* (κ). Distr. not indicated, Aga Swamp, Teso country, *P. Chandler 987* (κ). WESTERN PROV. Toro distr., Ruwenzori, *G. Taylor 2662* (BM). Distr. not indicated: Butiaba, plain on E shore of Lake Albert, *Bagshawe 843* (BM); 58 mi from Fort Portal, SW of Mukokya, *Lock 463* (κ); Kikonongo, Ruenzori, *Maitland 1037* (κ). Prov. and distr. not indicated: Bwamba, *R. Fyffe 19* (κ); Commo, shores of Nyanza Salt Lake, *Scott-Elliot 7972* (BM, κ); Plucot (Usoga), *R. Dümmer 2790* (BM); Waryanga-Jinja, *P. Chandler 2066* (κ, P). **Zaire.** PROV. KIVU. Beni territory: Beni, *Lebrun 4599* (κ, US); Bwambali, Parc Natl. Albert, *De Witte 13942* (κ). Territory not indicated: Bitshumbi [Vitshumbi], Bosquet, *Lebrun 9269* (BR, K, MO, P); Bitschumbi, Kikongomoko, *De Witte 1035* (BR, K); Kabare, *Bequaert 5424* (BR); Kotonda [Katanda], *Lebrun 7705* (κ, P); NO Kongo, Semliki-Ebena, *Mildbraed 2129* (HBG). PROV. ORIENTALE, Ituri, versant Ouest, massif du Ruwenzori, *H. Humbert 8809* (P). Prov. not indicated: Ruindi, *Lebrun 8029* (κ, P); près du camp de la rivière Ruindi, *De Witte 2083* (κ).

A comment on the typification of this species is warranted. The holotype for *Porana densiflora* was destroyed with the Berlin herbarium, and no isotype has come to light that might serve as lectotype. This situation prompted Verd-court (1963) to designate *Holst 3205* (κ) as a neotype for the name. In the material loaned for the tribal revision, I found a fragment of the original Fischer collection conserved at Goettingen. Perhaps Hallier removed a bit of the holotype from Berlin for his studies at Goettingen, where he worked for some time. In any case, the application of the name is without question because *Fischer 284* is the same species as *Holst 3205*. Although the latter collection now has no nomenclatural standing, it is useful for comparative purposes because it has been authenticated by comparison with the only fragment of the holotype known to exist. The Holst collection has been widely distributed and is more readily available to botanists than the original Fischer collection.

DACTYLOSTIGMA

Based on a single poorly preserved specimen from Madagascar, Austin (1973) described the genus *Dactylostigma*, typified by *D. linearifolia*. The generic name refers to the highly divided stigmas, lobed like the fingers of a hand, which Austin believed were unique in the Convolvulaceae. The holotype specimen is depauperate, and although stigmas are visible, the other structures inside the flowers are largely obscured by fungal hyphae. The spent flowers are enclosed in large, papery calyces, with the two outer sepals much accrescent, the third sepal less so, and the fourth and fifth ones only slightly increased in size. The fruits, which are immature on the holotype specimen, are formed from a unilocular ovary containing four ovules, only one of which develops into a seed. These features suggest a relationship to the Poraneae, to which tribe Austin referred the new genus.

During a visit to the Paris herbarium in 1984, I was able to examine the

very rich Madagascan collections conserved there. Having studied additional, more complete material of *Dactylostigma*, I can now amplify Austin's description of the plant. The flowers are functionally unisexual, with staminate and pistillate flowers borne on separate plants. I was able to compare these specimens with complete material of *Hildebrandtia* Vatke and *Cladostigma* Radlk., two African genera known to be dioecious (Hallier, 1898). The stigmas of *Dactylostigma* proved to be identical to those of *Hildebrandtia*, although the Madagascan plants are clearly a different species of that genus than any of those known from Africa (Verdcourt, 1961, 1981). Austin (pers. comm.) saw no comparative material of *Hildebrandtia* when he described *Dactylostigma* and thus did not realize that his novelty was in fact the first species of *Hildebrandtia* from Madagascar.

