

**A SURVEY OF THE SPECIES OF THE GENUS
ADENIA (PASSIFLORACEAE)
IN MADAGASCAR, WITH SOME NEW COMBINATIONS,
THE DESCRIPTION OF SOME NEW TAXA, AND A KEY
TO THE SPECIES**

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Résumé : Aperçu des espèces malgaches du genre *Adenia* (Passifloracées) avec une clef des taxons. Discussion des caractères des membres d'un groupe d'espèces cohérentes et difficiles à distinguer. Proposition de quelques espèces et combinaisons nouvelles pour Madagascar.

The first *Adenia*'s from Madagascar have been described, under the synonymous generic name *Modecca*, by TULASNE in 1857 as *M. antongiliana* and *M. refracta*. Additional species were proposed by BAKER in 1882: *M. densiflora*, in 1884: *M. peltata*, in 1887: *M. hederaceifolia*, and in 1890: *M. cladosepala*. In 1903 JUELLE gave an ample description of *Ophiocaulon fringilavense* Drake. In 1909 CLAVERIE added four species more, namely *Adenia olaboensis*, *A. sphaerocarpa*, *A. Perrieri* and *A. ambongensis*. In 1940 PERRIER DE LA BÂTHIE described the remaining hitherto known species, viz. *A. monadelphica*, *A. subsessilifolia* (with the forma *pyromorpha*), *A. elegans*, *A. epigea* (with the var. *stylosa*), and two new subspecies in *A. sphaerocarpa*: ssp. *mandrarenensis* and ssp. *isaloensis*. *A. hederaceifolia* (Baker) Schinz was recognized by PERRIER as being synonymous with *A. peltata* (Baker) Schinz; *A. cladosepala* (Baker) Harms was recorded as a not sufficiently known species. All this was enumerated again in his treatment of the *Passifloraceae* in the " Flore de Madagascar et des Comores " published in 1945.

The monographing of the genus *Adenia* necessitated, also in the light of the recently augmented material available, the revision of PERRIER's rather recent treatment. PERRIER recognized 13 species and 4 taxa of subspecific rank, based on c. 110 different collections, whereas the present author had over 225 collections at his disposal, thus the material roughly being doubled since 1945.

Careful examination of the often fragmentary or incomplete material¹

1. Most species are dioecious, and not rarely flowering when leafless; they are often of a more or less succulent habit and hence difficult to dry.

revealed that a part of PERRIER's taxonomic conclusions should be changed and, moreover, that the recently collected material harboured again a few still undescribed species. It was confirmed that, as PERRIER already stressed, all Madagascar species are endemic to the island. In addition it appeared that many species are even distinctly locally endemic, which is most likely correlated with the great variety in habitats, which causes a relatively great species-density in comparison to the African continent. It is interesting in this respect, that adjacent East- and tropical South-Africa are the regions which are next relatively richest in species with regard to the remaining area of the genus.

The here adopted 21 Madagascan species fall, mainly on account of the shape of the hypanthium, apart into two main groups: one group ("Groupe I" with PERRIER) contains a single species, *A. densiflora*, with a broad saucer-shaped hypanthium and which belongs to Sect. *Microblepharis* (Wight & Arnott) Endlicher, the remaining 20 species ("Groupe II" with PERRIER) with the hypanthium narrow, much longer than wide, are allied with some east-african species, including the type species of the genus *A. venenata*, and hence belong to sect. *Adenia*.

Most species of Madagascar seem to some extent characterized by the mode in which the stem-base is thickened or not, or if and how subterranean tubers are present (cf. PERRIER DE LA BÂTHIE, 1940, 1945).

The greater part of the Malagasy species is easily distinguished by various other conspicuous vegetative- as well as flower-characters, and their identification cause no problems. Some members of a "block" of small coherent species appear, however, sometimes to be difficult to determine. Comparable "blocks" of more or less reticulately-knit species are found in *Adenia* e.g. in the section *Ophiocaulon* (see DE WILDE in Acta Bot. Neerl. 17, 2: 126-136 (1968) or in the species related to *A. lobata* (section *Blepharantes*) (see DE WILDE in Acta Bot. Neerl. 17, 4: 288-293 (1968)).

