

# A revision of *Octolepis* Oliv. (Thymelaeaceae, Octolepidoideae)

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## KEY WORDS

Thymelaeaceae,  
Octolepidoideae,  
*Octolepis*,  
Africa,  
Madagascar,  
conservation,  
new species.

## ABSTRACT

A taxonomic revision of *Octolepis* Oliv. (Thymelaeaceae) based on morphology is presented. Six species are recognized. The sole continental African species, *O. casearia* Oliv., is the only member of sect. *Octolepis*; the five other species, all from Madagascar, are placed in the new sect. *Dioicae*. Two varieties are recognized for *O. casearia* (var. *casearia* and *flamigniï*); *O. decalepis* Gilg is placed formally into synonymy for the first time under *O. casearia*. Three of the five species of sect. *Dioicae* are described as new (*O. aymoniniana*, *O. ibityensis*, and *O. ratovosonii*); *O. dioica* Capuron f. *oblanceolata* Capuron is raised to the rank of species. This revision includes full descriptions, illustrations of new species, identification keys, and conservation assessments for each taxon.

## RÉSUMÉ

Révision d'*Octolepis* Oliv. (Thymelaeaceae, Octolepidoideae).

Une révision taxonomique d'*Octolepis* Oliv. (Thymelaeaceae) basée sur la morphologie est présentée. Six espèces sont reconnues. La seule espèce inféodée au continent africain, *O. casearia* Oliv., est l'unique membre de la sect. *Octolepis*; les cinq autres espèces de Madagascar sont placées dans une nouvelle sect. *Dioicae*. Deux variétés sont reconnues au sein de *O. casearia* (var. *casearia* et *flamigniï*); *O. decalepis* Gilg est formellement mis en synonymie sous *O. casearia* pour la première fois. Trois des cinq espèces de la sect. *Dioicae* sont nouvellement décrites (*O. aymoniniana*, *O. ibityensis* et *O. ratovosonii*); *O. dioica* Capuron f. *oblanceolata* Capuron est élevée au rang d'espèce. Cette révision inclut des descriptions complètes, des illustrations des nouvelles espèces, des clés d'identification et des estimations du statut de conservation pour chaque taxon.

## MOTS CLÉS

Thymelaeaceae,  
Octolepidoideae,  
*Octolepis*,  
Afrique,  
Madagascar,  
conservation,  
nouvelles espèces.

## INTRODUCTION

Thymelaeaceae are a cosmopolitan family composed of about 40-45 genera and 700-800 species (MABBERLEY 1997; HERBER 2003). Molecular studies utilizing *rbcL* (ALVERSON *et al.* 1998; FAY *et al.* 1998; SAVOLAINEN *et al.* 2000) and combined chloroplast and *atpB* sequence data (BAYER *et al.* 1999) suggest that Thymelaeaceae are one of the basal families of the order Malvales Dumort. WURDACK & HORN (2001), on the basis of 18S *rDNA*, *atpB* and *rbcL* sequence data, found that Thymelaeaceae are sister to *Tepuianthus* Maguire & Steyerf. (= Tepuianthaceae Maguire & Steyerf.), a genus almost entirely restricted to the “*tepuis*” (flat-topped sandstone mountains) of Venezuela and adjacent regions of Brazil and Colombia. HORN (2004) provides a detailed discussion regarding the relationship of Octolepidoideae to *Tepuianthus*.

Based on new morphological and palynological data, HERBER (2002, 2003) adjusted the limits of the subfamilial groups within Thymelaeaceae, resulting in the recognition of two subfamilies, Octolepidoideae Gilg (= Gonystylidae Tiegh. + *Octolepis* Oliv.; 8 genera, *c.* 50 spp.), and Thymelaeoideae Burnett (37 genera, *c.* 750 spp.). Subfamily Octolepidoideae is clearly distinguished morphologically from Thymelaeoideae by its short or non-tubular flower, 3-12 carpellate gynoeceum, capsular fruit, and non-crotonoid exine pattern of the pollen grain (HERBER 2002, 2003). HERBER (2003) further subdivided Octolepidoideae into two informally ranked groups. The *Octolepis* group differs from the *Gonystylus* group by straight, peltate, or reflexed (vs horse-shoe-shaped) anthers, a straight (vs contorted) style, the pubescent (vs glabrous) seed coat, striate (vs uniform) endotegmen, copious (vs absent) endosperm, and flat (vs thickened) cotyledons. The group is composed of *Octolepis*, a small genus of shrubs to medium-sized trees in continental Africa and Madagascar, and four other genera, endemic to New Caledonia and Australia (Queensland and Northern Territory), namely *Arnhemia* Airy Shaw (1 sp.), *Deltaria* Steenis (1 sp.), *Lethedon* Spreng. (*c.* 15 spp.), and *Solmsia* Baill. (2 spp.).

*Octolepis* is distinguished from other genera in Octolepidoideae by a unique suite of morpholog-

ical characters, including imbricate aestivation of the sepals, straight filaments in flower bud, (8) 10 (12) (20) stamens, basifixed anthers, and 3-6 locular ovaries. Basifixed anthers are probably a synapomorphy of the genus according to HERBER (2003).

The taxonomy of *Octolepis* has never been revised and species limits within the genus have been particularly unclear. This revision specifically addresses the taxonomic problems associated with the continental African taxa (the *Octolepis casearia* species complex) and the Malagasy taxa (the *Octolepis dioica* complex).

## TAXONOMIC HISTORY OF *OCTOLEPIS*

OLIVER (1865) first described *Octolepis* based on a single species from Nigeria (*O. casearia* Oliv.). Over the course of the next 50 years, several authors published seven additional names in *Octolepis* for taxa with types from the adjacent tropical African countries of Cameroon, Democratic Republic of the Congo (Kinshasa), Gabon, Ivory Coast, and Liberia. GILG (1899) was responsible for publishing four of those names, each based on only one or two specimens. He distinguished his species by single characters, such as leaf shape and size, acumen length, number of secondary veins, and flower meristicity (4- vs 5-merous flowers). The large amount of morphological plasticity in these characters, in addition to the lack of sufficient material at the time the species were described, led later authors (AYMONIN 1966a, b; ROBYNS 1975) to consider nearly all species of the *O. casearia* complex to be synonymous with *O. casearia*. Most authors have recognized a second species of *Octolepis* in Africa, (*O. decalapis* Gilg) because of its (almost) always 5-merous flowers.

CAPURON (1963) described a single dioecious species of *Octolepis* (with three forms) from Madagascar, named *Octolepis dioica* Capuron; African *Octolepis* are monoecious and have bisexual flowers. The genus has rarely been mentioned in the literature since the description of *O. dioica*.

Dioecy, or at least partial dioecy (e.g., gynodioecy or functional dioecy), has been recorded in both subfamilies of Thymelaeaceae, and in

14 genera, including *Lethedon* and *Solmsia* (HERBER 2003). These two genera may also be the most closely-related genera to *Octolepis* based on morphology (HERBER 2002, 2003) and a preliminary molecular analysis (WURDACK unpubl. data).

## MATERIALS AND METHODS

This revision is based on morphological data gathered from herbarium specimens examined from the following institutions: A, B, BM, BR, F, G, GH, K, MA, MO, NY, P, TAN, TEF, US, WAG. Because Malagasy material was poorly known and under represented in herbaria, several months were spent observing the species *in situ* and collecting additional material. After two periods of collection at different times of the year (January-March 2003 and March-July 2004), fertile material was collected for representatives of four of the five Malagasy species recognized in the revision. I was unable to find *O. aymoniniana* Z.S.Rogers in the field.

Descriptive terminology follows STEARN (1992). Measurements are taken from fertile specimens. Flower width was determined by measuring the distance between opposing sepal tips laid flat. The number of petals in the flowers of *Octolepis* has been interpreted differently by authors. This confusion is caused by whether or not the petals are truly divided almost entirely to the base, making them bifid and typically double the number of sepals, or not divided at all, and equal to the number of sepals. I have found various degrees of fusion at the base of the petal lobes in both African and Malagasy species, but have most often observed fusion of two adjacent lobes *c.* 1 mm from the receptacle. Petals are described as bifid in the remainder of the paper.

Keys are intended for use with fertile material. Several Malagasy collections made from low and mid-elevation forests, areas where *Octolepis* has rarely been recorded, exhibit somewhat different morphology from the species enumerated below. This material has been excluded from the descriptions and specimen citation, but these specimens are discussed under either *O. dioica* and *O. oblanceolata*, where they would be identified using the key to species.

Complete collection data for cited exsiccatae and photos of types and other representative specimens are posted on the W<sup>3</sup> TROPICOS database at: <http://mobot.mobot.org/W3T/Search/vast.html/>. Coordinates and elevations of collecting localities in mainland Africa were assigned *post-facto*, when necessary, using several on-line gazetteers and paper maps; Malagasy collections lacking coordinates and elevations were assigned with the "Gazetteer to Malagasy Botanical Collecting Localities" (SCHATZ & LESCOT 2005: <http://www.mobot.org/MOBOT/Research/madagascar/gazetteer/>). *Post-facto* coordinates and elevations are enclosed by square brackets in the text. The distribution maps were created using ArcView GIS (version 3.2a); distributions of the Malagasy species are mapped over the five simplified bioclimatic zones of Madagascar (SCHATZ 2000 following CORNET 1974). Conservation status for each species is provisionally assigned based on the *Red List Categories and Criteria version 3.1* (IUCN 2001).

The species concept and criteria (i.e. the way the species are recognized) follow those proposed in ROGERS (2004). Unlike that study, however, infraspecific taxa (*viz.* two varieties) are recognized by a single consistent morphological character difference coupled with a slightly allopatric distribution.

## SYSTEMATICS

### OCTOLEPIS Oliv.

J. Linn. Soc. Bot. 8: 161, t. 12 (1865).

*Makokoa* Baill., Bull. Mens. Soc. Linn. Paris 1: 619 (1886). — Type: *Makokoa congolana* Baill.

TYPE. — *Octolepis casearia* Oliv.

Shrubs or trees; plants monoecious (Africa) or dioecious (Madagascar); bark longitudinally striate, sometimes lenticellate. Leaves alternate or opposite, often discolorous, caducous or persistent on mature stems, estipulate; leaf blades glabrous adaxially, sparsely covered with inconspicuous adpressed indument abaxially or glabrescent (trichomes *c.* 0.5-1 mm long), margin

TABLE 1. — Morphological differences in *Octolepis* between sect. *Octolepis* and sect. *Dioicae*.

Character	Sect. <i>Octolepis</i>	Sect. <i>Dioicae</i>
Sexual system	monoecious	dioecious
Habit	shrubs 2-4 m tall, rarely trees to 7 m tall	trees to 20 m tall
Leaves	persistent	caducous
Inflorescence position	lateral or sublateral, borne on foliated stems	axillary, usually borne on defoliated stems
Inflorescence type	compact racemose axes (often elongating into spurs)	fasciculate
Petal orientation	erect	adpressed to sepals
Petal lobe shape	broadly oblong	narrowly triangular
Lobe length/width ratio	c. 1-1.5:1	c. 4-7:1
Petal lobe apex	broadly truncate or rounded	acute, rounded at tip
Petal indument	tomentose or tomentose-strigose	strigose
Petal trichome orientation	no particular direction	toward receptacle
Pericarp	dry, thin, smooth	fleshy, thick, rugose or rugulose

entire,  $\pm$  revolute; midrib grooved adaxially, raised abaxially; venation brochidodromous; fine venation reticulate; leaf buds conduplicately folded, covered with dense indument; petioles grooved adaxially, articulate, drying darker than midrib. Inflorescences axillary and fasciculate (Malagasy species), or lateral (or sublateral) and borne on short woody compact racemose axes (African species); inflorescence bracts absent; pedicels articulate. Flowers white, small, bisexual or unisexual; staminate and pistillate flowers of similar size and shape; floral tube absent; sepals 4-6, imbricate, reflexed or spreading, rarely erect, persistent in fruit; petals scale-like, 4 or 5 (10), bifid, divided nearly to base, adnate to receptacle, persistent in fruit; stamens twice the number of petals, (8) 10 (12) (20), straight in bud,  $\pm$  inserted in a single whorl, persistent in fruit; anthers oblong, introrse, basifixed. Staminate flowers with a minute pistillode; pistillode obscured by many erect receptacle trichomes. Pistillate flowers with (8) 10 (12) (20) persistent staminodes; rudimentary anthers globose or undifferentiated; subgynoecial disc absent; gynoecium 3-6-carpellate, sessile; carpels uniovulate; ovary superior, usually one to several locules aborting, densely pubescent, surrounded by many erect receptacle trichomes; ovules minute, anatropous, pendulous; style terminal, straight, persistent; stigma globose, lobed, papillate. Fruits green-yellow or white (*O. casearia*), loculicidal capsules, subspheroidal to ovoid-pyramidal, developed carpels

producing longitudinal lines of dehiscence; dehiscence lines depressed or  $\pm$  plane, often bicarinate on both sides of line; pericarp dry and thin, or fleshy and thicker. Seeds brown or black, ovoid, triangular or circular in cross section, edges rounded, adaxial side often costate, curved, abaxial side costate, other sides curved or  $\pm$  flat; seed coat crustaceous, thin, outer epidermis puberulent, indument red-orange, denser near poles, inner epidermis finely striate; endosperm copious; cotyledons longitudinally curved, thin (c. 0.5-1.5 mm thick).

