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UNE ESPÈCE NOUVELLE DE *CAMPTOLEPIS* RADLK. (SAPINDACEAE) POUR MAYOTTE DANS L'ARCHIPEL DES COMORES ET LECTOTYPIIFICATION DES ESPÈCES MALGACHES DU GENRE.

A NEW SPECIES OF *CAMPTOLEPIS* RADLK. (SAPINDACEAE) FOR MAYOTTE
IN THE COMOROS ARCHIPELAGO, AND LECTOTYPIIFICATION
OF THE MALAGASY SPECIES OF THE GENUS.

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RESUME:

Une étude du genre *Camptolepis* Radlk. de l'archipel des Comores et de Madagascar révèle une nouvelle espèce maoraise, *Camptolepis viscardii* sp. nov. qui est décrite et illustrée. Les caractères morphologiques qui distinguent le nouveau taxon des espèces apparentées sont soulignés et un statut de conservation UICN est proposé. Des clés d'identification pour les espèces de *Camptolepis* sont données en français et en anglais. Les lectotypes de *C. crassifolia* Capuron, *C. hygrophila* Capuron et *C. grandiflora* Capuron sont désignés. La nouvelle espèce se distingue principalement par ses feuilles plus grandes, son pédicelle et son calice pubescent, et son ovaire 4-loculé. Le genre *Camptolepis* contient désormais cinq espèces, dont quatre présentent des répartitions restreintes, une étant endémique de Mayotte et trois de Madagascar.

MOTS-CLES:

Mayotte, Comores, espèce nouvelle, statut UICN.

ABSTRACT:

A study of the genus *Camptolepis* Radlk. from the Comoros archipelago and Madagascar reveals a new species of Mayotte, *Camptolepis viscardii* sp. nov. that is described and illustrated. Morphological characters that distinguish the new taxon from the related species are outlined and an IUCN conservation status is proposed. Keys for the species of *Camptolepis* are proposed in French and English. Lectotypes of *C. crassifolia* Capuron, *C. hygrophila* Capuron and *C. grandiflora* Capuron are designated. The new species is mainly recognized by its larger leaves, pubescent pedicel and calyx, and its 4-loculate ovary. The genus *Camptolepis* now comprises five species, including four with very restricted distributions, one endemic to Mayotte, and three endemic to Madagascar.

KEY-WORDS:

Mayotte, Comoros, new species, IUCN status.



GENERAL SITUATION OF THE FLORA OF MAYOTTE AND ONGOING RESEARCH

For the past 25 years, the flora of Mayotte, a French archipelago located north-west of Madagascar, and to a lesser extent, the flora of the Comoros islands, have seen a surge in the publication of new taxa, consecutive to multiple floristic inventories. Intensive inventory was performed in Mayotte by the *Service de l'Environnement et de la Forêt de Mayotte* (SEF), and later by the *Conservatoire Botanique National de Mascarin* (CBNM) in collaboration with the Herbarium of the *Muséum national d'Histoire Naturelle* in Paris (MNHN). Consequently, since 1996, 43 taxonomic novelties have been described from Mayotte in 32 different families (Bidault *et al.* 2022). Among them, 29 are considered endemic to the island, including five being only known from a single mountain, Mlima (Mount) Choungi, southern of Grande-Terre. This highlights the need of yet more botanical inventories in Mayotte, as well as the other islands of the Comoros archipelago, as taxonomical novelties and new records are still regularly discovered (Tralet *et al.* 2019) and are yet to be discovered. Considering that less than 5% of the original vegetation extent is thought to be remaining on Mayotte (Pascal *et al.* 2001; Pascal 2002), these new species, along with other strict endemic taxa, are often considered as highly threatened. Description and naming of these rare, endemic species, as well as the assessment of their risk of extinction, also allow for designing adapted conservation measures, to be implemented by local institutions, such as the *Conservatoire Botanique National de Mascarin*, in order to ensure the survival of this unique natural patrimony. For instance, the recently described, Mayotte endemic and Critically Endangered *Foetidia comorensis* Labat, E. Bidault & Viscardi (Labat *et al.* 2011) is now protected by the French authorities, and is subjected to a conservation action plan in order to avoid its extinction.

HISTORY OF THE GENUS CAMPTOLEPIS RADLK.

Camptolepis Radlk. is a Sapindaceae genus of five species (including the new species here described), placed the tribe *Schleichereae* by Capuron (1969) due to indehiscent, unlobed fruits with seeds completely surrounded by a fleshy, pulpy and translucent arillode. Recent phylogenetic work at the scale of the entire family (Buerki *et al.* 2021) placed the genus within the newly described tribe *Stadmanieae* Buerki & Callm., characterized

by actinomorphic flowers, petals (when present) with basal appendages, ovary 3-carpelate, and a seed covered by an aril. In this tribe are also found the afro-malagasy genera *Beguea*, *Chouxia*, *Gereaua*, *Macphersonia*, *Pappea*, *Plagioscyphus*, *Pseudopteris*, *Stadmania* and *Tsingya*. The three species *Camptolepis crassiflora* Capuron, *C. grandiflora* Capuron and *C. hygrophila* Capuron only occur in Madagascar (Capuron, 1969), where they are narrowly endemic and geographically exclusive: *C. grandiflora* is only known from Montagne d'Ambre (northern Madagascar), between 300 and 840 m in elevation, *C. hygrophila* is endemic to the south-western part of the country, and *C. crassifolia* is solely known from the type collection, made in 1966 in a coastal forest south of Vohémar (north-eastern coast of the country). The type of *Camptolepis ramiflora* (Taub.) Radlk. occurs in coastal East Africa (Tanzania and Kenya) and in Madagascar, mostly from the northern part of the country, as well as in the west, and from a single collection in the South Madagascar (near Tolanaro).

