adansonia

2020 • 42 • 8

Gymnosiphon mayottensis Cheek, sp. nov. (Burmanniaceae) a new species from Mayotte, Comoro Islands

Martin CHEEK &
Sébastien TRACLET

art. 42 (8) — Published on 25 May 2020
www.adansonia.com

MUSÉUM
NATIONAL D'HISTOIRE NATURELLE
PUBLICATIONS SCIENTIFIQUES

Adansonia est indexé dans / Adansonia *is indexed in:*
– Science Citation Index Expanded (SciSearch®)
– ISI Alerting Services®
– Current Contents® / Agriculture, Biology, and Environmental Sciences®
– Scopus®

Adansonia est distribué en version électronique par / Adansonia *is distributed electronically by:*
– BioOne® (http://www.bioone.org)

Adansonia *est une revue en flux continu publiée par les Publications scientifiques du Muséum, Paris*
Adansonia *is a fast track journal published by the Museum Science Press, Paris*

Les Publications scientifiques du Muséum publient aussi / *The Museum Science Press also publish:*
Geodiversitas, ***Zoosystema***, ***Anthropozoologica***, ***European Journal of Taxonomy***, ***Naturae***, ***Cryptogamie*** **sous-sections** ***Algologie***, ***Bryologie***, ***Mycologie***.

Diffusion – Publications scientifiques Muséum national d'Histoire naturelle
CP 41 – 57 rue Cuvier F-75231 Paris cedex 05 (France)
Tél. : 33 (0)1 40 79 48 05 / Fax : 33 (0)1 40 79 38 40
diff.pub@mnhn.fr / http://sciencepress.mnhn.fr

ISSN (imprimé / *print*) : 1280-8571/ ISSN (électronique / *electronic*) : 1639-4798

Gymnosiphon mayottensis Cheek, sp. nov. (Burmanniaceae) a new species from Mayotte, Comoro Islands

Martin CHEEK
Herbarium, Royal Botanic Gardens, Kew, Surrey TW9 3AE (United Kingdom)
m.cheek@kew.org

Sébastien TRACLET
Conservatoire botanique national de Mascarin,
1 ruelle Chamodeau, RN2, Coconi, F-97670 Ouangani (Mayotte)
straclet@cbnm.org

Submitted on 6 June 2019 | accepted on 4 October 2019 | published on 25 May 2020

Cheek M. & Traclet S. 2020. — *Gymnosiphon mayottensis* Cheek, sp. nov. (Burmanniaceae) a new species from Mayotte, Comoro Islands. *Adansonia*, sér. 3, 42 (8): 179-188. https://doi.org/10.5252/adansonia2020v42a8. http://adansonia.com/42/8

ABSTRACT
A new species of *Gymnosiphon* Blume (Burmanniaceae), *G. mayottensis* Cheek, sp. nov. is formally described from Mount Bénara and Mount Mtsapéré on the island of Mayotte in the Comores. This is the first named species of the genus published from the Comoro Islands. The new species resembles *G. longistylus* (Benth.) Hutch. in the six long, filamentous, stigma appendages, two arising from each of the three styles, also in the absence of an underground tuber or thickened rhizome; it differs in that the bracts are appressed to the rhachises, and about equal in length to them (not patent, and < ¼ as long), the outer tepals turn rapidly from white to translucent at anthesis (not remaining white), the inner perianth lobes are absent (not present and conspicuous), the stigmas are broader than long, held horizontally and are united along their lateral margins (not longer than broad, pendulous, free from each other along their lateral margins). The new species is known from two forest sites, both with threats, and less than 50 individuals are known. Accordingly, it is assessed as Critically Endangered (B1ab(i-iv), B2ab(i-iv), D) using the IUCN 2012 standard. The new species is illustrated by colour photos and line drawings, and mapped.

KEY WORDS
Achlorophyllous, mycotrophs, Africa, Madagascar, saprophytes, threatened, new species.

RÉSUMÉ
Gymnosiphon mayottensis *Cheek, sp. nov. (Burmanniaceae), une nouvelle espèce à Mayotte, archipel des Comores.*
Une nouvelle espèce de *Gymnosiphon* Blume (*Burmanniaceae*), *G. mayottensis* Cheek, sp. nov. est décrite du Mont Bénara et du Mont Mtsapéré sur l'île de Mayotte, dans l'archipel des Comores. Il s'agit de la première description d'une espèce de ce genre pour l'archipel. Cette nouvelle espèce ressemble à *G. longistylus* (Benth.) Hutch. avec ses six longs stigmates filamenteux, deux apparaissant sur chacun des trois styles, mais aussi par l'absence d'un tubercule souterrain ou d'un rhizome épais. Cette nouvelle espèce diffère également par : ses bractées appliquées aux rachis et de longueurs à peu près égales (érigées et < ¼ de la longueur chez *G. longistylus*), ses tépales externes passant rapidement de blanc à translucide à l'anthèse (alors qu'ils restent blancs chez *G. longistylus*), l'absence de lobes internes sur le périanthe (présents et visibles chez *G. longistylus*) et par ses stigmates plus larges que longs, horizontaux et unis par les bordures latérales (plus longs que larges, pendants, libres entre eux au niveau des bordures latérales chez *G. longistylus*). Cette nouvelle espèce est connue de deux zones forestières menacées avec moins de 50 individus recensés. De ce fait, elle est évaluée en « danger critique d'extinction » (CR B1ab(i-iv), B2ab(i-iv), D) selon les critères de l'UICN (2012). *Gymnosiphon mayottensis* Cheek, sp. nov. est illustrée dans cet article par des photos en couleurs, des dessins et sa distribution est cartographiée.

MOTS CLÉS
Achlorophylliennes, mycotrophes, Afrique, Madagascar, saprophyte, menacé, espèce nouvelle.

INTRODUCTION

Mayotte is a small French island of the Comoros archipelago (376 km²) which hosts a rich biodiversity: the indigenous species richness is considered one of the most important in the world (Barthelat & Viscardi 2012; Duperron *et al.* 2019). Since the 1990s, numerous floristic surveys were made in Mayotte by the Service des Eaux et Forêts (SEF) of Direction de l'Agriculture et de la Forêt (DAF) de Mayotte, the Muséum national d'Histoire naturelle de Paris, and since 2007 principally by the Conservatoire botanique national de Mascarin (CBNM). The analysis of the material collected during these surveys and stored principally in MAO and P, has resulted in the identification of new species for science in many different families of vascular plants: Fabaceae (Du Puy & Labat 1996a, b; Labat & Pascal 1999), Sapotaceae (Labat *et al.* 1997), Oleaceae (Labat *et al.* 1999), Salicaceae and Achariaceae, as Flacourtiaceae (Hul *et al.* 1999), Araliaceae (Lowry *et al.* 1999), Putranjivaceae as the Euphorbiaceae (McPherson 2000), Malvaceae/Sterculiaceae (Labat *et al.* 2001), Orchidaceae (Bosser & Morat 2001), Buxaceae (Schatz & Lowry 2002), Boraginaceae (Miller 2003), Asteraceae (Labat & Beentje 2003), Urticaceae (Wilmot-Dear & Friis 2004), Rutaceae (Labat *et al.* 2005; Rabarimanarivo *et al.* 2015), Melastomataceae (Stone 2006), Olacaceae (Rogers *et al.* 2006), Asphodelaceae (Ellert 2006), Icacinaceae (Labat *et al.* 2006), Dioscoreaceae (Wilkin *et al.* 2007), Vitaceae (Descoings 2007), Cyatheaceae (Janssen & Rakotondrainibe 2008), Rubiaceae (Mouly & De Block 2008; Mouly 2009; Mouly & Puff 2010), Iridaceae (Goldblatt & Manning 2010), Lecythidaceae (Labat *et al.* 2011), Passifloraceae (Pignal *et al.* 2013), Myrtaceae (Byng *et al.* 2016), Apocynaceae (Stevens *et al.* 2016), Annonaceae (Hoekstra *et al.* 2016), Dryopteridaceae (Duan *et al.* 2017) and Euphorbiaceae (Kainulainen *et al.* 2017). In total, 45 new species have been described since 1996 in Mayotte including 29 which are strictly endemic. The publication of these new taxa shows that field inventory is still necessary for this small island: new species are still frequently being discovered in Mayotte (Traclet *et al.* 2018, 2019). However, the knowledge of the flora of Mayotte remains higher than the others islands of the archipelago (Grande Comore, Anjouan, Mohéli) where explorations are mostly only recent (2008-2011) and suggests that many species remain to be discovered on these islands, including new species to science as well as species previously thought to be endemic to Mayotte (e.g. *Labramia mayottensis*). Considering that only 5% of the original vegetation of the island is still present (Pascal *et al.* 2001; Pascal 2002), these species, and also all the endemic species of the Comoro Archipelago, are highly threatened and should be included in action plans and conservation programs.