#### INFRAGENERIC CLASSIFICATION OF *OCTOLEPIS*

*Octolepis casearia*, the continental African species, differs significantly from the Malagasy taxa by a number of vegetative, floral, and fruit characters (Table 1). The petals of *O. casearia* (Fig. 1A, B) have an obvious papillate surface sculpturing. In *O. dioica* (Fig. 1C), the petals are also papillate, but the sculpture pattern is rarely evident because of the dense indument covering the lobes. Petal indument in *O. casearia* is always tomentose or tomentose-strigose, usually concentrated along the margin and apex of the lobes, and the trichomes are not oriented in a particular direction. The petal indument of *O. dioica* is representative of the other Malagasy species and is characterized as strigose (never tomentose) on both surfaces with the individual trichomes always oriented toward the receptacle (receptacle located just outside the bottom of the

frame in Figure 1C). Populations of African and Malagasy *Octolepis* are separated geographically by *c.* 3000 km.

In addition to the substantial morphological and geographical differences, these two groups form distinct monophyletic lineages. Combined *rbcl* and *trn-F* sequence data taken from the five recognized Malagasy species, both varieties of *O. casearia*, and a sample of *O. decalepis* (*sensu* Gilg), indicate that each group is monophyletic with 99% bootstrap support (WURDACK unpubl. data).

Based on these strong lines of supporting evidence, the following infrageneric classification for *Octolepis* is proposed, to stress the significant differences between these two groups. Two sections are recognized here: sect. *Octolepis* (the sole continental African species, *O. casearia*) and sect. *Dioicae* Z.S.Rogers (the five Malagasy species).

### *Octolepis* Oliv. sect. *Octolepis*

TYPE. — *Octolepis casearia* Oliv.

Monoecious shrubs, rarely small trees; bark usually lenticellate. Leaves alternate, persistent on mature stems, apex usually not aborting. Inflorescences lateral or sublateral, borne on the foliated portion of the stems; axes compact, racemose, elongating with up to *c.* 30 flowers per inflorescence. Flowers bisexual; sepals spreading or reflexed; petals 4 or 5, rarely 6; petal lobes broadly oblong, length/width ratio *c.* 1-1.5:1, erect, apex truncate or rounded; stamens 8 or 10. Fruits white, dry, dehiscence lines  $\pm$  plane, not carinate on side of dehiscence lines; pericarp < 2 mm thick, smooth when dry. Seeds with cotyledons *c.* 0.5(-1) mm thick [plants of continental Africa].

### *Octolepis* Oliv. sect. *Dioicae* Z.S.Rogers, sect. *nov.*

TYPE. — *Octolepis dioica* Capuron.

*Haec sectio a sectione Octolepide speciebus monoiciis (nec dioiciis), habitu plerumque fruticoso (nec arborescente),*

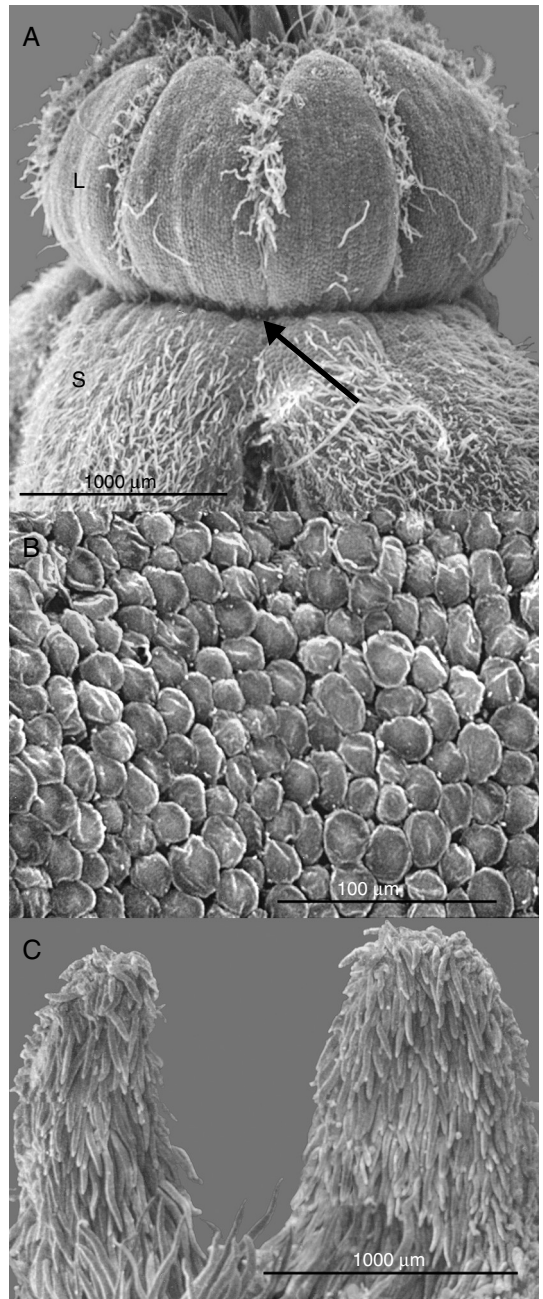


FIG. 1. — SEM microphotograph of the petals in *Octolepis*: **A**, *O. casearia* (sect. *Octolepis*), adaxial surface of sepals (S) and abaxial surface of petal lobes (L). The arrow indicates the point where two erect lobes meet to form a single deeply divided bifid petal. The stamens located just above petal lobes are out of frame; **B**, papillate abaxial surface of the petal shown in A at higher magnification; **C**, *O. dioica* (sect. *Dioicae*), adaxial surface of a bifid petal. A, B, *Breteler et al.* 9450, WAG pickled sample; C, *Razakamalala* 748, MO pickled sample.

*foliis persistentibus (nec caducis), inflorescentiis lateralibus (nec terminalibus), petalis lobis late oblongis (nec triangularibus) et pericarpio tenui pagina laevi (nec crasso pagina plus minusve rugosa) differt.*

Dioecious trees; bark rarely lenticellate. Leaves alternate to opposite, caducous on mature stems, apex often aborting. Inflorescences axillary, fasciculate; fascicles 1 to several-flowered, usually borne on defoliated portion of stems. Flowers unisexual; sepals spreading or erect; petals 4-6 (10); petal lobes narrowly triangular,

length/width ratio *c.* 4-7:1, spreading, adpressed to sepals, apex acute, rounded at the tip. Staminate flowers with (8) 10 (12) (20) stamens; pistillode minute, obscured by many receptacle trichomes. Pistillate flowers with (8) 10 (12) (20) staminodes. Fruits green-yellow, fleshy, often bicostate on both sides of dehiscence lines; pericarp 2-8 mm thick, rugose or rugulose, often pitted, rarely smooth when dry. Seeds with cotyledons 1-1.5 mm thick [plants of Madagascar].

### Key to the species of *Octolepis*

(Leaves of Malagasy species illustrated in Figure 2)

1. Monoecious shrubs, rarely small trees; petal lobes broadly oblong (length/width ratio 1-1.5:1), apex truncate or rounded; fruits dry; [plants of Africa] ..... 2. *O. casearia*
- 1'. Dioecious trees; petal lobes narrowly triangular (length/width ratio 4-7:1), apex acute, rounded at the tip; fruits fleshy; [plants of Madagascar] ..... 2
2. Leaf blades chartaceous, apex attenuate-acuminate; secondary veins 15-25 pairs, closely-spaced; pedicels 0.3-0.5 mm in diam.; receptacle trichomes surrounding the gynoecium 2.5-3.0 mm long in pistillate flowers .... 1. *O. aymoniniana*
- 2'. Leaf blades coriaceous or coriaceous-chartaceous, apex usually slightly emarginate to retuse, sometimes acute, rounded, or obtuse, rarely short cuspidate; secondary veins rarely up to 12 pairs, sparsely-spaced; pedicels more than 0.5 mm in diam.; receptacle trichomes surrounding the gynoecium up to 2.5 mm long in pistillate flowers ..... 3
3. Petioles 8-16 mm long; pedicels (in flower or fruit) 1.6-2.5 cm long, (1.5-)-2-3 mm in diam.; sepals 5-9 mm wide; bidif petals 10 (i.e. 20 lobes); stamens and staminodes 20 ..... 6. *O. ratvosonii*
- 3'. Petioles up to 8 mm long; pedicels (in flower or fruit)  $\leq$  1.5 cm long, up to 1 mm in diam.; sepals 2-4 mm wide; bifid petals 4-6 (i.e. 8-12 lobes); stamens and staminodes (8) 10 (12) ..... 4
4. Widest leaf blades 1-1.4 cm wide; pedicels less than 2 mm long; flowers 4-6 mm wide; largest fruits 1.6 cm long, dehiscence lines 1 or 2, rarely 3 ..... 4. *O. ibityensis*
- 4'. Widest leaf blades (1.6-)-2-4 cm wide; pedicels greater than 4 mm long; flowers more than 8 mm wide; largest fruits 2-3 cm long, dehiscence lines 4 or 5 ..... 5
5. Longest leaf blades 2.8-6.0(-6.5) cm long, *c.* 1-2.5 times longer than wide; leaf margin flat; flowers 8-11 mm wide ..... 3. *O. dioica*
- 5'. Longest leaf blades (7.0-)-7.4-12.4 cm long, *c.* 3-6 times longer than wide; leaf margin undulate; flowers 11-13 mm wide ..... 5. *O. oblanceolata*

#### 1. *Octolepis aymoniniana* Z.S.Rogers, sp. nov.

*Haec species a speciebus aliis Octolepidis lamina foliari tenui marginibus haud revolutis, venis secundariis numerosis (15 ad 25), pedicellis filamentosis 0.3-0.5 mm in diametro et trichomatibus numerosissimis 2.5-3 mm longis gynoecium cingentibus differt.*

TYPUS. — *Kotozafy & Randriamanantena 355*, Madagascar, Prov. Fianarantsoa, Ranomafana Parc National (parcelle 1), à Antara, à 7 km au N de la ville d'Ambatolahy, *c.* 900 m, [21°14'S, 47°26'E], 19-21 Oct. 1993, ♀ fl. (holo-, MO!; iso-, TAN!, WAG!).

Treelets to 2 m tall; young stems densely strigose-tomentose. Leaves alternate to subopposite; blades broadly elliptic or elliptic-oblong, *c.* 6.1-9.7 × 1.7-2.5 cm, length/width ratio *c.* 3-4:1, chartaceous, surfaces  $\pm$  discolourous, adaxial surface glabrous, abaxial surface lighter green, sparsely strigose or glabrescent, apex attenuate-acuminate (rarely subacute), acumen up to 9 mm long, margin sparsely strigose or glabrescent, slightly undulate, base short attenuate or cuneate; midrib strigose; venation raised on both surfaces, densely congested, secondary

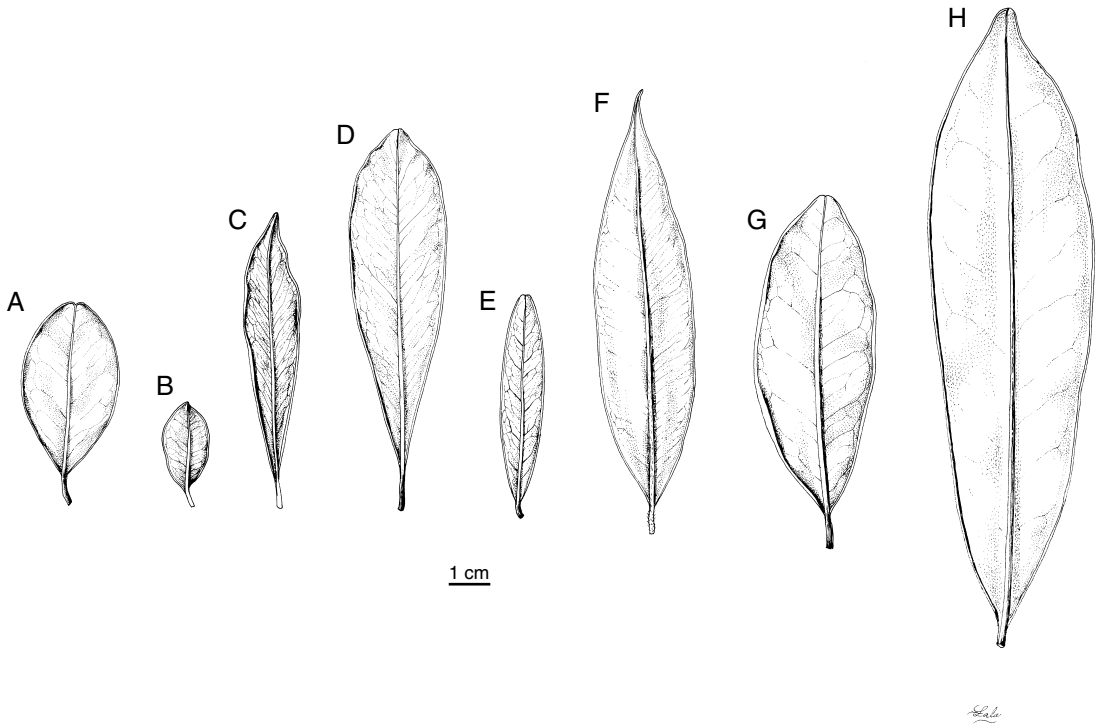


FIG. 2. — Leaf variation in the Malagasy species of *Octolepis* (abaxial leaf surface): **A, B, *O. dioica*** Capuron; **C, D, *O. oblanceolata*** (Capuron) Z.S.Rogers; **E, *O. ibityensis*** Z.S.Rogers; **F, *O. aymoniniana*** Z.S.Rogers; **G, H, *O. ratvosonii*** Z.S.Rogers. A, Rogers & Razakamalala 46; B, Service Forestier 6028; C, Réserves Naturelles 10459, type collection; D, Randriamampionona 1308; E, Randrianaivo et al. 8, type collection; F, Kotozafy & Randriamanantena 355, type collection; G, Rogers et al. 165, type collection; H, Ratvoson et al. 247, an exceptionally large leaf.