In 1991 and 1996, two collections of an unknown Sapindaceae were made at the same place in Hachiroungou (north-west of Mayotte) by S. Ménager (number S-156), then by O. Pascal (834), that remained undetermined for several years. The same subpopulation was sampled again in 2006 and 2009 by F. Barthelat and then G. Viscardi, who both considered it as a member of the genus *Camptolepis*, and possibly representing an undescribed species, due to its noticeable differences with *C. ramiflora* (G. Viscardi comm. pers.): the combination of distinctively larger leaflets (10 to 20, up to 24 cm long, vs always less than 11 cm long in all other species of the genus), pubescent pedicel and calyx (vs glabrous or puberulent, but never pubescent), and its habitat as hygrophilous or mesophilous evergreen forests on ridges (vs deciduous, drier forests). The Maoran *Camptolepis* shares morphological features with *C. ramiflora*, that allow to differentiate them from other species in the genus, such as their 4-7 mm long pedicel (vs 1-2 mm long for *C. crassifolia* and *C. hygrophila*, 12-18 mm long for *C. grandiflora*). On the other hand, the Maoran *Camptolepis* has a flat internal scale of the petal, similar to *C. crassifolia*, vs cuculate for *C. grandiflora* and *C. ramiflora* and bilobed for *C. hygrophila*.

In 2019, as part of the project entitled “*BEST RUP 2483 : Connaissance et conservation de la flore méconnue et menacée de Mayotte*” coordinated by CBNM (2018-2019), several additional collections were made in Hachiroungou, and subpopulations of this *Camptolepis* were found at two other ridges in Mayotte: Majimbini

its identity could not be clarified. Barthelet (2019) refers to this taxon as *Camptolepis rami-flora*, but suggests it could represent a new infraspecific taxon, or even a new species. Traclet *et al.* (2019) gives a brief description of its habitus, phenology and distribution, indicating that it is found in most of the island's humid forest areas, including Bénara, the large mountain ridge of the south-central part of the island. Nevertheless, no collection from this place has been found and could be studied by authors. In the frame of the *BEST RUP* project, prolific material was sent from Mayotte to the Museum national d'Histoire naturelle in Paris, including fruits preserved in ethanol, whose observation allowed to confirm that it represents a new, undescribed species, which was already suspected 16 years before by Barthelet and Viscardi. This species is hence hereby described as *Camptolepis viscardii* sp. nov., is illustrated, and information on its phenology, ecology and distribution is provided.

MATERIALS & METHODS

Herbarium material was examined at MAO, MO and P, as well as images of types deposited at other institutions available through the JSTOR Global Plants website [<http://plants.jstor.org>]. Measurements of leaf

and inflorescence sizes were made using the Annotate software version 1.7.37. It is an image annotation tool for the natural sciences (<https://www.recolnat.org/fr/annotate>). It allows to perform physical and identification measurements in digitized herbarium specimens, zoology, paleontology and other images. It is available at <https://www.recolnat.org/fr/annotate>. The results are organized according to the following convention: (minimum value –) **first quartile - third quartile** (– maximum value). The distribution map (generated using the QGIS software, version 3.14; QGIS Development team, 2023) is based on georeferenced specimen data as well as human observations obtained from the CBNM's database Mascarine (Conservatoire Botanique National de Mascarin, 2023). No post-facto georeferencing was needed for this study.

A preliminary assessment of conservation status using the IUCN categories and criteria (IUCN, 2012, IUCN Standards and Petitions Committee, 2019) is provided for the species. The geographical parameters of area of occupancy [AOO] and extent of occurrence [EOO], estimated using a 2×2 km grid, were calculated using the GeoCAT tool (Bachman *et al.*, 2011).

KEY TO THE SPECIES OF *CAMPTOLEPIS*

- 1 Flower 15-20 mm tall; pedicel 12-18 mm long..... *Camptolepis grandiflora* Capuron
Flower less than 15 mm tall; pedicel less than 7 mm long 2
- 2 Leaf blade obovate, thickened; margins clearly recurved..... *Camptolepis crassifolia* Capuron
Leaf blade narrowly to widely elliptic or ovate, not thickened; margins not recurved or inconspicuously so 3
- 3 Leaf blade (8-) **10-20** (-24) cm long; pedicel hairy, not puberulent; in humid to mesophilous evergreen forests
..... *Camptolepis viscardii* sp. nov.
Leaf blade (2-) **5-9** (-11) cm long; pedicel glabrous or puberulent, never hairy; in dry deciduous coastal forests
or riverine forests in dry areas..... 4
- 4 Leaf blade narrowly elliptic (3 to 6 times longer than wide); apex rounded, sometimes emarginate; calyx
puberulent outside; pedicel 1-2 mm long, puberulent *Camptolepis hygrophila* Capuron
- 5 Leaf blade ovate (2 to 3 times longer than wide); apex shortly acuminate; calyx glabrous; pedicel 4-7 mm
long, glabrous or with very few scarce hairs..... *Camptolepis ramiflora* (Taub.) Radlk.

