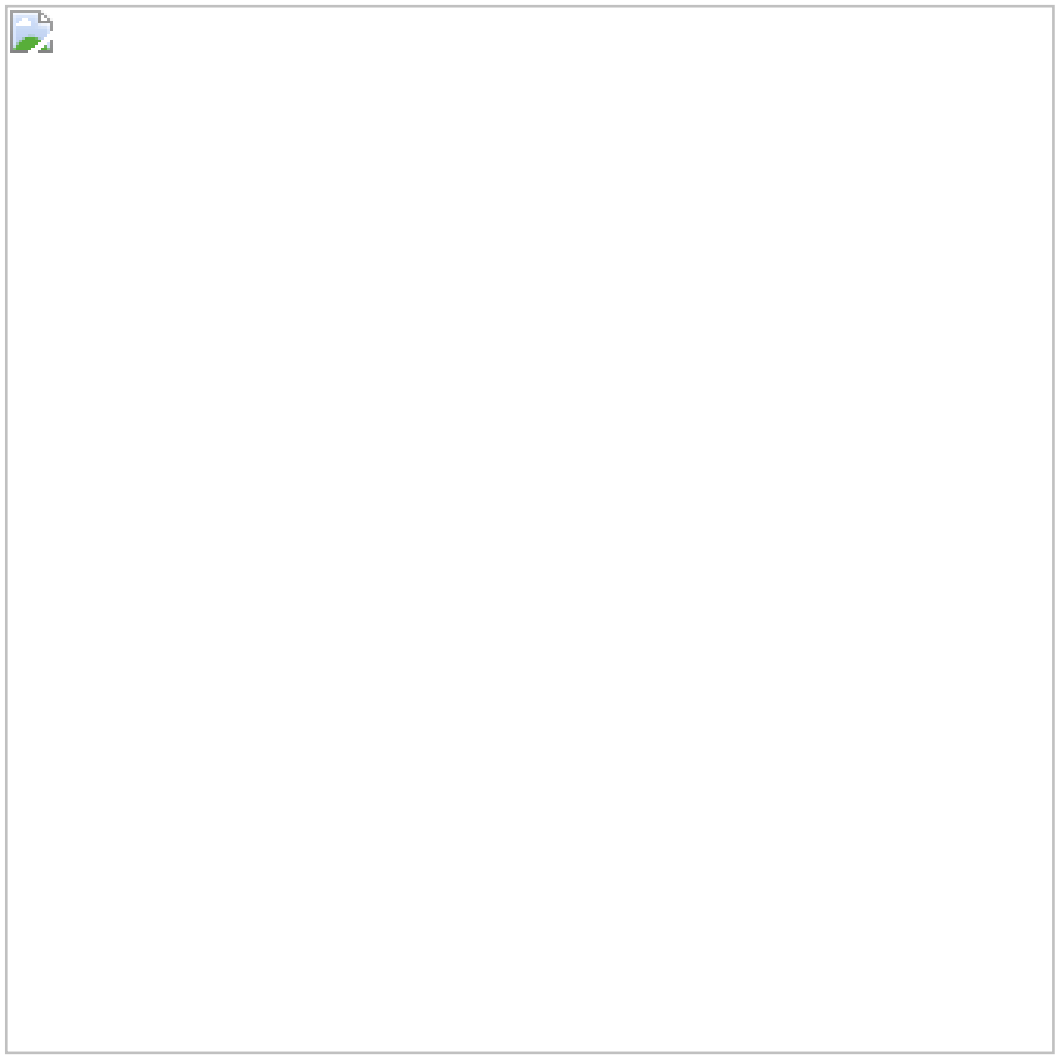

Taxonomy of Anisotes Nees (Acanthaceae: Justicieae) in the Comoros Archipelago and a preliminary List of Acanthaceae in the Islands

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Taxonomy of Anisotes Nees (Acanthaceae: Justicieae) in the Comoros Archipelago and a preliminary list of Acanthaceae in the Islands

Thomas F. Daniel

Abstract

DANIEL, T. F. (2014). Taxonomy of Anisotes Nees (Acanthaceae: Justicieae) in the Comoros Archipelago and a preliminary list of Acanthaceae in the Islands. *Candollea* 69: 45-54. In English, English and French abstracts.

A new species and a new combination in *Anisotes* Nees are proposed for the acanthaceous flora of the Comoros Archipelago. The new species, *Anisotes mayottensis* T. F. Daniel, is known only from Mayotte, and can be distinguished from its Comoran congener by its unequally five-lobed (4+1) or equally four-lobed calyx; longer corolla, stamens, and thecae; and four-aperturate pollen. *Anisotes comorensis* (Lindau) T. F. Daniel, based on *Himantochilus comorensis* Lindau, is proposed for a species endemic to Grande Comore. A lectotype is designated for *Himantochilus comorensis*. Both species are described, mapped, and distinguished by a key; *Anisotes mayottensis* is also illustrated. All *Acanthaceae* known from the archipelago are listed in a table.

Key-words

ACANTHACEAE – *Anisotes* – Comoros Archipelago – Mayotte – Taxonomy – Pollen

Résumé

DANIEL, T. F. (2014). Taxonomie d'Anisotes Nees (Acanthaceae: Justicieae) dans l'archipel des Comores et une liste préliminaire des Acanthaceae dans les Îles. *Candollea* 69: 45-54. En anglais, résumés anglais et français.