veins 15-25 pairs, closely-spaced, angle of divergence from midrib 50-65°, submarginal vein loop 1-2 mm from margin; intersecondaries nearly parallel, closely-spaced; petioles 5-7 mm long, *c.* 1 mm in diam., densely strigose-tomentose or glabrescent. Inflorescences axillary, borne on defoliated portion of stem; fascicles 1-4-flowered, 1 or 2 flowers persistent; pedicels *c.* 8-14 mm long, filamentous (0.3-0.5 mm in diam.), glabrous, base strigose. Flower buds 3-3.5 × 3 mm, sparsely strigose or glabrescent, surface smooth. Flowers 9-11 mm wide; sepals 5, ovate or oblong, 3.6-4.5 × 1.7-2.2 mm, coriaceous, sparsely strigose or glabrescent on both surfaces, apex acute, strigose-tomentose, margins tomentose or glabrescent; petals 5, densely strigose on both surfaces; petal lobes narrowly triangular, each lobe 3.7-4.3 × 0.5-0.7 mm, length/width ratio *c.* 6-7:1, coriaceous, apex

acute. Staminate flowers not seen. Pistillate flowers with 10 staminodes, each 1-1.2 mm long, 0.1-0.2 mm wide (at base), rugulose, glabrous; rudimentary anthers globose; ovary 0.8-1.4 × 1.1-1.8 mm, surrounded by hundreds of erect receptacle trichomes, each 2.5-3 mm long; style 3.1-3.8 × 0.2-0.4 mm, glabrescent, base strigose. Fruits not seen. — Fig. 3.

**DISTRIBUTION AND PHENOLOGY.** — *Octolepis aymoniniana*, known only from the type collection, was made in dense, humid, primary forest within Ranomafana National Park at 900 m elevation (Fig. 7). The species was collected in flower in October.

**VERNACULAR NAMES.** — None available.

**CONSERVATION STATUS.** — *Octolepis aymoniniana* is known from a single collection made in 1993. Despite a thorough search of the type

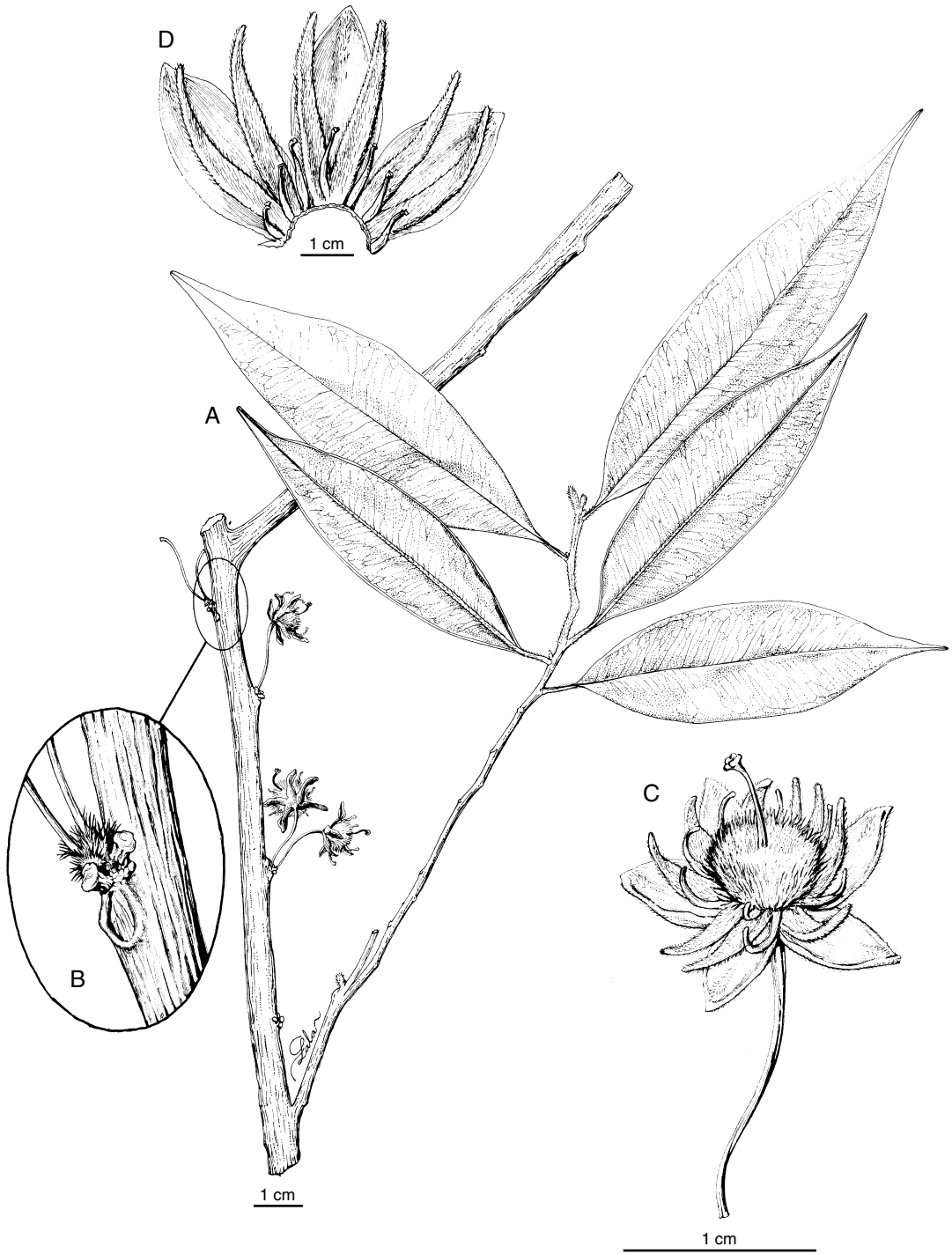


FIG. 3. — *Octolepis aymoniniana* Z.S. Rogers, *sp. nov.*: **A**, habit of pistillate individual; **B**, base of inflorescence and leaf scar; **C**, pistillate flower (note ovary surrounded by hundreds of long, erect, filamentous receptacle trichomes); **D**, relationship between sepals, bifid petals, and staminodes. *Kotozafy & Randriamanantena 355* (TAN, type).



locality accompanied by the original collector (KOTOZAFY), I was unable to locate other individuals in 2003. The site falls within the current boundaries of Ranomafana National Park. Vegetation at the locality remains in good condition, so it is likely that *O. aymoniniana* still occurs there. The species is assigned a provisional status of Vulnerable (VU B1ab+B2ab).

*Octolepis aymoniniana* is distinguished by the highly congested venation consisting of 15-25 pairs of closely-spaced secondary veins with many intersecondaries, and the small, narrow, elongated areolae. The species differs markedly from other members of the genus by its filamentous pedicels (*c.* 0.3-0.5 mm in diam.) and by the hundreds of long receptacle trichomes (2.5-3 mm long) surrounding the gynoeceum in pistillate flowers. Vegetatively, the species can be recognized from all other Malagasy *Octolepis* by the thin, chartaceous leaf blades with attenuate-acuminate (or infrequently subacute) apices and non-revolute margins.

*Octolepis aymoniniana* is named in honor of Gérard-Guy AYMONIN, whose lifetime study of paleotropical Thymelaeaceae has been a great contribution to our knowledge of the family.

## 2. *Octolepis casearia* Oliv.

J. Linn. Soc. Bot. 8: 161, t. 12. (1865). — Type: *Mann 2306*, Nigeria, State Cross River, River Old Calabar, [4°54'N, 8°16'E], Feb. 1863, fl. (lecto-, K!, designated by AYMONIN 1966a).

Shrubs 2-3 m tall, rarely small trees to 7 m tall; bark usually lenticellate; stems with internodes 0.9-6.1 cm long; young stems densely to sparsely strigose-tomentose. Leaves alternate, blades broadly obovate or elliptic, *c.* 5-31 × 3.5-10.5 cm, length/width ratio *c.* 2.5-4:1, coriaceous or rarely subcoriaceous, sometimes bullate, surfaces usually discoloured, adaxial surface glabrous, abaxial surface usually lighter green, glabrescent or sparsely strigose, trichomes *c.* 0.3-0.5 mm long, apex acuminate or acute, acumen up to 2.2 cm long, margin revolute, glabrescent or sparsely strigose, base cuneate or short attenuate; midrib strongly raised on abaxial surface,

sparsely to moderately strigose; venation strongly raised on both surfaces, secondary veins *c.* 6-13 pairs, usually strongly arched toward apex, angle of divergence from midrib 55-75°, submarginal loop *c.* 4-11 mm from margin; petioles *c.* 4-10 mm long, strigose-tomentose. Inflorescences lateral or sublateral, borne on foliated portion of the stem; axes to 6.7 mm long, *c.* 2 mm wide, with up to *c.* 30 flowers per inflorescence, densely strigose-tomentose; pedicels *c.* 3-8 mm long, strigose-tomentose. Flowers 6-11 mm wide; sepals 4 or 5, rarely 6, ovate or subtriangular, 2.5-6 × 1.3-3.1 mm, reflexed or spreading, coriaceous to subcoriaceous, strigose-tomentose on both surfaces, margins tomentose, apex acute; petals 4 or 5, rarely 6, erect, glabrescent or tomentose-strigose on both surfaces; each petal lobe broadly oblong, 1.1-3 × 0.5-1.4 mm, length/width ratio *c.* 1-1.5:1, coriaceous to subcoriaceous, apex truncate or rounded, densely tomentose, margin usually densely tomentose; stamens 8 or 10, rarely 12; filaments 1.4-5.5 × 0.2-0.3 mm, strigose-tomentose or glabrescent; anthers 0.7-1 × 0.3-0.5 mm; ovary subspheroidal, 0.9-1.5 × 0.8-1.3 mm, densely strigose-hirsute, surrounded by many erect receptacle trichomes, each *c.* 0.5 mm long; style 1.1-1.6 × 0.3-0.5 mm, strigose. Fruits white, ovoid-suborbicular, 1-1.5 × 1-1.3 cm; dehiscence lines 2-5 (i.e. 2-5 carpels develop), plane or slightly raised; pericarp dry, 1-2 mm thick, smooth, glabrescent or sparsely strigose, or covered with dense persistent indument. Seeds dark brown or black, 8-13 × 5-8 mm, puberulent, indument denser near poles and on adaxial surface, trichomes *c.* 0.2-0.5 mm long, erect or adpressed.

TYPIIFICATION. — In the protologue of *Octolepis casearia* (OLIVER 1865), three collections were cited (*Mann s.n.*, Sept. 1862; *Mann s.n.*, Feb. 1863; and *Thomson s.n.*). No specimens collected by THOMSON have been located, but two numbered specimens collected by MANN are deposited in the Kew herbarium, which correspond to the dates cited in the protologue (*Mann s.n.*, Sept. 1862 [= *Mann 1815*] and *Mann s.n.*, Feb. 1863 [= *Mann 2306*]). These collections undoubtedly represent the two specimens mentioned by OLIVER (1865). In the Thymelaeaceae

treatments appearing in the *Flore du Gabon* (AYMONIN 1966a: 46) and *Flore du Cameroun* (AYMONIN 1966b: 80), only one of these syntypes (*Mann 2306*) was mentioned as the type of *O. casearia*, thereby effectively lectotypifying the name according to Article 7.11 of the *Code* (GREUTER *et al.* 2000).

*Octolepis casearia* is easily recognized from all other members of the genus by its bisexual flowers, broadly oblong petal lobes with truncate or rounded apices, dry fruit with a thin pericarp, and its central and west African distribution.

*Octolepis casearia* is circumscribed here to include all previously described continental African taxa. Earlier authors have also recognized a broadly circumscribed *O. casearia*, due to the overlapping, continuous morphological variation within characters used to distinguish the species. Here, *O. decalepis* Gilg, previously segregated by some because of its (almost) always 5-merous flowers, is also included within *O. casearia*.

Flower meristicity is rather variable geographically within *Octolepis casearia* and inconsistent among specimens, sometimes even for collections

made from the same locality or even those taken from the single plant (meristicity is much more variable within the Malagasy species). *Octolepis casearia* has 5-merous flowers in Ivory Coast and almost always in Liberia, 4-merous flowers in Nigeria, 4- or 5-merous flowers in Cameroon and Gabon, and 5-merous flowers in the Republic of the Congo (Brazzaville).

