

Synopsis of *Humbertacalia* (Compositae), a genus endemic to Madagascar and Réunion

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Synopsis of *Humbertacalia* (Compositae), a genus endemic to Madagascar and Réunion

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ABSTRACT

Humbertacalia C. Jeffrey is a genus native to Madagascar and Réunion characterized by its scandent habit, the discoid capitula, and the caudate anther bases. According to the present treatment, it comprises ten species, nine endemic to Madagascar and one species thriving in both Madagascar and Réunion. The new combinations *Humbertacalia abbreviata* (Humbert) Rabarim., Callm. & J. Calvo, comb. nov., stat. nov., *H. apocynifolia* (Baker) Rabarim., Callm. & J. Calvo, comb. nov., and *H. diffusa* (Baker) J. Calvo, Rabarim. & Callm., comb. nov., stat. nov. are established and nine other names are lectotypified. At the specific rank, the name *H. voluta* (Baker) C. Jeffrey is synonymized under *H. apocynifolia* comb. nov. and *H. leucopappa* (Bojer ex DC.) C. Jeffrey is synonymized under *H. racemosa* (Bojer ex DC.) C. Jeffrey. A detailed study of the type material of *H. leucopappa* at G revealed that the species was misinterpreted for a long time, despite the wide usage of the name. Revised nomenclature, diagnostic description, taxonomic discussion, conservation status and list of specimens examined are provided for all accepted species, in addition to an identification key and two illustrations.

KEY WORDS

Asteraceae,
Senecioneae,
Madagascar,
Réunion,
identification key,
lectotypifications,
new synonyms,
new status,
new combinations.

RÉSUMÉ

Synopsis du genre Humbertacalia (Compositae), endémique de Madagascar et de Réunion.

Humbertacalia C. Jeffrey est un genre originaire de Madagascar et de la Réunion caractérisé par son port lianescent, le capitule discoïde et les bases caudées des anthères. Selon le présent traitement, il comprend dix espèces, neuf endémiques de Madagascar et une espèce présente à la fois à Madagascar et à la Réunion. Les nouvelles combinaisons *Humbertacalia abbreviata* (Humbert) Rabarim., Callm. & J. Calvo, comb. nov., stat. nov., *H. apocynifolia* (Baker) Rabarim., Callm. & J. Calvo, comb. nov. et *H. diffusa* (Baker) J. Calvo, Rabarim. & Callm., comb. nov., stat. nov. sont proposées et neuf noms sont lectotypifiés. Au rang spécifique, d'une part le nom *H. voluta* (Baker) C. Jeffrey est synonymisé avec *H. apocynifolia* comb. nov. et d'autre part *H. leucopappa* (Bojer ex DC.) C. Jeffrey avec *H. racemosa* (Bojer ex DC.) C. Jeffrey. Une étude détaillée du matériel type de *H. leucopappa* à G a révélé que l'espèce a été longtemps mal interprétée, bien que le nom soit largement utilisé. Une nomenclature révisée, des descriptions succinctes, des discussions taxonomiques, le statut de conservation et des listes de spécimens examinés sont fournis pour toutes les espèces acceptées, en plus d'une clé d'identification et de deux illustrations.

MOTS CLÉS

Asteraceae,
Senecioneae,
Madagascar,
Réunion,
clé d'identification,
lectotypifications,
synonymes nouveaux,
statuts nouveaux,
combinaisons nouvelles.

INTRODUCTION

Humbertocalia C. Jeffrey (Compositae, Senecioneae) is a genus hitherto known by ten species, nine endemic to Madagascar and one with shared distribution between Madagascar and Réunion Island (Jeffrey 1993; Peng & Zhang 2016). They are scandent woody plants characterized by alternate leaves, discoid capitula, involucre with supplementary bracts, usually whitish corollas, sagittate to caudate anther bases, and truncate to obtuse style branches with a crown of sweeping trichomes (penicillate in one species). In Madagascar, *Humbertocalia* species thrive in humid, subhumid, and mountain bioclimates, from sea level to elevations of *c.* 2500 m, from Montagne d'Ambre National Park in the north to Andohahela National Park in the south-east. Thus far, the genus seems to be absent from dry and subarid bioclimates.

Most species of *Humbertocalia* were originally described within the large genus *Senecio* L., whose circumscription has notably been modified during the last decades in pursuit of a more natural, hence monophyletic, delimitation of this highly diversified genus (Jeffrey 1992; Pelsner *et al.* 2007; Nordenstam *et al.* 2009). In the frame of the *Flore de Madagascar et des Comores*, Humbert (1963) recorded 85 *Senecio* species classified in 17 informal groups, 78 of them endemic to Madagascar and two endemic to the Comoro archipelago. The species currently treated under *Humbertocalia* were placed by Humbert in *Senecio* group XIII, which included eight species. Jeffrey (1992) elevated this group at generic rank mainly based on its scandent habit, the discoid capitula, and the sagittate to caudate anther bases. A single species was subsequently described: *H. madagascarensis* Y.L. Peng & Li Bing Zhang in 2016.

Morphologically, species of *Humbertocalia* resemble a Malagasy species of the genus *Hubertia* Bory that usually displays a scandent habit, i.e., *H. faujasioides* (Baker) C. Jeffrey (synonym of *Senecio faujasioides* Baker). This species was also treated under *Senecio* by Humbert (1963) and can be separated from *Humbertocalia* by its radiate capitula. Another lianoid species that shows morphological affinities with *Humbertocalia* is *Senecio hadiensis* Forssk. This species is widely distributed in Tropical East Africa and has fleshy leaves and radiate capitula with *c.* 8 involucral bracts. It was placed by Humbert (1963) in *Senecio* group XIV under the heterotypic later synonym *Senecio petitianus* A. Rich. He recognized two varieties, the typical one with radiate capitula and *S. petitianus* var. *discoideus* (Humbert) Humbert characterized by its discoid capitula and known only from Comoros. This latter taxon is being studied by the authors (Calvo & Callmander, unpubl. data). Because of the palmately veined leaves and the penicillate style branches of the typical species, *H. tomentosa* (Lam.) C. Jeffrey, the genus also resembles the discoid, penicillate species of the tropical Asian genus *Cissampelopsis* (DC.) Miq. However, the members of this genus have prehensile petioles (Vanijajiva & Kadereit 2008). The African species of *Mikaniopsis* Milne-Redh., also with prehensile petioles, further differ in having disciform capitula (peripheral florets female with tubular corollas).

Phylogenetically, there is no molecular data for suggesting the potential relationships of *Humbertocalia* within the tribe. Pelsner *et al.* (2010) included one accession of *Humbertocalia* sp. (*Phillipson et al.* 5641, P) that appears to be nested with one accession of *Austrosynotis rectirama* (Baker) C. Jeffrey (synonym of *Senecio rectiramus* Baker), a species from Malawi and Tanzania (Jeffrey 1992). However, the specimen *Phillipson et al.* 5641 (G) corresponds to *Hubertia hypargyrea* (DC.) C. Jeffrey. New studies are essential to draw the evolutionary history of this plant group.

We present here a synopsis of the genus *Humbertocalia*. We propose three new combinations and six new synonymies resulting in ten accepted species. This contribution includes updated nomenclature, succinct descriptions, and taxonomic discussions for the ten recognized species, as well as a dichotomous identification key and line illustrations for two species.

MATERIAL AND METHODS

This study is mostly based on the revision of the available literature and the examination of herbarium specimens kept at G, MO, P, TAN, and TEF. Additionally, digital herbarium specimens or supplementary information were obtained from MARS, MPU, and US. The preliminary conservation status of each species was assessed following IUCN Red List Categories and Criteria (IUCN 2012). We calculated EOO and AOO (with a 2 × 2 km grid) using the online “GeoCAT” software (<http://geocat.kew.org>; Bachman *et al.* 2011).

TAXONOMIC TREATMENT

Family COMPOSITAE Giseke
Genus *Humbertocalia* C. Jeffrey

Kew Bulletin 47 (1): 82 (Jeffrey 1992).

TYPE SPECIES. — *Humbertocalia tomentosa* (Lam.) C. Jeffrey (basionym: *Eupatorium tomentosum* Lam.).

ETYMOLOGY. — The name *Humbertocalia* honors the French botanist Henri Humbert (1887-1967), who was devoted to the study of the flora of Madagascar and became the foremost specialist in Malagasy Compositae. The epithet is derived in the same way as some of the other genera of the “Cacalia” group (e.g. *Monticalia* C. Jeffrey, *Paracalia* Cuatrec., *Pentacalia* Cass.).

DESCRIPTION

Plants scandent, woody, with long stems that usually climb or lean over other plants, generally (1)2-4(10) m long, glabrescent or covered with different types of indumentum composed of multicellular trichomes. Stems cylindrical, usually striate, lenticellate or not. Leaves simple, alternate, petiolate (rarely sessile); leaf laminae 3.5-12 × 2-8 cm, oblong, lanceolate, or broadly ovate, base attenuate to cordate (sometimes somewhat truncate), apex rounded to acuminate, margins entire to dentate (usually remotely mucronate-denticulate), plane, glabrous to slightly arachnoid on the adaxial surface, glabrescent to densely lanate on the abaxial surface, venation

KEY TO THE SPECIES OF *HUMBERTACALIA* C. JEFFREY

1. Leaves palmately 3(-5)-veined; style branches penicillate; achenes pubescent 10. *H. tomentosa* (Lam.) C. Jeffrey
— Leaves pinnately veined; style branches with a crown of sweeping trichomes; achenes mostly glabrous 2
2. Leaves sessile, base amplexicaul to semi-amplexicaul 2. *H. amplexifolia* (Humbert) C. Jeffrey
— Leaves petiolate, base attenuate to subcordate 3
3. Involucral bracts 5; leaves glabrous, coriaceous 4
— Involucral bracts 8-13; leaves glabrous or with indumentum, coriaceous or chartaceous 5
4. Capitula pedunculate, not clustered; peduncles 2-4 mm long 7. *H. neoalleizettei* (Humbert) C. Jeffrey
— Capitula sessile or subsessile, usually arranged in glomerules 8. *H. pyriformis* (Bojer ex DC.) C. Jeffrey
5. Capitula mostly pedunculate, not arranged in glomerules 6
— Capitula sessile or subsessile, usually arranged in glomerules 8
6. Involucral bracts 12-13, arachnoid-floccose (at least at base); leaves initially arachnoid; peduncles 6-15 mm long 5. *H. diffusa* J. Calvo, Rabarim. & Callm., comb. nov., stat. nov.
— Involucral bracts 8(-9), glabrous; leaves glabrous; peduncles 1-5 mm long 7
7. Involucral bracts 1.8-2 mm long; florets *c.* 10
..... 1. *H. abbreviata* (Humbert) Rabarim., Callm. & J. Calvo, comb. nov., stat. nov.
— Involucral bracts 3.6-4 mm long; florets *c.* 20 9. *H. racemosa* (Bojer ex DC.) C. Jeffrey
8. Involucral bracts 2-3 mm long; leaves glabrous to initially arachnoid on adaxial surface
..... 3. *H. apocynifolia* (Baker) Rabarim., Callm. & J. Calvo, comb. nov.
— Involucral bracts 3.7-5.3 mm long; leaves pilose to tomentose-hirsute (rarely glabrous) on adaxial surface 9
9. Involucral bracts (11-)13, 3.7-4.5 mm long 4. *H. coursii* (Humbert) C. Jeffrey
— Involucral bracts 8(-9), 4.4-5.3 mm long 6. *H. madagascarensis* Y.L. Peng & Li Bing Zhang

pinnate or palmate, conspicuous or not, chartaceous to coriaceous, sometimes slightly fleshy; petioles up to 4 cm long. Synflorescences axillary or terminal, thyrsoid-paniculiform or corymbiform. Capitula homogamous, discoid, sessile to pedunculate (peduncles up to 8 mm); involucre cylindrical, cupuliform, or campanulate, glabrous or covered by indumentum; receptacles flat, usually fimbriate; involucral bracts (3-)5-10(-13), 1.8-5.3 × 0.6-2.4 mm long; supplementary bracts (calycle) (1-)4-8, 0.3-2.4 mm long. Florets (3-)5-20, hermaphrodite; corollas tubular, 5-lobed, mostly whitish; filament collars barely swollen at base; anther bases sagittate to caudate, anther appendages 2-3-times longer than wide; style branches truncate to obtuse with a crown of sweeping trichomes or penicillate, stigmatic areas usually in two bands. Achenes 1.3-3 × 0.4-0.8 mm, rather cylindrical, 5-10-ribbed, glabrous or pubescent, brownish; pappus usually 1-seriate, of capillary bristles, barbellate, whitish.

NOTES

Pelser *et al.* (2007) presumed the affiliation of *Humbertacalia* to subtribe Senecioninae on the basis of its morphology, distribution, and karyology. Although some exceptions exist, the subtribe Senecioninae includes genera characterized by having a balustriform filament collar and stigmatic areas in two bands (Nordenstam *et al.* 2009). The *Humbertacalia* species has usually stigmatic areas in two bands but the filament collars are barely swollen at the base, indeed, they are rather cylindrical in some species.

There are species of *Humbertacalia* that are extremely variable in leaf shape and indumentum, which makes that these characters become barely useful for distinguishing certain species. On the other side, the character sessile/pedunculate capitula appears to be useful for species separation, however, few specimens remain unidentified because they show a combination of characters that do not match the accepted species as currently circumscribed. Phylogenetic information of this group may contribute to elucidate the species relationships and it could also involve some adjustments in the present taxonomic treatment.

1. *Humbertacalia abbreviata* (Humbert)

Rabarim., Callm. & J. Calvo, comb. nov., stat. nov.