Achlorophyllous mycotrophic plants, often known as saprophytes, are remarkable for lacking all chlorophyll and being completely dependent on fungi for their survival. In continental Africa, individual species or entire genera which are achlorophyllous mycotrophs occur in the families *Orchidaceae, Gentianaceae* and *Burmanniaceae*, while all members of *Triuridaceae* and *Thismiaceae* are achlorophyllous mycotrophs (Cheek & Ndam 1996; Cheek & Williams 2000; Cheek 2006; Sainge *et al.* 2010). Additionally, in the Comores and Madagascar, an achlorophyllous genus of Iridaceae, *Geosiris* Baillon, occurs (Goldblatt & Manning 2010). New discoveries of achlorophyllous mycotrophs, even new genera to science, are still steadily being made across Africa and Madagascar (Cheek *et al.* 2003, 2018, 2019; Cheek 2004a; Nuraliev *et al.* 2016)

The achlorophyllous mycotroph detected at Mt Bénara was readily identified as *Gymnosiphon* Blume due to the combination of three broad, spreading outer perianth lobes, each lobe itself with a lateral segment, the abscission after anthesis of the upper part of the perianth tube (carrying with it the lobes and stamens), leaving a naked tube surmounting the ovary, and the conspicuous thread-like stigmatic filaments which within the Burmanniaceae are known only in *Gymnosiphon*. Burmanniaceae were last monographed by Jonker (1938). He included within the family the Thismiaeae, which are now treated as a separate family, Thismiaceae (e.g. Maas-van der Kamer 1998). *Hexapterella* Urban, a monotypic S. American genus, is sister to *Gymnosiphon* in the molecular phylogeny of Merckx *et al.* (2006).

Gymnosiphon is pantropical with 33 species, including 17 species in the neotropics and eight species in SE Asia, one species extending to Australia (Gray *et al.* 2019). Until the 21st century, only four species were known for Africa-Madagascar, but with the discovery of *Gymnosiphon marieae* Cheek from Madagascar (Cheek *et al.* 2008), *G. afro-orientalis* Cheek from Malawi and Zambia (Cheek 2009), *G. samoritoureanus* Cheek from Guinea (Cheek & van der Burgt 2010) and *G. constrictus* Maas & H.Maas from Gabon (Maas & Maas-van der Kamer 2010), the number has doubled to eight. The Mt Bénara material was initially considered to be possibly *G. longistylus* (Benth.) Hutch. due to the long stigmatic filaments, but detailed examination of spirit material under the microscope showed it to be abundantly distinct from that species (see Table 1) and from all other species in Africa and Madagascar (see identification key).

The number of species described as new to science each year regularly exceeds 2000, adding to the estimated 369 000 already known (Nic Lughadha *et al.* 2016), although the number of flowering plant species known to science is disputed (Nic Lughadha *et al.* 2017). Only about 7% of plant species have been assessed and included on the Red List using the IUCN (2012) standard (Bachman *et al.* 2019), but this number rises to 21-26% when additional evidence-based assessments are considered, and 30-44% of these assess the species as threatened (Bachman *et al.* 2018). Newly discovered species such as *Gymnosiphon mayottensis* Cheek, sp. nov., reported in this paper, are likely to be threatened, since widespread species tend to have been already discovered. This makes it all the more urgent to discover, document and protect such species before they become extinct as are several achlorophyllous mycotrophs in Africa such as *Oxygyne triandra* Schltr. (Cheek & Cable 2000; Onana & Cheek 2011; Cheek & Onana 2011; Cheek *et al.* 2018) and *Afrothismia pachyantha* Schltr. (Cheek *et al.* 2019) both in Cameroon. Closer to Mayotte, *Afrothis-*

mia baerae Cheek (Cheek 2004b) known from a single site in Kenya, has not been seen since it was published 15 years ago despite searches and may also be extinct (Luke pers. comm. to Cheek 2019). Many Comorean species are already highly at risk of extinction due to habitat clearance and degradation such as by fire, mainly for smallholder and plantation agriculture following logging (DAAF 2013).

MATERIAL AND METHODS

Names of species and authors follow IPNI (2012). Herbarium and spirit-preserved material was examined with a Leica Wild M8 dissecting binocular microscope fitted with an eyepiece graticule measuring in units of 0.025 mm at maximum magnification. The drawing was made with the same equipment with a Leica 308700 camera lucida attachment. Specimens were inspected from the following herbaria: B, BM, EA, K, MAO, MO, P, SRGH, WAG, YA. The format of the description follows those in other papers describing new species in *Gymnosiphon* e.g. Cheek & van der Burgt (2010). All specimens cited have been seen. The conservation assessment follows the IUCN (2012) categories and criteria. Herbarium codes follow Index Herbariorum (Thiers, continuously updated). Georeferences are given in WGS 84 format.

KEY TO THE SPECIES OF *GYMNOSIPHON* IN AFRICA, COMORO ISLANDS AND MADAGASCAR

1. Stigmas with filiform extensions exserted from flower at anthesis 2
— Stigmas lacking filiform extensions 5

2. Flowers zygomorphic, inflorescence capitate, Madagascar ..... *G. marieae* Cheek
— Flowers actinomorphic, inflorescences cymose, Africa and Comoro Islands 3

3. Perianth tube 2-5 mm long 4
— Perianth tube 1 mm long ..... *G. constrictus* Maas & H.Maas

4. Inflorescence bracts about as long as rhachis internodes, inner tepals absent; stigmas horizontal; tepals changing from white to translucent at anthesis ..... *G. mayottensis* Cheek, sp. nov.
— Inflorescence bracts < ¼ as long as rhachis internodes, inner tepals present; stigmas pendulous; tepals white at anthesis ..... *G. longistylus* (Benth.) Hutch.