Precursory to the monograph of the whole genus *Adenia* the present ad-interim publication aims, beside the description of some new taxa and the enumeration of the Malagasy species in the form of a synoptic key with annotations, to draw attention to the distinction between the above mentioned "difficult" species.

KEY TO THE SPECIES

1. Male flowers slender; hypanthium narrow, usually much longer than wide, gradually passing into the flower stipe.
2. Leaf scars in dried specimens not distinctly wart-like raised.
3. Blade-base not- or slightly peltate, with the glands relatively large, at the apex of the petiole or an small auricles not- or only partially extending on the peltate part of the blade; glands not exclusively on the peltate part.

4. Gland at blade base 1 *A. olaboensis* Claverie
4. Glands at blade base 2.
 5. Leaves primarily deeply 5-parted. *A. Perrieri* Claverie
 5. Leaves entire or 3(-5)-lobed, or 3-parted.
 6. Filaments inserted at or near the base in the hypanthium ; sepals erect or spreading.
 7. Leaves sessile.
 8. Plant without tendrils. Leaves $1\frac{1}{2}$ -6 cm long. *A. pyromorpha* (H. Perr.) de Wilde
 8. Plant with tendrils. Leaves $1-1\frac{1}{2}$ ($\cdot 2\frac{1}{2}$) cm *A. subsessilifolia* H. Perr.
 7. Leaves with petioles at least $\frac{1}{3}$ as long as the blades.
 9. Leaf-blades small, up to $3\frac{1}{2}$ cm, with rounded apex, entire or mostly 3-lobed or 5-parted, the lobes often once more lobed or parted *A. elegans* H. Perr.
 9. Leaf-blades larger, with rounded or acute apex, entire or lobed.
 10. Stipe of male flowers 3-9 mm, occupying less than $\frac{1}{3}$ of the total length of the 27-36 mm long flower *A. antongilliana* (Tul.) Schinz
 10. Stipe of male flowers ($6\frac{1}{2}$ -) 10-24 mm, occupying about the half of the 19-55 mm long flower.
 11. Inflorescences axillary to normal leaves, mostly peduncled, mostly with a tendril. Leaf-blades usually less than 7 cm long.
 12. Male flowers 19-25 (-30) mm. Filaments included in the hypanthium.
 13. Glands at blade-base on the apex of the petiole, not extending on the slightly peltate blade-base. Stigma's sessile. Fruits ovoid, 6-7 cm long *A. furingalavensis* (Drake ex Jumelle) Harms var. *stylosa* (H. Perr.) de Wilde
 13. Glands at blade base partially on the apex of the petiole, partially on the \pm thickened slightly peltate (sagged) blade-base. Stigma's on distinct free style arms. Fruits ellipsoid, $4-4\frac{1}{2}$ cm *A. isaloensis* (H. Perr.) de Wilde

12. Male flowers 30-40 mm. Filaments mostly extending considerably beyond the hypanthium. Base-glands restricted to the apex of the petiole, not partially on the slightly peltate blade-base . . . *A. longestipitata* de Wilde
11. Inflorescences mostly sessile, without tendrils, axillary to reduced leaves arranged on short-shoots. Leaves larger, (3-)5-20 cm.
14. Glands at blade base on or largely on the apex of the petiole; not on auricles. Leaves grey, whitish or glaucous beneath, with reticulate venation. Filaments extending beyond the hypanthium. Disk glands distinctly spaced.
15. Leaves with acute apex; without minute appendages beneath. Male flowers very slender. Anthers 4-5½ mm. Stigma's sessile
A. fringalavensis (Drake ex Jum.) Harms
15. Leaves mostly blunt, on the lower surface densely set with whitish scale-like appendages well visible with a lens. Male flowers less slender. Anthers 6-8 (-9) mm. Stigma's on free style arms
. *A. cladosepala* (Baker) Harms
14. Glands at blade base on two auricles lateral at the apex of the petiole. Leaves greenish beneath, with trabeculate venation between the main nerves. Filaments and part of the anthers included in the hypanthium. Disk an entire ring, or consisting of 5 contiguous parts
. *A. sphaerocarpa* Claverie
6. Filaments inserted in- or near the throat in the hypanthium; sepals recurved.
16. Plant erect, without tendrils. . . *A. ecirrosa* de Wilde
16. Plant climbing, provided with tendrils.
17. Fruits ovoid, c. 5 cm long . . . *A. monadelpha* H. Perr.
17. Fruits elongate-fusiform, c. 13 cm long
. *A. epigea* H. Perr.
3. Blade-base distinctly, 1 ½-8 mm wide, peltate, membranous (not thickened), bearing 0-3 minute glands exclusively on the peltate part.