(Fig. 1)

Senecio exsertus var. *abbreviatus* Humbert, *Notulae Systematicae* 15(4): 370 (Humbert 1959). — Typus: Madagascar. Ihorombe Region [Prov. Fianarantsoa], Ifandana, [22°49'S, 47°07'E], 6.IX.1926, fl., *Decary 5226* (lecto-, designated here, P[P00835897]!; isolecto-, P[P04391738]!; US[US01832483 image!] (Fig. 1).

ETYMOLOGY. — The epithet *abbreviata* probably refers to the small involucre of this species.

VERNACULAR NAMES. — “Vahimary” (*Decary 5226*).

DISTRIBUTION AND ECOLOGY. — *Humbertacalia abbreviata* comb. nov., stat. nov. is endemic to the humid and subhumid bioclimatic areas

(Cornet 1974) in southeastern Madagascar within the Anosy, Ihorombe and Atsimo-Atsinanana administrative regions. This species grows in lowland and medium altitude moist evergreen forests (*sensu* Gautier *et al.* 2018a) on laterite of gneiss, mostly in clearing or forest margins, at elevations of *c.* 500–900 m.

CONSERVATION STATUS. — *Humbertocalia abbreviata* comb. nov., stat. nov. has an estimated extent of occurrence (EOO) of 3365 km², an area of occupancy (AOO) of 16 km² and four locations. Even though the species occurs in the protected areas of Ivohibe, Befotaka–Midongy du Sud and Andohahela, at these sites it is nevertheless threatened by ongoing degradation or destruction of its habitat due to shifting agriculture, annual fire, logging and wood harvesting (Goodman *et al.* 2018); all of which will result in continuing decline in its EOO, AOO, habitat quality, number of subpopulations and number of mature individuals. Therefore, *H. abbreviata* comb. nov., stat. nov. is assessed as “Endangered” [EN B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar.** Anosy Region [Prov. Toliara]: Bassin de la Manampanihy (sud-est), Col de Fitana, [24°44'S, 46°51'E], 300–700 m, 15.X.1928, fl., *Humbert 6038* (G, P[P02397476, P02397477], TAN, US[US01832484]). — Atsimo-Atsinanana Region [Prov. Fianarantsoa]: Midongy du Sud, forêt d'Anamangy, 23°31'16"S, 47°05'19"E, 640 m, 13.IX.2005, fl., *Andrianjafy et al. 1184* (MO, P[P00860315], TAN). — Ihorombe Region [Prov. Fianarantsoa]: Ivohibe, Ambatovita, 4.5 km NE d'Ivohibe, 22°28'08"S, 46°55'34"E, 874 m, 28.XI.2010, fl., *SNGF 2649* (K, MO, P, SNGF, TAN, TEF).

DESCRIPTION

Leaves petiolate; leaf laminae 6–8 × 2.9–4 cm, lanceolate to ovate, base obtuse to rounded, apex attenuate to acuminate, margins entire, glabrous on both surfaces, venation pinnate (conspicuous on both surfaces, including tertiary veins), rather coriaceous; petioles up to 1.8 cm long. Synflorescences mostly axillary, narrowly thyrsoid-paniculiform. Capitula shortly pedunculate (peduncles 1–2.5 mm long); involucre cupuliform, glabrous; involucre bracts 8, 1.8–2 × *c.* 1 mm; supplementary bracts 4–5, 0.3–0.4 mm long. Florets *c.* 10, 3.8–4 mm long; corollas tubular, 5-lobed, whitish; anther bases caudate, as long as or slightly longer than filament collar; style branches obtuse with a crown of sweeping trichomes. Achenes *c.* 2.8 × 0.6 mm, rather cylindrical, *c.* 9-ribbed, glabrous except for few trichomes on the upper part, straw-coloured; pappus *c.* 3.7 mm long, whitish.

NOTES

Humbertocalia abbreviata comb. nov., stat. nov. is well-characterized by the glabrous leaves with conspicuous venation on both surfaces, the shortly pedunculate capitula, and the small involucre with the involucre bracts somewhat fused at the base. It is similar to *H. racemosa* (Bojer ex DC.) C. Jeffrey, from which it differs in involucre shape (strictly cupuliform, with the bracts somewhat fused at the base in *H. abbreviata* comb. nov., stat. nov. vs rather campanulate, with the bracts partite along their whole length or almost so in *H. racemosa*), involucre bract length (1.8–2 mm long in *H. abbreviata* comb. nov., stat. nov. vs 3.6–4 in *H. racemosa*), and peduncle length (1–2.5 mm long in *H. abbreviata* comb. nov., stat. nov. vs 2–5 in *H. racemosa*), and floret number (*c.* 10 in *H. abbreviata* comb. nov., stat. nov. vs *c.* 20 in *H. racemosa*).

It is interesting to note that the collections *Decary 5222* and *5226*, which come from the same locality and were collected on the same day, were both treated as belonging to *Senecio exsertus* var. *abbreviatus* (Humbert 1963). However, *Decary 5222* clearly corresponds to *Humbertocalia racemosa*.

Humbert (1959), when describing the new variety, designated the collection *Decary 5226* at P as the holotype of the name. As two specimens corresponding to this collection are kept at P and there is no explicit indication suggesting that Humbert selected one of the two duplicates to serve as holotype, the name *S. exsertus* var. *abbreviatus* is lectotypified on the best preserved specimen **P00835897** (Fig. 1).

2. *Humbertocalia amplexifolia* (Humbert) C. Jeffrey

Kew Bulletin 47 (1): 83 (Jeffrey 1992).

Senecio amplexifolius Humbert, *Mémoires de la Société linnéenne de Normandie* 25: 139, 303 (Humbert 1923). — Typus: **Madagascar.** Diana Region [Prov. Antsiranana], Mt. Tsaratanana, [13°57'S, 48°52'E], 2000 m, XII.1912, fl., *Perrier de la Bâthie 2809* (holo-, P[P00498727]!).

ICONOGRAPHY. — Humbert (1963: 761, fig. 139, 1–2, sub *Senecio amplexifolius*).

ETYMOLOGY. — The epithet *amplexifolia* describes the distinctive sessile leaves of this species.

VERNACULAR NAMES. — Unknown.

DISTRIBUTION AND ECOLOGY. — *Humbertocalia amplexifolia* is endemic to northern Madagascar (Diana Region), occurring in subhumid bioclimate and known only from the Tsaratanana massif, in montane ericoid thickets, on granitic or basaltic substrate, at elevation *c.* 2000 m.

CONSERVATION STATUS. — *Humbertocalia amplexifolia* has a very restricted distribution with an area of occupancy (AOO) of 4 km² based upon a single locality from two historical collections within the Tsaratanana protected area. The remaining montane ericoid thickets in the vast summit plateau is scarce because of an accidental fire by a geological expedition at the beginning of the 20th century (Gautier *et al.* 2018b). Only a few vestiges remain, and therefore, the habitat of *H. amplexifolia* is in threat because of its vulnerability to further fire. On this basis, *H. amplexifolia* is assessed as “Critically Endangered” [CR B2ab(iii)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar.** Diana Region [Prov. Antsiranana]: Massif du Tsaratanana et haute vallée du Sambirano (Réserve naturelle n° 4), vers l'Antsasarotra, [13°57'S, 48°52'E], 2000 m, XI–XII.1937, fl., *Humbert 18319* (G, P[P02397556, P02397557, P04391737], TAN[TAN001008]).

DESCRIPTION

Leaves subsessile; leaf laminae 5–9 × 2–4.2 cm, lanceolate, base amplexicaul to semi-amplexicaul, apex acute to attenuate, margins dentate (teeth up to 3 mm deep), glabrous on both surfaces, venation pinnate (conspicuous on both surfaces, including tertiary veins), rather coriaceous; petioles very short (up to 2 mm long). Synflorescences axillary and terminal, corymbose-paniculiform. Capitula pedunculate (peduncles 2–8 mm long); involucre rather cylindrical, gla-



Humbertalia racemosa (DC.) C. Jeffrey
 var. *abbreviatus*
 Determined by: *Muséum Botanical Garden*
 O. Kanuriambolomamonjy & M. Rabarimanarivo, 2009

Herbier Muséum Paris
 P00835897

HOLOTYPE
 de *Senecio exsertus* Sch. Bip.
 var. *abbreviatus* Humbert
 in *Notul. Syst. (Paris)* 15(4) : 370-371 1893

MISSION R. DECARY
 MADAGASCAR
 Localité : *Handana (P. de Farafangana)*
Terme : Rahimany, Grand Canal à fleur jaunâtre Port.
 Date : *6.9.1926*

HERB. MUS. PARIS.
Senecio exsertus Sch. Bip.
 var. *abbreviatus*
 (*Cacalia racemosa* DC.)
 R. DECARY - MADAGASCAR
 Reçu le 2 Mars 1927

FIG. 1. — Lectotype of *Senecio exsertus* var. *abbreviatus* Humbert, Decary 5226 (P00835897).

brous, somewhat swollen at base; involucre bracts 5, 3-3.6 × 0.8-1.3 mm; supplementary bracts 3-4, 0.5-0.8 mm long. Florets 8-10, 4.3-4.5 mm long; corollas tubular, 5-lobed, whitish; anther bases sagittate, a quarter as long as filament collar; style branches obtuse with a crown of sweeping trichomes. Achenes 2.4-2.6 × c. 0.8 mm, rather cylindrical, c. 6-ribbed, glabrous, straw-coloured; pappus c. 3.8 mm long, whitish.

NOTES

This species is easily distinguished by its subsessile leaves with the lamina bases amplexicaul to semi-amplexicaul. These characters make this species unique within the genus that any confusion with the remaining taxa is unlikely.

3. *Humbertocalia apocynifolia* (Baker)
Rabarim., Callm. & J. Calvo, comb. nov.
(Fig. 2)

Vernonia apocynifolia Baker, *Journal of the Linnean Society, Botany* 20: 175 (Baker 1883). — *Senecio apocynifolius* (Baker) Humbert, *Mémoires de la Société linnéenne de Normandie* 25: 140 (Humbert 1923). — Typus: Madagascar. Central Madagascar, s.d., *Baron 1698* (holo-, K[K000377694]!; iso-, P[P00557671, fragment]!).

Vernonia voluta Baker, *Journal of the Linnean Society, Botany* 21: 415 (Baker 1885). — *Senecio leucopappus* var. *volutus* (Baker) Humbert, *Mémoires de la Société linnéenne de Normandie* 25: 140 (Humbert 1923). — *Senecio volutus* (Baker) Humbert, *Flore de Madagascar et des Comores* 189 (3): 764 (Humbert 1963). — *Humbertocalia voluta* (Baker) C. Jeffrey, *Kew Bulletin* 47 (1): 83 (Jeffrey 1992), **syn. nov.** — Typus: Madagascar. *sine loco*, fl., *Baron 2375* (holo-, K[K000377690 image]!; iso-, P[P00557586, P00557587]!).

Senecio leucopappus var. *hederifolius* Humbert, *Notulae Systematicae* 15 (4): 372 (Humbert 1959). — *Senecio leucopappus* subvar. *hederifolius* (Humbert) Humbert, *Flore de Madagascar et des Comores* 189 (3): 763 (Humbert 1963), **syn. nov.** — Typus: Madagascar. Atsimo-Atsinanana Region [Prov. Fianarantsoa], massif de l’Ivakoany (centre-sud), [23°50’S, 46°26’E], 1250-1550 m, XI-XII.1933, fl., *Humbert 12210* (lecto-, designated here, P[P00557669]!; isolecto-, G[G00412690]!, P[P00557668]!).

ADDITIONAL ICONOGRAPHY. — Humbert (1963: 761, fig. 139, 5 to 11, sub *Senecio leucopappus*).

ETYMOLOGY. — The epithet *apocynifolia* refers to the resemblance of the leaves of this species with those of the members of the genus *Apocynum* L. (Apocynaceae).

VERNACULAR NAMES. — “Dingadingam-bahy” (*Cours 2754*); “Kim-boimboilahy” (*Malcomber et al. 1558*); “Rongasoa” (*Réserves Naturelles 9107*); “Vahymasina” (*Gautier & Chatelain 2806*).

DISTRIBUTION AND ECOLOGY. — *Humbertocalia apocynifolia* comb. nov. is a widespread species, where it is found in humid, subhumid, and montane bioclimates, from Diana Region in the north to Anosy region in the south. It occurs in lowland, medium altitude moist evergreen humid forests and montane ericoid thicket but also in disturbed forests, mostly at the edge or in open areas of remnant forests or shrublands at high elevation, sometimes on laterite of gneiss, or along river banks, at c. 300 to 2100 m elevation.

CONSERVATION STATUS. — *Humbertocalia apocynifolia* comb. nov. has an extent of occurrence (EOO) of 181 654 km², an area of occupancy (AOO) of 284 km² and more than 40 locations with

respect to the most serious plausible threat of shifting agriculture. It occurs within numerous protected areas namely Ambatofotsy, Ambohitantely, Andohahela, Andringitra, Anjanaharibe-Sud, Befotaka – Midongy du Sud, CAZ (Corridor Ankeniheny Zahamena, Main parcel), CAZ – Ankerana (Corridor Ankeniheny Zahamena), CAZ – Vohibe Forest (Corridor Ankeniheny Zahamena), Corridor forestier Marojejy-Anjanaharibe Sud-Tsaratana nord, Corridor forestier Marojejy-Anjanaharibe Sud-Tsaratana sud, Ivohibe, Kalambatritra, Mahimborondro, Mangabe, Manongarivo, Mantadia, Marojejy, Montagne d’Ambre, Ranomafana, Tsaratana, and Zahamena. Being widely distributed and present in many protected areas, *H. apocynifolia* is assessed as “Least Concern” [LC], according to IUCN Red List Categories and Criteria (IUCN 2012).