5. Rootstock with numerous bulbils, ovary ribbed, inner tepals absent, Malawi, NE Zambia, S Tanzania ..... *G. afro-orientalis* Cheek
— Rootstocks lacking bulbils, ovary smooth, inner tepals present, Guineo-Congolian Africa or Madagascar 6

6. Flowers sessile or subsessile, pedicel if present to 0.5 mm long 7
— Flowers with a distinct pedicel 1 mm long or more 8

7. Flowers white, perianth tube > 10 mm long ..... *G. bekensis* Letouzey
— Flowers yellow or white, perianth tube < 5 mm long ..... *G. samoritoureanus* Cheek

8. Plants commonly 15-35 cm tall; base of stem completely covered in many tens of brown leaf-scales, E. Africa ..... *G. usambaricus* Engl.
— Plants always < 15 cm tall; base of stem sparsely covered, with only 3-4 leaf scales, Madagascar ..... *G. danguyanus* H.Perrier

RESULTS

Gymnosiphon mayottensis Cheek, sp. nov.
(Figs 1-3)

Gymnosiphon mayottensis Cheek, sp. nov. resembles *G. longistylus* (Benth.) Hutch. in the six long, filamentous, stigma appendages, two each arising from each of the three styles, also in the absence of an underground tuber or thickened rhizome; it differs in that the bracts are appressed to the rhachises, and about equal in length to them (not patent, and < ¼ as long), the outer tepals turn rapidly from white to translucent at anthesis (not remaining white), the inner perianth lobes are absent (not present and conspicuous), the stigmas are broader than long, held horizontally and are united along their lateral margins (not longer than broad, pendulous, free from each other along their lateral margins).

TYPUS. — **Mayotte**. Grande Terre, Chirongui, Bénara, bord de sentier, 567m, [–12.879241, 45.160691], sous-bois de forêt humide d'altitude, fl., 01. IV.2019, *S. Traclet, A. Dimassi & E. Vennetier 665* (holo-, K [K000593140]; iso-, MAO[MAO03189]; P, MO).

PARATYPI. — **Mayotte**. Grande Terre, Chirongui, Bénara, à droite du sentier, [–12.87921, 45.16077], bord de sentier de forêt humide, (fl., 24.III.2019, *E. Vennetier 9* (MAO[MAO02677]); Grande Terre, Chirongui, Bénara, au milieu du sentier, 560 m, [–12.878979, 45.160331], sous-bois de forêt humide d'altitude, spécimen le plus bas observé ce jour en fleur à 14h, pas d'autre individu sur la station, fl., 01.IV.2019, *S. Traclet, A. Dimassi & E. Vennetier 666* (MAO[MAO03190]); Grande Terre, Chirongui, Bénara, sur la petite colline du *Cynorkis* sp. blanc, 535 m, [–12.876430, 45.159233], fl., 07.IV.2019, *E. Vennetier 12* (MAO[MAO02287]); Grande Terre, Mamoudzou, Majimbini, RF de Majimbini, 483 m, [–12.766693, 45.189309], forêt humide sur crête à *Labramia mayottensis*, *Brexia madagascariensis*, *Grisollea myrianthea* et *Garcinia anjouanensis*, fl., 03.V.2019, *A. Dimassi & E. Vennetier 123* (MAO[MAO04114]).

TABLE 1. — The more significant diagnostic characters separating *Gymnosiphon mayottensis* Cheek, sp. nov. and *G. longistylus* (Benth.) Hutch.

	Gymnosiphon longistylus	***Gymnosiphon mayottensis* Cheek, sp. nov.**
Geographic range	Guinea to Democratic Republic of Congo	Mayotte, Comoro Islands.
Ratio of width of lateral: central segments of outer perianth lobes	*c.* 1:1	*c.* 1:2-5
Inner perianth lobes	Conspicuous in throat of perianth tube	Absent
Bracts	Patent, not adpressed; < ¼ as long as rhachis internodes	Adpressed to, and as long as rhachis internodes
Colour & translucency of outer perianth lobes at anthesis	White, opaque	Initially white, opaque, rapidly becoming translucent, colourless
Stigmas	Stigmas united only at base, each free, pendulous, longer than broad	Stigmas united along their lateral margins, horizontal, broader than long
Position of stigmatic head	Inserted deep in throat of perianth tube	At mouth of perianth tube

DISTRIBUTION. — This species is known from Mayotte island at altitudes between 300 m and 600 m above sea level. Two stations are referenced: the largest one at Mount Bénara (area of station *c.* 13 ha) and a second at Mount Mtsapéré (area of station *c.* 8 ha). Photographs of what appears to be a similar but slightly different species have been seen from Moheli, but material has not yet been obtained so the specific identification remains uncertain.

HABITAT. — Old secondary tropical humid forest above 300 m, and primary forest 450-567 m primary altitude.

PHENOLOGY. — Flowering was observed in March, April and early May.

ETYMOLOGY. — The epithet refers to the island of Mayotte, from which the species was discovered and to which the species is endemic on current evidence.

DESCRIPTION

Erect, probably perennial herb 7-9 cm tall above roots, above ground part *c.* 3-5 cm tall (*Traclet et al. 665)*, glabrous, achlorophyllous, white when alive. Tuber(s) and swollen rhizome absent. Base of stem (only one seen) with loose rosette of 3-4 spreading, oblong, white reduced leaves, 0.8-2 × 0.5 mm, apex obtuse. Roots *c.* 7, vermiform, to 5 mm long, *c.* 0.1 mm diam. Stem terete, erect, single, unbranched, *c.* 6 cm long, *c.* 1 mm in diameter, internodes 5-25 mm long. Scale-leaves cupular 0.5-0.6 mm diam., clasping the stem for 40-50% of its circumference. Inflorescence appearing subcapitate, 1-11-flowered, initially single-flowered, then cymose-biparous, with two equal but contracted branches. Bracts navicular (elliptic-oblong, concave), 1.5-1.6 × 0.5-0.5 mm, adpressed to the rhachis (inflorescence axis), about as long as the internodes which they subtend, apex rounded. Pedicels 1.2-1.4 mm long. Flower white in bud, becoming translucent at anthesis, erect, actinomorphic, 3-4.5 mm long, 4(-5) mm wide at anthesis (flowers recorded open at 1400 hrs: *Traclet et al. 665, 666*), scent if present not recorded. Perianth tube 1.5-1.7 mm long, cylindrical, 1.3 mm wide, distal portion of tube above anther insertion as broad as the proximal portion. Outer tepals 3, oblong in outline, 1.5-1.8 × 1.2-1.3 mm, patent, with two slender lateral lobes, diverging from the main, central lobe by up to 45°, lateral lobes arising between the base and the distal half of the central lobe and in the same plane, 0.2-0.7 × 0.1 mm, apex obtuse. Inner tepals absent. Anthers inserted below the stigmatic head, *c.* 0.5 mm below the sinus between the outer perianth lobes, each 0.4-0.5 mm long, 1.5-1.7 mm wide, the two lateral, dithecal anthers globose, 0.5-0.7 mm diam., separated by 0.2-0.3 mm on the large, conspicuous connective. Style cylindrical, 1.5-2 mm long, 3-lobed at apex, stigmatic head 1.2 mm wide, the three stigmas horizontal, each lunate to bifurcate-broadly obtriangular, 0.4-0.6-0.7 mm, each with a filiform appendage *c.* 2 mm long arising abruptly from the two sides, the appendages (probable pollen-receptive surfaces) extending along the outer perianth lobes. Ovary cylindric, outer surface lacking conspicuous ribs, 1.5-2 × 1.2-1.4 mm, unilocular, with 3 protoseptal, intruded parietal placentas, septal nectary glands six, globose, *c.* 0.2 mm diam., flanking the septae immediately below the junction with the perianth tube. Fruit indehiscent, lacking ribs, globose-ellipsoid, *c.* 1 × 1 mm, walls membranous, showing seeds; distal perianth tube remains subcylindrical, *c.* 1.5 × 1 mm. Seeds globose, 0.1-0.15 mm diam.