Une espèce nouvelle et une combinaison nouvelle dans le genre *Anisotes* Nees sont proposées pour la flore des *Acanthacées* de l'Archipel des Comores. L'espèce nouvelle, *Anisotes mayottensis* T. F. Daniel, n'est connue que de Mayotte, et se distingue de son congénère comorien par son calice à cinq lobes inégaux (4+1) ou à quatre lobes égaux; sa corolle, ses étamines, et ses thèques plus allongées ainsi que son pollen quadri-aperturé. *Anisotes comorensis* (Lindau) T. F. Daniel, basé sur *Himantochilus comorensis* Lindau, est proposé comme espèce endémique à la Grande Comore. Un lectotype est désigné pour *Himantochilus comorensisi* Lindau. Les deux espèces sont décrites et cartographiées, et une clé de détermination est proposée. *Anisotes mayottensis* est aussi illustrée, et toutes les *Acanthacées* connues de l'archipel sont énumérées dans un tableau.

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Introduction

The Comoros Archipelago consists of four islands and several islets at the northern end of the Mozambique Channel in the western Indian Ocean (Fig. 1). Three of the islands, Grande Comore (Ngazidja), Anjouan (Ndzwani), and Mohéli (Mwali) currently form the independent Union of the Comoros, whereas Mayotte (Maore) is an overseas department of France. The islands are volcanic in origin with Mayotte (8-15 m.y.) the oldest and Grande Comore (ca. 2.5 mya) the youngest (LOWRY & al., 1999). Floral and faunal affinities for these oceanic islands have been noted with Madagascar (e.g., VOELTZKOW, 1917; PASCAL & al., 2001; ROLLAND & al., 2005), the nearest coastline of which is about 300 km to the south and east.

VOELTZKOW (1917) listed 416 species of vascular plants, including seven species of *Acanthaceae,* as native to the Comoros Archipelago. The incompleteness of that early listing was highlighted by the recent compilation of BARTHELAT & BOULLET (2005) for Mayotte, which recorded more than 600 indigenous vascular plants for the one island, including 10 named *Acanthaceae*. Additional *Acanthaceae* at P, including a new species of *Anisotes* Nees treated here, bring the number of identified species of *Acanthaceae* on Mayotte to 16 (Table 1). In addition to the named species noted in Table 1, at least two others that remain unidentified also have been collected on Mayotte: a specimen of *Hypoestes* R. Br. (*Barthelat & al. 1481,* P) and a specimen of *Justicia* L. (*Barthelat & al. 1484,* P). The total vascular flora of the archipelago (native and introduced) has been estimated to be 1,500 species or more (LOWRY & al., 1999; PASCAL, 2002). Although the flora of the Union of the Comoros is less well known than that of Mayotte, additional *Acanthaceae* have been collected on those islands resulting in 23 species of the family currently being known from the Comoros Archipelago (Table 1).

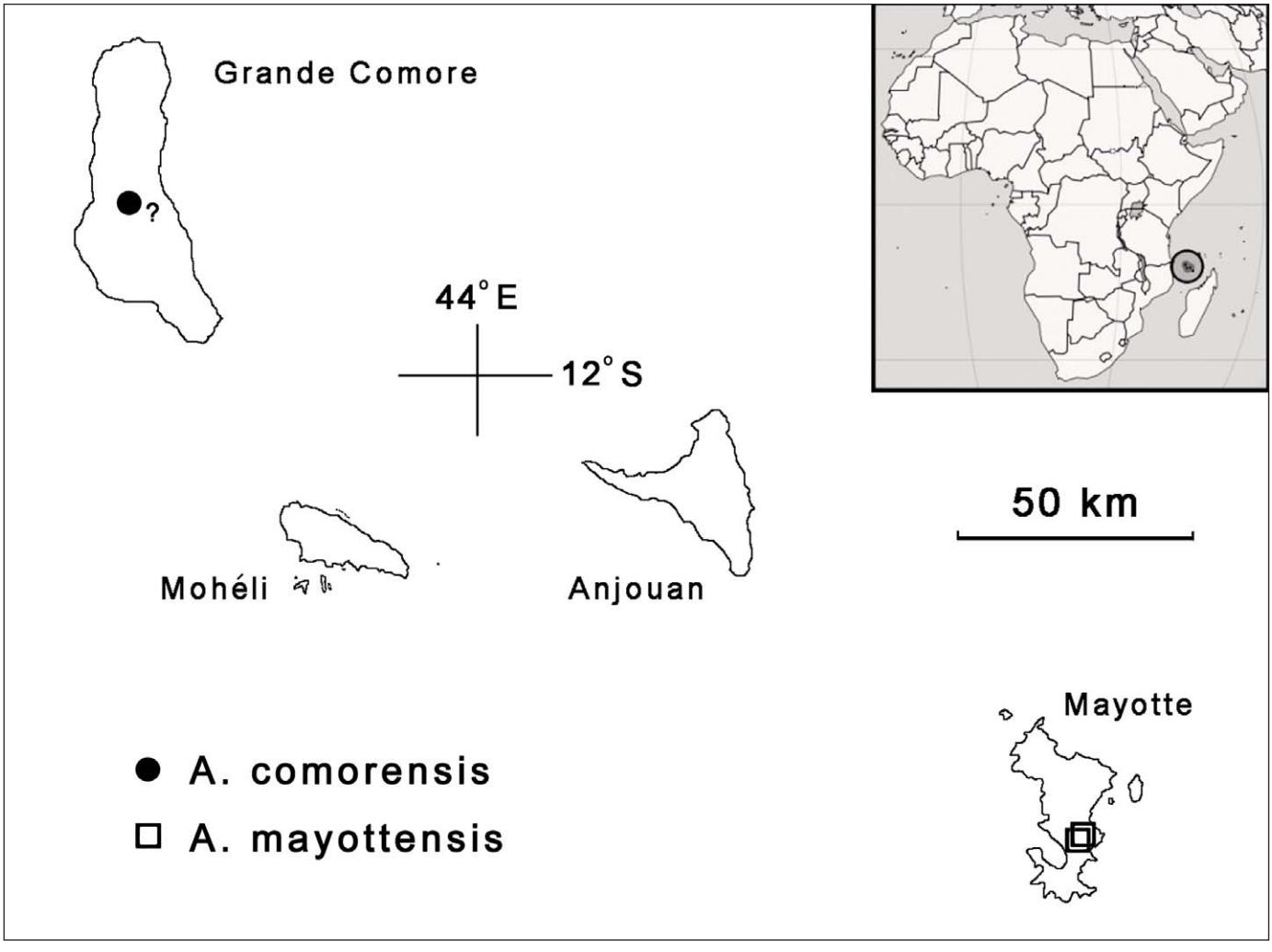

Fig. 1. – Comoros Archipelago (Union of the Comoros and Mayotte) showing distributions of *Anisotes comorensis* (Lindau) T. F. Daniel and *A. mayottensis* T. F. Daniel. The exact location of the sole collection of *A. comorensis* (Lindau) T. F. Daniel from Grande Comore is unknown.