SELECTED SPECIMENS EXAMINED. — Madagascar. Alaotra-Mangoro Region [Prov. Toamasina]: Ambatovy forest, 18°51’18”S, 48°17’55”E, 1151 m, 29.IX.2005, fl., *Antilabimena et al. 3812* (MO, P[P04403972], TAN); Route Moramanga, Anosibe PK 57, [19°20’S, 48°13’E], IX.1953, fl., *Bosser 6503* (P[P02397535]); Onibe, District d’Ambatondrazaka, [17°50’S, 48°33’E], 800-1000 m, XI.1938, fl., *Cours 939* (P[P02397534]); Androrangabe, [19°29’S, 48°04’E], 1200 m, 7.X.1945, fl. & m. fr., *Cours 2754* (MO, P[P02397532, P04416354], TAN); Amparihifarambolosy (Alaotra), [17°28’S, 48°44’E], 1200 m, 12.X.1945, fl. & im. fr., *Cours 2860* (P[P02397542]); Anosibe, S. de Moramanga, [19°26’S, 48°12’E], 7.IX.1942, fl., *Decary 18452* (P[P02397467, P02397468, P02397469]); entre Mandritsara et Andilamena, [17°01’S, 48°35’E], 900-1200 m, XI.1937, fl. & im. fr., *Humbert 18042* (P[P02397510, P04391733]); Mantadia PN, 18°53’S, 48°27’E, 1000 m, fl., *Nicoll 169* (MO, P[P02478396], TAN); Ambatovy, 18°49’15”S, 48°19’43”E, 1132 m, 20.X.2005, fl., *Razanatsoa & Razafindasy 572* (MO, P[P04403973], TAN). — Analamanga Region [Prov. Antananarivo]: Mandraka, [18°53’S, 47°55’E], 5.VIII.1906, m. fr., *Alleizette s.n.* (P[P02397531]); Tampoketsa, Ankazobe, [17°55’S, 47°06’E], X.1962, fl., *Bosser 16557* (P[P04388909, P04388913], TAN); Tampoketsa au N. d’Ankazobe, forêt d’Ambohitantely, [18°11’S, 47°17’E], 1600 m, X.1933, fl., *Humbert 11131* (G, P[P02397544, P02397545], TAN); Ivohimanitra forest, [19°22’S, 46°42’E], 8.XI.1894, *Forsyth Major 56* (G). — Anosy Region [Prov. Toliara]: Massif de Beampingaratra, col de Bevava au sommet de Bekoho, [24°26’S, 46°51’E], 1100-1500 m, 6-7.XI.1928, m. fr., *Humbert 6429* (P[P02397548], TAN); Massif de Beampingaratra, cime mont Papanga, [24°26’S, 46°51’E], 1576 m, 3-4.XI.1928, fr., *Humbert 6352* (G, P[P02397549, P02397550], US[US01832482]); Massif de Beampingaratra (sud-est), mont Papanga, [24°26’S, 46°51’E], 1400-1576 m, 3-4.XI.1928, fl., *Humbert 6352bis* (P[P02818089]); Massif de l’Andohahelo, vallée de Ranohela, [24°41’S, 46°49’E], 1000-1200 m, 18.X.1928, m. fr., *Humbert 6078* (P[P02397536]); Massif de l’Andohahelo, vallée de Ranohela, [24°42’S, 46°44’E], 300-1200 m, 18-26.X.1928, m. fr., *Humbert 6229* (P[P03279255, P03297537], TAN); Haute vallée du Mandrare, [24°31’S, 46°47’E], 600-900 m, m. fr., *Humbert 6509bis* (P[P02397547]); Bassin supérieur du Mandrare, col de Vavara, [24°30’S, 46°42’E], 1300-1600 m, 10.XI.1928, m. fr., *Humbert 6528* (P[P02397546]). — Atsimo-Atsinanana Region [Prov. Fianarantsoa]: Vondrozo, de Farafangana, [22°49’S, 47°19’E], 1.IX.1926, fl., *Decary 4891* (P[P02397470]). — Atsinanana Region [Prov. Toamasina]: Brickaville, Anivorano-Sud, Ankerana, 18°26’06”S, 48°50’08”E, 594 m, 31.X.2005, fl., *Andriantiana 312* (MO, P[P06898071], TAN). — Diana Region [Prov. Antsiranana]: Montagne d’Ambre, [12°37’S, 49°09’E], 01.X.2005, bud & fl., *Acevedo-Rodríguez & Razafindraibe 14520* (MO, US); forest of Analanjahany, 4 km south Talaviana, 200 m west of RN 7, 14°09’19”S, 48°57’28”E, 2063 m, 24.IV.2001, fr., *Birkinshaw et al. 874* (MO, P[P02397474], TAN); Antsatrotro, Réserve spéciale de Manongarivo, 14°05’S, 48°23’E, 1400 m, 26.V.1995, fl., *Gautier & Chatelain 2806* (G, P[P02397466], TAN); Andranomalaza, Réserve spéciale de Manongarivo, 14°02’S, 48°25’E, 1660 m, 28.V.2000, fl., *Gautier & Rakotomamonjy 3705* (G, P[P02818093],

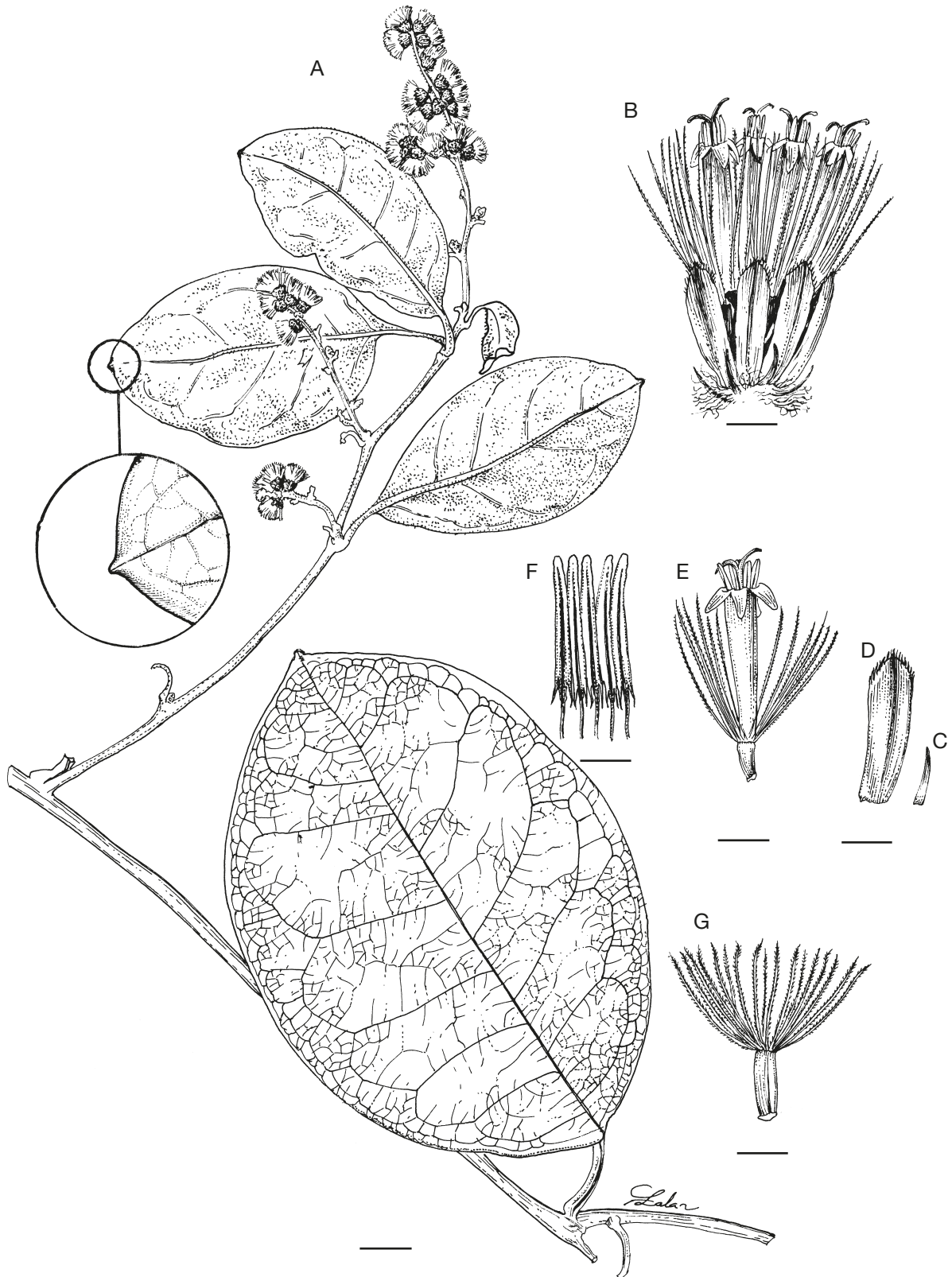


FIG. 2. — *Humbertacalia apocynifolia* (Baker) Rabarim., Callm. & J. Calvo (*Callmänder* 417, TAN): **A**, habit with leaf apex detail; **B**, capitulum; **C**, supplementary bract; **D**, involucre bract; **E**, floret; **F**, anthers; **G**, achene and pappus. Scale bars: A, 1 cm; B-E, G, 1 mm; F, 0.5 mm. Drawings: Roger Lala Andriamiarisoa.

TEF); route de Joffreville à la montagne d'Ambre (station forestière des Roussettes), X.1944, fl., *Homolle* 24 (P[P02397539]); Massif du Tsaratanana et haute vallée du Sambirano (Réserve naturelle n°

4), [13°57'S, 48°52'E], 2000 m, XI.1937, fl., *Humbert* 18261 (G, P[P02397511, P02397512]); Massif de Marivorahona au sud-ouest de Manambato (haute Mahavavy du nord, district d'Ambilobe),

[13°46'S, 48°59'E], 2000-2244 m, 18-26.III.1951, fl., *Humbert & Capuron 25733* (P[P02397460, P03312478], TAN). — Haute Matsiatra Region [Prov. Fianarantsoa]: Parc national de Ranomafana, Parcelle 1, à l'est de Vohiparara, au nord de la Route nationale 25, 21°14'S, 47°23'E, 1100-1200 m, 8-18.X.1993, fl., *Kotozafy 320* (G, K, MO, P[P00558049], TAN); Ankibory, canton et district Ambalavao, [22°13'S, 46°55'E], 18.VII.1955, fl., *Rakotouao 7609* (P[P02397523]). — Ihorombe Region [Prov. Fianarantsoa]: Pic d'Ivohibe, [22°31'S, 46°57'E], 1500-2000 m, 5.XI.1924, m. fr., *Humbert 3319* (P[P02397538, P03279254]); Massif de Kalambatritra (centre-sud), mont Analatsitendrika, [23°27'S, 46°27'E], 1650-1850 m, XI.1933, *Humbert 11919* (P[P02397551]); *ibid. loco*, fl., *Humbert 11920* (P[P02397543]); 8 km ESE d'Ivohibe, 5.5 km SE d'Angodongodona, corridor forestier entre le Réserve spéciale d'Ivohibe et le Parc national d'Andringitra, 22°25'S, 46°54'E, 1260 m, 9.XI.1997, fl., *Messmer et al. 562* (G, MO, P[P02397519]). — Sava Region [Prov. Antsiranana]: forêt d'altitude d'Ambohimirahavavy, montagne de Beampoko, 14°13'47"S, 49°08'19"E, 2062 m, 20.XI.2005, fl., *Andriamiarinoro & Randrianarivony 29* (G, MO, P[P02397475], TAN); Pentes orientales du massif de Marojejy (nord-est) à l'ouest de la haute Manantenina, affluent de la Lokoho, [14°27'S, 49°42'E], 1400 m, 15-25.XII.1948, fl., *Humbert 22477* (P[P02397526]); Partie occidentale du Massif de Marojejy (nord-est) de la vallée de l'Ambatoharanana au bassin supérieur de l'Antsahaberoka, [14°20'S, 49°40'E], 1400 m, 9.XI-2.XII.1959, fl., *Humbert 31700* (P[P02397513]); Réserve naturelle Marojejy, along the trail to the summit of Marojejy est, NW of Mandena, 14°27'S, 49°47'E, 380 m, 05.X.1988, fl., *Miller 3366* (MO, P[P02397518], TAN, US[US01832481]); forêt d'altitude d'Ambohimirahavavy, montagne de Beampoko, 14°13'41"S, 49°08'14"E, 1991 m, 17.XI.2005, fr., *Randrianarivelo et al. 338* (G, MO, P[P02397458], TAN); Andapa, forêt Betaolana, 8.5 km au NW d'Ambodiangezoka, le long de la rivière Ambolokopatrika, 14°32'S, 49°26'E, 875 m, 11.X.1999, fl., *Rakotomalaza & Ravelonarivo 1965* (G, MO, P[P02397515]); Andapa, Bealampona, environs d'Ampiferantany, 14°47'45"S, 49°27'54"E, 1161 m, 22.V.1995, *Ravelonarivo & Rabesonina 808* (G, MO); Anjilavahely, Ankijanadambo, 14°14'58"S, 49°26'19"E, 1546 m, 7.III.2006, fl., *Ravelonarivo et al. 1733* (G, MO, P[P02397456], TAN); Andrahanjo, Ambohimitsinjo, Sambava, [14°27'S, 49°42'E], 16.VIII.1957, fl., *Reserves naturelles 9107* (P[P02397522]). — Sofia Region [Prov. Mahajanga]: Bemafo, 14°13'24"S, 49°03'44"E, 1750 m, fl., *Andriamiarinoro 5* (MO, P[P02817285], TAN); Mangindrano, Ambohimiravavy massif, 14°13'11"S, 49°4'01"E, 1887 m, 20.X.2005, fl., *Callmander et al. 417* (G, MO, P[P02397473], TAN); Tsaratanana massif, N of Mangindrano, 14°10'24"S, 48°56'43"E, 1675 m, 21.X.2001, fl., *Lourey et al. 5447* (K, MO, P[P02397520], TAN[TAN000977]). — Vatovavy Region [Prov. Fianarantsoa]: Parc national Ranomafana, Parcelle 1, south of Ambohimiera, valley of Sakavolo river, 21°04'S, 47°29'E, 880-1100 m, 15-17.IX.1992, fl., *Malcomber et al. 1558* (K, MO, P[P00558043], TAN); *ibid. loco*, Parcelle 3, Talatakely, 21°15'S, 47°27'E, 800-1000 m, 3-8.IX.1993, fl., *Kotozafy et al. 229* (G, K, MO, P[P00558047], TAN!); *ibid. loco*, Vatoharanana, 40 km SO Ranomafana, 21°17'04"S, 47°26'00"E, 1025 m, 02.X.2000, fl., *Rakotouao & Randriatafika 984* (MO, P[P02397524], TAN). — *Sine loco*, 1837-1838, *Goudot s.n.* (G).