In contrast, variation in fruit morphology clearly delimits two distinct groups of specimens of *Octolepis casearia*. One group with densely pubescent fruits, includes the type of *O. flamignii* De Wild., and occurs in the Democratic Republic of the Congo (Kinshasa), southeastern Gabon, and the Republic of the Congo (Brazzaville), while a second group with glabrescent or sparsely strigose fruits, corresponds to *O. casearia* var. *casearia*, and grows in Cameroon, Ivory Coast, Gabon, Liberia, Nigeria, and the Republic of the Congo (Brazzaville). These two groups are slightly allopatric, but some populations come within *c.* 60 km of each other in Gabon and the Democratic Republic of the Congo (Fig. 4). These two distinct groups are recognized as varieties of *O. casearia*.

### Key to the varieties of *Octolepis casearia*

- Fruits glabrescent or sparsely strigose; [plants of Cameroon, Ivory Coast, Gabon, Liberia, Nigeria, and Republic of the Congo (Brazzaville)] ..... 2a. var. **casearia**
- Fruits densely pubescent, surface obscured by indument; [plants of Democratic Republic of the Congo (Kinshasa), southeastern Gabon, and Republic of the Congo (Brazzaville)] ..... 2b. var. **flamignii**

#### 2a. *Octolepis casearia* Oliv. var. *casearia*

*Makokoia congolana* Baill., Bull. Mens. Soc. Linn. Paris 1: 619 (1886). — Type: *Thollon 343*, Gabon, Ogooué, “mission P. Savorgnan de Brazza”, 6 Dec. 1883, fl. (holo-, P!; iso-, P[3]!). — *Octolepis congolana* (Baill.) Warb., Engl. & Prantl, Nat. Pflanzenfam. 3, 6a: 56 (1893).

*Octolepis decalepis* Gilg, Bot. Jahrb. Syst. 28: 142 (1899). — Type: *Dinklage 1741*, Liberia, County Grand Bassa, Fishtown, [5°52'N, 10°03'W], fl. (holo-, B!; iso-, A!, B[2]!, MO!); *syn. nov.*

*Octolepis dinklagei* Gilg, Bot. Jahrb. Syst. 28: 143 (1899). — Type: *Dinklage 177*, Cameroon, Prov. Sud, Ebea-Falle près Kribi, [2°57'N, 9°55'E], Oct. 1889, fl., fr. (lecto-, K!, here designated; iso-, S!).

*Octolepis macrophylla* Gilg, Bot. Jahrb. Syst. 28: 144 (1899). — Type: *Staudt 608*, Cameroon, Prov. Sud-Ouest, Station Johann-Albrechtshöhe [= Kumba], Urwaldgebiet, [4°38'N, 9°25'E], 11 Feb. 1896, fl. (lecto-, G!, here designated; iso-, A!).

*Octolepis nodosericea* Gilg, Bot. Jahrb. Syst. 28: 143 (1899). — Type: *Bos 6337*, Cameroon, Prov. Sud, *c.* 60 km N of Kribi, riverine forest of Bivouba River, 3°19'N, 10°06'E, 13 Feb. 1970, fl., fr. (neo-, WAG-0131161!, here designated; iso-, K!, WAG[2]!).

*Octolepis pierreana* Gilg ex Engl., in obs., Engl., Veg. Erde 9, Pflanzenzw. Afr. 628 (1921). — Type: *Breteler, Jongkind & Wieringa 11379*, Gabon, Prov. Ogooué-Ivindo, between Ndjolé and bridge crossing Ogooué River, [00°06'S, 11°25'E], 30 July 1992, fl., fr. (neo-, WAG-0131152!, here designated; iso-, G!, WAG!).

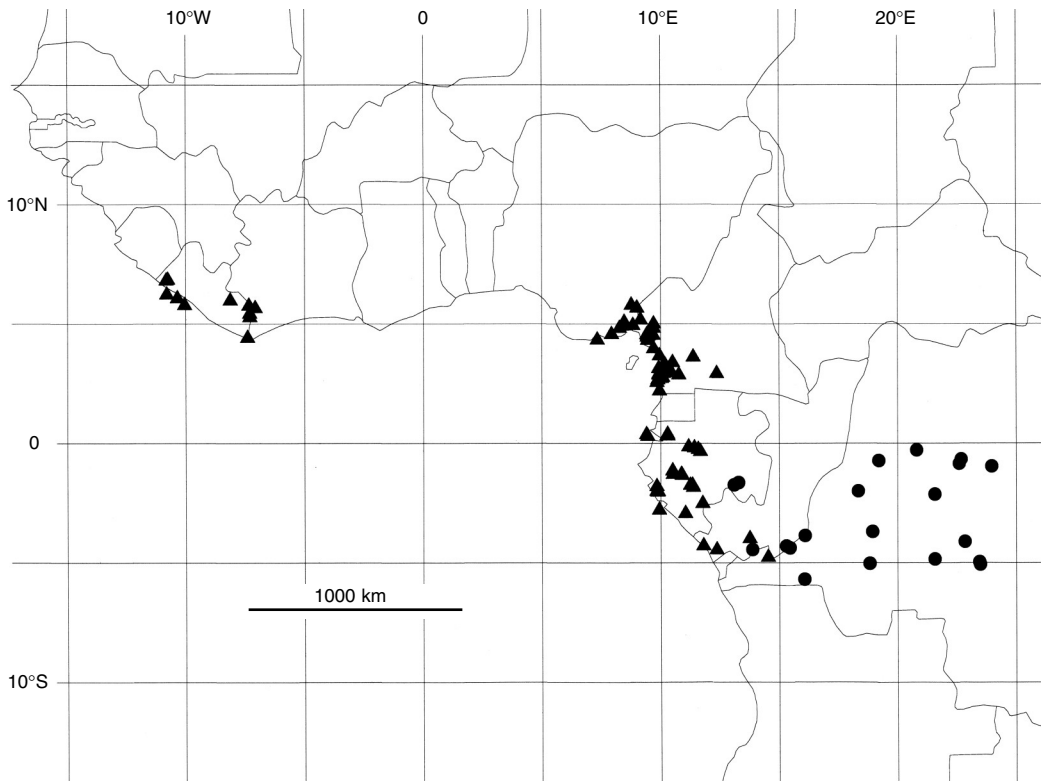


FIG. 4. — Distribution map of *Octolepis casearia* Oliv. var. *casearia* (▲) and *O. c.* var. *flamignii* (De Wild.) Z.S.Rogers (●). Outlines correspond to country boundaries in central and western Africa.

Shrubs to 3 m tall, rarely trees to 6 m tall; young stems densely to sparsely strigose-tomentose. Leaf blades *c.* 6.6-31 × 3-10.5 cm, sometimes bullate, apex acuminate or acute, acumens up to 2.2 cm long. Inflorescence axes to 6.7 mm long, with up to *c.* 30 flowers per inflorescence; pedicels 4-7 mm long. Flowers with 4 or 5 (6) sepals. Fruits glabrescent or sparsely strigose; trichomes up to 0.8 mm long.

Refer to OLIVER (1865: pl. 12) for an illustration of *O. casearia* var. *casearia*.

**DISTRIBUTION AND PHENOLOGY.** — *Octolepis casearia* var. *casearia* is widely distributed from Liberia to the Democratic Republic of the Congo (Kinshasa) from 0-760 m elevation (Fig. 4); one collection (*Thomas & Etuge 5906*) from Cameroon reported an elevation of 1000-1300 m.

Note the large geographic disjunction between populations growing in the western portion of the Ivory Coast and those in south eastern Nigeria. The variety is frequently found in primary and secondary forests. Individuals typically grow on sandy substrates and along river banks. *Octolepis casearia* var. *casearia* flowers and fruits year round. Flowers and fruits are often found on the same plant.

**VERNACULAR NAMES.** — Luvaka (*Hawner 39*).

**CONSERVATION STATUS.** — Based on available label data, *Octolepis casearia* var. *casearia* appears to be relatively common in primary and secondary forests in central and western Africa. The variety has been collected from several protected areas in a number of countries: Cameroon (Ejagham Forest Reserve; Korup National Park; Southern Bakundu Forest Reserve), Gabon

(Lopé-Okanda Reserve; Plateaux Betéké National Park), Ivory Coast (Taï National Park), Liberia (Gola National Forest). *Octolepis casearia* var. *casearia* should be considered a taxon of Least Concern (LC).

**TYPIIFICATION.** — The type material of *Octolepis dinklagei* (*Dinklage 177*) deposited at B is believed to have been destroyed (R. VOGT pers. comm.). The duplicate of the type collection deposited at K is designated as the lectotype.

GILG (1899) cited two syntypes for *Octolepis macrophylla* (*Staudt 608*; *Staudt 838*). No duplicates of either collection are extant at B. Two duplicates of *Staudt 608*, one each at A and G, have been located; the G sheet is the more complete specimen and is selected as the lectotype.

*Zenker 823*, a collection made near Kribi, Cameroon, was originally cited as the type of *Octolepis nodosericea*. No duplicates of the collection have been located and the holotype that would have been deposited at B may have been destroyed (R. VOGT pers. comm.). In accordance with Article 9.6 of the *Code* (GREUTER *et al.* 2000), a neotype must therefore be chosen. As *O. nodosericea* was not illustrated in the protologue, another specimen must be selected. *Bos 6337* does not conflict with the description and was made near the type locality. The WAG duplicate with the accession number 0131161 is selected as the neotype.

The validly published name *Octolepis pierreana* Gilg ex Engl. (ENGLER 1921) was distinguished from *O. macrophylla* Gilg by its more lanceolate leaf blade with a longer acuminate apex; the species was noted to be from Gabon in the protologue. No cited specimens or illustrations accompanied the description and original material GILG may have used to describe the species has not been found, making it necessary to designate a neotype. *Breteler et al. 11379* (WAG-0131152) has more lanceolate leaves than those found on the lectotype of *O. macrophylla* and is chosen as the neotype.

*Octolepis casearia* var. *casearia* is easily distinguished from var. *flamignii* by the glabrescent or sparsely strigose (vs densely pubescent) fruits.

**SELECTED MATERIAL EXAMINED** (1 collection cited for each major political division below country; all of the 124 examined collections are available on the W<sup>3</sup>TROPICOS database; every georeferenced collection is plotted in Figure 4). — CAMEROON: *Prov. Centre: Breteler 2659*, Oveng village, 27 km from Sangmélima, along road to Yaoundé, [3°42'N, 11°22'E], 20 Mar. 1962, fl. (A!, WAG[2]!). — *Prov. Littoral: Mildbraed 8227*, Douala [= Kribi], [3°45'N, 9°57'E], Feb. 1914, fl. (K!). — *Prov. Sud: Bos 7022*, 30 km S of Kribi, Mbodé bay, [2°45'N, 9°53'E], 7 July 1970, fl., fr. (BR!, K!, MO!). — *Prov. Sud-Ouest: Thomas et al. 7531*, Korup National Park, sandy area between Baro and Ikenge villages, 250 m, [5°15'N, 9°09'E], 1 Apr. 1988, fl., fr. (MO!, WAG!).

GABON: *Prov. Estuaire: De Wilde et al. 8826*, Barrage de Kinguélé, 100 m, 0°28'N, 10°17'E, 19 Nov. 1986, fl., fr. (K!, MA!, MO!, WAG[4]!). — *Prov. Moyen-Ogooué: Wieringa et al. 4066*, 34 km on road Alèmbé to Lopé, 0°03'35"S, 11°10'20"E, 11 Jan. 2001, fr. (WAG[2]!). — *Prov. Ngounie: Wieringa et al. 2991*, Fougamou, 10 km on forestry road following Bendolo River, 180 m, 1°12'35"S, 10°31'06"E, 30 Oct. 1994, fl., fr. (WAG[2]!). — *Prov. Nyanga: Le Testu 1844*, Tchibanga, région du Nyanga, [2°51'S, 11°02'E], 10 Nov. 1914, fl. (A!, BM!). — *Prov. Ogooué-Ivindo: Breteler et al. 11379*, between Ndjolé and bridge crossing Ogooué River, 0°06'S, 11°25'E, 8 May 1992, fl., fr. (G!, WAG[2]!). — *Prov. Ogooué-Maritime: Breteler et al. 9450*, Rabi, 1°55'S, 9°50'E, 24 Mar. 1990, fl., fr. (WAG[2]!).

IVORY COAST: *Region Bas-Sassandra: Breteler 7367*, c. 13 km NW of Tabou, [4°30'N, 7°24'W], 12 Apr. 1974, fl. (BR!, MO!, WAG[2]!). — *Region Dix-Huit Montagnes: Aké Assi 17804*, Parc National de Taï, [5°45'N, 7°05'W], 15 Dec. 1987, fl. (G[2]!, MO!).

LIBERIA: *County Bomi: Stoop 201A*, Bomi Hills, Gola National Forest, [6°56'N, 10°45'W], 24 Aug. 1970, fr. (WAG!). — *County Grand Bassa: Dinklage 2044*, Grand Bassa, [5°52'N, 10°03'W], fl., fr. (A!, K[2]!, MO!). — *County Grand Gedeh: Jansen 1281*, 10 miles from Tchien, along road to Cape Palmas, [6°04'N, 8°08'W], 22 Jan. 1969, fl. (MO!, WAG[2]!). — *County Montserrado: Dinklage 2909*, Monrovia, [6°18'N, 10°48'W], 21 Oct. 1923, fl. (A!).