CLEF POUR LES ESPÈCES DU GENRE *CAMPTOLEPIS*

- 1 Fleur de 15-20 mm de hauteur; pédicelle 12-18 mm de long..... *Camptolepis grandiflora* Capuron
Fleur de moins de 15 mm de hauteur; pédicelle de moins de 7 mm de long 2
- 2 Folioles obovées à limbe épaissi, à marge nettement révoluée *Camptolepis crassifolia* Capuron
Folioles étroitement à largement elliptiques ou ovées, à limbe non épaissie et bordure non ou à peine révoluée
..... 3
- 3 Foliole (8-) **10-20** (-24) cm de long; pédicelle pubescent, mais non pubéruent; plante des forêts humides à
mésophiles sempervirentes *Camptolepis viscardii* sp. nov.
Foliole (2-) **5-9** (-11) cm de long; pédicelle glabre ou pubéruent, jamais pubescent; plante de forêts côtières
sèches caducifoliées ou de forêts riveraines en zone sèche..... 4
- 4 Folioles étroitement elliptiques (3 à 6 fois plus long que large); sommet arrondi, parfois un peu émarginé;
calice nettement pubéruent sur la face externe; pédicelle de 1-2 mm de long, nettement pubéruent
Camptolepis hygrophila Capuron
Folioles ovées (2 à 3 fois plus long que large); sommet à acumen court; calice glabre; pédicelle de 4-7 mm
de long, glabres ou avec quelques très rares poils..... *Camptolepis ramiflora* (Taub.) Radlk.

Genus *Camptolepis* Radlk.

in *Natürlichen Pflanzenfamilien. Nachträge zum II bis IV Teil*. Leipzig nachtr.3: 207 (1907). Type species: *C. ramiflora* (Taub.) Radlk.

The first description by Radlkofer (1907) was completed by Capuron (1969), in particular by the description of the fruit that Radlkofer did not know. Capuron then attached the genus to the tribe *Schleicheræ*, due to its indehiscent, unlobed fruits with seeds completely surrounded by a fleshy, pulpy and translucent arillode.

They are dioecious trees of 8-30 m with a rhitidome falling in patches (Capuron, 1969), with alternate exstipulate pinnate leaves, oblong lanceolate leaflets, alternate or sub-opposed, with short and often thick petioles. Inflorescences usually branched, moderately large, (0.9-) **1.9-3.9** (-8.3) cm, in very short thyrses, bearing dicazes and small triangular bracts. Flowers type 5. Sepals elliptic, overlapping lobed, broad, the outer two, smaller and orbicular. Petals elliptic, broadly ovate, short-unguiculate and broad, with a large scale, more or less cu-

cullate, or sometimes 2-lobed. Disc enlarged, depressed in the middle. Stamens and staminodes, 5-6 (-7) or 10-14 (-16), more or less exerted, with elongated anthers. Ovary (and rudimentary ovary) 3-, 4- or 5-locular, style with 3 to 5 stigmas. Seeds with basilar hilum, embryo with more or less overlapping cotyledons. Infructescence mostly cauliflorous, short and more or less branched. Seeds more or less attenuated into a large, short beak at the base. Smooth cotyledons and basal radicle. Fruits erect, crustaceous, 1 to 5 seeds, outer tegument generally shiny black, forming a slight bead around the hilum, light in color, with a sharp edge. This hilum, transversely elliptical, is located at the base of the adaxial face of the seed, it is thus almost vertical, its center is partly occupied by a sort of mass of more or less bony tissue (this is the real hilum, in which you can see the conducting bundles). This mass is separated from the periphery of the hilum by a deep circular groove. The embryo is almost straight and the basal radicle is lodged in a cavity of the integuments, at the extreme base of the seed, on the abaxial face, this radicle is slightly flattened. The description of the seeds is provided by Capuron (1969).

1. *Camptolepis crassifolia* Capuron (Capuron 1969: 110). Type: **Madagascar**. Est (Nord): forêt littorale au S. de Vohémar, 11-19 XII 1966, *R. Capuron* 27277-SF (lectotype P! [P00363102], selected here; isolectotype: K, image! [K000426370, K000426371], MO, image! [MO-176079], P! [P00363103, P00363104], TEF, image! [TEF000465], WAG, image! [WAG0027190]).
2. *Camptolepis grandiflora* Capuron (Capuron 1969: 110). Type: **Madagascar**. Est (Nord): Ouest (Nord) Base N.W. de la montagne d'Ambre. Forêt d'Ankorefo, vers 300 m, 19 X 1954, *R. Capuron* 11348-SF (lectotype P! [P00835778], selected here; isolectotypes: P! [P00363097, P00363098, P00363100], TEF, image! [TEF000466]).
3. *Camptolepis hygrophila* Capuron (Capuron 1969: 111). Type: **Madagascar**. Ouest (confins Sud Ouest): ravins d'un cours d'eau temporaire, à la base Nord-Ouest de la crête de Maroakoho, rive droite de la Menarandra, à l'Ouest de Tranoroa, 13 XI 1962, *R. Capuron* 20661-SF (lectotype P! [P01297679], selected here; isolectotypes: P! [P00363095, P00363096]).
4. *Camptolepis ramiflora* (Taub.) Radlk. (Radlkofer 1907: 207). — *Deinbollia ramiflora* Taub., (Taubert 1895: 250). Type: **Tanzania**. Bagamoyo, II 1889, *C. Sacleux* 689 (neotype P! [P00214690], designated by Capuron (1969); isoneotype: P! [P00355397]).
5. *Camptolepis viscardii* E.Bidault & M.Pignal **sp. nov.** Type: Mayotte. Grande-Terre, Acoua. Hachiroungou, flm, [12°43'S, 45°04'E], 29 XII 2009, *G. Viscardi, M. Mchangama, B. Ali Sifari & V. Guiot* 234 (holotype, P! [P00778950]!; isotype, MAO[MAO01657]!). Figures 1 à 4. urn:lsid:ipni.org:names:77321828-1.