- 18. Leaves entire, mostly with (1-) 2 distinct blade-glands; gland at blade-base 1. Leaves membranous
..... *A. Boivinii* de Wilde
- 18. Leaves entire or lobed, without blade-glands; glands at blade-base (0-)1-3.
 - 19. Gland at blade-base (0-) 1; filaments inserted about halfway in the hypanthium. Stigma's on free style -arms. Leaves mostly coriaceous
..... *A. refracta* (Tul.) Schinz
 - 19. Glands at blade base (0-) 2-3; filaments inserted in the throat of the hypanthium. Stigma's \pm sessile. Leaves \pm membranous..... *A. peltata* (Baker) Schinz
- 2. Leaf scars in dried specimens distinctly raised, giving the branches a knobby appearance.
 - 20. Leaves oblong with acute base . . . *A. pachyphylla* de Wilde
 - 20. Leaves ovate-elliptic, with obtuse or rounded base.
 - 21. Leaves with obtuse to subacute apex. Glands at blade-base 1-2, partially extending on the petiole. Stipe of female flowers $2\frac{1}{2}$ - $3\frac{1}{2}$ mm *A. fasciculata* de Wilde
 - 21. Leaves with acute-acuminate apex. Gland at blade-base 1, on the margin of the 1-2 mm broad peltate blade -base. Stipe of female flowers c. 1 mm.... *A. acuta* de Wilde
- 1. Male flowers broad; hypanthium much wider than long, well marked off from the stipe *A. densiflora* (Baker) Harms

EXCLUDED SPECIES : *A. membranifolia* (Baker) Harms = *Deidamia bipinnata* Tul.

The group of closely related " difficult " species referred to above comprises the following species: *A. pyromorpha*, *A. subsessifolia*, *A. elegans*, *A. antongilliana*, *A. isaloensis*, *A. longeslipitata*, *A. firingalavensis*, *A. cladosepala* and *A. sphaerocarpa*. They are characterized by two basal leaf glands and slender, tubular-infundibuliform male flowers with the filaments inserted at or near the base in the long cup-shaped hypanthium.

As already appears from the key some of these species are mutually only slightly differing and seem more or less arbitrarily separated; they are sometimes characterized mainly only in vegetative characters, but sometimes by good flower-characters, or both. I could not find, however, sufficient reasons to reduce some of them; in contrary, the description of one of new species in this group, *A. longeslipitata*, seemed justified.

It is remarked here, that much of the available material on which the species are based is poor, and that future collecting and field observations certainly will bring more light in this still rather obscure group. Future revisers should, therefore, be particularly cautious in describing new species and rather try, with more evidence at hand, to prove the possible untenability of some of the here accepted species.

The most significant differentiating characters of the "difficult" species mentioned above, together with some observations, are given below in short descriptions:

Adenia subsessifolia H. Perr.

Not. Syst. 9 : 50 (1940). — LECTOTYPE : *Perrier de la Bathie 19144*, Lac Manampetsa, Madagascar (P).