NIGERIA: *State Akwa Ibom: Talbot & Talbot 3364*, Eket, [4°39'N, 7°56'E], 1912-1913, fl. (BM!). — *State Cross River: Van Meer 1446*, Oban Group Forest Reserve, Kwa River, 150 m, [5°09'N, 8°28'E], 24 Apr. 1971, fr. (WAG[2]!).

REPUBLIC OF THE CONGO (Brazzaville): *Region Bouenza: Sita 2460*, région de Mouyondzi, environs chutes de la Bouenza, [3°54'S, 13°46'E], 8 Jan. 1968, fr. (BR[2]!). — *Region Kouilou: Dechamps 13155*, Les Sara, [4°22'S, 12°22'E], 28 June 1989, fl., fr. (BR!, MO!, WAG!). — *Region Pool: Attims 172*, Mayombe, 15 km N du campement forestier de Ngongo, [4°41'S, 14°32'E], 27 Mar. 1969, fr. (BR!).

**2b. *Octolepis casearia* Oliv. var. *flamigni* (De Wild.) Z.S.Rogers, comb. et stat. nov.**

*Octolepis flamigni* De Wild., Ann. Mus. Congo Belge, Bot., sér. 5, 3: 117, pl. 28. (1909). — Type: *Flamigni 194A* [cited as "*Flamigni 194*"], Democratic Republic of the Congo (Kinshasa), Prov. Kasai-Oriental, Bene Dibebe, [4°07'S, 22°50'E], 22 July 1907, fl., fr. (lectotype-, BR!, here designated; iso-, BR!).

Shrubs to 4 m tall, rarely trees to 7 m tall; young stems densely strigose-tomentose. Leaf blades *c.* 5–22 × 3.5–7.6 cm, apex acuminate or acute, acumens up to 1.1 cm long. Inflorescence axes to 4 mm long, with up to 14 flowers per inflorescence; pedicels 3–8 mm long. Flowers with 5 sepals. Fruits densely pubescent, surface obscured by dense persistent indument; trichomes to 0.5 mm long.

Refer to DE WILDEMAN (1909: 117, pl. 28) for an illustration of *O. casearia* var. *flamigni*.

DISTRIBUTION AND PHENOLOGY. — *Octolepis casearia* var. *flamigni* occurs in the Democratic Republic of Congo (Kinshasa), the Republic of the Congo (Brazzaville), and southeastern Gabon (Fig. 4). The estimated elevational range for the species is 300–650 m. *Octolepis casearia* var. *flamigni* grows in primary, secondary and gallery forest, and sometimes on sand. It probably flowers and fruits year round. Flowers and fruits may occur simultaneously on a plant.

VERNACULAR NAMES. — Mukulo (*Dechamps* [R. 47] 100).

CONSERVATION STATUS. — *Octolepis casearia* var. *flamigni* appears to be relatively widespread in disturbed forests. Thus, the variety should be considered a taxon of Least Concern (LC).

TYPIFICATION. — Two sheets of the type collection (*Flamigni 194A*) are deposited at BR. A "TYPUS" label is affixed to both specimens, but only one of them is fertile and annotated by DE WILDEMAN. This particular sheet must have been the basis of the description and is designated as the lectotype.

*Octolepis casearia* var. *flamigni* is easily distinguished from var. *casearia* by the dense, persistent indument on the fruits (vs glabrescent or sparsely strigose fruits).

ADDITIONAL MATERIAL EXAMINED. — DEMOCRATIC REPUBLIC OF THE CONGO (Kinshasa): Prov. Bandundu: *Lebrun 6441*, entre Kole et Bekese, Lac Leopold II, [2°00'S, 18°20'E], Oct. 1932, fl. (BM!, BR!); *Vanderyst 3072*, Kikwit, [5°02'S, 18°49'E], Jan. 1914, fl. (BR!); *Vanderyst 9723*, entre Ipamu et la Kamtsha, [3°42'S, 18°56'E], July 1921, fr. (BR!); *Vanderyst 10085*, same locality, July 1920, fr. (BR!); *Vanderyst 10228*, Mpio-Mpio, [3°52'S, 16°05'E], Apr. 1921, fl. (BR!); *Vanderyst 10240*, same locality, Aug. 1920, fr. (BR!). — Prov. Bas-Zaïre: *Laurent s.n.*, Kole, Tsaka, [5°42'S, 16°04'E], 24 Nov. 1903, fl. (BR!). — Prov. Équateur: *Evrard 2812*, Monkoto, Iwama, [2°08'S, 21°34'E], 12 Oct. 1957, fl. (BR!, MO!, WAG!); *Evrard 5181*, Ikela, Yongo, [0°17'S, 20°48'E], 19 Nov. 1958, fl. (BR!); *Evrard 5192*, Ikela, Yalikunga-Yalomboka, [0°40'S, 22°41'E], 20 Nov. 1958, fr. (BR!); *Evrard 5493*, Ikela, Mondombe, Bokone, [0°51'S, 22°36'E], 8 Jan. 1959, fr. (BR!); *Germain 8356*, Bokote, route Boende-Ingende, village Bumbanda, [0°44'S, 19°12'E], 18 May 1954, fl., fr. (BM!, BR!). — Prov. Haut-Zaïre: *Lisowski 43100*, Haut-Zaïre, Zone d'Opala, près du village Liferia, entre Kaneke et Masua, [0°58'S, 23°58'E], 14 Nov. 1976, fl. (BR!); *Lisowski 43131*, same locality, fl. (BR!). — Prov. Kasai-Occidental: *Dechamps (R. 47) 100*, Kasai, Mweka, Kakenge, 585 m, [04°51'S, 21°34'E], 16 Jan. 1959, fl. (BR!, K!). — Prov. Kasai-Oriental: *Claussens 208*, Bene Dibebe, [4°07'S, 22°50'E], Oct. 1904, fl. (BR(2)!); *Luja 135*, Sankuru, [4°58'S, 23°27'E], Dec. 1903, fl., fr. (BR!); *Vankerckhoven 17*, Sainte Trudon (= Mombelaye), [5°04'S, 23°29'E], June 1911, fl., fr. (BR!). — Kinshasa City: *Breyne 799*, Zone: Kinshasa, Ndjili Aerodrome, [4°23'S, 15°27'E], 5 Mar. 1970, fl., fr. (BR!); *Breyne 2345*, same locality, 7 Mar. 1975, fl. (BR!); *Muambi 11*, Maluku, Plaine de Kinshasa, [4°18'S, 15°18'E], 9 Dec. 1967, fr. (BR!); *Muambi 27*, same locality, 5 Jan. 1968, fr. (BR!); *Pauwels 4944*, Leopoldville, Nkamu, Bingi-Bingi, [4°18'S, 15°18'E], 30 Mar. 1965, fl. (BR!, MO!, WAG!). GABON: Prov. Haut-Ogooué: *Breteler 6437*, Moanda-Franceville, 1°39'S, 13°17'E, 12 Sept. 1970, fr. (MO!, WAG[2]!); *Breteler 6738*, Moanda-Bakoumba, km 30, 1°45'S, 13°05'E, 7 Mar. 1975, fl. (BR!). REPUBLIC OF THE CONGO (Brazzaville): *Region Bouenza: Sita 2669*, Plateau des Cataractes, piste Taba-Mandzakala, région de Kinkala, [4°27'S, 13°52'E], 11 Oct. 1968, fl., fr. (BR[2]!).

**3. *Octolepis dioica* Capuron**

*Adansonia*, n.s. 3: 138 (1963). — Type: *Service Forestier (Capuron) 18002*, Madagascar, Prov. Antananarivo, forêt Ambohitantely, sur le Tampoketsa d'Ankazobe, *c.* 1600 m, [18°09'S, 47°18'E], June 1957, ♀ fl. (holo-, P!; iso-, G!, K!, MO!, TEF!).

*Octolepis dioica* Capuron f. *macrocarpa* Capuron, *Adansonia*, n.s. 3: 140 (1963). — Type: *Service Forestier (Ravelojaona) 6028*, Madagascar, Prov. Antananarivo, région de Tsinjoarivo (Ambatolampy), [1500 m], [19°38'10"S, 47°41'30"E], 27 Oct. 1952, fr. (holo-, P!; iso-, TEF!); *syn. nov.*

Trees to 20 m tall; young stems strigose-tomentose. Leaves alternate or subopposite; blades broadly obovate or elliptic, rarely suborbicular, 2.0-6.0(-6.5) × 1.4-4.0 cm, length/width ratio *c.* 1.5-2.5:1, coriaceous, surfaces usually discolorous, adaxial surface glabrous, abaxial surface lighter green-brown, sparsely strigose or glabrescent, apex slightly emarginate to retuse, rarely acute, rounded or rarely short cuspidate, margin strigose or glabrescent, revolute, more so near base, base short attenuate or cuneate; midrib strigose or glabrescent; venation strongly raised to nearly inconspicuous on both surfaces, secondary veins *c.* 5-7 pairs, straight or slightly arched towards apex, angle of divergence from midrib 45-65°, submarginal vein loop *c.* 1-3 mm from margin; petioles 4-7 mm long, *c.* 1 mm in diam., strigose-tomentose or glabrescent. Inflorescences axillary, usually borne on defoliated portion of stem; fascicles 3-7-flowered, 1 or 2 flowers persistent; pedicels 4-10(-14) mm long, *c.* 0.5 mm in diam., glabrescent or sparsely strigose. Flower buds 2-3.5 × 2.5-3.5 mm, glabrescent, rarely sparsely strigose, ± smooth. Flowers 8-11 mm wide; sepals 4-5(6), ovate or oblong, rarely suborbicular or subtriangular, 4-7(-10) × 2-4 mm, coriaceous, glabrescent on both surfaces, apex acute or rounded, tomentose, margins glabrescent or tomentose; petals 4-5(6), densely to moderately strigose, rarely glabrescent near base; each petal lobe narrowly triangular, (3.5-)4.5-6.5(-8.0) × 0.5-1.2 mm, length/width ratio *c.* 5-7:1, coriaceous, apex acute. Staminate flowers with spreading sepals; stamens 10; filaments 2.5-4.7 × 0.2-0.3 mm; anthers 1.5-2.4 × 0.8-1.3 mm; pistillode minute, obscured by dense erect receptacle trichomes, trichomes 0.5-1.0 mm long. Pistillate flowers with erect sepals; staminodes 10, 0.5-1.2 mm long, 0.1-0.3 mm wide (at base), smooth or rugulose, glabrous; rudimentary anthers globose or undifferentiated; ovary 1.8-3.4 × 1.8-2.4 mm, surrounded by many erect

receptacle trichomes, trichomes 0.7-0.9 mm long; style 0.0-1.1 × 0.4-0.5 mm, glabrescent. Fruits ovoid-pyramidal, 1.9-3.0 × 1.6-2.3 cm; dehiscence lines 4 or 5 (i.e. 4 or 5 carpels develop), usually strongly depressed, bicarinate on both sides of line; pericarp fleshy, *c.* 4-6 mm thick, rugose or rugulose, sparsely or moderately covered with short indument, trichomes *c.* 1.0-1.5 mm long, subadpressed or erect; persistent style to 2 mm long. Seeds dark brown or black, 1.3-1.9 cm long, 5-7 mm wide, puberulent.

Refer to CAPURON (1963: 139, pl. 2, Nos 1-10) for an illustration of *O. dioica*.

DISTRIBUTION AND PHENOLOGY. — *Octolepis dioica* occurs in humid forests along the central plateau of Madagascar from *c.* 850-1650 m elevation (Fig. 8). It has been collected as far north as Marojejy National Park, and as far south as Andohahela National Park (Parcel 1). The species flowers from February to December and fruits from September to February. Flowering time may be no more than one or two weeks in length based on my observations of the population growing at Ranomafana National Park. Flowers and fruits do not occur on the same plant simultaneously.

VERNACULAR NAMES. — Avoha (*Service Forestier 17898*); Gavoala (*Service Forestier 34058*); Fanamoratrakoho (*Service Forestier 17898*); Fanamosatrakora (*Service Forestier 34480*); Hafotramaladia (*Service Forestier s.n.* [20 Dec. 1951]); Havoa (*Service Forestier 48-R-121, Service Forestier 6028*); Valolahy (*Service Forestier 16804, 16824, 18001, 18002*).

CONSERVATION STATUS. — *Octolepis dioica* is relatively widespread in Madagascar and occurs in several protected areas: Ambohitantely Special Reserve, Andohahela National Park, Marojejy National Park, Ranomafana National Park, Zahamena National Park. The extent of occurrence of the species is *c.* 90000 km<sup>2</sup> and the area of occupancy is *c.* 80000 km<sup>2</sup> based on a 100 km grid cell size (cell width/height, not area). At the present time, *O. dioica* should be considered a species of Least Concern (LC), but its status may need to be upgraded in the future, as suitable habitat continues to disappear in the high plateau region of Madagascar.

TABLE 2. — Morphological differences between *Octolepis dioica* Capuron and *O. ibityensis* Z.S.Rogers.