DESCRIPTION

Leaves petiolate; leaf laminae 3.5-8(-12) × 2-5(-8) cm, ovate, elliptic, or oblanceolate, base attenuate to rounded (sometimes nearly truncate or oblique), apex acute to obtuse (usually mucronate), margins entire or remotely mucronate-denticulate to shallowly dentate, glabrous to initially arachnoid on adaxial surface, glabrous to lanate on abaxial surface, venation pinnate (usually conspicuous on both surfaces, less noticeable on abaxial surface when covered by indumentum), rather chartaceous (rarely somewhat fleshy); petioles up to 2 cm long.

Synflorescences axillary and terminal, thyrsoid-paniculiform. Capitula sessile to subsessile; involucre rather campanulate, glabrescent to arachnoid-floccose; involucre bracts (5-)8-10(-13), 2-3 × 0.7-1 mm; supplementary bracts 4-8, 0.7-1.5 mm long. Florets 10-20, 3-4 mm long; corollas tubular, 5-lobed, whitish; anther bases caudate, as long as or slightly longer than filament collar; style branches truncate to obtuse with a crown of sweeping trichomes. Achenes 1.5-2 × c. 0.5 mm, rather cylindrical, 8-10-ribbed, glabrous, straw-coloured to brownish; pappus 3-4 mm long, whitish (Fig. 2).

NOTES

Humbertacalia apocynifolia comb. nov. can be distinguished from the remaining species of the genus by its petiolate leaves, the thyrsoid-paniculiform synflorescences composed of sessile or subsessile capitula arranged in glomerules, the (5-)8-10(-13) involucre bracts, and the glabrous achenes. It is, however, a highly variable species concerning leaf shape and indumentum, which motivated Humbert to describe several infraspecific taxa and to propose different taxonomic treatments over time. In 1923, he recognized two varieties within *Senecio leucopappus* (under the concept currently ascribed to *Humbertacalia apocynifolia* comb. nov.; see comments under *H. racemosa*): the typical variety embracing the glabrous or glabrescent forms, and *Senecio leucopappus* var. *volutus* (synonym of *Vernonia voluta*) for including those forms with the abaxial leaf surfaces covered by a brownish floccose indumentum. In this regard, Humbert (1923) wrote: "Malgré la grande différence d'aspect des cas extrêmes, ces 2 variétés se séparent difficilement: l'exemplaire d'Alleizette a des feuilles presque glabres (passage à la var. α)" [Despite the difference in appearance of the extreme cases, these 2 varieties are difficult to separate: Alleizette's specimen has almost glabrous leaves (transition to var. α)]. Later, in the frame of the *Flore de Madagascar et des Comores*, Humbert (1963) treated the var. *volutus* at specific rank but stated once again its similarity with *S. leucopappus* and the possibility of considering them mere subspecies of a single taxon ("[...] dont il pourrait être considéré comme une sous-espèce"). Humbert (1963: 757, 765) also supported the separation of *S. volutus* by its capitula mostly pedunculate. This is quite striking because the type material of *Vernonia voluta* (Baron 2375) shows mostly sessile capitula. The other material cited by Humbert (1963: 765) is a Baron's quote ["localité indéterminée entre l'Antsih. et la côte E., E. Androna", Baron (1903: 320)] and *Humboldt 81*. This latter collection represents the type material of *Senecio exsertus* var. *diffusus* Humbert, here treated as *Humbertacalia diffusa* (Baker) J. Calvo, Rabarim. & Callm., comb. nov., stat. nov. (see new combination below).

Between the glabrous or glabrescent plants (e.g. *Forsyth Major 56*, *Lourey et al. 5447*) and the floccose plants (e.g. *Andriamiarinoro & Randrianarivony 29*, *Baron 2375*), we studied multiple intermediate forms (e.g. *Goudot s.n.*, *Kotozafy et al. 229*) that make any separation unworkable and even, in many cases, arbitrary. We also found some specimens displaying whitish-lanate abaxial leaf surfaces and 12(-13) involucre bracts (e.g. *Messmer et al. 562*) and others having rather brownish-lanate abaxial leaf surfaces and (7-)8 involucre bracts (e.g. *Callmander*

et al. 417). Against this background, we believe that it is appropriate to treat *Humbertacalia apocynifolia* comb. nov. in its broadest sense to include those forms hitherto ascribed to *H. voluta*. Accordingly, the synonymy is proposed.

With regard to the leaf margin variability, one finds specimens with entire margins (e.g. *Humbert 11131*), remotely mucronate-denticulate (e.g. *Lowry et al. 5447*), and even shallowly and remotely denticulate (e.g. *Humbert 6446*, *Rakotovoao & Randriantafika 984*). Concerning the varietal name *Senecio leucopappus* var. *hederifolius*, it fits well within the aforementioned leaf variability of the species and we believe that it does not deserve taxonomic recognition. Although *Humbert* (1959) indicated the holotype of this name at P, there are two duplicates kept in this herbarium. The best-preserved specimen is designated here as lectotype (P00557669).

Finally, it should be mentioned that the specimen *Razakamalala et al. 3459* (MO, P[P04276658], TAN) has solitary capitula arranged in rather spiciform synflorescences. This feature does not match the typical synflorescences of *Humbertacalia apocynifolia* comb. nov., which are thyrsoïd-paniculiform and composed of capitula arranged in glomerules. Although the remaining characters match well the morphology of *H. apocynifolia* comb. nov., for the time being we prefer excluding it from this taxonomic entity. Additional collections are needed to evaluate the consistency of such morphology.

4. *Humbertacalia coursii* (Humbert) C. Jeffrey

Kew Bulletin 47 (1): 83 (Jeffrey 1992).

Senecio coursii Humbert, *Mémoires de l'Institut scientifique de Madagascar*, sér. B, 6: 195 (Humbert 1955). — Typus: Madagascar. Sava Region [Prov. Antsiranana], massif de l'Anjanaharibe (pentes et sommet nord) à l'ouest d'Andapa (haute Andramonta, bassin de la Lokoho (nord-est), [14°36'S, 49°27'E], 1200 m, 10.XII.1950-3.I.1951, bud & fl., *Humbert, Capuron & Cours 24660* (lecto-, P[P00727179]!; isolecto-, P[P02436224, P02436225]!). — Pentes occidentales du massif de Marojejy (nord-est), bassin de la Lokoho, à l'est d'Ambalamanasy II, district d'Andapa, [14°27'S, 49°42'E], 450-800 m, 28.XI.1948, fl., *Humbert & Capuron 22144* (syn-, P[P00498764, P02436230]!). — Fitovinany Region [Prov. Fianarantsoa], Bassin de Matitanana, forêt primitive de Tsianovoha, [21°47'S, 47°21'E], IX.1934, bud & fl., *Heim s.n.* (syn-, P[P00727178]!). — Atsinanana Region [Prov. Toamasina], forêt orientale (vestiges), bassin inférieur de Mangoro, [19°42'S, 48°03'E], X.1927, fl. & fr., *Perrier de la Bâthie 18123* (syn-, P[P00727180, P00727181]!).

ETYMOLOGY. — The epithet *coursii* honors the French botanist Gilbert Cours-Darne (1909-2001), who participated in collecting the type material with *Humbert* and *Capuron*. Cours was trained as an engineer in tropical agronomy and worked in Madagascar from 1931 to 1961 where he discovered numerous species in the company of *Humbert*.

VERNACULAR NAMES. — “Vahipiretaka” (*Heim s.n.*).

DISTRIBUTION AND ECOLOGY. — *Humbertacalia coursii* occurs in humid and subhumid bioclimates, along eastern Madagascar, from Marojejy (Sava Region) in the north to Ivohibe (Ihorombe region) in the south, in medium altitude moist evergreen forest on gneiss and granite substrate, at elevations from 500-1600 m.

CONSERVATION STATUS. — *Humbertacalia coursii* has an estimated extent of occurrence (EOO) of 16 892 km², an area of occupancy (AOO) of 24 km², and six locations with respect to the most serious plausible threat of illegal logging and agriculture. Even though, it occurs within the protected areas of Anjanaharibe-Sud, Marojejy and Ivohibe, it is threatened by ongoing degradation or destruction of its habitat due to shifting agriculture, illegal logging and wood harvesting; all of which will result in inferred continuing decline in its habitat quality. Based on current information, *H. coursii* is therefore assessed as “Vulnerable” [VU B1ab(iii)+B2ab(iii)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar. Sava Region [Prov. Antsiranana]: Anjanaharibe, Andapa, [14°36'S, 49°27'E], 1200 m, 17.XII.1950, bud & fl., *Cours 3698* (MO, P[P02397553], TAN); pentes orientales du Marojejy (NE), à l'ouest de la rivière Manantenina, affluent de la Lokoho, [14°25'45"S, 49°44'22"E], 1450 m, 24.III.1949, ster., *Humbert 23649* (P[P02397552]). — Ihorombe Region [Prov. Fianarantsoa]: forêt de Marovahy près d'Ivohibe, [22°31'S, 46°59'E], 27.XI.1924, fl., *Armand 35* (P[P02397554, P02397555]).

DESCRIPTION

Leaves petiolate; leaf laminae 6-10 × 3-5.1 cm, lanceolate to elliptic, base cuneate to obtuse, apex acute to attenuate (usually mucronate), margins remotely mucronate (entire in overall appearance) to shallowly dentate, tomentose-hirsute on both surfaces (rarely pilose), venation pinnate (conspicuous on abaxial surface), rather chartaceous; petioles up to 3 cm long. Synflorescences axillary and terminal, spiciform. Capitula sessile; involucre campanulate, slightly arachnoid to glabrescent at base; involucre bracts (11-)13, 3.7-4.5 × 0.7-0.9 mm; supplementary bracts 6-8, 1.5-2 mm long. Florets c. 20, 3.2-3.7 mm long; corollas tubular, 5-lobed, pale greenish; anther bases caudate, almost as long as filament collar; style branches obtuse with a crown of sweeping trichomes. Achenes c. 1.8 × 0.6 mm (immature), rather cylindrical, glabrous, straw-coloured; pappus 3.7-3.9 mm long, whitish.

NOTES

This species is well-characterized by the tomentose-hirsute leaves on both surfaces and the long-spiciform synflorescences with sessile capitula usually arranged in lax glomerules. The trichomes are pluricellular, with the apical part whitish flageliform and caducous and the basal cells permanent and ochraceous. It might be confused with *Humbertacalia madagascarensis*, but the involucre bract number and length are useful to discriminate each other [(11-)13, 3.7-4.5 mm in *H. coursii* vs 8(-9), 4.4-5.3 mm in *H. madagascarensis*]. Moreover, *H. coursii* has sessile capitula whereas those of *H. madagascarensis* are subsessile, sometimes having a short peduncle up to 2 mm long. The trichomes of the leaves and stems are also longer in *H. coursii*.

Among the syntypes cited in the protologue, the specimen P00727179 (*Humbert 24660*) is designated as the lectotype because it is taxonomically very informative and the collection consists of three duplicates. The collection *Cours 3698* comes from the same gathering (see *Humbert's* annotation on the label of P02436225), but it is not considered type material because it is not explicitly mentioned in the protologue.

5. *Humbertocalia diffusa* (Baker)

J. Calvo, Rabarim. & Callm., comb. nov., stat. nov.

Senecio exsertus var. *diffusus* Humbert, *Notulae Systematicae* 15 (4): 371 (Humbert 1959). — Typus: Madagascar. Atsinanana Region [Prov. Toamasina], Lamandra, environs de Foulpointe, N. de Tamatave, [17°41'S, 49°31'E], 12.XI.1881, fl., *Humblot 81* (lecto-, designated here, P[P00727182]!; isolecto-, P[P00727183]!).

ETYMOLOGY. — The epithet *diffusa* probably refers to the lax synflorescences that this species displays.

VERNACULAR NAMES. — Unknown.

DISTRIBUTION AND ECOLOGY. — *Humbertocalia diffusa* comb. nov., stat. nov. occurs in humid bioclimate, in lowland moist evergreen forest of northeastern Madagascar (Atsinanana and Sava Regions), at low elevations *c.* up to 100 m.

CONSERVATION STATUS. — *Humbertocalia diffusa* comb. nov., stat. nov. has an area of occupancy (AOO) of 8 km² and two locations with respect to the most serious plausible threat of shifting agriculture. Its known distribution does not include any of the protected areas and we infer continuing decline in its AOO, habitat quality, number of subpopulations and number of the mature individuals as well. Therefore, *H. diffusa* comb. nov., stat. nov. is assessed as “Endangered” [EN B2ab(ii,iii,iv,v)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar. Sava Region [Prov. Antsiranana]: Antanandavahely, S/P d'Antalaha, [15°17'S, 50°20'E], 16.VII.1966, fl. & m. fr., *Jacquemin 64-J* (P[P04428413]!); *ibid. loco*, m. fr., *Rakotozafy 515* (TAN).