OTHER MATERIAL EXAMINED :

MADAGASCAR : *Afzelius s.n.* (S), Tuléar ; *Bosser 14233* (P), Androka à Ampanihy ; *Decary 3595* (P), Ambovombe ; *8369* (P), Behara ; *8458* (P), Ambovombe ; *8527* (P), Ambovombe ; *856* (P), Ambovombe ; *8573* (P), Ambovombe ; *8836* (P), Antanimora ; *9459* (P), N. de Behara ; *18574* (P), Baie de St. Augustin ; *Déquaire 27409* (P), Tuléar ; *Humbert 29381* (P), Bevoalava à Ankazondranto ; *Humbert & Capuron 29546* (P), estuaire de l'Oaylahy ; *Keraudren 1396* (P), Lac Tsimanampetsotsa ; *1522* (P) Imonty ; *Leandri 3666* (P), Tuléar ; *4096* (P), Lac Tsimanampetsotsa ; *4915* (P), NE. d'Efocetsi ; *4947* (P), Lac Tsimanampetsotsa ; *4966* (P), Lac Tsimanampetsotsa.

Adenia pyromorpha (H. Perr.) de Wilde, *stat. nov.*

BAS. : *Adenia subsessifolia* H. PERR. forma *pyromorpha* H. Perr. Not. Syst. 9 : 51 (1940) — LECTOTYPE : *Humbert 11712*, Betroka, Madagascar (P; iso-B).

OTHER MATERIAL EXAMINED :

MADAGASCAR : *Bosser 13914* (P), S. de Betroka ; *Humbert 11599* (P), Betroka ; *Lam & Meuse 5529* (L.), Betroka à Ihosy.

NOTE : Both *A. subsessifolia* and *A. pyromorpha* are sufficiently characterized by the sessile or subsessile leaves.

Adenia elegans H. Perr.

Not. Syst. 9 : 51 (1940) — LECTOTYPE : *Decary 3757*, Ambovombe, Madagascar (P) — PL. 1, b-b', c-c'.

OTHER MATERIAL EXAMINED :

MADAGASCAR : *Bosser 16359* (P), Belalana ; *Decary 3185* (P), Ambovombe ; *8413* (P), Ambovombe ; *9324* (P), Farigidraty ; *15965* (P), Distr. de Betloky ; *Humbert 2767* (K, pp.), Isalo-Sud ; *2932* (P), Isalo ; *12969* (P), vallée de la Manambolo ; *Leandri 3790* (P), Tuléar ; *Leandri & Saboureau 4290* (P), bassin de la Mananara ; *4266* (P), Imonty ; *4559* (P), Imonty ; *Peltier 1433* (P), Betloky ; *Perrier de la Bathie 19123* (P), Lac Manampetsa.

Small, slender liana, with cylindrical stem base ; roots forming subterranean tubers. *Leaves* small, deeply 3-lobed or 3-partite, more rarely entire, the lobes often once more 3-partite or -lobed, apex obtuse, 1-3½ (-4) ×

PL. 1. — Leaves of various *Adenia* species, seen from beneath (× ½), with details of the gland-bearing basal parts (× 5). Details of each species seen either only from above, or from beneath (left) and above (right) respectively. Directly visible part of glands in detail-drawings solid black: a, *A. longstipitata* de Wilde (*Humbert 6712*, P, holotype) ; b, *A. elegans* H. Perr. (*Perrier de la Bathie 19122*, P, syntype) ; c, *id.* (*Leandri 4559*, P) ; d, *A. isaloensis* (H. Perr.) de Wilde (*Humbert 2767*, P, lectotype) ; e, *A. firingalavensis* (Drake ex Jumelle) Harms var. *firingalavensis* (Greot 222b, P) ; f, *firingalavensis* (Drake ex Jumelle) Harms var. *stylosa* (H. Perr.) de Wilde (*Perrier de la Bathie 6756*, P, holotype) ; g, *A. antongilliana* (Tulasne) Schinz (*Richard 28*, P, holotype) ; h, *A. cladosepala* (Baker) Harms (*Perrier de la Bathie 1969*, P) ; j, *A. sphaerocarps* Claverie (Herb. Cambeselles s.n., MPU).