	<i>Camptolepis crassifolia</i>	<i>Camptolepis grandiflora</i>	<i>Camptolepis hygrophila</i>	<i>Camptolepis ramiflora</i>	<i>Camptolepis viscardii</i> sp. nov.
HABIT	Tree 10-15 m tall, 40 cm DBH	Tree 6-14 m, DBH unknown	Tree 10-20 m, 40 cm DBH	Tree 8-11 m, 20 cm DBH	Buttress tree 8-20 m tall, 20 to 50 cm DBH
LEAF BLADE	Obovate, thickened, margins revolute	Narrowly elliptic to elliptic, not thickened, margins not revolute	Narrowly elliptic, not thickened, margins not revolute	Ovate, not thickened, margins not revolute	Elliptic to broadly elliptic, not thickened, margins slightly revolute
LEAF BLADE LENGTH	2-8 cm	3.5-10.5 cm	2.5-13 cm	4-8 (-11) cm	(8-) 10-20 (-24) cm
LEAF APEX	Rounded to emarginate	Widely acuminate, acumen rounded to emarginate	Rounded to emarginate	Attenuated to acuminate	Attenuated to acuminate
FLOWER SIZE	10-12 mm tall	15-20 mm tall	5-6 mm tall	5-6 mm tall	10-13 mm tall
PEDICEL LENGTH	1-2 mm	12-18 mm	1-2 mm	4-7 mm	3.5-9 mm
CALYX AND PEDICEL PUBESCENCE	Puberulous	Glabrous	Puberulous	Glabrous	Pubescent
PETAL INTERNAL SCALE	Flat	Cucullate	Bilobed	Cucullate	Flat
LOCULES	3	5	3	3	4
HABITAT	Coastal forest	Inland humid evergreen forest	Riverine forests in dry areas	Dry caducous littoral forests	Humid to mesophilous evergreen forest
DISTRIBUTION	Madagascar endemic, only known from a single locality near Vohémar	Madagascar endemic, only known from the Montagne d'Ambre area	Madagascar endemic, south-western part of the country	Madagascar, Tanzania, Kenya	Mayotte endemic

DIAGNOSIS

Camptolepis viscardii *camptolepibus* aliis combinatione characterum praecipue differt: foliolis (8-) **10-20** (-24) cm longum (vs semper minora 11 cm), pedicello 4-7 mm longum similari *C. ramiflorae* (vs 1-2 mm *C. crassifoliae* *C. hygrophilae*que atque 12-18 *C. grandiflorae*), pubescente (vs glabrum vel glabrescens *C. ramiflorae*, atque puberulentes *C. crassifoliae*, *C. grandiflorae*, *C. hygrophilae*que), calice pubescenti (vs glabrum vel glabrescens *C. grandiflorae* *C. ramiflorae*que atque puberulens *C. crassifoliae*, *C. hygrophilae*que), squama interna petali plano similari *C. crassifoliae* (vs cucullatam *C. grandiflorae* *C. ramiflorae*que atque bilobatam *C. hygrophilae*).

DESCRIPTION

Buttress tree 8-20 m tall and 20 - 30 (- 50) cm DBH, with a rhytidome that desquamates into plates, dioecious. Branches glabrous, young twigs slightly lenticellate, with yellow pubescence (dense upright hairs), becoming glabrescent. Leaves pinnate alternate, coarsely obovate, juvenile leaves reddish, (265 -) **327 - 405** (- 484) × (115

-) **160 - 283** (- 421) mm, petiole pulvinate, (27 -) **53 - 94** (- 149) × (1.3 -) **1.8 - 2.6** (- 3.3) mm, pale green, slightly quadrangular, blade glabrous, the rest of the leaf with yellow to russet pubescence, rachis, (39 -) **90 - 154** (- 270) mm long. Leaflets (5 -) **7 - 8** (- 9), subopposite to alternate, spaced (14 -) **33 - 49** (- 86) mm apart, petiolule (3 -) 5 - 7 mm long, slightly geniculate, brown to greyish when dry, lower part thick and wrinkled on dry specimens, upper part canaliculate. Blade elliptic to broadly elliptic, dark green and slightly embossed on the adaxial surface, paler on the abaxial surface on fresh material, pale green and slightly printed on the dry material, (82 -) **126 - 172** (- 237) × (23 -) **39 - 59** (- 90) mm, the basal ones smaller, margin entire, slightly revolute, apex attenuated to acuminate, forming an acute angle of ca. 17°, sometimes leaning on a side, base decurrent, attenuated on the petiolule. Venation brochidodromous, prominent below, slightly impressed above, secondary venation with open angles, (52° -) **61° - 73°** (- 88°). Inflorescence ramiflorous, on older branches, as short clusters of cymes (22 -) **27 - 32** × (21 -) **32 - 36** mm, axes and pedicels moderately to densely pubescent, with small, straight, applied