CONSERVATION STATUS

Despite the fact that all populations of *Gymnosiphon mayottensis* Cheek, sp. nov. are found in forest reserves, anthropogenic pressure still represents a strong threat on Mayotte. This is because traditional agriculture (slash-and-burn) is increasing everywhere, including inside the forest reserves. During the year 2013, the areas burned in forest reserves represented more than 76 ha (OFDM 2015). In addition, liana covers of the canopy by species such as *Decalobanthus peltatus* (L.) Simões & Staples (Convolvulaceae) regularly causes forest cover collapses and increases development of invasive alien species which threaten the ecosystem.

At the main station of the new species (Mount Bénara), less than 30 individuals were observed in a small area (13 ha). However, it is difficult to estimate accurately the size of the population because of the small size of the individuals which makes them inconspicuous. At the Mount Mtsapéré station, less than 25 individuals were found in small area (8 ha). According to the IUCN criteria (IUCN

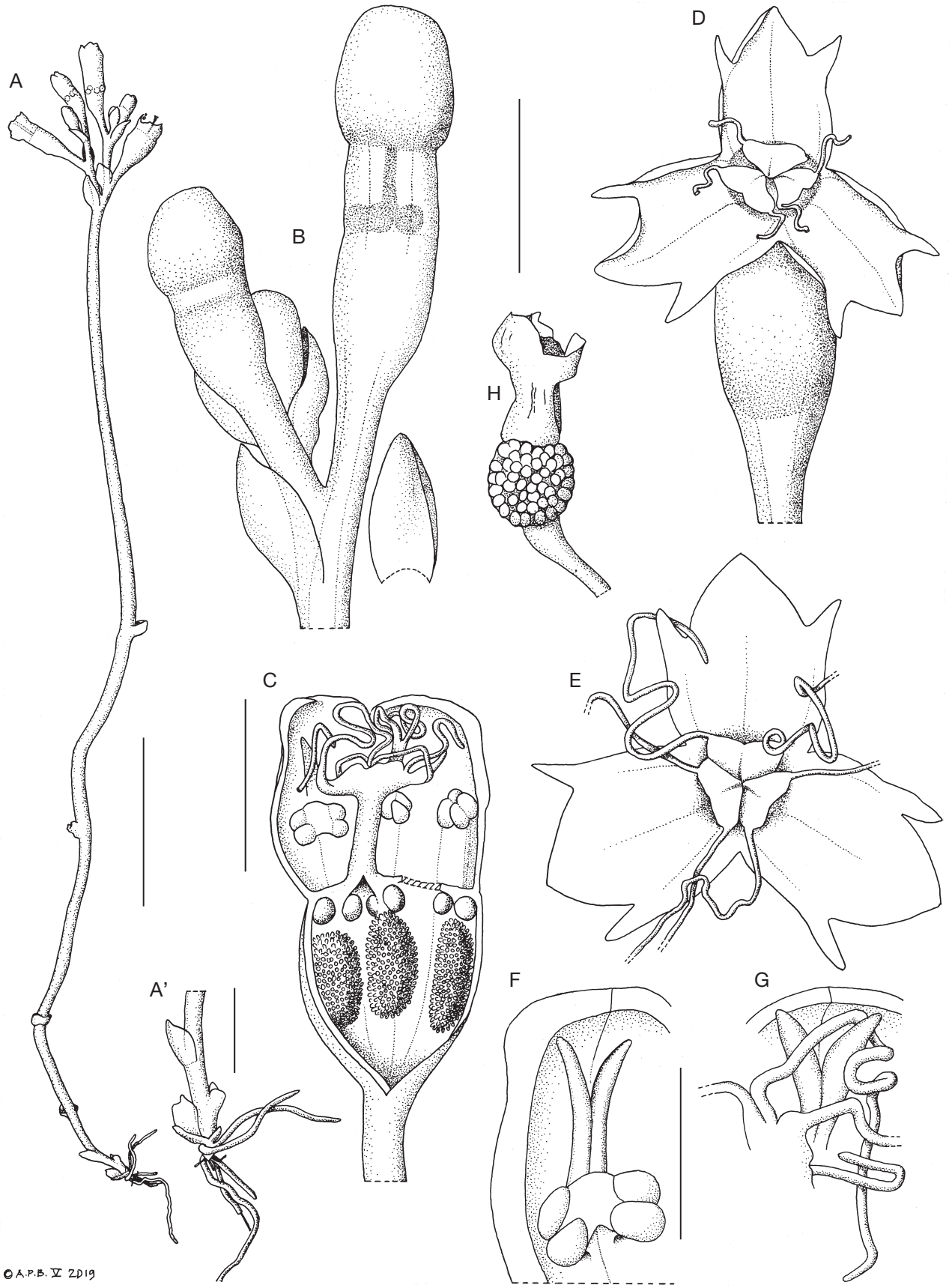

FIG. 1. — *Gymnosiphon mayottensis* Cheek, sp. nov.: **A**, habit; **A'**, detail showing base of stem and roots; **B**, branch of inflorescence with flower buds and detail of bract; **C**, dissection of large flower bud from B; **D**, open flower; **E**, perianth and stigmas (from photo); **F**, stamen and pair of lateral outer perianth lobes from bud dissected in C; **G**, stigmatic filament looped over lateral perianth lobe in bud dissected in C; **H**, fruit (dried). All drawn from *S. Traclet 665* (MAO03189), liquid preserved, unless otherwise indicated. Drawn by Andrew Brown. Scale bars: A, 1 cm; A', B, C, D, H, 2 mm; E, F, G, 1 mm.

Fig. 2. — *Gymnosiphon mayottensis* Cheek, sp. nov.: **A**, habit, whole plant with underground parts exposed; **B**, inflorescence viewed from above, note navicular bracts; **C**, flower at anthesis viewed from above, note filamentous style arms; **D**, flower viewed from side, note the translucent tepals. Photos: A, Guillaume Viscardi; **B**-**D**, Étienne Vennetier.

2012), using the IUCN-preferred grid cells of 4 km², the area of occupancy is 8 km², while the area of occurrence is difficult to calculate since only two points are known but is estimated as 9 km², and the species is severely fragmented due to clearance of the forest habitat between the two sites. In addition, we estimate a decline in the area of occupancy, number of localities and habitat quality, and in the number of mature individuals. The number of mature individuals is less than 50. Therefore, we propose, using the IUCN (2012) standard, the assessment of this species as Critically Endangered (B1ab(i-iv), B2ab(i-iv), D) at the global and regional level (Mayotte). It would be highly desirable for it to be the subject of a special protection statute. We recommend that a management plan to ensure the survival of this species is made and implemented. This should include a public sensitisation programme, annual monitoring of the *Gymnosiphon* population to determine trends in survivorship and threats, potentially increased guarding of the forest habitat, and seedbanking. Cultivation of achlorophyllous mycotrophic flowering species such as *Gymnosiphon mayottensis* Cheek, sp. nov. has never been achieved and so it is recommended that this is not attempted.