DESCRIPTION

Leaves petiolate; leaf laminae 5.4–6.1 × 2–2.6 cm, lanceolate to narrowly elliptic, base cuneate to attenuate (sometimes oblique), apex acute, margins entire or remotely mucronate-denticulate to shallowly and distantly sinuate, glabrescent (initially arachnoid) on both surfaces, venation pinnate (usually conspicuous on both surfaces), rather chartaceous; petioles up to 1.5 cm long. Synflorescences axillary and terminal, thyrsoid-paniculiform. Capitula long-pedunculate (peduncles 6–15 mm); involucre campanulate, arachnoid-floccose (at least at base); involucre bracts 12–13, 2.9–3 × 0.7–1 mm; supplementary bracts 4–6, 0.7–1.5 mm long. Florets 10–20, 3–4 mm long; corollas tubular, 5-lobed, whitish; anther bases caudate, as long as or slightly longer than filament collar; style branches truncate to obtuse with a crown of sweeping trichomes. Achenes 1.5–2 × *c.* 0.5 mm, rather cylindrical, 8–10-ribbed, glabrous, straw-coloured to brownish; pappus 3–4 mm long, whitish.

NOTES

This taxon was originally described as a variety of *Senecio exsertus* (Humbert 1959), the latter being a replacement name for *Cacalia racemosa* (synonym of *Humbertocalia racemosa*) under *Senecio*, but later placed in synonymy under *S. volutus* (Humbert 1963), which is here referred to as a synonym of *Humbertocalia apocynifolia* comb. nov. The indumentum of the synflorescence branches and leaves, as well as the number and length of the involucre bracts, matches well the overall characters of *H. apocynifolia* comb. nov.

but it remarkably differs in the synflorescence architecture (capitula long-pedunculate not arranged in glomerules in *H. diffusa* comb. nov., stat. nov. vs capitula sessile to subsessile arranged in glomerules in *H. apocynifolia* comb. nov.). Since the synflorescence architecture appears to be a useful discriminating character in this plant group, we consider it appropriate to treat this taxon at the specific rank. Because of the pedunculate capitula, this species might also be confused with *H. racemosa*, but this latter species has 2–5 mm long peduncles (vs 6–15 mm long in *H. diffusa* comb. nov., stat. nov.), 8(–9) involucre bracts, 3.6–4 mm long (vs 12–13 involucre bracts, 2.9–3 mm long in *H. diffusa* comb. nov., stat. nov.) and glabrous leaves and synflorescence branches (vs initially arachnoid leaves and floccose synflorescence branches in *H. diffusa* comb. nov., stat. nov.).

6. *Humbertocalia madagascarensis*

Y.L. Peng & Li Bing Zhang

Phytotaxa 283 (3): 291 (Peng & Zhang 2016).

TYPUS. — Madagascar. Sava Region [Prov. Antsiranana], Réserve naturelle intégrale de Marojejy, 10.5 km NW of Manantenina, along tributary at head of Andranomifototra River, Campement 4, 14°26'24"S, 49°44'30"E, 1625 m, 4–13.XI.1996, fr., *Rakotomazaza et al. 850* (holo-, MO[MO798972]!; iso-, G[G00398316]!, P[P02478358]!, TAN!).

Senecio leucopappus var. *austro-orientalis* Humbert, *Notulae Systematicae* 15 (4): 372 (Humbert 1959). — *Senecio leucopappus* subsp. *austro-orientalis* (Humbert) Humbert, *Flore de Madagascar et des Comores* 189 (3): 764 (Humbert 1963), **syn. nov.** — Typus: Madagascar. Anosy Region [Prov. Toliara], massif de Beampingaratra (sud-est), du col de Bevava au sommet de Bekoho, [24°26'S, 46°53'E], 1100–1500 m, 6–7.XI.1928, fl., *Humbert 6446* (lecto-, designated here, P[P00557667]!; isolecto-, G[G00007641]!, P[P00557666]!).

ICONOGRAPHY. — Humbert (1963: 761, fig. 139, 12–13, sub *Senecio leucopappus* subsp. *austro-orientalis*); Peng & Zhang (2016: 292, fig. 1).

ETYMOLOGY. — The epithet *madagascarensis* obviously refers to Madagascar.

VERNACULAR NAMES. — Unknown.

DISTRIBUTION AND ECOLOGY. — *Humbertocalia madagascarensis* occurs in subhumid bioclimate. It is known from medium altitude moist evergreen forest (Marojejy, corridor between Marojejy and Anjanaharibe-Sud, Manongarivo) in Sava and Diana Regions, subhumid forest of central Madagascar (Analamanga region), to eastern humid evergreen forests of Madagascar (Alaotra-Mangoro Region) up to the Massif of Kalambatritra, Beampingaratra (Anosy Region) and Midongy du Sud (Atsimo-Atsinanana Region), mostly degraded forests, on laterite of gneiss, between 1000–1900 m elevation.

CONSERVATION STATUS. — *Humbertocalia madagascarensis* has an estimated extent of occurrence (EOO) of 168 168 km², an area of occupancy (AOO) of 36 km² and eight locations with respect to the most serious plausible threat for agriculture. We inferred continuing decline in its habitat quality, even if the species occurs within the protected areas of Ambatofotsy, Ambohitantely, Befotaka-Midongy du Sud, Kalambatritra, Manongarivo, Marojejy and Mangabe. Therefore, *H. madagascarensis* is assessed as “Vulnerable” [VU B2ab(iii)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar.** Alaotra-Mangoro Region [Prov. Toamasina]: Anosibe an'Ala, Triatramarina, Ambohiboka, forêt Ambatofotsy, 19°32'23"S, 48°18'43"E, 1193 m, 8.X.2010, fr., *Razakamalala et al.* 5718 (MO, P, TAN); Moramanga, Ambohibary, Ampahitra, forêt de Ranomena, 19°11'50"S, 48°09'36"E, 1011 m, 08.IX.2012, fl., *Razakamalala & Randrianaivo* 7152 (MO, P[P00820812], TAN). — Analamanga Region [Prov. Antananarivo]: Ambohitantely, ad occidentem Tananarive, NNE civitatis Ankazobe, [18°09'30"S, 47°18'00"E], 1500-1550 m, 29.X.1967, *Bernardi* 11108 (G). — Anosy Region [Prov. Toliara]: Massif du Kalambatritra (centre-sud), Mont Analatsitendrika, [23°22'30"S, 46°29'30"E], 1650-1850 m, XI.1933, *Humbert* 11921 (P[P02397481, P02397482]). — Atsimo-Antsinanana Region [Prov. Fianarantsoa]: Befotaka, Parc National Befotaka-Midongy, 23°50'28"S, 46°57'17"E, 1308 m, 15.IX.2005, fl., *Rakotavao et al.* 2080 (MO, P[P02473417], TAN). — Diana Region [Prov. Antsiranana]: Special Reserve of Manongarivo, SE of Beraty, trail to summit of Antsatrotro, 14°05'S, 48°22'E, 1600-1700 m, 25-29.IX.1991, fl. *Malcomber et al.* 878 (G, MO, P[P02818086], TAN). — Sava Region [Prov. Antsiranana]: Réserve du Marojejy, Camp 3, [14°27'S, 49°42'E], 1250 m, 28.X.1967, fl., *Jacquemin* H615J (P[P03288991]).

DESCRIPTION

Leaves petiolate; leaf laminas 7.5-11.5 × 3.8-6.5 cm, oblanceolate to broadly elliptic, base attenuate to obtuse (sometimes remarkably oblique), apex acute to obtuse (usually mucronate), margins entire (rarely shallowly dentate), pilose to glabrous on adaxial surface, pilose to tomentose-hirsute on abaxial surface, venation pinnate (conspicuous on both surfaces), rather coriaceous; petioles up to 4 cm long. Synflorescences axillary and terminal, narrowly thirsoïd-paniculiform. Capitula sessile (rarely short-pedunculate with peduncles usually up to 2 mm); involucre campanulate, glabrous to slightly arachnoid; involucre bracts 8(-9), 4.4-5.3 × 1-2.4 mm; supplementary bracts 4-6, 1.8-2.4 mm long. Florets *c.* 20, 3.9-5.7 mm long; corollas tubular, 5-lobed, whitish?; anther bases long-caudate, as long as to longer than filament collar (almost twice longer); style branches obtuse with a crown of sweeping trichomes. Achenes *c.* 3 × 0.7 mm (immature), rather cylindrical, glabrous, straw-coloured; pappus 4.5-5.2 mm long, whitish.

NOTES

This species can be differentiated by its large capitula with *c.* 8 involucre bracts 4.4-5.3 mm long and the pilose abaxial leaf surfaces. Other species with 8(-9) involucre bracts are *Humbertalia abbreviata* comb. nov., stat. nov. and *H. racemosa*, both displaying shorter involucre bracts, 1.8-2 and 3.6-4 mm long, respectively. The indumentum resembles that of *H. coursii* but it is less dense and the trichomes somewhat shorter. It is a variable species mainly concerning the indumentum of the adaxial leaf surfaces and involucre; the original material of *H. madagascarensis* has sparsely pilose adaxial leaf surfaces and somewhat arachnoid involucre, whereas the type of *Senecio leucopappus* var. *austro-orientalis* has almost glabrous adaxial leaf surfaces and involucre. Otherwise, all the characters of the latter taxon match the diagnostic characters of *H. madagascarensis*, and for that reason it is placed in the synonymy. The capitula of this species are sessile or short-pedunculate but we studied a collection with a few capitula displaying *c.* 5 mm long peduncles (*Jacquemin* H615J, P). As

most capitula are sessile or short-pedunculate, this is also treated as part of the variability of *H. madagascarensis*. The collection *Razakamalala & Randrianaivo* 7152 shows a denser indumentum very similar to the typical one of *H. coursii*, however, the number and length of the involucre bracts are useful for discriminating each other. Lastly, it is interesting to note that the abaxial leaf surfaces were described as violet in *Rakotomalaza et al.* 850 but pale green in *Malcomber et al.* 878.

7. *Humbertalia neoalleizettei* (Humbert) C. Jeffrey (Fig. 3)

Kew Bulletin 47 (1): 83 (Jeffrey 1992).

Senecio neoalleizettei Humbert, *Notulae Systematicae* 15 (4): 374 (Humbert 1959). — Typus: **Madagascar.** Diana Region [Prov. Antsiranana], Massif du Tsaratanana, plateaux supérieurs et hauts sommets de l'Amboabory à l'Antsianongatalata, flanc sud de l'Antsianongatalata, [14°01'30"S, 48°59'00"E], 2600-2700 m, XI-XII.1937, fl., *Humbert* 18479 (lecto-, designated here, P[P00557630]; isolecto-, P[P00557629]!) (Fig. 3); *ibid. loco*, flanc sud de l'Amboabory, [14°01'30"S, 48°59'00"E], 2400-2500 m, XI-XII.1937, fl., *Humbert* 18372 (syn-, G[G00398317]!, P[P02397528, P02397529, P02397530, P03420990, P04416356, P04416357]!, TAN!).

ETYMOLOGY. — The epithet *neoalleizettei* honors Aymar Charles D'Alleizette (1884-1967), a French military administrator who was stationed in Madagascar in 1906. D'Alleizette was interested in botany and collected many botanical specimens.

VERNACULAR NAMES. — Unknown.

DISTRIBUTION AND ECOLOGY. — *Humbertalia neoalleizettei* is known only from Tsaratanana massif, in montane bioclimate of northern Madagascar (Diana Region). It occurs on plateau or slope of remnant medium altitude moist evergreen forest and montane ericoid thicket, at high elevation of 2400-2750 m.

CONSERVATION STATUS. — *Humbertalia neoalleizettei* has a narrow distribution with an area of occupancy (AOO) of 8 km² and known from two locations. The species grows on plateau or slope of Tsaratanana massif at high elevation within the protected area. The montane ericoid thicket in the vast summit plateau is vulnerable and under threat (see comments under *H. amplexifolia*) but the known distribution of *H. neoalleizettei* also includes remnant medium altitude moist evergreen forest. These forests are not threatened at these altitudes by illegal cannabis plantations. Therefore, *H. neoalleizettei* is assessed as "Endangered" [EN B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar.** Diana Region [Prov. Antsiranana]: Tsaratanana massif, between Tsaratanana peak and Maromokotro, 14°01'59"S, 48°58'49"E, 2720 m, 19.X.2001, fl., *Lowry et al.* 5429 (MO, P[P02397889], TAN); *ibid. loco*, plateau supérieur du massif (Tsiatongatalata), [14°01'30"S, 48°59'00"E], 2700-2750 m, 14.XII.1966, fl., *Service Forestier* 27088 (P[P02397527], TEF[TEF000676]).

DESCRIPTION

Leaves petiolate; leaf laminas 4.5-8 × 2-4.2 cm, lanceolate to elliptic, base cuneate, apex acute, margins finely dentate to crenate, glabrous on both surfaces, venation pinnate (conspicuous on both surfaces, including tertiary veins), rather coriaceous; petioles up to 1.5 cm long. Synflorescences mostly

terminal, thyrsoïd-paniculiform. Capitula pedunculate (peduncles 2–4 mm long); involucre rather cylindrical, glabrous, somewhat swollen at base; involucre bracts 5, 2.7–3 × 0.6–1.3 mm; supplementary bracts 1–3, 0.7–0.9 mm long. Florets *c.* 5, 4–4.4 mm long; corollas tubular, 5-lobed, whitish; anther bases short-caudate, a third to a half as long as filament collar; style branches obtuse with a crown of sweeping trichomes. Achenes 2.6–2.9 × 0.5–0.7 mm, rather cylindrical, *c.* 6-ribbed, glabrous, straw-coloured; pappus 3.8–4.1 mm long, whitish.