(long), white. *Bracts* opposite, narrow, 0.8 mm long, pubescence similar to inflorescence axes. *Female flower* 13 × 10 mm (withered flower), young flower 5 × 4 mm. *Pedicel* 3.5 – 4.5 × 0.8 mm. *Calyx* sparsely pubescent with short appressed hairs, verrucous on both faces, lobes 5, imbricated, largely ovate, greenish, the 2 external 2.5 × 2 mm, spoon shaped, the 3 internal 3.5 × 4 mm, largely ovate to round, margin thin, smooth, 0.6 – 0.8 mm wide. *Corolla*, dialypetalous 5, glabrous, ciliate, white, unguiculate, 7 × 2 – 4 mm, internal scale rounded, flat, white, slightly cucullate at apex, 4.5 × 3.5 – 4 mm, dense wooly pubescent. *Disc* with low ring, thin and undulate wall, 1.5 mm tall when dry, yellow, pubescent on its lower part. *Staminodes* (7 –) 13 – 14, 4 mm tall, filament cylindrical, 3 mm long, white, antherode 1 × 0.7 mm, pale yellow, connective profusely wooly pubescent, ca. 1 mm long. *Ovary* superior, 5 × 2.5 – 3 mm, 4-loculate, glabrescent, green, gynophore 2 mm long. *Style* 5 mm long, glabrescent. *Stigmas* 4, more or less oblong, in a cluster, sparsely pubescent. *Male flower* 10 × 8 mm. *Pedicel* (5 –) 7 – 9 × 1 mm, pubescence similar to the female flower. *Calyx*, *corolla* and *disc* similar to the female flower. *Stamens* 13, 6 – 8 mm long, filament cylindrical 5.5 – 6 mm long, anther 1.5 × 0.8 mm, connective profusely wooly pubescent, ca. 1 mm long. *Ovary* reduced, profusely wooly pubescent. *Fruit* ovoid, pale green, 30 mm in diameter when mature, asymmetrical, (2 –) 3 (– 4)-seeded, often with a single seed when mature. *Seed* black, beaked, ca. 20 mm in diameter, aril red.

DISTRIBUTION

Endemic to Mayotte, where it is known from most of the forests in the northern part of the island (north of Bénara, the highest ridge). Herbarium collections were gathered from three localities on small mountain ridges: the Hachiroungou, Maevadoani, and Majimbini massifs. In addition, human observations were made by the staff of the *Conservatoire botanique national de Mascarin* in various additional places such as Mroni Boungoumouhi in the northwest, Kwalé and Mro Oua Gouloué in the northeast, Sohoa, and the Bénara and Bougoundranavi massifs, but no herbarium collections were gathered that could be verified by us. Surprisingly, human observations were made as low as 10 m in elevation, whereas no herbarium collection was made below 210 m a.s.l.

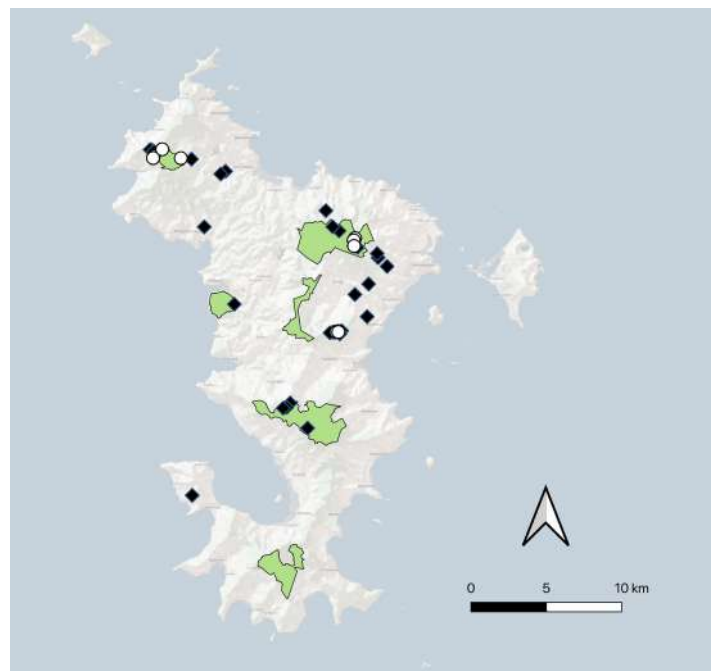


Figure 3. Distribution of *Camptolepis viscardii* E. Bidault & M. Pignal, *sp. nov.* in Mayotte. Open circles: herbarium collections, black diamonds: human observations. Green patches: the protected area “Réserve Naturelle Nationale des Forêts de Mayotte”.

PARATYPES

Grande-Terre, Acoua. R. F. des crêtes du Nord Hachiroungou, forêt, [12°43'S 45°04'E], fr., 24.I.2006, F. Barthelat, M. Mchangama, B. Ali Sifari & A. Andhumou 1551 (MAO[MAO00626]!). — Mamoudzou. Majimbini, 497 m, forêt humide, [12°45'57"S 45°11'11"E], st., 10.I.2019, A. Dimassi, S. Traclet, A. Abdallah & A. Mchindra 98 (MAO[MAO02259]!). — Acoua. Hachiroungou, 347 m, [12°42'56"S 45°04'01"E], st., 1.III.2019, A. Dimassi & A. Mchindra 116 (MAO[MAO02352]!, MO, P). — *Ibid.*, 344 m, [12°42'56"S 45°04'01"E], flm., 27.XII.2022, A. Dimassi & H. Attoumane 210 (MAO!, MO!, P!). — *Ibid.*, 210 m, [12°43'S 45°05'E], fl. jfr., 12.I.2023, A. Dimassi, H. Attoumane & A. Mchindra 211 (MAO!, MO!, P!). — *Ibid.*, 504 m, [12°46'09"S 45°11'11"E], fr., 14.III.2019, A. Mchindra 1 (MAO[MAO02336]!). — Hachiroungou, [12°43'S 45°04'E], st., 02.IX.1991, S. Ménager S-156 (MAO[MAO00625]!). — *Ibid.*, 400 m, [12°43'S 45°04'E], fl., 16.XII.1996, O. Pascal 834 (MAO[MAO00627]!). — Dembeni. Maevadoani, 386 m, forêt humide de crête, [12°49'14"S 45°10'33"E], st., 04.I.2019, S. Traclet 604 (MAO[MAO02212]!). — *Ibid.*, Juvénile, jeune feuille rouge, 396 m, forêt humide de crête, [12°49'14"S 45°10'38"E], juvénile, 04.I.2019, S. Traclet & A. Dimassi 605 (MAO[MAO02213]!). — *Ibid.*, 497 m, forêt humide de crête, [12°49'S 45°10'E], st., 04.I.2019, S. Traclet & A. Dimassi 606, même individu que MAO02246 (A), (MAO[MAO02214]!). — Mamoudzou. Majimbini, 486 m, forêt humide, [12°45'52"S 45°11'13"E], st.,