Character	<i>Octolepis dioica</i>	<i>Octolepis ibityensis</i>
Leaf blade shape	broadly elliptic or obovate (suborbicular)	narrowly elliptic or obovate
Width of widest leaf blade (mm)	(1.6-)2.0-4.0	1.0-1.4
No. of flowers per inflorescence	3-7	1
Pedicle length (mm)	≥ 4	≤ 2
Flower width (mm)	8-11	4-6
Sepal length (mm)	≥ 4	2.5-3.5
Petal lobe dimensions (mm)	≥ 3.5 × 0.5-1.2	2.1-3.2 × 0.4-0.5
Filament length (mm)	≥ 2.5	1.6-2.0
Anther dimensions (mm)	1.5-2.4 × 0.8-1.3	0.5-0.8 × 0.4-0.6
Length of longest fruits (cm)	2-3	1.4-1.6
No. of dehiscence lines on fruit	4 or 5	1 or 2(-3)
Pericarp thickness (mm)	≥ 4	2-3

TYPIIFICATION. — Two collections of *Octolepis dioica* were made from Ambohitantely Special Reserve by René CAPURON in June 1957, one was staminate (*Service Forestier 18001*), while the other was pistillate (*Service Forestier 18002*). Specimens of both collections are deposited at P and are annotated with the word "Type" in CAPURON's handwriting, but only the latter was designated as the type in the original publication, so it is thus to be regarded as the holotype. *SF 18001* is a paratype.

*Octolepis dioica* is distinguished from *O. ibityensis*, the most morphologically similar species, by a number of vegetative, floral, and fruit characters (Table 2). *Octolepis dioica* differs from *O. oblanceolata*, a species previously described as a form of *O. dioica*, by its shorter leaves (longest leaf blades 2.8-6.0(-6.5) vs (7.0-)7.4-12.4 cm long) with flat (vs undulate) margins and by its smaller flowers (8-11 vs 11-13 mm wide).

CAPURON (1963) based *Octolepis dioica* f. *macrocarpa* on a single collection (*Service Forestier 6028*), which had smaller leaves and larger fruits with more pronounced carinate dehiscence lines than the other specimens available to him at the time of description. I observed overlapping variation in these characters at Analamazoatra Special Reserve and Ranomafana National Park, which suggests that the variation in fruit morphology noted by CAPURON is most likely due to differences in maturity and the number of developed seeds.

Three collections are excluded from the description of *Octolepis dioica* (*Andrianjafy 209*, *Service Forestier 28811*, *28813*). Both *Service Forestier* col-

lections, determined as *O. dioica* by CAPURON, were made in 1969 from Kalalao forest, a small degraded forest on laterite on Île Ste Marie. *Andrianjafy 209* was recently collected at 600 m elevation in Zahamena National Park. All three collections have leaves similar to those found in *O. dioica*, but differ by their densely sericeous pedicels and sepals.

ADDITIONAL MATERIAL EXAMINED. — MADAGASCAR: *Service Forestier s.n.* without precise locality, st. (TEF!). — *Prov. Antananarivo: Rogers et al. 118*, Ambohitantely Special Reserve, 2 km NE of the park entrance, dense humid forest on laterite, 1600 m, 18°10'08"S, 47°16'40"E, 6 Feb. 2003, st. (MO!); *Rogers et al. 119*, same locality, st. (MO!); *Rogers et al. 123*, same locality, st. (MO!); *Rogers et al. 125*, same locality, st. (MO!); *Service Forestier (Ravelojaona) 48-R-121*, Tsinjoarivo, (Ambatolampy), [1500 m], [19°37'30"S, 47°41'30"E], 20 July 1951, st. (TEF!); *Service Forestier (Ecol. Forest.) 16804*, Manankazo-Ankazobe SF, village le plus proche Poste Forestier Manankazo, [1300-1600 m], [18°09'00"S, 47°14'00"E], 22 June 1955, y.fl. (TEF!); *Service Forestier (Ecol. Forest.) 16824*, same locality, 22 June 1955, y.fl. (P!, TEF[2]!); *Service Forestier (Capuron) 18001*, Forêt d'Ambohitantely, sur le tampoketsa d'Ankazobe, c. 1600 m, [18°09'30"S, 47°18'E], June 1957, ♂ fl. (P[2]!, TEF[2]!). — *Prov. Antsiranana: Rakotomalaza et al. 853*, Marojejy Réserve Naturelle Intégrale, 10.5 km NW of Manantenina, along tributary at head of Andranomifototra River, Camp 4, 1625 m, 14°26'24"S, 49°44'30"E, 9 Nov. 1996, fr. (G!, MO!, P!, TAN!); *Rakotonasolo & Ravelonarivo 600*, same locality, 1580-1650 m, 25 Feb. 2003, ♂ y.fl. (MO!); *Rakotonasolo & Ravelonarivo 601*, same locality, ♂ y.fl. (MO!). *Prov. Fianarantsoa: Ravelolonanahary et al. 7*, Ranomafana National Park, piste touristique de Vohiparara, à l'Est du village de Vohiparara, 1020-1170 m, 21°14'S, 47°23'E, 8 Oct.

1996, fr. (MO!, P!, TAN!); *Rogers et al. 63*, Ranomafana National Park (Parcel 1), along piste A, 1140 m, 21°14'12"S, 47°23'47"E, 17 Jan. 2003, fr. (MO!, P!, TAN!); *Rogers et al. 64*, same locality, fr. (MO!, P!, TAN!); *Rogers et al. 65*, same locality, fr. (MO!, P!, TAN!); *Rogers et al. 66*, same locality, st. (MO!). — *Prov. Toamasina: Andrianjafy et al. 144*, Parc National de Zahamena, près compound d'Andalantitra, 1240-1400 m, 17°52'47"S, 48°44'21"E, 28 Sept. 2001, fr. (MO!); *Dorr & Barnett 3190*, Analamazoatra Réserve Spéciale, [18°56'S, 48°25'E], 2-5 Nov. 1984, fr. (MO!, TAN!); *Perrier de la Bâthie 4675*, Forêt d'Analamazoatra, [18°56'S, 48°26'E], fr. (P[2]!); *Razafitsalama et al. 491*, Parc National Mantadia, [18°50'S, 48°28'E], 27 Oct. 2003, fr. (TAN!); *Razakamalala 748*, Analamazoatra Réserve Spéciale, 1000 m, 18°56'12"S, 48°25'10"E, Sept. 2003, fl. (MO!, P!, TAN!); *Rogers et al. 46*, same locality, 1000 m, 18°56'12"S, 48°25'10"E, 10 Jan. 2003, fr. (MO!, P!, TAN!); *Rogers et al. 169*, same locality, 26 Feb. 2003, st. (MO!); *Rogers et al. 170*, same locality, 26 Feb. 2003, st. (MO!); *Rogers et al. 171*, same locality, 26 Feb. 2003, st. (MO!); *Service Forestier s.n.*, Analamazoatra-Perinet, S.P. 36, 20 Dec. 1951, st. (TEF!); *Service Forestier (Raderasolo) 4411*, same locality, 15 Oct. 1951, fl. (TEF!); *Service Forestier (Gachet) 17898*, same locality, 20 Feb. 1958, fr. (P!, TEF!); *Service Forestier (Capuron) 18052*, same locality, 29-30 July 1957, y.fl. (P!, TEF!); *Service Forestier (Capuron) 24346*, same locality, 21 Dec. 1965, fr. (Kl, MO!, P!, TEF!); *Service Forestier 34058*, Firaisana Andasibe, Fivondronona Moramanga, Ampangalatsary, crête Nord, [1000 m], [18°56'S, 48°26'E], 6 Sept. 1990, fl., fr. (MO!, TEF!); *Service Forestier (Comtet) 34480*, Fokontany Faliarana, Firaisana Andasibe, Fivondronona Moramanga, village le plus proche Faliarana, au bord de la rivière de Iofa, [18°47'S, 48°33'E], 15 Oct. 1993, fr. (TEF[2]!). — *Prov. Toliara: Messmer et al. 114*, Andohahela National Park, parcelle 1, 15 km NW of Eminiminy, 1500 m, 24°34'10"S, 46°43'55"E, 24 Nov. 1995, fr. (G!, MO!).

#### 4. *Octolepis ibityensis* Z.S. Rogers, sp. nov.

*Haec species a Octolepide dioica, cui aliter similis est, foliis angustioribus 0.8-1.4 (haud 1.4-4.0) cm latis, inflorescentiis unifloris (haud 3- ad 7-floris), pedicellis minus quam 2 (haud plus quam 4) mm longis et fructu 1.4-1.6 cm longo lineis dehiscentiae 1 vel 2 (haud 1.9-3 cm longo lineis (4 ad 5)) differt.*

TYPUS. — *Randrianaivo, Ranaivojoana, Birkinshaw, Ravololonanahary, Ralimanana & Randrianasolo 8*, Madagascar, Prov. Antananarivo, Mont Ibity, à 2-3 km à l'Est de la Cimiterie d'Ibity, 1590-1830 m, 20°04'40"S, 47°00'10"E, 19-21 Oct. 1993, ♂ fl. (holo-, MO!; iso-, G!, P, TAN!, WAG!).

Trees to 3 m tall; young stems sparsely moderately to sparsely strigose-tomentose or glabrescent. Leaves alternate to subopposite, rarely opposite; blades narrowly obovate or elliptic, *c.* 2.6-4.6 × 0.8-1.4 cm, length/width ratio *c.* 3-5:1, coriaceous, surfaces discolorous, adaxial surface glabrescent, abaxial surface lighter green, sparsely strigose or glabrescent, apex emarginate, usually with a small notch, rarely rounded, margin sparsely strigose or glabrescent, revolute, more so near base, base short attenuate or cuneate; midrib sparsely strigose or glabrescent; venation strongly raised on both surfaces, secondary veins *c.* 6-7 pairs, ± parallel, straight or arched toward apex, angle of divergence from midrib 30-55°, submarginal vein loop *c.* 1-2 mm from margin; petioles 3-5 mm long, *c.* 1 mm in diam., strigose-tomentose or glabrescent. Inflorescences axillary, borne on the defoliated portion of the stem; fascicles 1-flowered; pedicels *c.* 1-2 mm long, *c.* 1 mm in diam., glabrescent or sparsely strigose. Flower buds 2.0-2.5 × 2.0-2.5 mm, sparsely strigose, ± smooth. Flowers 4-6 mm wide; sepals 5, rarely 6, ovate, *c.* 2.5-3.5 × 2.0-2.5 mm, coriaceous, strigose-tomentose or glabrescent on both surfaces, ± smooth, apex acute or rounded, margin tomentose; petals 5, rarely 6, moderately to sparsely pubescent on both surfaces; each petal lobe narrowly triangular, 2.1-3.2 × 0.4-0.5 mm, length/width ratio *c.* 5-8:1, coriaceous, apex acute. Staminate flowers with 10 stamens, rarely 12; filaments 1.6-2.0 × 0.2-0.3 mm; anthers 0.5-0.8 × 0.4-0.6 mm; pistillode minute, obscured by dense erect receptacle trichomes, trichomes *c.* 0.5-0.8 mm long. Pistillate flowers (description based on persistent organs in fruit) with 10 staminodes, rarely 12; staminodes 0.8-1.2 mm long, 0.2-0.4 mm wide (at base), ± smooth, glabrous; rudimentary anthers globose; ovary surrounded by many erect receptacle trichomes, trichomes *c.* 0.5-0.8 mm long. Fruits ovoid or ovoid-pyramidal (with 3 faces), 1.4-1.6 × 1.2-1.4 cm; dehiscence lines 1 or 2, rarely 3 (i.e. 1-3 carpels develop), depressed, not bicarinate; pericarp fleshy, *c.* 2-3 mm thick, rugose or rugulose, sparsely strigose to nearly glabrous, trichomes of different lengths, trichomes 0.7-1.0 mm long or 0.1-0.2 mm long; persistent style to 1 mm long. Seeds dark brown