Table 1. – *Acanthaceae* of the Comoros Archipelago. The list of taxa is based on collections at CAS, K, and P. Taxonomic status of and conservation assessment for each is currently under study. For individual islands: A = Anjouan, GC = Grande Comore, MH = Mohéli, and MY = Mayotte. When a specific island was not provided by a collector, CA (= Comoros Archipelago) is indicated.

Taxa	Island(s)	Collectors (Herbaria)	Native Distribution	Comments
Anisostachya commersonii T. Anders.	A	*Commerson s.n.* (K)	Endemic	*Anisostachya* is usually treated in *Justicia* L., and additional studies may show the latter genus to be the best placement for the species
Anisotes comorensis (Lindau) T. F. Daniel	GC	*Humblot 1584* (P)	Endemic	
Anisotes mayottensis T. F. Daniel	MY	*Pascal 936* (CAS)	Endemic	
Asystasia gangetica (L.) T. Anderson	A	*Boivin s.n.* [in 1850] (P)	Paleotropics	
	GC	*Boivin s.n.* [in 1850] (P)		
	MY	*Mas 154* (P)		
Avicennia marina (Forssk.) Vierh.	A	*Floret 1063* (P)	Paleotropics	
	MY	*Humblot 1182* (P)		
Barleria comorensis Lindau	A	*Boivin s.n.* [in 1850] (P)	Endemic	
	GC	*Humblot 1591* (P)		
Barleria decaisniana Nees	MY	*Humblot 1113* (P)	Madagascar	
Blepharis maderaspatensis (L.) Roth	GC	*Boivin s.n.* [1850] (P)	Africa, Asia, Madagascar	
	MY	*Barthelat & al. 985* (P)		
Dicliptera heterostegia Nees	A	*Boivin s.n.* [1850] (P)	Africa, Asia, Madagascar	
Dicliptera hyalina Nees	MY	*Humblot 1178* (P)	Madagascar	
Ecbolium syringifolium (Vahl) Vollesen	MY	*Barthelat & al. 807* (CAS, P)	Madagascar	
Hypoestes comorensis Baker	A	*Hildebrandt 1622* (P)	Endemic	Plants show variation in size of bracteoles and flower on different islands. For example, *Labat & al. 3692* (CAS) from Grande Comore has bracteoles 9-10.5 mm long and corollas 28-32 mm long, whereas *Pascal 939* (CAS) from Mayotte has bracteoles 15-16 mm long and corollas 45 mm long
	GC	*Humblot 1517* (P)		
		Labat & al. 3692 (CAS)		
	MY	*Pascal 939* (CAS, P)		
Hypoestes sp.	MY	*Barthelat & al. 1481* (P)	Unknown	Additional study of this specimen is required to determine whether it represents one of the many species of *Hypoestes* described from Madagascar or whether it represents an undescribed taxon
Isoglossa comorensis Lindau	GC	*Boivin s.n.* [in 1847-1852] (P); *Humblot 1467* (P)	Endemic	An isosyntype (*Humblot 1467*, P) indicates the collection was from Grande Comore with "Anjouan" on the original label crossed out
	CA	*Humblot 1467* (P)		
	MY	*Humblot 1304 [=304]* (P)		
Justicia exsul Benoist				This species, described from a specimen cultivated at a botanic garden on Réunion, is purported to have come originally from Mayotte. At P, Benoist identified several collections from Madagascar with this name, but because no other collections of the species are currently known from Mayotte, its occurrence on that island remains unconfirmed and is not included herein among the known species of the Comoros Archipelago

Cont.

Table 1. – *Cont.*

Taxa	Island(s)	Collectors (Herbaria)	Native Distribution	Comments
Justicia haplostachya (Nees) T. Anderson	A GC MY	*Hildebrandt 1620* (P) *Humblot 1585* (P) *Barthelat & al. 1619* (P)	Madagascar	
Justicia johannae Benoist	A	*Boivin s.n.* [in 1850] (P)	Endemic	
Justicia paucinervis Benoist	A CA MY	*Labat & al. 3769* (P) *Humblot 1124* (P image seen) *Humblot 1042* (P)	Endemic	This species has also been treated as *Anisostachya paucinervis* (Benoist) Benoist. BENOIST (1965) described *A. paucinervis* as a new species based on the type numbers of *J. paucinervis (Humblot 42 [=1042])* and *Humblot 124 [=1124]*. It was reported from Grande Comore, but *Humblot 1042* seems to be from Mayotte and the island from which *Humblot 1124* was collected remains unknown. The species has been collected on Mayotte several times but is not otherwise known from Grande Comore
Justicia sp.	MY	*Barthelat & al. 1484* (P)	Unknown	Additional study of this specimen is required to determine whether it represents one of the many species of *Justicia* described from Madagascar or whether it represents an undescribed taxon
Mendoncia flagellaris Benoist	MY	*Barthelat & al. 568* (CAS, P)	Madagascar	
Phaulopsis imbricata subsp. *madagascariensis* M. Manktelow	MH MY	*Benson 124* (BM) *Boivin s.n.* [in 1850] (P)	Madagascar	These collections were cited by MANKTELOW (1996) and/or annotated by her. She annotated the Boivin specimen at P as intermediate with subsp. *imbricata*
Phaulopsis verticillaris (Nees) M. Manktelow	A GC MY MH	*Waterlot 896* (P) *Boivin s.n.* [1850] (P) *Boivin s.n.* [1850] (P) *Richard 216* (P)	Madagascar	According to MANKTELOW (1996) occurrences of this species in Madagascar remain questionable
Pseuderanthemum tunicatum (Afzel.) Milne-Redh.	A MY	*Boivin s.n.* [in 1850] (P) *Barthelat & al. 408* (P)	Africa	As treated by CHAMPLUVIER (2002) this is a western and central African species. The identity of Comoran plants requires additional study
Rhinacanthus nasutus Kuntze	GC MY	*Humblot 1612* (P) *Barthelat & al. 1699* (P)	Asia, Madagascar, Malesia	DARBYSHIRE & HARRIS (2006) consider *R. nasutus* (sensu stricto) to be confined to Asia (India to China and Malesia), but extending to the Mascarenes and Madagascar where they indicate it is likely introduced. Additional studies should determine whether Comoran plants conform to an African taxon rather than *R. nasutus*