S. Traclet, A. Dimassi, A. Abdallah & A. Mchindra 622, (MAO[MAO02236]!). — *Ibid.*, 486 m, forêt humide, [12°45'57"S 45°11'11"E], st., 10.I.2019, *S. Traclet, A. Dimassi, A. Abdallah & A. Mchindra* 623, (MAO[MAO02237]!). — *Ibid.*, 497 m, forêt humide, [12°46'09"S 45°11'11"E], fl., 10.I.2019, *S. Traclet, A. Dimassi, A. Abdallah & A. Mchindra* 624 (MAO[MAO02238]!). — Dembeni. Maevadoani, 396 m, forêt humide de crête, [12°49'14"S 45°10'38"E], st., 04.I.2019, *S. Traclet, A. Dimassi* 632, même individu que MAO02214, (MAO[MAO02246]!). — *Ibid.*, 396 m, forêt humide de crête, [12°49'14"S 45°10'38"E], st., 04.I.2019, *S. Traclet & A. Dimassi* 633, même individu que MAO02213, (MAO[MAO02247]!). — Mamoudzou. Majimbini, 504 m, [12°46'09"S 45°11'11"E], jfr., 12.II.2019, *S. Traclet* 659 (MAO[MAO02293]!). — Acoua. RF des crêtes du Nord, forêt mesohumide à Nesogordonia, [12°43'S 45°04'E], fl. jfr., 22.I.2009, *G. Viscardi, M. Mchangama, B. Ali Sifari & A. Andhumou* 79 (MAO[MAO01604]!). — *Ibid.*, [12°43'S 45°04'E], ff., 12.II.2009, *G. Viscardi, M. Mchangama, B. Ali Sifari & E. Bidault* 102, (MAO[MAO01610]!). — Mtsamboro. Hachiroungou, [12°42'S 45°04'E], flm., 3.III.2011, *G. Viscardi* 483, (MAO[MAO03572]!, P).

HABITAT

Mesophilous and hygrophilous evergreen forests on ridge, between 210 and 500 m in elevation (herbarium collections only), also in degraded lowland forests and riverine forests, as low as 10 m in elevation when considering the human observations.

CONSERVATION STATUS

Camptolepis viscardii is endemic to Mayotte and known from 21 collections and 59 human observations, all made between 1991 and 2023. These 21 collections and 59 observations represent 67 unique occurrences and between one and six subpopulations that are still present, as having been recently sampled. No precise counting of individuals has been made, even though observations mention this species as not very abundant where found. It is nevertheless estimated that this species is represented by more than 50 individuals. Based on a 2 km x 2 km cell size, the AOO of this species is estimated as 72 km², below the upper threshold for Endangered status under Criterion B2. The EOO is calculated as 212 km², below the upper threshold for Endangered status under Criterion B1. Eight of the nine occurrences located on the Hachiroungou massif are included within the recently created National Natural Reserve number 328

(Réserve naturelle nationale des Forêts de Mayotte), which is scattered across the whole Maoran territory. Eleven of the fifteen occurrences located on the Majimbini massif are also included within the same protected area, as well as four of the five occurrences located on the Bénara massif. The occurrence of Sohoa is located just outside its border. The other 25 occurrences, including all those located on the Maevadoani and Bougoundranavi massifs, are not included in any protected area.

Nonetheless, the occurrences from the Maevadoani massif are included in the Songoro Mbili Forestry Reserve. All the occurrences located outside the protected area are threatened by small-scale agriculture, that induces a decline in the quality of the habitat of this species. In addition, at least ten occurrences (Longoni, M'Tsangamouji, Dzoumogné, Tsountsou, M'Tsapéré), located at the lowest elevations, are threatened by wood collecting for fuel, which is expected to lead to the future disappearance of those subpopulations. As a consequence, the 67 occurrences represent 12 or 13 locations (*sensu* IUCN 2012; IUCN Standards and Petitions Committee 2019), with regards to the most important threat (wood collecting). Based on this threat, we infer a past, current and a future continuous decline in the extent and the quality of its habitat, as well as the number of individuals of this species, and we estimate a future decline in the EOO, AOO, and number of occurrences of this species. *Camptolepis viscardii* nearly qualifies for a threatened category, and is thus assessed as NT.

PHENOLOGY

Flowers were mostly observed in December and January, exceptionally in February and March. Fructification occurs from January to March.

ETYMOLOGY

We are pleased to dedicate this new species to Guillaume Viscardi, botanist, currently at the *Conservatoire botanique national de Martinique*, who worked for 15 years in Mayotte at the *Service Environnement et Forêts* in Coconi, and as the coordinator of the Mayotte office of the *Conservatoire botanique national de Mascarin*. Guillaume Viscardi tirelessly explored Mayotte's forests and made invaluable collections that allowed the discovery of numerous new species, and significantly increased the knowledge on the flora of Mayotte and the Comoros archipelago.

Sari litchi (Shibushi / buc ISO 639-3), faux litchi (french / fra ISO 639-3).