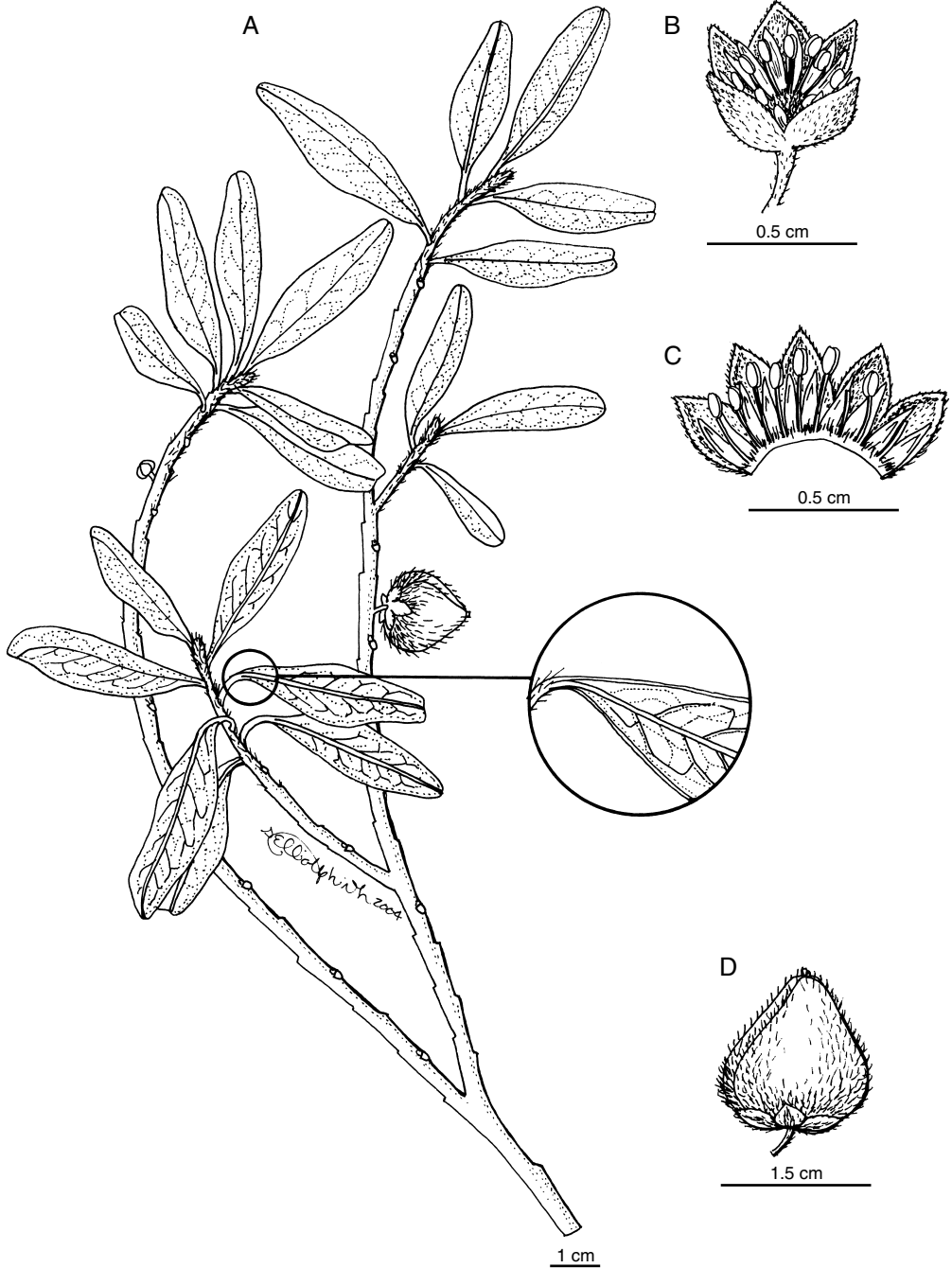


FIG. 5. — *Octolepis ibityensis* Z.S.Rogers, sp. nov.: **A**, habit; **B**, staminate flower; **C**, relationship between sepals, bifid petals, and stamens; **D**, fruit. A, D, Rogers et al. 80 (TAN); B, C, Randrianaivo et al. 8 (TAN, type).

or black, 1.1-1.2 cm long, 5-6 mm wide, sparsely puberulent, more evident near the poles. — Fig. 5.

**DISTRIBUTION AND PHENOLOGY.** — *Octolepis ibityensis* grows in narrow tracts of gallery forest along two ravines on the Ibity Massif in central Madagascar from 1450 to 1830 m elevation (Fig. 8). The species flowers from October to January and fruits in January.

**VERNACULAR NAME.** — None available.

**CONSERVATION STATUS.** — *Octolepis ibityensis* is known from two remnant gallery forests on the slopes of the unprotected Ibity Massif. The lower slopes of the mountain are burned annually by local villagers, leaving only narrow (*c.* 5-15 m wide) tracts of forests running along streams that function as natural firebreaks and provide enough shelter to protect the small populations of *O. ibityensis* growing along them. However, due to the frequent burning, the tracts continue to narrow, and plants untouched by fire in 2003, have since been damaged to the point that they may not recover. *Octolepis ibityensis* is given the provisional status of Critically Endangered (CE B1ab+B2ab).

*Octolepis ibityensis* is distinguished from *O. dioica*, the most morphologically similar species, by its narrowly elliptic leaf blades, its shorter pedicels, its fewer flowered inflorescences, its smaller flowers (with shorter sepals, smaller petal lobes, shorter filaments, and smaller anthers), and its smaller fruits with fewer lines of dehiscence. Table 2 summarizes morphological differences between both species.

**PARATYPES.** — MADAGASCAR: *Prov. Antananarivo*: Rogers *et al.* 78, Ibity massif, *c.* 2-3 km E of the Ibity cement factory, along mountain stream of Be-Apombo, 1540 m, 20°04'14"S, 47°00'11"E, 20 Jan. 2003, st. (MO!); Rogers *et al.* 79, same general locality, along mountain stream of Falirano, 1470 m, 20°04'24"S, 47°00'10"E, 20 Jan. 2003, ♂ y.fl. (MO!); Rogers *et al.* 80, same locality, fr. (MO!, P!, TAN!); Rogers *et al.* 81, same locality, st. (MO!); Rogers *et al.* 306, same locality, 28 Apr. 2004, st. (MO!).

##### 5. *Octolepis oblanceolata* (Capuron) Z.S.Rogers, **comb. et stat. nov.**

*Octolepis dioica* Capuron f. *oblanceolata* Capuron, *Adansonia*, n.s. 3: 140 (1963). — Type: *Réserves*

*Naturelles (Rakotozon) 10459*, Madagascar, Prov. Toliara, Marovato, District: Amboasary, [24°41'S, 46°45'E], 16 June 1960, ♂ fl. (lecto-, P-00077575!, here designated; iso-, P[2]!, TEF!).

Trees to 10 m tall; young stems moderately to sparsely strigose-tomentose or glabrescent. Leaves alternate to opposite; blades broadly to narrowly obovate, rarely broadly elliptic, *c.* 6.5-12.4 × 1.3-4.0 cm, length/width ratio *c.* 2-6:1, coriaceous, surfaces discolorous, adaxial surface glabrous, abaxial surface lighter green-brown, sparsely strigose or glabrescent, apex usually acute, sometimes emarginate or short cuspidate, margin sparsely strigose or glabrescent, revolute, undulate, base attenuate or cuneate; midrib strigose or glabrescent; venation raised to nearly inconspicuous on both surfaces, secondary veins *c.* 8-12 pairs, ± parallel, arched toward apex in upper half of leaf, angle of divergence from midrib 35-55°, submarginal vein loop *c.* 2-3 mm from margin; petioles 4-8(-9) mm long, *c.* 1.0-1.5 mm in diam., glabrescent or sparsely strigose. Inflorescences axillary, usually borne on foliated portion of the stem; fascicles 2-flowered, usually 1 flower persistent; pedicels (0.9-)1.1-1.5 cm long, 0.5-0.7 mm in diam., glabrescent or rarely sparsely strigose. Flower buds 3.5-4 × 3.5-4 mm, glabrescent, ± smooth. Flowers 1.1-1.3 cm wide; sepals 4 or 5, ovate or oblong, rarely subtriangular, 5-6(-8) × 2-3(-4) mm, coriaceous, glabrescent, rarely sparsely strigose on both surfaces, apex acute or rounded, tomentose, margins glabrescent or tomentose; petals 5, rarely 6, densely to sparsely strigose on both surfaces; each petal lobe narrowly triangular, 3.8-5.2 × 0.8-1.1 mm, length/width ratio 4-5:1, coriaceous, apex acute. Staminate flowers with 10 stamens, rarely 12; filaments *c.* 3.5-4.5 × 0.3-0.4 mm; anthers *c.* 2 × 1 mm long; pistillode minute, obscured by dense erect receptacle trichomes, trichomes *c.* 1 mm long. Pistillate flowers (description based on persistent organs in fruit) with 10 (12) staminodes; staminodes 1.3-1.9 mm long, 0.3-0.4 mm wide (at base), smooth; rudimentary anther globose; ovary surrounded by many erect receptacle trichomes, trichomes *c.* 2 mm long. Fruits subspheroidal or ovoid-pyramidal, 1.7-2.1 × 1.7-2.4 cm; dehiscence lines 4 or 5 (i.e. 4 or 5 carpels develop), ± bicarinate on both sides of

line; pericarp fleshy, 4-5 mm thick, rugulose or nearly smooth, sparse or moderately pubescent, trichomes *c.* 1-2 mm long, erect or subadpressed,  $\pm$  rigid, not stinging; persistent style to 4 mm long. Seeds dark brown, 1.1-1.3 cm long, 5-6 mm wide, puberulent, indument denser near poles.

Refer to CAPURON (1963: 139, pl. 2, No. 12) for an illustration of *O. oblanceolata*.

DISTRIBUTION AND PHENOLOGY. — *Octolepis oblanceolata* occurs in southeastern Madagascar near Fort-Dauphin from *c.* 400-700 m elevation (Fig. 7). The species has been collected in Andohahela National Park and was also found in 2003 growing on the forested slopes above St Jacques, a small village overlooking Fort-Dauphin. Since then, however, the population at St Jacques has been extirpated (J. RABENANTO-ANDRO pers. comm.). The species flowers in June to November and fruits from August to January.

VERNACULAR NAME. — Tsilorano (*Réserves Naturelles 10072*).

CONSERVATION STATUS. — *Octolepis oblanceolata* is known from three or four populations, perhaps only one of which is formally protected within the boundaries of Andohahela National Park (Parcel 1). The population above St Jacques discovered in 2002 has recently been lost. Locality data for the other collections are incomplete, making it difficult to calculate extent of occurrence and area of occupancy. The species is assigned a preliminary conservation status of Endangered (EN B1ab+B2ab).

TIPIFICATION. — Three sheets of the type collection (*Réserves Naturelles 10459*) are deposited at P. Each of the specimens was identified as type of *Octolepis dioica* f. *oblanceolata* by CAPURON. The sheet, bearing the accession number P-00077575, was annotated as the “Type de la forme”, the second (P-00077576) bears an isotype label affixed to the lower half of CAPURON’s annotation slip, and the third is marked “Isotype d. l. [= de la] forme”. The style of the labels, the handwriting, and the completeness of the label information differs between all three sheets, but none of the data on the labels contradicts the protologue. Sheet (P-00077575) is the only sheet

without the isotype designation and is selected as the lectotype.

*Octolepis oblanceolata* was originally considered to be a form of *O. dioica* by CAPURON (1963). The species is distinguished from *O. dioica* by its larger, oblanceolate or more broadly obovate leaves, its more strongly arched secondary veins in the upper half of the leaves, its more often acute apices, its undulate leaf margins, its longer pedicels ((9.0-) 11.0-15.0 vs 4.0-10.0(-14.0) mm long), and its larger flowers (11-13 vs 8-11 mm wide).

Four collections are excluded from *Octolepis oblanceolata* as circumscribed above. Three of them (*A. Randrianasolo 790*, *Ludovic 721* and *734*) have been made recently at Mahabo forest, a littoral forest fragment along Madagascar’s southeast coast, and appear to be the first ever collected on sand in Madagascar (*Octolepis casearia* is frequently collected on sand in continental Africa). The fourth collection, *Service Forestier 25524*, was made in 1965 with an incomplete locality on the label, although it was probably made somewhere to the south of Mantadia National Park. There is also a good possibility that the collection was made near the coast, because it shares morphological similarities with the Mahabo specimens. All four collections have leaves that are clearly larger than those of *O. dioica*, resembling some of the broadly oblanceolate leaves found on plants of *O. oblanceolata*. However, these excluded specimens differ in having densely sericeous pedicels, and their smaller, much more densely pubescent fruits with 3, or rarely 4, dehiscence lines.

ADDITIONAL MATERIAL EXAMINED. — MADAGASCAR: *Prov. Toliara: Randriamampionona 1308*, Andohahela National Park, Emalio, Andranolava, Site de suivi éco-tourisme, [24°41’S, 46°45’E], 25 Aug. 1996, fr. (MO!, P, TAN!); *Réserves Naturelles (Rakotoson) 10072*, Canton Behara, district Amboasary, [24°41’S, 46°45’E], 5 Nov. 1958, ♂ fl. (P!, TEF!); *Randrianaivo et al. 880*, Fivondronona Fort-Dauphin, Commune (Fokontany) Ampasinampo, Forêt de Ambatomitikitra, à 3 km W du village St Jacques, forêt humide de basse altitude, 400-700 m, 24°58’56”S, 46°57’30”E, 2 Dec. 2002, fr. (MO!, P, TAN!); *Rogers et al. 101*, same locality, 520-660 m, 24°58’57”S, 46°57’24”E, 25 Jan. 2003, st. (MO!); *Rogers et al. 102*, same locality, fr. (MO!, P!, TAN!); *Rogers et al. 103*, same locality, fr. (MO!).

## 6. *Octolepis ratovosonii* Z.S.Rogers, sp. nov.

*Haec species quoad speciebibus aliis Octolepidis ab pedicellis 1.6-2.5 cm longis, petalis 10 (haud 5), staminibus vel staminodiis 20 (haud 10, raro 8 vel 12) et pericarpio indumento denso bistrato praedito strato exteriore trichomatibus urticantibus constante differt.*

TYPUS. — Rogers, *Rakotonasolo & Ravelonarivo 165*, Madagascar, Prov. Antsiranana, Anjanaharibe-Sud Réserve Spéciale, c. 2 km NE of main road, along trail to Ranomafana thermal spring, 976 m, 14°45'05"S, 49°29'45"E, fr. (holo-, MO!; iso-, BR!, K!, P!, TAN!, WAG!).