Anisotes was revised by BADEN (1981b), some renovations of African taxa were made by VOLLESEN (2010), and additional Malagasy species were proposed by DANIEL & al. (2007, 2013). As currently circumscribed, the genus consists of 29 species that occur in Africa, the Arabian Peninsula, Socotra, and Madagascar. Two additional species are recognized here from the Comoros Archipelago. DANIEL & al. (2007) noted the lack of clear morphological distinctions between *Anisotes* and the large and morphologically variable *Justicia.* In the Comoros Archipelago, *Anisotes* can be distinguished from *Justicia* by its larger corollas (20-32 vs. less than 10 mm long) with the lower lip of the limb coiled (vs. not coiled) at maturity. A treatment of *Anisotes* for the Comoros Archipelago is provided below in which one species is newly described from Mayotte and a species from Grande Comore previously treated in *Himantochilus* Benth. & Hook. f. is transferred to *Anisotes*.

The extent of pollen diversity among species of *Anisotes* is unusual for an acanthaceous genus of its size. BADEN (1981a, 1981b) and DANIEL & al. (2013) noted the following types of pollen among species of the genus: two-, three-, and four-colporate grains with four, six, and eight pseudocopi, respectively; two- and three-aperturate grains with apertures in a trema region studded with one or two rows of insulae; and two-pororate grains. Pollen of the two Comoran endemics (Fig. 2) does not add to this variation, but each one has a different type.

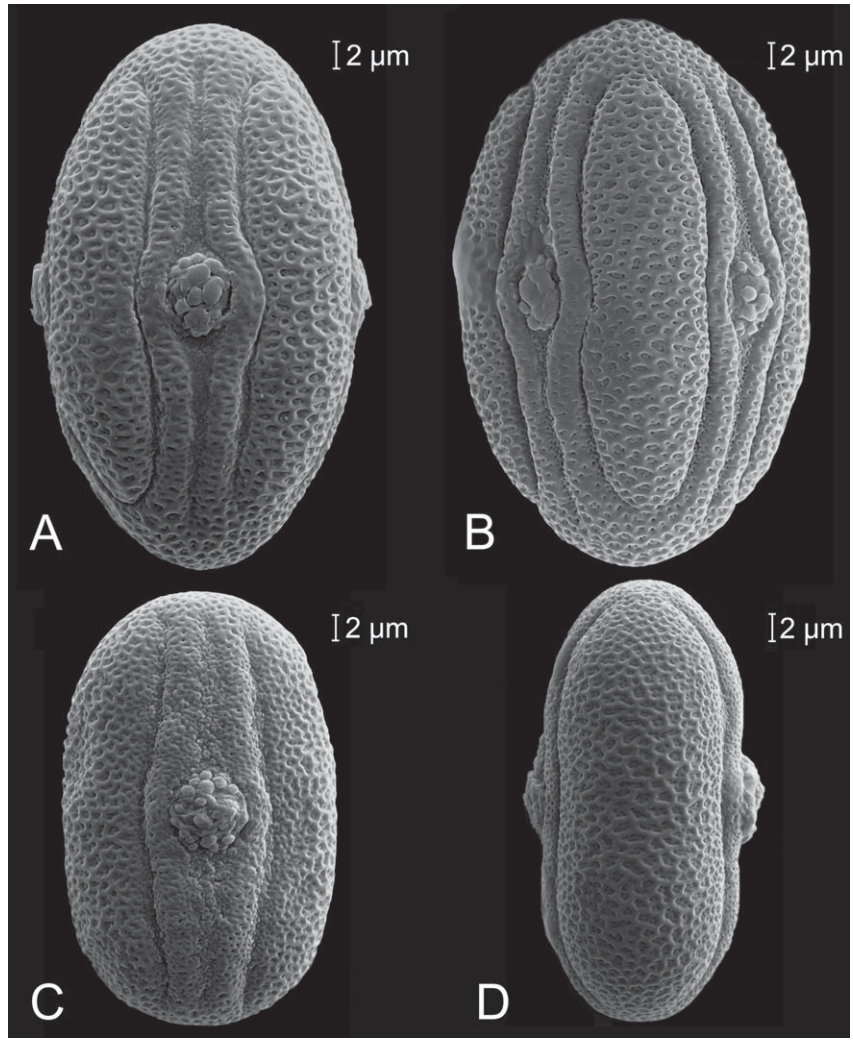

Fig. 2. – Pollen of *Anisotes* Nees in the Comoros Archipelago. **A-B.** *Anisotes mayottensis* T. F. Daniel; **C-D.** *A. comorensis* (Lindau) T. F. Daniel; **A.** Apertural view; **B.** Interapertural view; **C.** Apertural view; **D.** Interapertural view.