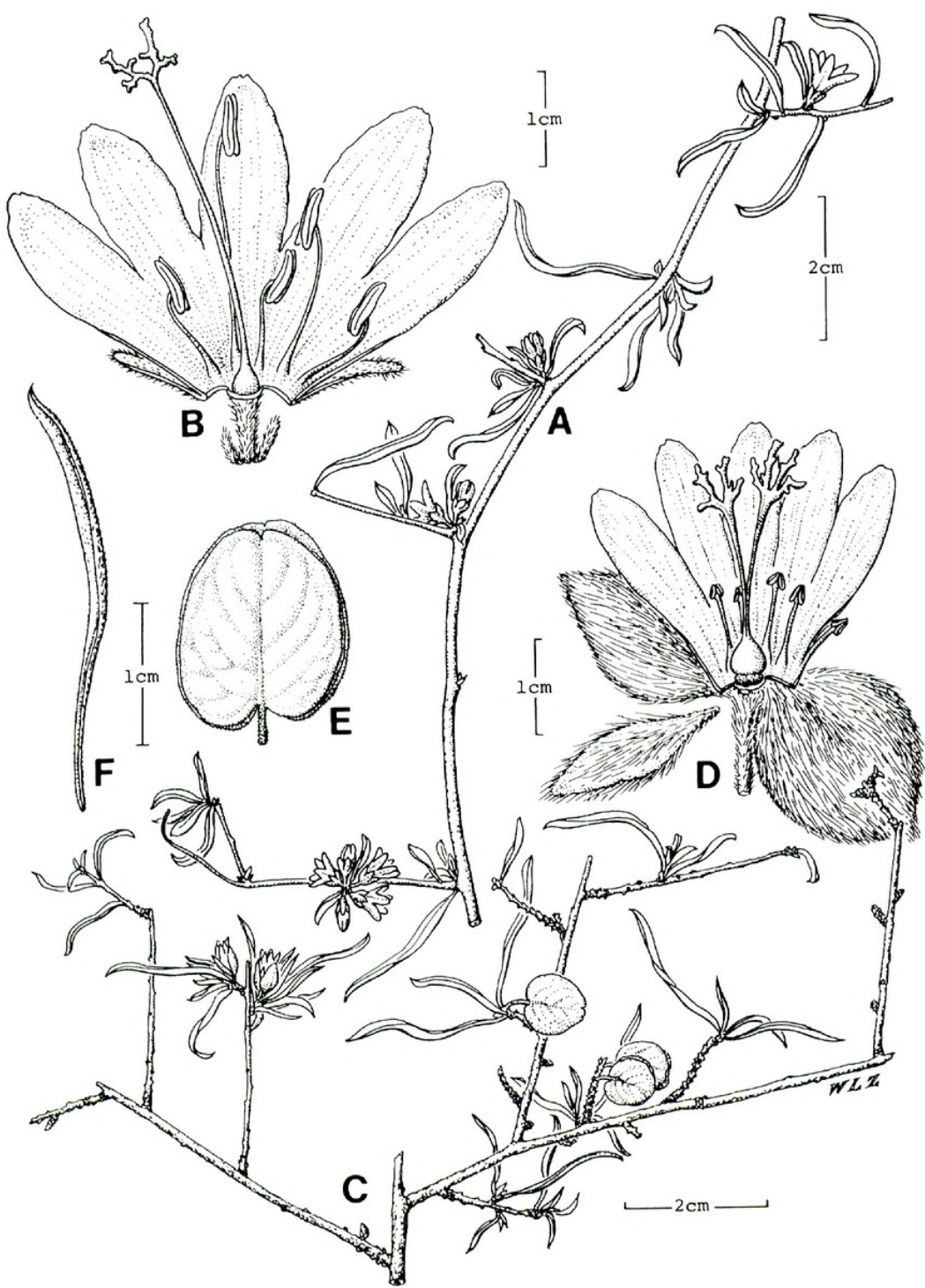
I here reduce *Dactylostigma* to synonymy with *Hildebrandtia*, which has been placed in the tribe Hildebrandtieae Peter (Melchior, 1964; Roberty, 1964; Willis, 1973) due to the dioecious habit, a feature unique in the Convolvulaceae. The epithet *linearifolia* is preoccupied in *Hildebrandtia*, so a new name is required. I take the opportunity to name the first Madagascan species of the genus in honor of Daniel F. Austin, who has contributed greatly to an improved understanding of the complex relationships in the Convolvulaceae.

***Hildebrandtia austinii* Staples, nom. nov.**

FIGURE.

Dactylostigma linearifolia D. Austin, *Phytologia* 25: 426. 1973, non *Hildebrandtia linearifolia* Verdc. (1981). TYPE: Madagascar, delta de la Linta, côte SW, 24–28 Aug. 1928, Humbert & Swingle 5368 [♀] (holotype, MO!; isotype, P!).