NOTES

This species is easily recognized by its glabrous, finely dentate to crenate leaves, the involucre composed of five involucre bracts, and the pedunculate capitula. This latter character distinguished it from *Humbertalia pyrifolia* (Bojer ex DC.) C. Jeffrey, a similar species that has sessile or subsessile capitula, usually arranged in glomerules.

The protologue is ambiguous when designating the type of the name because Humbert cited two collections as follows: “Humbert 18372, 18479 (Holotype P)”. Because the indicated elevation rank is “entre 2400 et 2700 m alt.”, where “2400 m” corresponds to the lower elevation of *Humbert 18372* and “2700 m” the higher elevation of *Humbert 18479*, it is quite clear that Humbert considered both collections as the type material. The use of the term “holotype” to denote what is in fact syntypes is an error to be corrected. Herein, we designate the specimen [P00557630](#) corresponding to *Humbert 18479* as the lectotype of the name (Fig. 3); an isolectotype is also kept at P.

8. *Humbertalia pyrifolia* (Bojer ex DC.) C. Jeffrey (Fig. 4)

Kew Bulletin 47 (1): 83 (Jeffrey 1992).

Mikania pyrifolia Bojer ex DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 5: 195 (Candolle 1836). — Typus: Madagascar. Province de Betsilou, s.d., fl., *Bojer s.n.* (holo-, G-DC[G00323809])! (Fig. 4).

Senecio curvatus Baker, *Journal of the Linnean Society, Botany* 20: 190 (Baker 1883). — Typus: Madagascar. Central Madagascar, X.1881, fl., *Baron s.n.* (holo-, K[K000377693])!.

Vernonia asclepiadea Drake, *Bulletin de la Société botanique de France* 46: 238 (Drake 1899). — Typus: Madagascar. Analamanga Region [Prov. Antananarivo], Ost Imerina, Andrangoloaka, [19°02'S, 47°55'E], XI.1880, fl. & fr., *Hildebrandt 3626* (lecto-, designated here, P[P00727176 excl. branch on the left]!; isolecto-, G[G00412688, G00412689]!, P[P00727177]!).

ICONOGRAPHY. — Humbert (1963: 761, fig. 139, 3–4, sub *Senecio curvatus*).

ETYMOLOGY. — The epithet *pyrifolia* refers to the leaves similar to those of *Pyrus* L. (Rosaceae).

VERNACULAR NAMES. — “Anadraïsoa” (*Benoist 1269*); “Hanidraïsoa” (*Alleizette 809M*); “Kimboimboy lahy” (*Kotozafy 311*); “Rangasolahy” (*Réserves Naturelles 6337*).

DISTRIBUTION AND ECOLOGY. — *Humbertalia pyrifolia* is endemic to Madagascar where it is widespread from Tsaratanana and Maro-

jevy (Diana and Sava Regions) in the north to Andohahela (Anosy Region) in the south. It occurs in humid, subhumid and montane bioclimates, in sclerophyllous woodland, remnant medium altitude moist evergreen forest or montane ericoid thicket at high elevation, especially on gneiss and granite substrate (inselberg rock face) or laterite of gneiss, at elevations from 1000 to over 2500 m.

CONSERVATION STATUS. — *Humbertalia pyrifolia* has an extent of occurrence (EOO) of 90 776 km², an area of occupancy (AOO) of 76 km², and 15 locations with respect to the most plausible threat of fire. It occurs within the protected areas of Andohahela, Andringitra, Ankaratra-Manjakatempo, Corridor forestier Ambositra-Vondroza, Ivohibe, Marojevy, Ranomafana, Tsaratanana. Being widespread and occurring in many protected areas, *H. pyrifolia* is assessed as “Least Concern” [LC] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar. Analamanga Region [Prov. Antananarivo]: Manjakandriana, [18°55'S, 47°49'E], IV.1906, fl. & im. fr., *Alleizette 809M* (P[P02397487]); Angavokely, [18°55'S, 47°46'E], X.1960, fl., *Bosser 14535* (MO, TAN); gorges de la Mandraka, [18°54'S, 47°55'E], 1000–1400 m, 16.VIII.1924, m. fr., *Humbert & Perrier de la Bathie 2297* (P[P02397502]); Angavokely, [18°50'S, 47°42'E], 20.X.1960, 1700 m, fl. & im. fr., *Leandri 3239* (P[P02397507]). — Anosy Region [Prov. Toliara]: Massif de l'Andohahelo, [24°42'S, 46°44'E], 1200–1800 m, 18–26.X.1928, fl., *Humbert 6100* (P[P02397499]). — Amoron'i Mania Region [Prov. Fianarantsoa]: Ambositra, [20°31'S, 47°15'E], 16.XI.1938, fl., *Decary 13562* (P[P02397491]); Ambohimombo forest, [20°42'30"S, 47°25'30"E], 1350–1440 m, 26.XII.1894, *Forsyth-Major 353* (P[P02397490]). — Atsimo-Atsinanana Region [Prov. Fianarantsoa]: Haute vallée de la Rienana (bassin du Matitanana), [22°14'30"S, 47°07'30"E], 1000–1400 m, 18.XI.1924, fl., *Humbert 3469* (G, P[P02397500]). — Diana Region [Prov. Antsiranana]: Massif du Tsaratanana (Réserve naturelle n° 4), [14°02'S, 48°58'E], 2600 m, XI–XII.1937, fl. & m. fr., *Humbert 18394* (P[P02397498]); *ibid. loco*, 2300–2875 m, XI–XII.1937, fl., *Humbert 18468* (P[P02397496]); *ibid. loco*, 14°08'47"S, 48°58'22"E, 2450 m, 16.X.2001, bud & fl., *Lowry et al. 5375* (G, K[K000662061], MO, P[P02397505], TAN); *ibid. loco*, 16.VII.1954, bud, *Réserves Naturelles 6337* (G, MO, P[P04130326], TAN). — Haute Matsiatra Region [Prov. Fianarantsoa]: Parc national de Ranomafana, parcelle 1 à l'est de Vohiparara, au nord de la Route nationale 25, 21°14'S, 47°23'E, 1100–1200 m, 8–18.X.1993, fl., *Kotozafy 311* (MO, P[P00558048], TAN, US[US01832485]). — Ihorombe Region [Prov. Fianarantsoa]: Pic d'Ivohibe, [22°31'S, 46°57'E], 1500–2000 m, 05.XI.1924, fl., *Humbert 3275* (P[P02397501], TAN); Sendrisoa, Ambalavao, [22°13'30"S, 46°55'00"E], 9.X.1951, fl. & im. fr., *Réserves Naturelles 3484* (P[P02397504, P02397506], TAN). — Vakinankaratra Region [Prov. Antananarivo]: Manjakatempo, [19°22'S, 47°18'E], 25.X.1951, fl., *Benoist 1269* (P[P02397485], TAN); *ibid. loco*, 28.X.1951, *Benoist 1278* (P[P02397483]); *ibid. loco*, 23.X.1951, fl. & m. fr., *Benoist 1293* (P[P02397494]); *ibid. loco*, IX.1959, fl., *Bosser 13324* (TAN); *ibid. loco*, IX.1962, bud & fl., *Bosser 16566* (P[P02397493, P02397495], TAN); *ibid. loco*, 19°22'S, 47°16'E, 1550–2602 m, 20.IX.1993, fl., *Lewis & Razafimandimbison 603* (K, MO[MO-5815954], P[P00558037], TAN[TAN000980], US[US01832494]); Tsiafajavona, [19°21'S, 47°14'E], 2000 m, X.1921, fl. *Perrier de la Bathie 13935* (P[P02397503], TAN, US[US01832486]). — *Sine loco*: *Baron 4967* (P[P02397484]); *Campeon s.n.* (P[P02397492]).

DESCRIPTION

Leaves petiolate; leaf laminas 3.5–8 × 2.5–4 cm, lanceolate to elliptic, base obtuse to rounded or subcordate, apex acute to acuminate, margins subentire, remotely mucronate-denticulate or dentate, glabrous on both surfaces, venation pinnate (con-



Fig. 3. — Lectotype of *Senecio neoalleizettei* Humbert, Humbert 18479 (P00557630).

spicuous on both surfaces, including tertiary veins), rather coriaceous; petioles up to 0.8 cm long. Synflorescences axillary and terminal, thyrsoïd-paniculiform. Capitula sessile or subsessile; involucre rather cylindrical, glabrous except for some arachnoid trichomes near base; involucre bracts (3-)5, 2.1-3 × 0.7-1.1 mm; supplementary bracts 3-4, 0.7-1.6 mm long, ovate. Florets (3-)5, 2.8-3.9 mm long; corollas tubular, 5-lobed, whitish; anther bases caudate, a third as long as filament collar; style branches truncate with a crown of sweeping trichomes. Achenes *c.* 2 × 0.4 mm, rather cylindrical, *c.* 5-ribbed, glabrous, straw-coloured; pappus 2.6-3.9 mm long, whitish.

NOTES

This species is morphologically close to *Humbertacalia neoalleizettei* and *H. amplexifolia*, with which it shares the glabrous, rather coriaceous leaves and the involucre composed of five involucre bracts. From *H. amplexifolia*, it differs in having pedunculate leaves with obtuse to rounded or subcordate bases (vs subsessile leaves with amplexicaul to semi-amplexicaul bases in *H. amplexifolia*). The differences against *H. neoalleizettei* are explained above under this latter species.

The lectotype and the isolectotype at P of *Vernonia asclepiadea* contain mixed material of *Humbertacalia pyriformis* and *Conyza cf. bakeri* Humbert. The duplicates at G, however, are only composed of *Humbertacalia pyriformis*. In the protologue of *Vernonia asclepiadea*, Drake del Castillo (1899) remarked “Capitules [...] à dix ou quinze fleurs” [Capitula ... with 10 or 15 florets], which notably differs from the capitula of *Humbertacalia pyriformis* composed of *c.* five florets; such mismatch might be explained by a confusion of the author because of the mixed material.

9. *Humbertacalia racemosa* (Bojer ex DC.) C. Jeffrey (Fig. 5)

Kew Bulletin 47 (1): 83 (Jeffrey 1992).

Cacalia racemosa Bojer ex DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 6: 330 (Candolle 1838). — *Senecio exsertus* Sch. Bip., *Flora* 28: 499 (Schultz Bipontinus 1845), *nom. nov.*, non *Senecio racemosus* (M. Bieb.) DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 6: 358 (Candolle 1838). — Typus: Madagascar. Prov. Fianarantsoa, forêts de la province de Betsilau [Betsileo], 1835, fl., Bojer *s.n.* (holo-, G-DC[G00471391]!; iso-, P[P00557715, fragm.]!).

Cacalia leucopappa Bojer ex DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 6: 330 (Candolle 1838). — *Senecio leucopappus* (Bojer ex DC.) Humbert, *Mémoires de la Société linnéenne de Normandie* 25: 140 (Humbert 1923). — *Humbertacalia leucopappa* (Bojer ex DC.) C. Jeffrey, *Kew Bulletin* 47 (1): 83 (Jeffrey 1992), *comb. inval.* [Turland *et al.* 2018: ICN Art. 41.5] — *Humbertacalia leucopappa* (Bojer ex DC.) Pruski, *Phytoneuron* 2021-65: 19 (Pruski 2021), *syn. nov.* — Typus: Madagascar. Province Fianarantsoa, forêts de la province Betsilau, 1835, fl., Bojer *s.n.* (holo-, G-DC[G00471375]!; iso-, P[P00557670, fragm.]!) (Fig. 5).

Senecio exsertus var. *angustifolius* Humbert, *Notulae Systematicae* 15 (4): 371 (Humbert 1959), *syn. nov.* — Typus: Madagascar. Anosy Region [Prov. Toliara], massif du Beampingaratra (Sud-Est), col du Beampingaratra, 1350 m, 31.X-1.XI.1928, Humbert 6262 (holo-, P[P00835898]!).

ICONOGRAPHY. — Humbert (1963: 761, fig. 139, 14-15, sub *Senecio exsertus*).

ETYMOLOGY. — The epithet *racemosa* refers to the synflorescence type of this species, although it is strictly narrowly paniculiform rather than racemiform.

VERNACULAR NAMES. — Unknown.

DISTRIBUTION AND ECOLOGY. — *Humbertacalia racemosa* occurs in subhumid bioclimate, in central plateau, southeastern and eastern of Madagascar (Alaotra-Mangoro, Ihorombe and Vakinankaratra Regions). It grows in sclerophyllous woodland or remnant medium altitude moist evergreen forest, usually on hillsides, at elevations around 600 to 1800 m.

CONSERVATION STATUS. — *Humbertacalia racemosa* has an extent of occurrence (EOO) of *c.* 23 857 km², an area of occupancy (AOO) of 16 km², and four locations with respect to the most serious plausible threat of agriculture. Even though one subpopulation occurs within the protected area of Ankaratra-Manjakatempo, the species habitat of the other three subpopulations is threatened by agriculture, fire and logging; all of which will result in inferred continuing decline in its EOO, AOO, habitat quality, number of subpopulations, and number of the mature individuals. In addition, this species is only known from six old herbarium specimens, no recent collection is recorded. *Humbertacalia racemosa* is therefore assessed as “Endangered” [EN B2ab(i,ii,iii,iv,v)] according to IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar. Alaotra-Mangoro Region [Prov. Toamasina]: Ambatondrazaka, Onibe [17°50'S, 48°33'E], 1000 m, VIII.1938, fl., Cours 908 (P[P02397480]). — Ihorombe Region [Prov. Fianarantsoa]: Ifandana, Pce. de Farafangana, [22°49'S, 47°07'E], 6.IX.1926, fl., Decary 5222 (P[P02397479, P04391739]). — Vakinankaratra Region [Prov. Antananarivo]: Tsinjoarivo sur la colline du Rova, [19°37'S, 47°41'E], 8.X.1966, fl., Jacquemin H153J (P[P02397478]); Manjakatempo, [19°22'S, 47°18'E], fl., Service Forestier *s.n.* (TEF).