[**A-B:** *Pascal 936,* CAS; **C-D:** *Humblot 1584,* P]

Taxonomic treatment

Anisotes Nees in A. DC., Prodr. 11: 424. 1847.

Typus: *Anisotes trisulcus* (Forssk.) Nees (≡ *Dianthera trisulca* Forssk.)

For a complete list of generic synonyms, see VOLLESEN (2010).

Shrubs to small *trees*, cystoliths present, nodes often swollen. *Leaves* opposite, evergreen or deciduous, (sessile to) petiolate, margin entire to crenate. *Inflorescence* of sessile to pedunculate dichasiate spikes or racemes or of dichasia in leaf axils; dichasia sessile to pedunculate. *Bracts* opposite. *Bracteoles* 2. *Flowers* sessile to pedicellate. *Calyx* 5-lobed, lobes equal to unequal in length, 1 lobe sometimes reduced or absent. *Corolla* 2-labiate, purple, red, yellow, orange, greenish, or whitish, tube shorter than limb, subcylindric (at least near base) or sometimes ± expanded distally, with 2 invaginations (from the outer surface; i.e., appearing as pubescent projections internally) on lateral surfaces, upper lip arching forward and hood-like, entire or 2-fid, rugulate within, lower lip tightly coiled or spirally twisted like a dangling corkscrew at maturity, 3-lobed. *Stamens* 2, exserted from corolla tube, inserted near base or apex of corolla tube, ± appressed to upper lip and opening toward lower lip (i.e., flower nototribic), anthers 2-thecous, thecae parallel to subperpendicular, subequally to unequally inserted, lacking basal appendages or with one or both short-mucronate at base; staminodes 0. *Pollen* 2-4-aperturate. *Capsule* stipitate, head subspheric to ellipsoid, sometimes with a slight medial constriction. *Seeds* 4 (or fewer by abortion), subdiscoid, surfaces usually rugose, rarely pubescent (with either glandular or hygroscopic/eglandular trichomes).

Anisotes is a Paleotropical genus of subfamily *Acanthoideae*, tribe *Justicieae* (DANIEL & al., 2007; DANIEL & al., 2013) with 31 species currently recognized. 23 species occur on the African mainland, six species are endemic to Madagascar, and 2 species are endemic to the Comoros Archipelago.

Key to *Anisotes* in the Comoros Archipelago

1. Calyx lobes 5, subequal in length, lanceolate, 0.5-0.6 mm wide, margins not hyaline; bracts membranaceous, major veins evident but not conspicuous, margin ciliate with trichomes 0.1-0.3 mm long; bracteoles lanceolate, 0.3-0.5 mm wide; corolla 20-22 mm long; stamens 10-13 mm long, thecae 1.5-1.8 mm long; pollen 2-colporate and 4-pseudocolpate; Grande Comore ..... **1. *A. comorensis*** T. F. Daniel

1a. Calyx lobes 4 or 5, if 4 then equal in length, if 5 then unequal in length with 4 lobes ovate, equal in length, 1.8-2 mm wide and with 1 lobe conspicuously reduced (linear to lanceolate and 0.5-1 mm wide), margins hyaline; bracts coriaceous, major veins conspicuous, margin ciliate with trichomes to 0.8 mm long; bracteoles linear-oblanceolate 0.9-1.1 mm wide; corolla 24-32 mm long; stamens 17-18 mm long, thecae 2-2.5 mm long; pollen 4-colporate and 8-pseudocolpate; Mayotte..... **2. *A. mayottensis*** T. F. Daniel

Anisotes comorensis (Lindau) T. F. Daniel, **comb. nova.**

≡ *Himantochilus comorensis* Lindau in Bot. Jahrb. Syst. 20: 61. 1894.

Lectotypus (designated here): **COMOROS. Grande Comore:** s.l., VII.1886, *Humblot 1584* (P [P00184832]!; iso-: LD [LD1212195] image seen, P [P00184831, P00184833]!).

Perennial to 3.5 [or more ?] dm tall. Older stems not seen; younger stems pubescent with flexuose to retrorse eglandular trichomes 0.2-0.5 mm long, trichomes ± evenly disposed or becoming concentrated in 2 lines. *Leaves* petiolate, petioles to 45 m long, blades membranaceous, ovate to elliptic, 60-102 mm long, 22-37 mm wide, 2.1-2.8 × longer than wide, cuneate to subattenuate at base, acuminate at apex, major veins ± prominent, secondary veins 5-7 per side, surfaces pubescent with antrorse to flexuose eglandular trichomes. *Spikes* axillary, mostly opposite at leaf nodes, (1-)2-4 per axil, densely bracteate, pedunculate, peduncles 3-16 mm long, pubescent like young stems, fertile portion of spike (excluding corollas) 10-22 mm long, rachis not visible, puberulent with mostly erect eglandular trichomes to 0.1 mm long. *Bracts* light colored, imbricate, 4-ranked (2 adjacent rows fertile; thus ± secund), membranaceous, elliptic, 6-8.5 mm long, 2.5-4 mm wide, acute- to acuminate-apiculate at apex, apiculum 0.3-1 mm long, abaxial surface sparsely pubescent with antrorse to flexuose eglandular trichomes and with an inconspicuous understory (sometimes absent) of sessile to subsessile glands to 0.05 mm long, major veins evident but not conspicuous, 5, subparallel to midvein, margin sparsely ciliate with erect to flexuose eglandular trichomes 0.1-0.3 mm long, proximal pair of bracts sterile and often smaller (4-5.5 × 2.2-3.2 mm) than fertile ones. *Bracteoles* lanceolate, 4-5 mm long, 0.3-0.5 mm wide, abaxial surface pubescent like bracts to nearly glabrous, only midvein evident, margin ciliate like bracts. *Calyx* 5-lobed, 5.5-7 mm long, tube 0.5-1 mm long, lobes lanceolate, 4.5-6 mm long, subequal in length (posterior lobe smallest), 0.5-0.7 mm wide, long-aristate at apex (aristae to 2 mm long), abaxially pubescent like bracts to nearly glabrous, margin not noticeably hyaline, ciliate. *Corolla* color unknown, 20-24 mm long, externally pubescent with erect to flexuose to retrorse eglandular trichomes 0.1-0.3 mm long, tube slightly and gradually expanded from near base to mouth, 8.5-11 mm long (0.43-0.55 × as long as corolla), 1.5-2.5 mm in diameter near