Trees to 9 m tall; young stems densely to sparsely strigose-tomentose. Leaves alternate to opposite; blades broadly elliptic or obovate, c. 6.6-16.5 × 2.3-5.3 cm, length/width ratio c. 2.5-4:1, coriaceous, surfaces discolorous, dark green and glabrous adaxially, abaxial surface dries a distinctive light green, sparsely strigose or glabrescent, apex retuse or notched, margin sparsely strigose or glabrescent, flat or slightly undulate, strongly revolute, more so near base, base short attenuate or cuneate; midrib moderately strigose or nearly glabrous; venation raised on both surfaces, higher order venation raised or inconspicuous, secondary veins c. 7-11 pairs, angle of divergence from midrib 45-65°, submarginal vein loop c. 3-6 mm from margin; petioles 8-16 mm long, 1-2 mm in diam., strigose-tomentose. Inflorescences axillary, borne on foliated or defoliated portion of stem, 1-flowered; pedicels (in fruit) 1.6-2.5 cm long, (1.5-)-2.0-3.0 mm in diam., surface obscured by dense indument. Flower buds 5.1-7.0 × 4.0-6.1 mm, surface obscured by dense indument, rugose. Flowers (description based on staminate flower buds and persistent organs in fruit) with 4-6 sepals; sepals triangular or ovate, (0.8-)-1.0-1.1 × 0.5-0.9 cm, very coriaceous, c. 2-4 mm thick (in fruit), both surfaces obscured by dense indument, trichomes c. 0.3-0.4 mm long; petals 10, densely to moderately strigose; each petal lobe narrowly triangular, 2.4-3.1 × 0.4-0.6 mm, length/width ratio c. 4-6:1, coriaceous, apex acute. Staminate flowers with 20 stamens. Pistillate flowers with 20 staminodes; staminodes 1.5-1.9 mm long, 0.3-0.4 mm wide (at base), ± smooth, glabrous; rudimentary anthers well

developed, c. 1.0-1.1 × 0.3-0.4 mm; ovary surrounded by many erect receptacle trichomes, trichomes c. 1.5-2.5 mm long. Fruits ovoid-subspheroidal, 2.4-2.9 × 2.2-2.8 cm; dehiscence lines (4-)-5 or 6 (i.e. 4-6 carpels develop), strongly depressed, bicarinate on both sides of line; pericarp fleshy, 7-8 mm thick, rugose and pitted, surface obscured by 2-layered indument, shorter layer dense, trichomes 0.2-0.3 mm long, erect, soft, longer layer sparse, trichomes c. 1.5 mm long, erect, stiff, stinging (when fresh); persistent style 2-4 mm long. Seeds red-brown, 1.3-1.7 cm long, 7-9 mm wide, surface obscured by dense puberulent indument. — Fig. 6.

DISTRIBUTION AND PHENOLOGY. — *Octolepis ratovosonii* occurs in humid forests, from 800-1250 m elevation (Fig. 7). The species has been collected in flower bud in February and in fruit in February, July, and August.

VERNACULAR NAMES. — None available.

CONSERVATION STATUS. — *Octolepis ratovosonii* is known from three formally protected areas (Anjanaharibe-Sud RS, Manongarivo RS, Zahamena PN). The extent of occurrence of the species is c. 28000 km<sup>2</sup>. Area of occupancy is c. 10000 km<sup>2</sup> based on a 50 km grid cell size (cell width/height, not area). *Octolepis ratovosonii* should be considered Near Threatened (NT).

*Octolepis ratovosonii* differs markedly from all other species in the genus by having 10 (vs 4-6) petals, 20 (vs 10, rarely 8 or 12) stamens and staminodes, and larger flowers (probably 3-4 times larger than other species based on the flower buds). Other distinguishing features include its densely pubescent, long and robust (c. 1.6-2.5 cm × 1.5-3.0 mm) pedicels, its large, thickened, densely pubescent sepals, its thick, rugose, pericarp covered in by a two-layered indument, the longer of which is composed of stinging trichomes, and its densely puberulent seeds. *Octolepis ratovosonii* can be recognized vegetatively from the other Malagasy species by having the largest, thickest, leaves with the most revolute margins, and by the light green color of the blades after drying.

The epithet has been chosen in honor of Fidisoa RATOVOSON, a Malagasy botanist, who

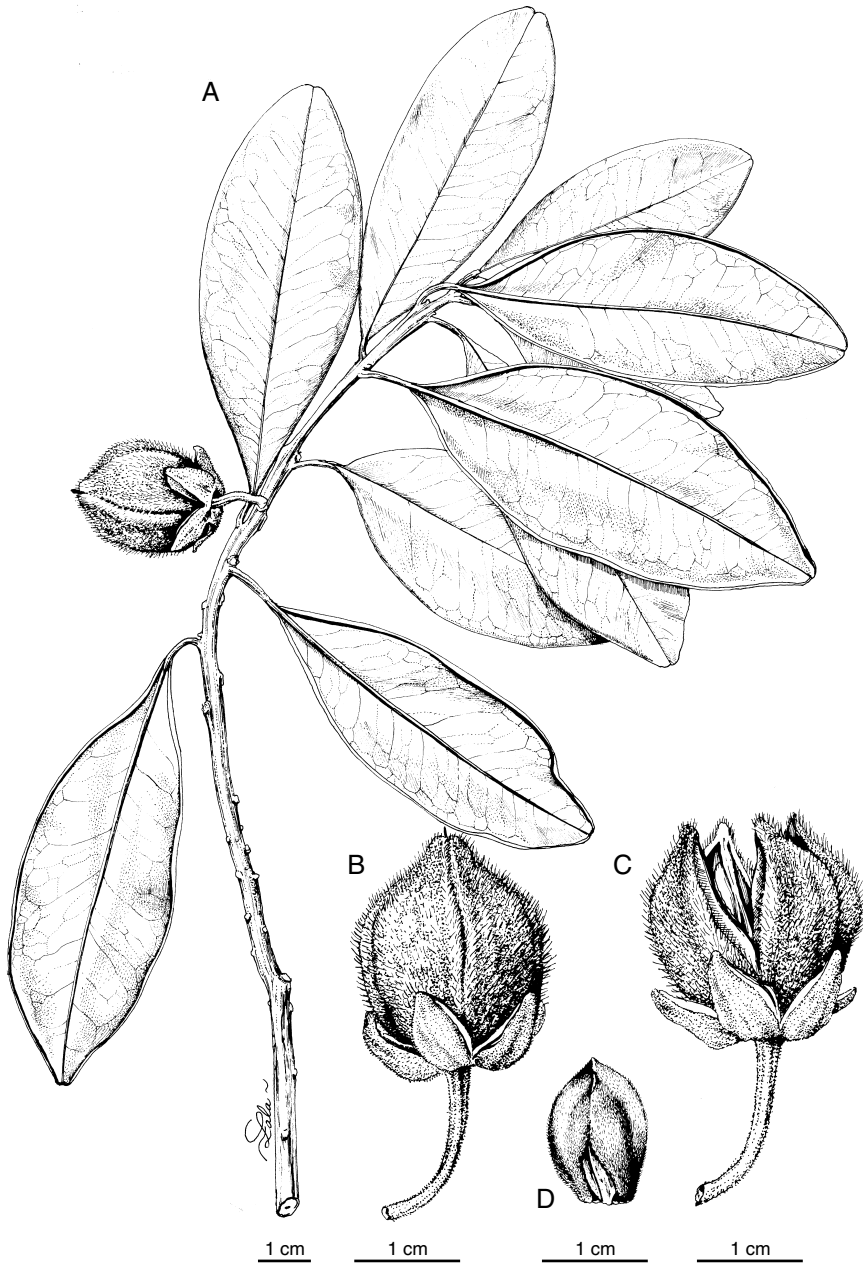


FIG. 6. — *Octolepis ratovosonii* Z.S.Rogers, **sp. nov.**: **A**, habit; **B**, fruit capsule; **C**, capsule after dehiscence; **D**, densely puberulent seed. Rogers *et al.* 165 (TAN, type).

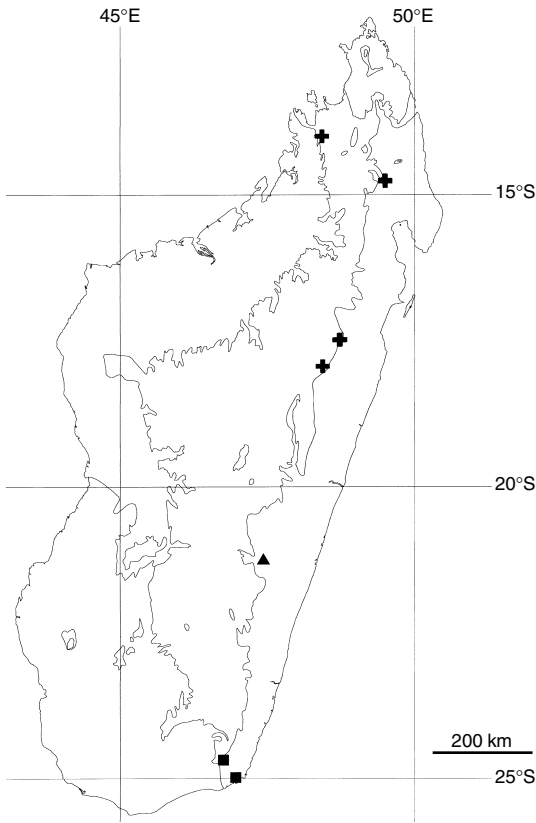


FIG. 7. — Distribution map of *Octolepis aymoniniana* Z.S.Rogers (▲), *O. oblanceolata* (Capuron) Z.S.Rogers (■), and *O. rativosonii* Z.S.Rogers (✚).

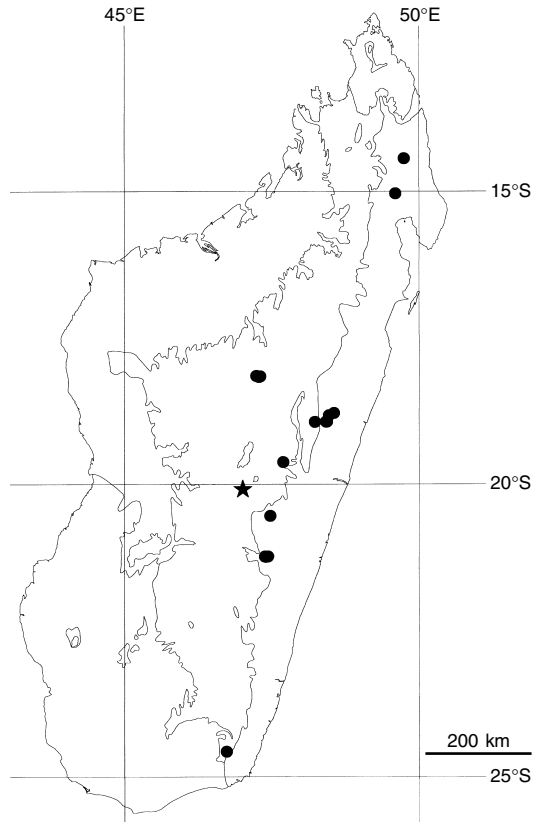


FIG. 8. — Distribution map of *Octolepis dioica* Capuron (●) and *O. ibityensis* Z.S.Rogers (★).

collected the species on two occasions at Zahamena National Park, and whose contributions have greatly increased our knowledge of the flora in that region.

PARATYPES. — MADAGASCAR: *Prov. Antsiranana: Razafoamandimbison et al. 229*, Anjananharibe-Sud Réserve Spéciale, au sud de campement à Mandritsarahely, 985 m, 14°46'S, 49°30'E, 10 July 1996, fr. (G!, MO!, TAN!); *Rogers et al. 164*, Anjananharibe-Sud Réserve Spéciale, c. 2 km NE of main road, along trail to Ranomafana thermal spring, 976 m, 14°45'05"S, 49°29'45"E, 18 Feb. 2003, ♀ y.fl., fr. (MO!); *Rogers et al. 166*, same locality, ♂ y.fl. (MO!); *Wohlhauser et al. 350*, Manongarivo Réserve Spéciale, Vallée de l'Ambahatra (cours supérieur), Bassin de l'Ambahatra (bras gauche, à l'ouest d'Andetryfotsy), 1200 m, 14°00'S, 48°26'E, 21 Nov.

2000, fr. (G!). — *Prov. Toamasina: Rativoson et al. 247*, Zahamena National Park, Fivondronana Ambaton-drazaka, Firaisana Antanandava, Ankosy, Ambarikely (3 km à l'Est d'Ankosy), 996-1250 m, 17°28'48"S, 48°49'33"E, 12 July 2000, y.fr. (MO!, P, TEF!); *Rativoson et al. 726*, Zahamena National Park, 800-850 m, 17°29'S, 48°43'E, 3 Aug. 2003, fr. (MO!, P, TEF!); *Service Forestier (Razakamalala & Norbert) 34487*, Ambodivoahangy, Fir. Antanandava, Fiv: Ambaton-drazaka, [17°56'S, 48°26'E], 15 Sept. 1997, fr. (TEF!).

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