Slender, scandent shrub, 0.5–2 m long, rufous-golden-sericeous on young parts, glabrate with age. Stems slender, virgate, nodes laxly spaced, main axes grayish and smooth, short shoots warty due to leaf scars, tips golden-sericeous. Leave clustered in fascicles at nodes or on lateral short shoots, subsessile, folded lengthwise in dried state; blade linear to oblong or narrowly obovate, 4–20 × ≤ 1 mm, base cuneate, apex acute or obtuse and apiculate, margin entire, both surfaces shining-golden-sericeous. Flowers borne among leaves, 1 to few per node, sessile or on pedicels ≤ 2 mm long (in fruit lengthening to 5–6 mm), 5-merous. Staminate flowers with sepals ± equal, elliptic-oblong, 2–3 × ≤ 1 mm, sericeous; corolla campanulate, 5-lobed, 5–6 mm long, white, sericeous outside, glabrous within; stamens barely exerted, unequal, 3–5 mm long, the filaments fused below to corolla tube and sparsely glandulose, free, filamentous, and glabrous above, the anthers dorsifixed, ellipsoid, introrse, whitish; pollen spheroidal, 15–18 μm in diameter, 3-colpate, surface finely granulate; pistillode with rudimentary ovary, the style 1, simple, the stigma deeply palmately dissected. Pistillate flowers with sepals unequal (the outer 2 larger, broad-ovate, ca. 5 × 3 mm, base oblique, apex acute; median one ovate, oblique, inner 2 oblong-lanceolate), chartaceous, sericeous on both surfaces; corolla campanulate, 5-lobed, ca. 5 mm long, white, the lobes sericeous outside, glabrous within; staminodes unequal, ≤ 2 mm, nonpolliniferous; disc pedestallike; ovary ovoid, 4-lobed, ca. 1 mm tall, glabrous; ovules 4; styles 2, free, filiform, glabrous; stigmas deeply palmately lobed. Capsule (immature) narrowly ovoid,



Hildebrandtia austinii: A, staminate plant, habit; B, staminate flower, corolla open; C, pistillate plant, habit; D, pistillate flower, corolla open; E, fruiting calyx; F, leaf. (A, B after Rakotomama & Surveillant 3929; C, D after Humbert & Perrier de la Bâthie 2423; E, F after Humbert & Swingle 5368.) Drawing by Wang Le-zhong.

1-seeded, tan to pale brown, glabrous, surmounted by persistent corolla and enclosed in accrescent calyx, the outer 2 sepals ovate, $13-20 \times 10-14$ mm, the middle one ovate-elliptic, oblique, 13×9 mm, the inner 2 oblong, $8-9 \times$ ca. 2 mm, all sepals chartaceous, villous on both surfaces. Seeds ovoid, carinate, ca. 2 mm long, dark brown, smooth, glabrous, with basal hilum.

DISTRIBUTION AND ECOLOGY. Endemic to Madagascar (known only from southwest coast in vicinity of Tuléar); sandy and lateritic soils 2–10 m alt. Flowering March to September, fruiting August and September.

VERNACULAR NAMES. Vongo, rakiorakitz.

SPECIMENS EXAMINED. **Madagascar.** Betioky distr.: Soalary canton, Reserve Naturelle X, *Ravelonanabary* 5017 [♀] (P), *Rakotomama & Surveillant* 3929 [♂] (P). Distr. not indicated: env. du Tuléar, delta du Fiherenana, *Humbert & Perrier de la Bâthie* 2403 [♂] (P), 2423 [♀] (P); km 4 de Tuléar, *Service Forestier SF* 16981 [♂] (P); env. de Tuléar, *Perrier de la Bâthie* 12834 [♂] (P).

The linear-oblong leaves of *Hildebrandtia austinii* set it apart from most other species of the genus. Only *H. linearifolia*, from Somalia, could be confused with it on the basis of leaf shape. The two species can be readily distinguished, however, by the differences in their habit and the nature of their fruiting sepals. *Hildebrandtia austinii* has slender, scandent stems with laxly arranged fascicles of leaves; the two outer fruiting sepals are ovate and are villous on both sides. In contrast, *H. linearifolia* is a shrub with stout stems and spinescent branches, with the fascicles of leaves crowded along them; the two outer fruiting sepals are orbicular and are appressed-pubescent on the abaxial side only.

The flowers of *Hildebrandtia austinii* provide another character that may prove taxonomically useful, once the character states are known in other species of *Hildebrandtia*. The pistillate flowers have a gynoeceum with two free styles, each terminating in a digitate stigma, whereas the staminate ones have a pistillode with a single style terminating in a pair of digitate stigmas. In other species for which this character is known, such as *H. africana* Vatke, flowers of both sexes have the style divided to the base (Miller & Morris, 1988).

One collection, *Ravelonanabary* 5017, has spherical hairy bodies in the axillary position usually occupied by flowers or fruits. These structures may be teratological byproducts (galls?) caused by infection of the reproductive organs with a pest or pathogen.

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