midpoint, upper lip 10-13 mm long, entire at apex, lower lip 10-11.5 mm long, recurved to recoiled, lobes 1.5-2.2 mm long, 0.5-2 mm wide. *Stamens* inserted near apex of corolla tube, 10-13 mm long, not extending beyond upper lip of corolla, filaments pubescent proximally and glabrous distally, thecae parallel to subperpendicular, unequally inserted (overlapping by 0.8-1 mm), 1.5-1.8 mm long (proximal theca slightly longer than distal theca), glabrous, distal theca usually with an inconspicuous basal appendage to 0.1 mm long, proximal theca with a basal appendage 0.3-0.4 mm long. *Pollen* 2-colporate, 4-pseudocolpate, globose-elliptic, polar diameter (P) 36-37 µm, equatorial diameter (E) in apertural view 23 µm, equatorial diameter in interapertural view 17 µm, P:E in apertural view = 1.57, P:E in interapertural view = 2.18, longer E:shorter E = 1.35, exine bireticulate. *Style* ca. 18-21 mm long, not or but barely extending beyond upper lip of corolla, pubescent proximally, stigma inconspicuous, lobes (if present) not evident. *Capsule* and *seeds* not known.

Phenology. – Flowering in July.

Distribution and habitat. – Comoros Archipelago; endemic to Grande Comore island (Fig. 1); the species is known only from the type collection made in 1886 from an undisclosed locale.

Discussion. – There are three specimens at P, one annotated (recently) as the holotype and two as isotypes. No herbarium of deposit was cited in the protologue, and Humblot's collections were widely distributed (Lanjouw & Stafleu, 1957) including to B, where Lindau worked on *Acanthaceae* after 1892. If a single specimen at B was used by Lindau in creating his protologue, it would have been the holotype. Such a specimen is no longer extant at B. The specimen at P annotated as the holotype bears Lindau's name in a handwriting that resembles that of Benoist rather than that of Lindau, and would thus appear to represent either a syntype or an isosyntype. This specimen (*Humblot 1584* [P00184832]), which also bears the unpublished combination attributed to Benoist, is here designated as lectotype of *Himantochilus comorensis*.

Lindau (1894) indicated that *H. comorensis* could be distinguished from its congeners by the shape of the leaves and the much smaller flowers. Baden (1981b) treated Lindau's *H. comorensis* as a "doubtful taxon", did not see the type, and noted that based on Lindau's description it was unlikely to pertain to *Anisotes*. Although *Anisotes* is not well distinguished morphologically from *Justicia* (Daniel & al., 2007; Daniel & al., 2013), Lindau's species contains the characteristic floral attributes of the former genus: relatively large (22-65 mm long) and strongly bilabiate corollas with ascending cochlear aestivation, a relatively short corolla tube (tube: corolla length up to 0.56, but usually 0.33 or less), a hoodlike and internally rugulate upper lip, and a lower lip that is usually recoiled.

Pollen of this species (Fig. 2) is two-colporate with two pseudocolpi in each mesocolpium. Similar pollen was noted in *Anisotes subcoriaceus* T. F. Daniel, Letsara & Martín-Bravo from Madagascar (Daniel & al., 2013).

Anisotes mayottensis T. F. Daniel, **spec. nova** (Fig. 3, 4).

Typus: Mayotte: Bénara, 600 m, 26.V.1997, fl., *Pascal 936* (holo-: CAS!; iso-: K, P!).

Species calycis lobis majoribus ovatis et 3-5 mm longis × 1.5-2 mm latis, corolla purpureo-rubra et 24-32 mm longa, et polline 4-aperturato a congeneribus diversa.

Shrubs to 1 m tall. Older *stems* dark greenish, brown, or slightly pinkish; younger stems evenly and ± densely pubescent with retrorsely to antrorsely appressed eglandular trichomes to 0.5 mm long. *Leaves* petiolate, petioles to 52 mm long, blades membranaceous, ovate, 56-116 mm long, 23-44 mm wide, 2.1-3.4 × longer than wide, rounded to subcuneate at base, acuminate at apex, venation ± prominent, secondary veins 4-7 per side, surfaces pubescent (trichomes mostly restricted to midvein) with appressed eglandular trichomes. *Spikes* axillary, alternate or opposite at leaf nodes, 1-2 per axil, densely bracteate, pedunculate, peduncles 4-15 mm long, pubescent with antrorsely appressed eglandular trichomes, fertile portion of spike (excluding corollas) 10-24 mm long, rachis not visible, nearly glabrous or sparsely pubescent with erect to flexuose eglandular trichomes to 0.2 mm long. *Bracts* green and lighter (hyaline) toward margin and apex, imbricate, 4-ranked (2 adjacent ranks fertile; thus ± secund), coriaceous, (ovate-elliptic to) elliptic (to obovate-elliptic), 5.5-7.5 mm long, 2.7-3.5 mm wide, acute-apiculate at apex, apiculum to 0.5 mm long, abaxial surface puberulent with erect to antrorse eglandular trichomes to 0.05 (-0.1) mm long, major veins conspicuous, 5, parallel to midvein, margin ciliate with erect to flexuose eglandular trichomes to 0.8 mm long, proximal pair of bracts sterile. *Bracteoles* linear-oblanceolate, 4-5.7 mm long, 0.8-1.2 mm wide, abaxial surface pubescent like bracts (to nearly glabrous), 1-3-veined, margin ciliate like bracts. *Calyx* either 5-lobed with 1 lobe conspicuously reduced or equally 4-lobed, 6-9 mm long, tube 3-4 mm long, 4 lobes ovate, 3-5 mm long, equal in length, 1.5-2 mm wide, subacuminate at apex, abaxially puberulent with eglandular and subglandular trichomes < 0.05 mm long, margin hyaline and ciliate, 5th lobe (if present) linear to lanceolate, 2-3 mm long, 0.5-1 mm wide, otherwise like larger lobes. *Corolla* purplish red, 24-32 mm long, externally pubescent with subglandular and eglandular trichomes < 0.05-0.2 mm long, tube subcylindric proximally, expanded distally, 6-13 mm long (0.25-0.46 × as long as corolla), 2.5-3 mm in diameter near midpoint, upper lip 14-24 mm long, entire at apex, lower lip recoiled, 15-24 mm long, lobes 3 mm long, 0.9-1 mm wide. *Stamens* inserted near apex of corolla tube, 17-18 mm long, not extending beyond