NOTES

The new species seems to have large affinities with *C. grandiflora* Capuron: the elliptic and acuminate leaflet shape, the slightly geniculate petiole. *C. grandiflora* is located in the *Montagne d'Ambre* massif, in the North-North West part of Madagascar in front of the Mayotte coast. *Camptolepis viscardii* differs from the other *Camptolepis* species by the following combination of cha-

racters: leaflets (8-) 10-20 (-24) cm long (vs always below 11 cm); pedicel 4-7 mm long similar to *C. ramiflora* (vs 1-2 mm for *C. crassifolia* and *C. hygrophila* and 12-18 mm for *C. grandiflora*); pedicel pubescent (vs glabrous to glabrescent for *C. ramiflora* and puberulous for the three other species); calyx pubescent (vs to glabrescent for *C. grandiflora* and *C. ramiflora*, and puberulous for *C. crassifolia* and *C. hygrophila*); a flat and rounded internal scale of the petals, similar to *C. crassifolia* (vs cucullate for *C. grandiflora* and *C. ramiflora*, and bilobed for *C. hygrophila*).



Figure 1. *Camptolepis viscardii* E. Bidault & M. Pignal, *sp. nov.* :
A, leaf; B, male inflorescence;
C, ♂ flower; D, ♀ flower;
E, infructescence; F, young fruit;
G, fruit (cross-section).
A, E, *Barthelat et al.* 1551,
B, C, *Viscardi* 483,
D, F, G, *Viscardi et al.* 79.
Drawings by Marie-Aimée Allard.

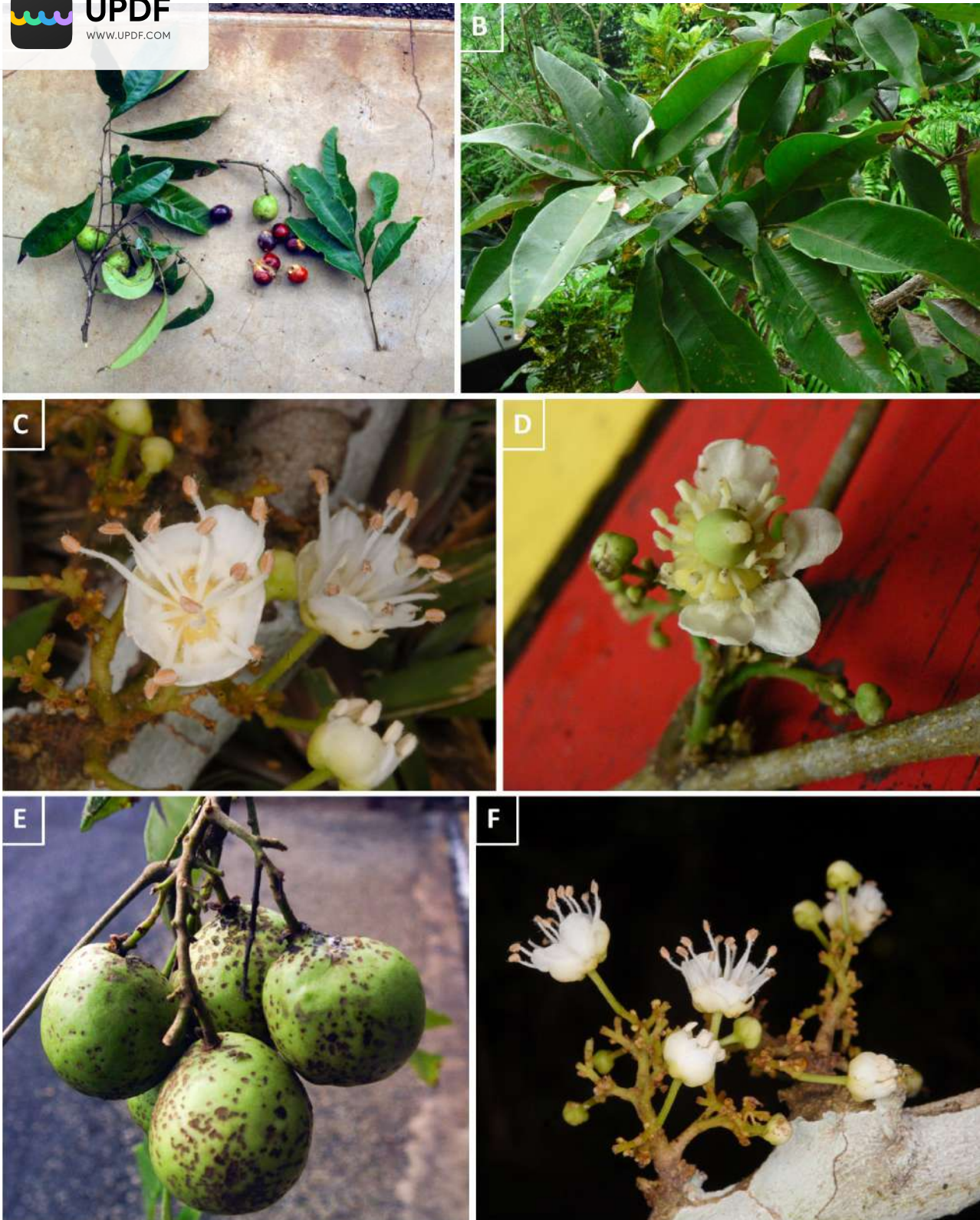


Figure 2. *Camptolepis viscardii* E.Bidault & M.Pignal, *sp. nov.*:

A, axillary branch with immature fruits (left), mature fruits (center), and fully grown leaf, detached (right);

B, axillary leafy shoot; C, male flowers; D, female flower;

E, infructescence with immature fruits; F, male inflorescence;

A, E, photos by F. Barthelat,

B-D, F, photos by G. Viscardi.