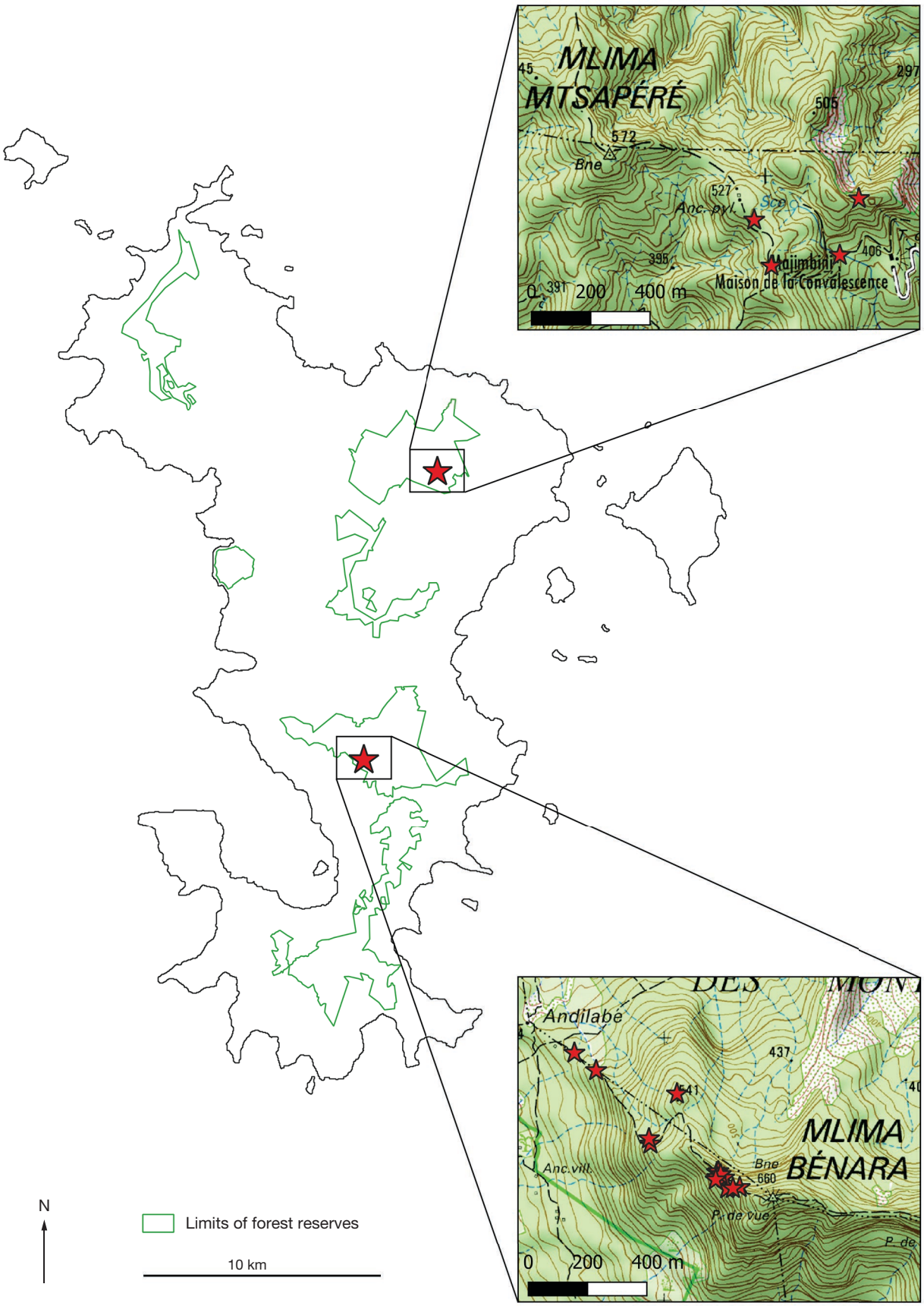

FIG. 3. — Map of the global distribution of *Gymnosiphon mayottensis* Cheek, sp. nov. Map by Sébastien Traclet.

HISTORY OF THE DISCOVERY

According to the database of MAO, the credit for the first mention of this species in Mayotte should be given to Fabien Barthelat. *Barthelat 1575*, *Gymnosiphon* sp. collected in Bénara 15 March 2006 with Maoulida Mchangama is recorded and his photo is published as "an unidentified species of *Gymnosiphon* species from Mayotte (the Comoros)" (Merckx 2008: 102), but the physical specimen has not been traced at MAO or in P. Guillaume Viscardi also took pictures of this species, also on Mount Bénara, on 20 March 2008, but without collecting a specimen. More than 10 years later, in March 2019, Etienne Vennetier collected a specimen and brought this species to light. Since then, the CBNM's botanists (Sebastien Traclet & Abassi Dimassi) have made other collections and sent these to K for determination and to confirm the status of the material as a new species. Finally, on 20 April 2019, a single specimen was found by A. Dimassi, Nicolas Valy, Agathe Meunier and Maoua Dimassi at a second locality, in the Majimbini forest reserve (Mount Mtsapéré). Since then, additional botanical prospection at this locality by A. Dimassi and E. Vennetier discovered additional individuals there.

DISCUSSION

The discovery of a new, endemic, longistylous species of *Gymnosiphon* in Mayotte was unexpected. While the majority of *Gymnosiphon* species in the Neotropics are longistylous, until now, only two species in Africa-Madagascar have this trait, namely *G. longistylus* and *G. mariae*. The first is restricted to Guineo-Congolian Africa. The report of *G. longistylus* from Tanzania by Cowley (1988) is an error. The morphological differences between *G. mayottensis* Cheek, sp. nov. and *G. longistylus* are numerous and are listed in Table 1. Most striking is the contracted inflorescence axis of *G. mayottensis* Cheek, sp. nov. (Fig. 2), which, together with the long, appressed bracts, gives the species a very different aspect from that of *G. longistylus*, in which the two inflorescence arms are long, and the flowers spaced wide apart due to the much longer rhachis internodes. In this respect, *G. mayottensis* Cheek, sp. nov. is intermediate between *G. longistylus* and *G. mariae*. This is because in the last species, from Madagascar, the inflorescence is so contracted that it is effectively capitate. However, *G. mariae* is in other respects so morphologically bizarre (zygomorphic flowers, heavily reticulate ovary-hypanthium, single large ovoid tuber) in the context of the variation within the genus in Africa-Madagascar, even globally, that recent common ancestry with *G. mayottensis* Cheek, sp. nov. seems unlikely. To resolve the ancestry and origin of *G. mayottensis* Cheek, sp. nov., molecular phylogenetic studies are advisable. Thus far such studies have included only three species from Africa, and none from Madagascar, so that only three of the nine species now known to occur in Africa and Madagascar have been included (Merckx *et al.* 2006). A curious feature of *G. mayottensis* Cheek, sp. nov. is the placement in the unopened flowers of the lateral segments of the outer perianth lobes. In the unopened flowers these resemble paired, linear inner perianth lobes. However, as the flower expands and opens at anthesis, they reveal themselves to be the lateral segments of the outer perianth lobes, and inner perianth lobes are absent (Fig. 1).

A further curious feature of *G. mayottensis* Cheek, sp. nov. are the translucent outer perianth lobes at anthesis. In other species of the genus in Africa and Madagascar, the outer perianth lobes are usually bright white at anthesis (exceptionally they are often yellow in *G. samoritoureanus*). Sometimes, just before the outer perianth lobes fall after anthesis, they become translucent in e.g. *G. longistylus* (Cheek pers. obs). Apart from in *G. mayottensis* Cheek, sp. nov., the only recorded observation of translucency at anthesis is the observation by Danguy, reported by Perrier (1936) that the lateral segments of the outer lobes of *G. danguyanus* of Madagascar are also translucent.