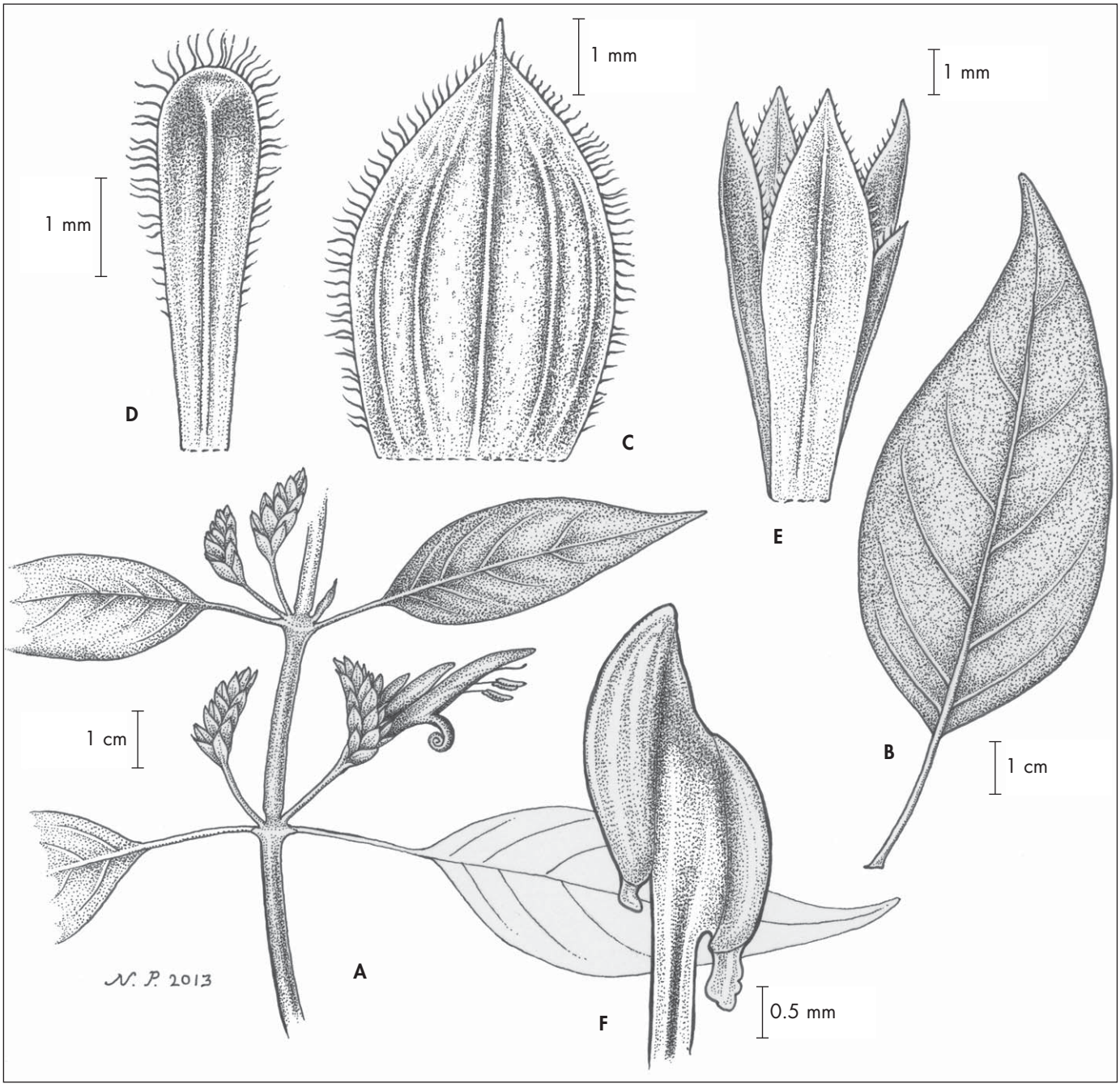

Fig. 3. – *Anisotes mayottensis* T. F. Daniel. **A.** Habit; **B.** Leaf; **C.** Bract; **D.** Bracteole; **E.** Calyx; **F.** Distal portion of stamen with anther. [**A, C-E:** *Barthelat & al. 386,* MO; **B, F:** *Pascal 936,* CAS] [Drawing: Noel Pugh]

Fig. 4. – *Anisotes mayottensis* T. F. Daniel. Distal portion of stem with inflorescences. [Photo: F. Barthelat (used with permission)]

upper lip of corolla, filaments glabrous distally, thecae subparallel, unequally inserted (overlapping by 1-1.5 mm), 2-2.5 mm long (± equal in length), glabrous, distal theca with a basal appendage 0.1-0.2 mm long, proximal theca with a basal appendage 0.3-0.6 mm long. *Pollen* 4-colporate, 8-pseudocolpate (the 2 pseudocolpi in each mesocolpium often fused near poles to form pseudocolpal ellipses), euprolate to perprolate, polar diameter (P) 41-60 µm, equatorial diameter (E) 21-27 µm, P:E = 1.56-2.86, exine bireticulate. *Style* 24-32 mm long, not extending or extending beyond upper lip of corolla, glabrous distally, stigma inconspicuous, lobes (if present) not evident. *Capsule* and *seeds* not known.