Surprisingly, *Camptolepis viscardii* has a 4-loculate ovary (as observed on transversally cut ovaries), despite the fact that Capuron (1969) mentions all species within the genus as being either 3- or 5-loculate. Nevertheless, several fruits of this species at different stages of maturation (preserved in ethanol) were transversally cut, and appeared to be inconsistently (2 –) 3 (– 4)-seeded. In addition, some small locules without seeds within the nearly matured fruits could be observed, hence some of the seeds most probably do not develop at all during maturation, as commonly seen in *Tina* Schult. and across the family (Buerki *et al.* 2011). We do not know whether Capuron (1969) made his observations on fruits or by transversally cutting ovaries, but it remains possible that the 3-loculate species (*C. crassifolia*, *C. hygrophila* and *C. ramiflora*) were observed as such on fruits with one or more aborted seeds, due to the small number of collections available at that time. The overall rareness of female flowers in the collections prevented us from checking this character for the other four species of the genus. More collections, including ethanol-preserved female flowers, would be necessary to answer this question.

Camptolepis species can be distinguished by the structure of their leaflets (see figure 4). The general shape of the leaflets is elliptical in *C. viscardii* and *C. grandiflora*, elliptical-ovate in *C. ramiflora*, narrowly obovate in *C. hygrophila* and obovate in *C. crassifolia*. The apex is rounded to obtuse in *C. crassifolia*, obtuse in *C. hygrophila* and slightly acuminate in the others; the short acumens is curved in *C. grandiflora* and *C. viscardii*. The margin is flat except in *C. crassifolia* where it is revolute. In addition, the venation on the abaxial side is not very pronounced in *C. viscardii* and more pronounced in the other species, particularly in *C. crassifolia*. It is brochidodromous in all species with very pronounced intersecondary veins of the same diameter as the secondary veins in *C. viscardii*, *C. grandiflora* and *C. hygrophila*, finer and more sinuous in *C. crassifolia* and close to tertiary venation in *C. ramiflora*.

During the examination of the available material of *Camptolepis*, it also appeared that *C. ramiflora*, the most widely distributed species of the genus, shows important morphological variability that may lead to the recognition of several taxa, as already noticed by Barthelat (2019). Specimens collected from the region of Daraina (Madagascar), for example, show obovate leaves with rounded apex, significantly smaller than the tanzanian neotype collection of *C. ramiflora*, designated by

Capuron (1969). Nevertheless, resolving this complex would require additional studies that are beyond the scope of the present study, which is primarily aimed at describing a new species from Mayotte.

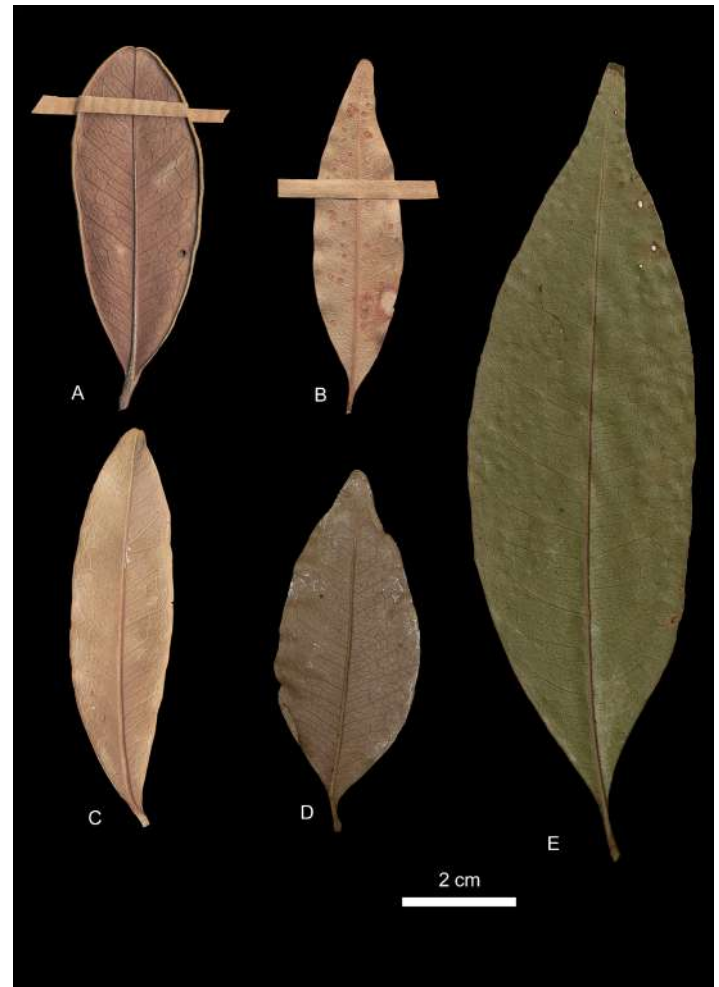


Figure 4. Comparison of distal leaflets of the genus *Camptolepis* Radlk. **A**, *C. crassifolia* Capuron, R. Capuron 27277 SF; **B**, *C. grandiflora* Capuron, R. Capuron 27227 SF; **C**, *C. hygrophila* Capuron, R. Capuron 20661 SF; **D**, *C. ramiflora* (Taub.) Radkl.; **E**, *C. viscardii* E. Bidault & M. Pignal, sp. nov., S. Tralet, A. Dimassi, A. Abdallah & A. Mchindra 623.

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