The discovery of *G. mayottensis* Cheek, sp. nov., due to its proximity to a modern research facility staffed by CBNM, offers hope that the mystery of the pollination and seed dispersal, and other aspects of the biology of this pantropical genus, such as its mycorrhizal associates, might at last be resolved. To date concrete observations on these have been completely absent, and only speculation exists (Merckx 2008; Cheek *et al.* 2008).

The mystery of the possible conspecificity of the *Gymnosiphon* species on Moheli referred to above, remains to be resolved because the physical specimens remain to be retrieved. This taxon is recorded by the specimen *Bidault et al.* 61 (27 March 2011), for which images can be seen on Tropicos (accessed 31 May 2019: https://www.tropicos.org/Image/100268552). It is possible that the Moheli material might represent a further new taxon of the genus in view of certain morphological disparities with *G. mayottensis* Cheek, sp. nov.

Gymnosiphon mayottensis Cheek, sp. nov. is only the third species of achlorophyllous mycotroph recorded from Mayotte. The other two are *Seychellaria madagascariensis* C.H.Wright (Triuridaceae) known only from Mount Choungui (CBNM 2016), and *Geosiris albiflora* Goldblatt & J.C.Manning (Iridaceae, Goldblatt & Manning 2010) known only from Sohoa and Mount Choungui. *Gymnosiphon mayottensis* Cheek, sp. nov. has not been recorded growing together with either of these two species.

Acknowledgements
This study has benefitted from the BEST RUP funding « Promouvoir la conservation et l'utilisation durable de la Biodiversité et des Services Écosystémiques dans les Régions Ultra-Périphériques (RUP) » in the project « BEST RUP 2483 : Connaissance et conservation de la flore méconnue et menacée de Mayotte » led by the Conservatoire botanique national de Mascarin (2018-2019). The authors thank Etienne Vennetier, teacher and amateur orchid specialist for making the first of the specimens of *Gymnosiphon mayottensis* Cheek, sp. nov. studied in this paper, for his many photographs, and Abassi Dimassi of CBNM for discovering the second site. Guillaume Viscardi, previous curator of MAO, for his help with history of the discovery of this new species, pictures and for his efforts to find *Barthelat 1575*. Xander van der Burgt is thanked for technical assistance. Finally, the authors thank Marc Pignal, Thierry Deroin and an anonymous reviewer for their valuable comments on an earlier version of this paper.

REFERENCES

BACHMAN S. P., NIC LUGHADHA E. M. & RIVERS M. C. 2018. — Quantifying progress towards a conservation assessment for all plants. *Conservation Biology* 32 (3): 516-524. https://doi.org/10.1111/cobi.13071

BACHMAN S. P., FIELD R., READER T., RAIMONDO D., DONALDSON J., SCHATZ G. E.& NIC LUGHADHA E. M. 2019. — Progress, challenges and opportunities for Red Listing. *Biological Conservation* 234: 45-55 https://doi.org/10.1016/j.biocon.2019.03.002

BARTHELAT F. & VISCARDI G. 2012. — Flore menacée de l'île de Mayotte: importance patrimoniale et enjeux de conservation. *Revue d'Écologie* 67 (sup. 11): 15-28. http://hdl.handle.net/2042/55939

BOSSER J. & MORAT P. 2001. — Contribution à l'étude des Orchidaceae de Madagascar et des Mascareignes. XXXI. Espèces et combinaisons nouvelles dans les genres *Oeceoclades, Eulophia* et *Eulophiella*. *Adansonia,* sér. 3, 23 (1): 7-22.

BYNG J. W., BARTHELAT F., SNOW N. & BERNARDINI B. 2016. — Revision of *Eugenia* and *Syzygium* (Myrtaceae) from the Comoros archipelago. *Phytotaxa* 252: 163-184. https://doi.org/10.11646/phytotaxa.252.3.1

CHEEK M. 2004a. — Kupeaeae, a new tribe of *Triuridaceae* from Africa. *Kew Bulletin* 58: 939-949. https://doi.org/10.2307/4111207

CHEEK M. 2004b. — A new species of *Afrothismia* (Burmanniaceae) from Kenya. *Kew Bulletin* 58: 951-955. https://doi.org/10.2307/4111208

CHEEK M. 2006. — African Saprophytes: new discoveries, *in* GHAZANFAR S. A. & BEENTJE H. J. (eds), *Taxonomy and Ecology of African Plants, their Conservation and Sustainable Use.* Proceedings of the 17th AETFAT Congress, Addis Ababa, Ethiopia. Royal Botanic Gardens Kew, London: 693-697.

CHEEK M. 2009. — Burmanniaceae, *in* TIMBERLAKE J. R. & MARTINS E. S. (eds), *Flora Zambesiaca* 12 (2): 145-148.

CHEEK M. & NDAM N. 1996. — Saprophytic Flowering Plants of Mount Cameroon, *in* VAN DER MAESEN, VAN DER BURGT & VAN MEDENBACH DE ROOY (eds), The Biodiversity of African Plants. Proceedings XIV AETFAT congress. Kluwer: 612-617.

CHEEK M. & CABLE S. 2000. — *Oxygyne triandra*. *The IUCN Red List of Threatened Species* 2000: e.T39556A10248327. https://doi.org/10.2305/IUCN.UK.2000.RLTS.T39556A10248327.en

CHEEK M. & WILLIAMS S. A. 2000. — A Review of African Saprophytic Flowering Plants, *in* TIMBERLAKE J. & KATIVU S. (eds), *African Plants. Biodiversity, Taxonomy & Uses.* Proceedings of the 15th AETFAT Congress at Harare, Zimbabwe. Royal Botanic Gardens, Kew, London: 39-49.

CHEEK M. & VAN DER BURGT X. 2010. — *Gymnosiphon samoritoureanus* (Burmanniaceae) a new species from Guinea, with new records of other achlorophyllous heteromycotrophs. *Kew Bulletin* 65: 83-88. https://doi.org/10.1007/s12225-010-9180-9

CHEEK M. & ONANA J.-M. 2011. — *Red Data Plant Species in Cameroon, a Guide for Secondary School Teachers*. RBG, Kew, 16 p.

CHEEK M., WILLIAMS S. A. & ETUGE M. 2003. — *Kupea martinetugei,* a new genus and species of Triuridaceae from western Cameroon. *Kew Bulletin* 58: 225-228. https://doi.org/10.2307/4119366

CHEEK M., WILLIAMS S. A. & BROWN A. 2008. — *Gymnosiphon marieae* sp. nov. *(Burmanniaceae)* from Madagascar, a species with tepal-mediated stigmatic extension. *Nordic Journal of Botany* 26: 230-234. https://doi.org/10.1111/j.1756-1051.2008.00339.x

CHEEK M., TSUKAYA H., RUDALL P. J. & SUETSUGU K. 2018. — Taxonomic monograph of *Oxygyne* (Thismiaceae), rare achlorophyllous mycoheterotrophs with strongly disjunct distribution. *PeerJ* 6: e4828. https://doi.org/10.7717/peerj.4828

CHEEK M., ETUGE M. & WILLIAMS S. A. 2019. — *Afrothismia kupensis* sp. nov. (*Thismiaceae*), Critically Endangered, with observations on its pollination and notes on the endemics of Mt Kupe, Cameroon. *Blumea* 64 (2): 158-164. https://doi.org/10.3767/blumea.2019.64.02.06

COWLEY E. J. 1988. — Burmanniaceae, *in* POLHILL R. M. (ed.), *Flora of Tropical East Africa*. Balkema, Rotterdam: 1-9.