Phenology. – Flowering: May-June.

Distribution and habitat. – Comoros Archipelago; known from two relatively recent collections from the crests of the southern highlands on the island of Mayotte (Fig. 1), where it is endemic; plants occur in humid evergreen forest (with *Olea capensis* L., *Labramia mayottensis* Labat , M. Pignal & O. Pascal, *Dicoryphe platyphylla* Tul., *Strychnos mitis* S. Moore, *Syzygium* sp., *Gastonia duplicata* Baill., *Grisollea myriantha* Baill., *Nuxia pseudodentata* Gilg, *Ravensara areolata* Kosterm., *Scolopia coriacea* Tul., *Trophis montana* (Leandri) C. C. Berg) at elevations between 350 and 600 m.

Local name. – "Nanatsy be" (Shibushi; *Barthelat & al. 386*).

Discussion. – This species shows variation in the number of calyx lobes from five (4+1) to four. The presence of both forms on *Barthelat & al. 386* suggests that the reduced fifth lobe is sometimes lost. Similar variation in the number and configuration of calyx lobes is known for *Justicia*, but apparently has not been reported in other species of *Anisotes*. It is noteworthy that *A. comorensis* and at least one Malagasy species (*A. venosus* T. F. Daniel, Letsara & Martín-Bravo; Daniel & al., 2013) have a calyx with one lobe somewhat reduced in size relative to the others.

The four-aperturate pollen of this species (Fig. 2) is unusual in the genus. It has been previously documented only for the tropical west African species, *A. guineensis* Lindau (Baden, 1981b).

Paratypi. – **Mayotte:** Grande Terre, Tsararano, Bénara, Crêtes du Bénara, 10.V.2001, *Barthelat & al. 386* (MO, P); Grande Terre, Tsararano, Réserve Forestière du Bénara, ch. de crête-sommet, 27.V.2001, *Barthelat & al. 1188* (P); Mlima Choungi, 10.VI.1996, *Pascal 563* (P).

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References

Baden, C. (1981a). The genus Macrorungia (Acanthaceae), a taxonomic revision. *Nordic J. Bot*. 1: 143-153.

Baden, C. (1981b). The genus Anisotes (Acanthaceae), a taxonomic revision. *Nordic J. Bot*. 1: 623-664.

Barthelat, F. & V. Boullet (2005). Index de la flore vasculaire de Mayotte - version 2005-1. *In:* Rolland, R., V. Boullet & J.-P. Quod (ed.), *Mayotte: Biodiversité et Evaluation Patrimoniale:* 115-187. DAF de Mayotte and CBN Mascarin [http://etic.univ-reunion.fr/get/images/Mayotte/mayotte_inventaire%20znieff.pdf].

Champluvier, D. (2002). Contribution à l'étude du genre Pseuderanthemum (Acanthaceae) en Afrique tropicale. *Syst. Geogr. Pl.* 72: 33-53.

Daniel, T. F., B. A. V. Mbola, F. Almeda & P. B. Phillipson (2007). Anisotes (Acanthaceae) in Madagascar. *Proc. Calif. Acad. Sci.* 58: 121-131.

Daniel, T. F., R. Letsara & S. Martín-Bravo (2013). Four new species of Anisotes (Acanthaceae) from Madagascar. *Novon* 22: 396-408.

Darbyshire, I. & T. Harris. (2006). Notes on the genus Rhinacanthus (Acanthacee) in Africa with a synopsis of the R. nasutus - R. gracilis complex and a key to the African members of the genus. *Kew Bull.* 61: 401-418.

Lanjouw, J. & F. A. Stafleu (1957). Index herbariorum, part II (2), collectors. *Regnum Veg*. 9: 175-295.

Lindau, G. (1894). Acanthaceae africanae. II. *Bot. Jahrb. Syst*. 20: 1-76.

Lowry, P. P., O. Pascal & J.-N. Labat (1999). A new species of Polyscias (Araliaceae) from Mayotte, Comoro Islands. *Adansonia* ser. 3, 21: 67-73.

Manktelow, M. (1996). Phaulopsis (Acanthaceae) - a monograph. *Symb. Bot. Upsal.* 31(2): 1-184.

Pascal, O. (2002). *Plantes et Forêts de Mayotte*. Muséum national d'Histoire naturelle, Paris.

Pascal, O., J.-N. Labat, M. Pignal & O. Soumille (2001). Diversité, affinités phytogéographiques et origines présumées de la flore de Mayotte (Archipel des Comores). *Syst. Geogr. Pl.* 71: 1101-1123.

Rolland, R., V. Boullet & J.-P. Quod (ed.) (2005). *Mayotte: Biodiversité et Evaluation Patrimoniale*. DAF de Mayotte and CBN Mascarin [http://etic.univ-reunion.fr/get/images/Mayotte/mayotte_inventaire%20znieff.pdf].

Voeltzkow, A. (1917). Flora und fauna der Comoren. *In:* Voeltzkow, A. (ed.), *Reise in Ostafrika in den Jahren 1903-1905* 3: 429-480. Stuttgart.

Vollesen, K. (2010). Anisotes. *In:* H. J. Beentje (ed.), *Fl. Trop. E. Africa, Acanthaceae* part 2: 651-663. Royal Botanic Gardens, Kew.