DESCRIPTION

Leaves petiolate; leaf laminae 4-8 × 2.2-3.5 cm, lanceolate to elliptic, base obtuse to rounded, apex acute, margins entire, glabrous on both surfaces, venation pinnate (conspicuous on both surfaces, including tertiary veins), rather coriaceous; petioles up to 1 cm long. Synflorescences axillary and terminal, narrowly thyrsoïd-paniculiform. Capitula pedunculate (peduncles 2-5 mm long); involucre campanulate, glabrous; involucre bracts 8(-9), 3.6-4 × 0.8-1.2 mm; supplementary bracts 4-6, 0.8-1 mm long. Florets *c.* 20, 3.9-4 mm long; corollas tubular, 5-lobed, whitish (somewhat purplish?); anther bases long-caudate, almost twice longer than filament collar; style branches obtuse with a crown of sweeping trichomes. Achenes *c.* 1.3 × 0.4 mm (immature), rather cylindrical, glabrous, straw-coloured; pappus *c.* 4.2 mm long, whitish.

NOTES

The name *Cacalia leucopappa* Bojer ex DC. has widely been misinterpreted, probably due to the species concept established by Humbert. According to Humbert (1923, 1963), this species displays mostly sessile capitula arranged in subglobose glomerules; collections cited by him as *Forsyth Major 56* and *Humbert & Capuron 25733* perfectly fit with such morphology. This is in contrast to

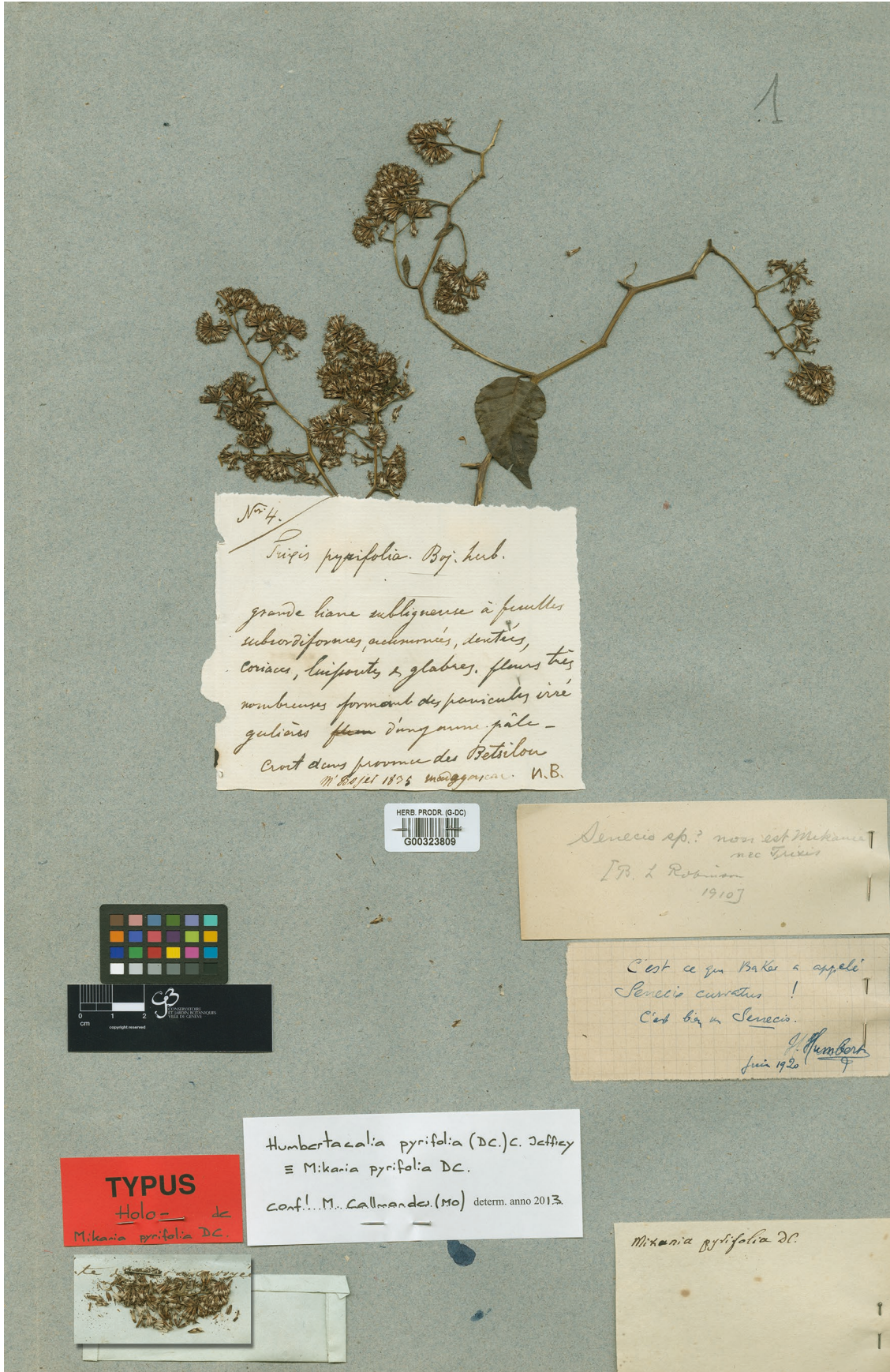


FIG. 4. — Holotype of *Mikania pyrifolia* Bojer ex DC., Bojer s.n. in G-DC (G00323809; © Herbar, Conservatoire et Jardin botanique de Genève, reproduced with permission).

the information provided in the protologue by Candolle (1838) based on the type (*Bojer s.n.*, forêts de la province de Betsilau [Betsileo], 1835), where the capitula are described as follows: “paniculae ramis racemosis, pedicellis capitulo brevioribus bracteolas subulatas gerentibus”. The type material shows, indeed, synflorescences racemiform composed of pedunculate capitula, where the distal ones are solitary and the proximal ones are arranged in groups of 2-3 that, in turn, are shortly pedunculate (Fig. 5). The peduncles bear a few linear, 1.5-2.5 mm long bracteoles (sometimes only one at the base). These characters do not support Humbert’s concept of *C. leucopappa*, but perfectly match those of *C. racemosa*. In fact, Candolle stated at the end of the protologue of *C. leucopappa*: “Valdè affinis *C. racemosae* sed folia 2 ½ poll. longa. pollicem lata. Cor. flavidae in specim. juniores”. Comparing both protologues, one realizes that they are very similar in describing the leaf venation, the synflorescence type, the bracteoles, the involucre bract number, and the floret number, only slightly differing in leaf size and floret color. The difference regarding leaf size is not significant considering that the type specimen of *C. racemosa* lacks lower cauline leaves, which usually decrease in size towards the synflorescences (by contrast, note that the single leaf in the holotype of *C. leucopappa* is not attached to the synflorescence and most probably corresponds to a cauline leaf). Likewise, the dissimilarity in floret color (purplish in *C. racemosa* vs yellowish in *C. leucopappa*) might be explained by a confusion. A collection of *C. racemosa* (*Cours 908*) clearly indicates that the styles and anthers are yellow and the corollas are white, which might have led Bojer to wrongly describe the corollas as yellowish. On the other hand, it is not rare that whitish corollas take certain purple hues depending on the phenological state. Finally, it is interesting that the two specimens come from the same region, i.e., “forêts de la province de Betsilau” [forests of Betsileo Province]. For all these reasons, *C. racemosa* and *C. leucopappa* are considered the same taxonomic entity. *Cacalia leucopappa* is synonymized with *C. racemosa* because the traditional usage of this latter name preserves the species concept intended by Candolle.

Humbertacalia racemosa can be distinguished by the combination of the following characters: leaves glabrous with conspicuous venation on both surfaces, capitula pedunculate, involucre bracts 8(-9), 3.6-4 mm long, and c. 20 florets. It shows morphological affinities with *H. abbreviata* comb. nov., stat. nov. (see comments under this latter species). The collection *Miller & Randrianasolo 4392* (MO, P, TAN) matches well the characters of *H. racemosa* except for its leaves with inconspicuous venation. Additional collections are needed to confirm its placement under this species or if, otherwise, it deserves to be treated as a distinct taxon.

The name *Senecio exsertus* var. *angustifolius* based on *Humbert 6262* shows an overall similar morphology as *Humbertacalia racemosa* and is here placed under the latter species.

10. *Humbertacalia tomentosa* (Lam.) C. Jeffrey (Fig. 6)

Kew Bulletin 47 (1): 83 (Jeffrey 1992).

Eupatorium tomentosum Lam., *Encyclopédie méthodique, Botanique* 2: 410 (Lamarck 1786). — *Eupatorium auriculatum* Vahl, *Symbolae Botanicæ* 3: 95 (Vahl 1794), *nom. illeg.* (Turland *et al.* 2018: ICN Art. 52.1, 53.1), non *Eupatorium auriculatum* Lam., *Encyclopédie méthodique, Botanique* 2: 411 (Lamarck 1786). — *Mikania tomentosa* (Lam.) Willd., *Species Plantarum [Willdenow]* 3 (3): 1744 (Willdenow 1803). — *Cacalia penicillata* Cass., *Dictionnaire des Sciences naturelles (ed. 2)* 48: 460 (Cassini 1827), *nom. nov.*, non *Cacalia tomentosa* Jacq., *Florae Austriacæ* 3: 20 (Jacquin 1775). — *Senecio penicillatus* (Cass.) Sch. Bip., *Flora* 28: 499 (Schultz Bipontinus 1845), non *Senecio tomentosus* Salisb., *Prodromus Stirpium in Horto ad Chapel Allerton*: 196 (Salisbury 1796). — *Senecio tomentosus* (Lam.) Cordem., *Flore de l’Île de la Réunion*: 543 (Cordemoy 1895), *nom. illeg.* [ICN Art. 53.1], non *Senecio tomentosus* Salisb. (Salisbury 1796). — Typus: **Réunion**. Isle de Bourbon, VIII.1771, *Commerçon s.n.* (lecto-, designated here, P-LA[P00308911]!; isolecto-, C[C10007936 image]!, MPU[MPU011692, MPU011693, MPU011694, MPU023482 images]!), P[P00150817, P00150818, P00150819]!), P-LA[P00308910, P00308912]!).

Senecio concolor Cordem., *Flore de l’Île de la Réunion*: 543 (Cordemoy 1895), *nom. illeg.* [ICN Art. 53.1]. — Typus: **Réunion**. Grand Tampon, s.d., *Frappier?* (lecto-, designated here, MARS[MARS090691 image]!).

Senecio penicillatus var. *glabrescens* Humbert, *Mémoires de la Société linnéenne de Normandie* 25: 141, 306 (Humbert 1923). — *Senecio penicillatus* subvar. *glabrescens* (Humbert) Humbert, *Flore de Madagascar et des Comores* 189 (3): 768 (Humbert 1963), *syn. nov.* — Typus: **Madagascar**. Analamanga Region [Prov. Antananarivo], Angavo à l’E de Tananarive, [18°55’S, 47°46’E], 1500 m, VIII.1914, fl., *Perrier de la Bâthie 3376* (lecto-, designated here, P[P00557619]!; isolecto-, P[P00557620]!, TAN[TAN000173]!). — Vakinankaratra Region [Prov. Antananarivo], versant E du Mt Tsiarafavona, [19°21’S, 47°14’E], 2000 m, IX.1921, fl., *Perrier de la Bâthie 13934* (syn-, P[P00557621, P00557622, P00557623]!).

ICONOGRAPHY. — Vahl (1794: tab. LXXII, sub. *Eupatorium auriculatum*); Humbert (1963: 761, fig. 139, 16-17, sub *Senecio penicillatus*); Jeffrey (1993: 135, pl. 44).

ETYMOLOGY. — The epithet *tomentosa* refers to the whitish lanate indumentum that this species has on the abaxial leaf surfaces.

VERNACULAR NAMES. — “Herbe à bouc” (Lamarck 1786); “petite liane blanche” (Cordemoy 1895); “liane des lylas” (*Commerçon s.n.*, *Lin* 167).

DISTRIBUTION AND ECOLOGY. — *Humbertacalia tomentosa* is known from Madagascar and the island of Réunion. In Madagascar, it is found in subhumid and montane bioclimates of the high plateau, mostly in sclerophyllous woodland, highland remnant medium altitude moist evergreen forest, and inselbergs, at elevations of 1200-2300 m, while in Réunion, it occurs in forests at 100-1800 m elevation.

CONSERVATION STATUS. — *Humbertacalia tomentosa* has an extent of occurrence (EOO) of 210 137 km², an area of occupancy (AOO) of 52 km², and 12 locations on Madagascar with respect to the most serious plausible threat of fire. It occurs in the protected areas of Ankaratra-Manjakatempo and Andringitra in Madagascar. Based on current information available, *H. tomentosa* is thus assessed as “Near Threatened” [NT] according to IUCN Red List Categories and Criteria (IUCN 2012).

Humbertacalia tomentosa is listed as “Least Concern” [LC] in Réunion (Picot 2010).