CBNM(BOULLET V. COORD.) 2016. — Index de la flore vasculaire de Mayotte (Trachéophytes) : statuts, menaces et protections – Version 2016.1 (mise à jour du 16 décembre 2016). Conservatoire Botanique National de Mascarin, Antenne de Mayotte, Coconi. http://floremaore.cbnm.org

DAAF 2013. — *Orientations forestières du Département de Mayotte*. DAAF, ONF & Département de Mayotte, 115 p.

DESCOINGS G. 2007. — Vitacées nouvelles de Madagascar et des Comores. *Journal de Botanique* 39: 17-35.

DUAN Y. F., HENNEQUIN S., ROUHAN G., BASSUNER B. & ZHANG L. B. 2017. — Taxonomic Revision of the Fern Genus *Ctenitis* (Dryopteridaceae) from Africa and the Western Indian Ocean1. *Annals of the Missouri Botanical Garden* 102 (1): 3-87. https://doi.org/10.3417/2016024

DUPERRON B., TRACLET S., VISCARDI G., GUIOT V., DIMASSI A., LAVERGNE C. & GIGORD L. D. B. 2019 (mise à jour). — *Stratégie de lutte contre les espèces végétales invasives à Mayotte : diagnostic et programme opérationnel de lutte – Version 2.1.* Conservatoire botanique national de Mascarin & DEAL, Saint-Leu (Réunion), 87 p.

DU PUY D. J. & LABAT J.-N. 1996a. — New taxa and nomenclatural changes in *Rhynchosia* Lour. and *Eriosema* (DC.) Reichb.(Leguminosae-Papilionoideae-Phaseoleae) from Madagascar and the Comoro Islands. *Bulletin du Muséum national d'Histoire naturelle, 4ème série, section B, Adansonia : Botanique, Phytochimie* 18 (1-2): 85-96. https://www.biodiversitylibrary.org/page/13740253

DU PUY D. J. & LABAT J.-N. 1996b. — New species of *Erythrina* and *Mucuna* from Madagascar and the Comoros. *Bulletin du Muséum national d'Histoire naturelle, 4ème série, section B, Adansonia: Botanique, Phytochimie* 18 (3-4): 225-234. https://www.biodiversitylibrary.org/page/13740397

ELLERT A. 2006. — *Aloe alexandrei*: a surprisingly unknown new species from the island of Grande Comore. *Cactus and Succulent Journal* 78: 10-14. http://doi.org/d25m8j

GOLDBLATT P. & MANNING J. C. 2010. — *Geosiris albiflora* (Geosiridoideae), a new species from the Comoro Archipelago. *Bothalia* 40: 169-171. https://doi.org/10.4102/abc.v40i2.208

GRAY B., MAHYUNI R.& LOW Y. W. 2019. — *Gymnosiphon queenslandicus* (Burmanniaceae), a new addition to the mycoheteroph flora of tropical rainforest in Australia. Australian *Systematic Botany* 32: 139-145. https://doi.org/10.1071/SB18035

HOEKSTRA P. H., WIERINGA J. J. & CHATROU L. W. 2016. — A nonet of novel species of *Monanthotaxis* (Annonaceae) from around Africa. *PhytoKeys* (69): 71. https://doi.org/10.3897/phytokeys.69.9292

HUL S., LABAT J.-N. & PASCAL O. 1999. — Deux nouvelles espèces de Flacourtiaceae de l'Ile de Mayotte dans l'Archipel des Comores. *Adansonia,* sér. 3, 20 (2): 263-269.

IPNI (INTERNATIONAL PLANT NAMES INDEX). 2012. — http://www.ipni.org/ipni/ (accessed: January 2018).

IUCN 2012. — *IUCN Red List Categories:* version 3.1. Prepared by the IUCN Species Survival Commission. IUCN Gland, Switzerland and Cambridge, United Kingdom.

JANSSEN T. & RAKOTONDRAINIBE F. 2008. — A revision of the indusiate scaly tree ferns (Cyatheaceae, *Cyathea* subgen. *Alsophila* sect. *Alsophila*) in Madagascar, the Comoros, and the Seychelles. *Adansonia,* sér. 3, 30 (2): 221-376.

JONKER F. P. 1938. — *Monograph of the Burmanniaceae*. *Mededelingen van het Botanisch Museum en Herbarium van de Rijksuniversiteit te Utrecht*. Universitätsbibliothek Johann Christian Senckenberg, Utrecht, 279 p.

KAINULAINEN K., VAN EE B., RAZAFINDRAIBE H. & BERRY P. E. 2017. — A revision of the *Adenophorus* Group and other glandular-leaved species of *Croton* (Euphorbiaceae) from northern Madagascar and Mayotte, including three new species. *Candollea* 72: 371-402. https://doi.org/10.15553/c2017v722a15

LABAT J.-N. & PASCAL O. 1999. — Two new species of *Cynometra* (Fabaceae: Caesalpinioideae) from Mayotte in the Comoro Archipelago. *Kew Bulletin* 54 (1): 163-169. https://doi.org/10.2307/4111033

LABAT J.-N. & BEENTJE H. 2003. — A new species of *Psiadia* (Compositae) from Mayotte. *Kew Bulletin* 58 (4): 971-975. https://doi.org/10.2307/4111211

LABAT J.-N., PIGNAL M. & PASCAL O. 1997. — Une nouvelle espèce de *Labramia* (Sapotaceae) de l'Île de Mayotte dans l'Archipel des Comores. *Adansonia,* sér. 3, 19 (2): 213-216.

LABAT J.-N., PIGNAL M. & PASCAL O. 1999. — Trois espèces nouvelles d'Oleaceae et note sur la présence d'*Olea capensis* dans l'Archipel des Comores. *Novon* 9: 66-72. https://doi.org/10.2307/3392121

LABAT J.-N., BIDAULT E. & VISCARDI G. 2011. — Une nouvelle espèce de *Foetidia* (Lecythidaceae, sous-famille Foetidioideae) en danger critique d'extinction récemment découverte à Mayotte, archipel des Comores. *Adansonia,* sér. 3, 33 (2) : 263-269. https://doi.org/10.5252/a2011n2a11

LABAT J.-N., MUNZINGER J. & PASCAL O. 2001. — Une nouvelle espèce de *Nesogordonia* Baillon (Sterculiaceae) de Mayotte, Archipel des Comores. *Candollea* 55 (2): 293-296.

LABAT J.-N., PIGNAL M. & PASCAL O. 2005. — Deux espèces nouvelles et une combinaison nouvelle chez les Rutaceae de l'Archipel des Comores. *Monographs in Systematic Botany from the Missouri Botanical Garden* 104: 361-369.

LABAT J.-N., EL-ACHKAR E. & RABEVOHITRA R. 2006. — Révision synoptique du genre *Pyrenacantha* (Icacinaceae) à Madagascar. *Adansonia,* sér. 3, 28 (2): 389-404.