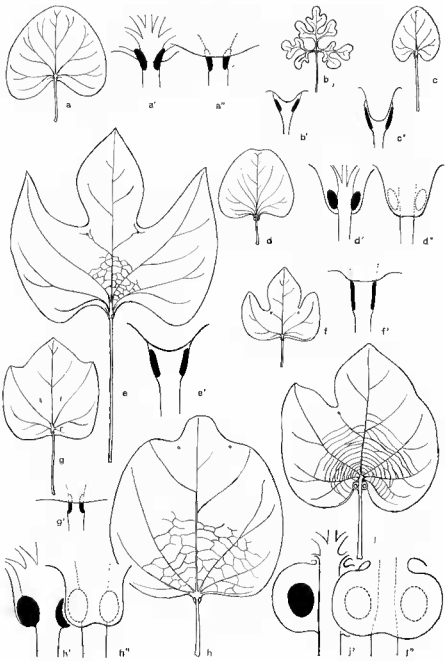


Planche I

1-4 cm. Petiole 1-3 cm. Leaves \pm coriaceous, mostly grey-glaucous at both sides, with rather distinct reticulate venation beneath, without whitish "hairs". Glands at blade-base situated largely on the apex of the petiole, hardly extending on the \pm cuneate, slightly peltate, blade-base. *Inflorescences* sessile, without tendrils, or \pm peduncled and provided with a tendril, usually axillary to normal leaves. *Male flowers* 34-47 mm, sepals 11-18 mm long. Filaments 4-8 mm, the basal 2-4½ mm connate, extending beyond the hypanthium or not. Anthers (5)-6-7 mm. *Female flowers* including the 5-11 mm long stipe, 23-32 mm long. Pistil 10-15 mm. Stigma's on 2-3 mm long free style arms. *Fruit* \pm fusiform, excluding the 2-5 mm long gynophore 5-6 \times 2½-3 cm.

S. and SW. Madagascar; 0-1000 m alt.

NOTE: This species is primarily characterized by its small, usually deeply 3-lobed or -partite leaves, with relatively long petioles. It is apparently most related to *A. isaloensis* and *A. longestipitata*, with which it is partially sympatric. Apart from the above mentioned leaf characters it is distinguished from *A. isaloensis* e.g. by the much larger male- and female flowers, the different shape of the blade-base and the position of the basal glands, and also by the about twice as long female flower stipes, which becomes particularly evident in fruiting specimens. From *A. longestipitata* it is distinguished e.g. by the different shape, size and consistency of the leaves.

***Adenia antongilliana* (Tulasne) Schinz**

in ENGL. Bot. Jahrb. 15, Beibl. 33 : 3 (1892).

BAS. : *Madecca antongilliana* Tulasne, Ann. Sc. Nat., sér. 4 (8) : 51 (1857) —

TYPE : *Richard 23*, Antongil, Madagascar (holo-, P). — Pl. 1, g-g'.

OTHER MATERIAL EXAMINED:

MADAGASCAR : *Boivin 2569* (P), Port Levee; *Richard 10* (P), Antongil; *Perrier de la Bâthne 6741* (P), Sambava; s.n. (P), Ambavahibe.

Small liana, with cylindrical, not thickened stem base. *Leaves* entire or 3-lobed in the upper half, apex acute or subacute, 3-6 \times 3-6 cm. Petiole 1½-3½ cm. Dry leaves thinly coriaceous, pale greenish beneath, with rather fine, distinct venation, and with scattered short, thick, whitish "waxy" hairs visible with a lens. Basal glands laterally at the apex of the petiole, not extending on the membranous, (1-) 2 mm wide peltate blade-base. *Inflorescences* peduncled, provided with a tendril, axillary to normal leaves or sessile in 1-2 cm long short-shoots, without tendrils. *Male flowers* including the 3-9 mm long stipe, 27-36 mm; sepals 15-23 mm long. Filaments 6-10 mm, the basal 1-5 mm connate, well emerging from the hypanthium. Anthers 5½-9 mm long. *Female flowers* & *fruit* not known.

NE. Madagascar. Low altitudes.

NOTES : This species is distinguished from apparently its closest relative, *A. longestipitata*, by the short stipe in the male flowers and the long anthers.

It shares the presence of microscopical white "waxy" hairs with *A. cladosepala*, but in this latter species this feature is much more significant.

Adenia isaloensis* (H. Perr.) de Wilde, *stat. nov.