FIG. 5. — Holotype of *Cacalia leucopappa* Bojer ex DC. in G-DC: **A**, zoom in of the synflorescence branches; **B**, annotations on the verso of the label in Bojer's hand. (G00471375; © Herbar, Conservatoire et Jardin botanique de Genève, reproduced with permission).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar.** Amoron'i Mania Region [Prov. Fianarantsoa]: environs d'Ambositra, mont Vatomavy, [20°27'S, 47°07'E], 1500-1870 m, 23.VII.1928, fl., *Humbert & Swingle 4796* (P); Antety près Ambositra, [20°32'S, 47°13'E], 1600 m, V.1912, fl., *Perrier de la Bâthie 2945* (P). — Analamanga Region [Prov. Antananarivo]: Tampoketsa d'Ankazobe, [18°19'S, 47°06'E], 10.VIII.1939, fl., *Decary 14962* (P). — Haute Matsiatra Region [Prov. Fianarantsoa]: Andringitra National Park, 22°09'19"S, 46°56'41"E, 1750 m, 26.V.2004, fl., *Rogers 679* (MO, TAN); Ialatsara (Ambositra), [21°04'S, 47°12'E], VIII.1953, fl., *Bosser 6256* (P); *ibid. loco*, fl., *Bosser 6257* (TAN[TAN000978]); *ibid. loco*, fl., *Bosser 6258* (MO, TAN); Andringitra, district d'Ambalavao, au pied du Tzorana, [22°13'S, 46°55'E], 2300 m, 10.V.1957, fl., *Cours 5181* (P, TAN); Mont Belambana (sud Betsileo) entre les bassins du Mananara et du Mangoky, [21°50'S, 46°56'E], 1200 m, 1911, *Perrier de la Bâthie 2961* (P, TAN); RN 5, canton Sendrisoa, district Ambalavao, [22°13'S, 46°55'E], 05.VI.1951, fl., *Réserves Naturelles 3062* (P, TAN). — Vakinankaratra Region [Prov. Antananarivo]: Massif de l'Ankaratra, flanc oriental du Tsiarafajavona, restes de forêt à Manjakatomp, [19°22'S, 47°18'E], 1700-2000 m, 15.VII.1928, fl., *Decary et al. 4535* (G, K[K000377691], P[P04391736]). **Réunion.** Benoune, riv. des Pluies, [20°56'S, 55°30'E], 100 m, VII.1945, fl., *Rivals s.n.* (P[P03276421]); forêt de La Nouvelle près du col de Fourche, [21°04'S, 55°26'E], 1800 m, V.1945, fl. & fr., *Rivals s.n.* (P[P03276419]); forêt des Hauts de la Raudes Lataniers, [21°02'S, 55°23'E], V.1943, bud, *Rivals s.n.* (P[P03276420]); Le Tampon, sentier botanique de Notre-Dame-de-la-Paix, southern portion of trail closest to the ridge, 21°15'58"S, 055°36'06"E, 1695 m, 1.IX.2021, *Ah-Peng & Wilding 416* (G); trail from Le Brulé to La Roche Ecrite, 1400 m, 23.VII.1961, *St. John 26523* (G); [wrongly indicated from Cape of Good Hope], s.d., *Ecklon s.n.* (G); Isle de Bourbon Cton. Lam. Dct., s.d., bud & fl., *Lin 167* (MPU[MPU011692, MPU011693, MPU011694]); Bourbon, 1820, *Perrottet s.n.* (G).

DESCRIPTION

Leaves petiolate; leaf laminae 4-8 × 2-5.2 cm, ovate to elliptic-lanceolate, base cordate to rounded (sometimes truncate), apex acute to acuminate, margins remotely mucronate (entire in overall appearance) to irregularly and shallowly dentate, glabrescent on adaxial surface (usually initially arachnoid), arachnoid to whitish-lanate on abaxial surface (rarely quickly deciduous), venation palmately 3-5-veined (conspicuous on abaxial surface), rather chartaceous; petioles up to 2.5 cm long, with reduced or well-developed suborbicular auricles. Synflorescences axillary and terminal, thyrsoïd-paniculiform to narrowly thyrsoïd-paniculiform (spiciform). Capitula sessile; involucre rather cylindrical, arachnoid at base; involucre bracts 5-8, 2.2-3(-3.7) × 0.6-1.2 mm; supplementary bracts 3-6, 0.5-1.7 mm long. Florets 5-10, 2.9-3.5 mm long; corollas tubular, 5-lobed, whitish; anther bases caudate, a half to as long as filament collar; style branches penicillate (tuft 0.25-0.3 mm long, rarely absent). Achenes 1.7-2.3 × 0.5-0.6 mm, rather cylindrical, 5-6-ribbed, pubescent to sparsely pubescent (trichomes *c.* 0.25 mm long), straw-coloured; pappus 2.2-3.8 mm long, whitish (Fig. 6).

NOTES

Humbertacalia tomentosa is characterized by having palmately veined leaves, usually whitish-lanate indumentum on the abaxial leaf surfaces, and pubescent achenes. It is

the only member of the genus displaying penicillate style branch apices, with the tuft of longer trichomes reaching 0.25-0.3 mm long (rarely absent). It is a variable species concerning the leaf shape, which can be ovate with cordate bases to elliptic-lanceolate with rounded to truncate bases, as well as in regard to the leaf margins that vary from remotely mucronate (entire in overall appearance) to irregularly and shallowly dentate. Some specimens display well-developed leaf auricles (e.g. *St. John 26523*) but in other specimens these appear to be much reduced or almost absent (e.g. *Ecklon s.n.*).

Humbert (1963) recognized the plants from Réunion as *Senecio penicillatus* subvar. *penicillatus* (homotypic synonym of *Humbertacalia tomentosa*), a taxon that is also recorded from Madagascar (e.g. *Perrier de la Bâthie 2961*) and that he differentiated from *Senecio penicillatus* subvar. *glabrescens* by the higher density of the indumentum on the abaxial leaf surfaces. The multiple intermediate forms between both taxa did not allow him to separate them at a higher rank (Humbert 1963: 768). He also stated that some specimens from Réunion were characterized by having 5-6 involucre bracts with 5-6 florets, but were otherwise identical to the Malagasy populations with usually *c.* 8 involucre bracts and *c.* 10 florets. In Madagascar, there are certainly some specimens with very sparse arachnoid trichomes on the abaxial leaf surfaces (e.g. *Perrier 13934*), but the typical forms are also found (e.g. *Cours 5181*). As Humbert, we also studied several intermediate forms (e.g. *Humbert & Swingle 4796*). This, together with the fact that we did not find any other difference, makes unadvisable recognizing more than a single taxon.

P-LA harbours three specimens of *Eupatorium tomentosum*. The specimen P00308911 is the only one that bears a label with the provenance of the material ("isle de bourbon") and the collector name ("Commerson."); P00308910 lacks any label; and P00308912 indicates Commerson as the collector but Brazil as the origin of the material, which is clearly a mistake because this species is not known in this country. Because of the similar phenology and the overall preservation conditions of the material, the three specimens are considered as belonging to the same collection, as well as several specimens that are kept in the general herbarium of P and MPU. The specimen P00308911 from P-LA is therefore designated as the lectotype.

Vahl's name *Eupatorium auriculatum* was treated as a heterotypic later synonym of *E. tomentosum* and the specimen at C (C10007936) was indicated as the holotype of the name (Jeffrey 1993). In our opinion, this specimen is a duplicate of the Commerson collection from 1771 although no label explicitly indicates that. The fact that Vahl indicated that the provenance of the plant was "Brasilia", as it appears on one of the specimens in P-LA, reveals that it most probably originated from P. The specimen may have reached C through A. Thouin (1747-1824), who sent other Commerson's collections from Réunion to Vahl such as the original material of *Cacalia reticulata* Vahl (1794: 91). It is known that considerable numbers of Commerson's

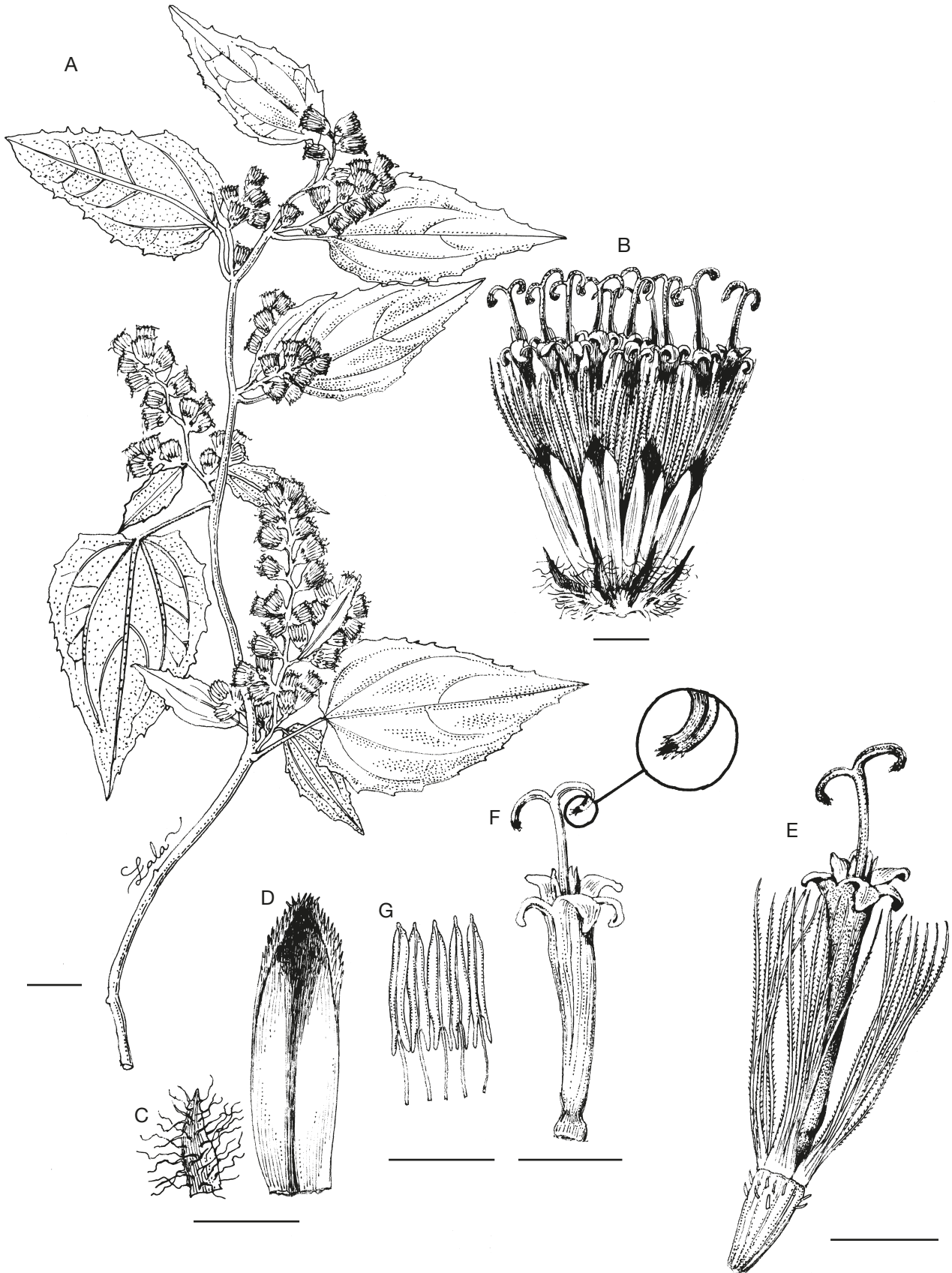


FIG. 6. — *Humbertacalia tomentosa* (Lam.) C. Jeffrey (Rogers 679, TAN): **A**, habit; **B**, capitulum; **C**, supplementary bract; **D**, involucre bract; **E**, floret; **F**, floret with style branch apex detail (ovary and pappus removed); **G**, anthers. Scale bars: A, 1 cm; B-F, 1 mm. Drawings: Roger Lala Andriamiarisoa.

duplicates were sent from P to several European herbaria (Stafleu & Cowan 1976). Here, *Eupatorium auriculatum* Vahl [1794] and *E. tomentosum* Lam. [1786] are treated as homotypics, the former being illegitimate on account both of its superfluity and for being a later homonym of *E. auriculatum* Lam. [1786].

In the protologue of *Senecio concolor*, Cordemoy cited a Frappier specimen from “Grand Tampon” and also indicated that the plant was found by himself in “Rivière Saint-Denis” (both in Réunion), though it remains unclear if material from the latter locality was collected or not. The single specimen of *S. concolor* originating from Cordemoy’s personal herbarium we found is kept at MARS and bears a label where both localities are indicated and no collector specified. Jeffrey (1993) considered this specimen as a syntype, which seems appropriate considering the ambiguity of the protologue and that other collections may exist as the whereabouts of Cordemoy’s herbarium are poorly known (Stafleu & Cowan 1976). In pursuit of establishing the usage of this name, we here lectotypify *S. concolor* on the MARS specimen.

Humbert (1923) described *Senecio penicillatus* var. *glabrescens* on the basis of the syntypes *Perrier de la Bâthie* 3376 and 13934, which separated from the typical variety by the laxer arachnoid indumentum on both leaf surfaces. The collection 3376 is taxonomically informative and consists of three specimens kept in two different herbaria. The specimen P00557619 is accordingly designated as the lectotype of the name *S. penicillatus* var. *glabrescens*.

Finally, it is interesting to note that the name *Cacalia cuspidata* Klatt was included in the synonymy of *Humbertacalia tomentosa* by Jeffrey (1993), who did not study the type material. We also failed in locating it, but according to Cordemoy (1895: 544) we believe that the original description does not fit well with the concept of *H. tomentosa*. Therefore, the name *Cacalia cuspidata* is, for the time being, excluded from the synonymy of this species.

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