LOWRY P. P., PASCAL O. & LABAT J.-N. 1999. — A new species of *Polyscias* (Araliaceae) from Mayotte, Comoro Islands. *Adansonia,* sér. 3, 21 (1): 67-73. http://www.biodiversitylibrary.org/page/56152618

MAAS-VAN DE KAMER H. 1998. — Burmanniaceae, *in* KUBITZKI K. (ed.), *The Family and Genera of Vascular Plants III. Monocots, Lilianae (except Orchidaceae)*. Springer, Berlin: 154-164.

MAAS P. J. M. & MAAS-VAN DE KAMER H. 2010. — Burmanniaceae, *in* SOSEF M. S. M. *et al.* (eds), *Flore du Gabon.* Vol. 41. Nationaal Herbarium Nederland, Leiden: 11-22, 67, 68.

MCPHERSON G. 2000. — *Drypetes* (Euphorbiaceae) in Madagascar and the Comoro Islands. *Adansonia,* sér. 3, 22 (2): 205-209.

MERCKX V. S. F. T. 2008. — *Mycoheterotrophy in Dioscoreales*. PhD Thesis, Katholieke Universiteit Leuven, 217 p.

MERCKX V. S. F. T., SCHOLS P., MAAS-VAN DER KAMER H. & MAAS P. 2006. — Phylogeny and evolution of Burmanniaceae (Dioscoreales) based on nuclear and mitochondrial data. *American Journal of Botany* 93: 1684-1998. https://doi.org/10.3732/ajb.93.11.1684

MILLER J. S. 2003. — Classification of Boraginaceae subfam. Ehretioideae: resurrection of the genus *Hilsenbergia* Tausch ex Meisn. *Adansonia,* sér. 3, 25 (2): 151-189.

MOULY A. 2009. — Les Rubiaceae émergentes de la canopée endémique de l'archipel des Comores : affinités floristiques dans l'Océan indien et taxonomie. *Adansonia,* sér. 3, 31 (1): 197-206. https://doi.org/10.5252/a2009n1a14

MOULY A. & DE BLOCK P. 2008. — A new species of *Coptosperma* (Rubiaceae) from the Comoro Islands and Madagascar. *Systematics and Geography of Plants* 78: 145-154. https://www.jstor.org/stable/20649760

MOULY A. & PUFF C. 2010. — *Paederiantiti* sp. nov. (Rubiaceae) from the Comoros and notes on the affinities of Comorian rubiaceous climbers and lianas. *Nordic Journal of Botany* 28 (3): 262-266. https://doi.org/10.1111/j.1756-1051.2010.00636.x

NIC LUGHADHA E., BACHMAN S. P. & GOVAERTS R. 2017. — Plant Fates and States: Response to Pimm and Raven. *Trends in Ecology & Evolution* 32: 887-889. https://doi.org/10.1016/j.tree.2017.09.005

NIC LUGHADHA E., GOVAERTS R., BELYAEVA I., BLACK N., LINDON H., ALLKIN A., MAGILL R. E. & NICOLSON N. 2016. — Counting counts: Revised estimates of numbers of accepted species of flowering plants, seed plants, vascular plants and land plants with a review of other recent estimates. *Phytotaxa* 272 (1): 82-88. https://doi.org/10.11646/phytotaxa.272.1.5

NURALIEV M. S., CHEEK M. & BEER A. S. 2016. — *Seychellaria barbata* (Triuridaceae), a new species from Marojejy National Park, Madagascar. *Phytotaxa* 268: 229-243. https://doi.org/10.11646/phytotaxa.268.4.1

ONANA J. M. & CHEEK M. 2011. — *Red Data Book of the Flowering Plants of Cameroon: IUCN Global Assessments*. Royal Botanic Gardens, Kew, 578 p.

PASCAL O. 2002. — *Plantes et forêts de Mayotte.* Muséum national d'Histoire naturelle, Paris, 116 p. (Patrimoines naturels ; 53).

PASCAL O., LABAT J.-N., PIGNAL M. & SOUMILLE O. 2001. — Diversité, affinités phytogéographiques et origines présumées de la flore de Mayotte (Archipel des Comores). *Systematics and Geography of Plants* 71: 1101-1123. https://doi.org/10.2307/3668743

PERRIER DE LA BÂTHIE H. 1936. — Un *Gymnosiphon* de Madagascar. *Notulae Systematicae* 5: 160-162. https://www.biodiversitylibrary.org/page/6463478

PIGNAL M., YOCKTENG R., HEARN D. J. & LABAT J. N. 2013. — *Adenia barthelatii* (Passifloraceae), a new endemic species of Mayotte and its phylogenetic status within the genus *Adenia*. *Phytotaxa* 99 (1): 40-48. https://doi.org/10.11646/phytotaxa.99.1.3

RABARIMANARIVO M. N., RAKOTONIRINA N. H., PHILLIPSON P. B., LOWRY P. P., LABAT J. N. & PIGNAL M. 2015. — Révision du genre *Ivodea* Capuron (Rutaceae), endémique de Madagascar et de l'archipel des Comores. *Adansonia*, sér. 3, 37 (1): 63-102. https://doi.org/10.5252/a2015n1a6

ROGERS Z. S., MALÉCOT V. & SIKES K. G. 2006. — A monograph of *Olax* L. (Olacaceae) in Madagascar and the Comoro Islands. *Adansonia,* sér. 3, 28 (1): 71-100.

SAINGE M. N., FRANKE T., MERCKX M. & ONANA J. M. 2010. — Distribution of myco-heterotrophic (saprophytic) plants of Cameroon, *in* VAN DER BURGT X., VAN DER MAESEN J. & ONANA J. M. (eds), *Systematics and Conservation of African Plants.* Royal Botanic Gardens, Kew, London: 281-288.

SCHATZ G. E. & LOWRY P. 2002. — A synoptic revision of the genus *Buxus* L. (Buxaceae) in Madagascar and the Comoro Islands. *Adansonia*, sér, 3, 24: 7-19.

STEVENS W. D., LABAT J.-N. & BARTHELAT F. 2016. — Two new species of Apocynaceae, Asclepiadoideae from Mayotte. *Candollea* 71 (1): 127-134. https://doi.org/10.15553/c2016v711a15

STONE R. D. 2006. — New species of *Memecylon* L. and *Warneckea* Gilg (Melastomataceae) from Madagascar and Mayotte. *Adansonia,* sér. 3, 28 (2): 337-358. http://www.biodiversitylibrary.org/page/11159906

TRACLET S., DIMASSI A. & VALY N. 2018. — *Cartographie simplifiée de la végétation des presqu'îles de Saziley et Charifou*. CBNM, Rapport technique, version 2.2, 42 pages.

TRACLET S., ABDALLAH A., MCHINDRA A. & DIMASSI A. 2019. — BEST RUP 2483 : Connaissance et conservation de la flore méconnue de Mayotte – Version 2. Rapport bilan non publié, CBNM, 77 pages + annexes (29 p.).

WILKIN P., HLADIK A., LABAT J.-N. & BARTHELAT F. 2007. — A new edible yam (*Dioscorea* L.) species endemic to Mayotte, new data on *D. comorensis* R. Knuth and a key to the yams of the Comoro Archipelago. *Adansonia,* sér. 3, 29: 215-228.

WILMOT-DEAR C. M. & FRIIS I. 2004. — The Old-World species of *Pouzolzia* (Urticaceae, tribus Boehmerieae). A taxonomic revision. *Nordic Journal of Botany* 24 (1): 62-64. https://doi.org/10.1111/j.1756-1051.2004.tb00825.x

Submitted on 6 June 2019;
accepted on 4 October 2019;
published on 25 May 2020.