BAS. : *Adenia sphaerocarpa* Claverie ssp. *isaloensis* H. Perr., Not. Syst. 9 : 56 (1940). — LECTOTYPE : *Humbert 2767*, Isalo, Madagascar (P; isolecto-, K pp) — Pl. 1, d-d^u.

OTHER MATERIAL EXAMINED:

MADAGASCAR: *Herb. d'Allenzette 2638 b.*, pp. (L.), Isalo; *Decary 15937* (P), Isalo; *15941* (P), Isalo; *16311* (P) Isalo; *16388* (P), Isalo; *Humbert 11220* (P), Isalo (Col des Tapia); *19555* (P), Isalo; *Keraudren 1115* (P), Isalo; *Leandri & Saboureau 3918* (P), Isalo; *3934* (P), Isalo; *Peltier 1269* (P), Isalo, près de Col des Tapia; *Perrier de la Bâllie 16619* (P), Isalo, Col des Tapia.

Usually small liana, growing from a subterranean tuber; stem-base above the ground cylindrical, not thickened. *Leaves* mostly small, entire or more rarely shallowly 3-lobed, apex rounded or obtuse, sometimes retuse, $1\frac{1}{2}$ -7 (-9) \times $1\frac{1}{2}$ -7 (-8) cm. Petiole $\frac{1}{2}$ -3 cm. Dry leaves thinly to thickly coriaceous, mostly distinctly grey-glaucous at both surfaces, finely reticulately nerved beneath. Glands at blade base situated partly at the apex of the petiole, partly on the more or less thickened, fleshy, semi-circular or slightly bi-lobed median "bulge" of the blade over the apex of the petiole. *Inflorescences* mostly distinctly peduncled, provided with a tendril, axillary to normal leaves. *Male flowers* small, including the $6\frac{1}{2}$ -12 mm long stipe, 19-28 mm long; sepals 7-10 (-13) mm. Filaments $4\text{--}5\frac{1}{2}$ mm, free or nearly so, included in the hypanthium. Anthers $4\text{--}5 \times 1\frac{1}{4}\text{--}1\frac{1}{3}$ mm. *Female flowers* including the 2-6 mm long stipe, 15-19 mm long. Pistil c. 9 mm. Stigma's on distinct, free, \pm recurved style-arms. *Fruit* ellipsoid-oblong, excluding the $3\frac{1}{2}$ -6 mm long gynophore $4\text{--}4\frac{1}{2} \times 2\text{--}2\frac{1}{2}$ cm.

Endemic in the Isalo mountains; 300-1200 m alt.

NOTES: Distinguished by its small male flowers, the small coriaceous greyish-glaucous leaves, and the position of the basal glands on the blade. *A. firingatavensis* var. *stylosa*, also with small male flowers, differs in addition by the sessile stigma's, the larger fruits, and the thickened stem base.

The material cited by PERRIER under his *A. sphaerocarpa* ssp. *isaloensis* belongs to three taxa; about the half represents the present species, the other half belongs to a here newly described species *A. longestipitata*, and one specimen (*Humbert 2915*) is a small-leaved form of *A. ataboensis*.

Adenia longestipitata de Wilde, *sp. nov.*

Liana mediocris, caule ad basin cylindrico, haud incrassato. *Folia* $1\frac{1}{2}$ - $6\frac{1}{2}$ × $1\frac{1}{2}$ -6 cm, integra vel leviter triloba, apice rotunda. Petioli $3\frac{1}{4}$ - $3\frac{1}{2}$ cm. Glandulae 2 folio basi instructae, lateraliter petiolo ad apicem insertae, haud extensae usque ad folii basin, basi peltata 1(-2) mm lata. *Inflorescentiae* pedunculo 1-4 cm longo, cirrosae. *Flores masculi* teneri, 28-40 mm longi, stipite 13-18 mm longo incluso. Sepala 12-16 mm longa. Filamenta hypanthio basi inserta, 5-7 mm longa, plerumque ultra hypanthium extensa. *Antherae* $4\frac{1}{2}$ -7 mm longae. *Flores femineae* ac fructus ignoti.

Small liana, the stem-base cylindrical, not thickened. *Leaves* entire or sometimes shallowly 3-lobed, apex rounded $1\frac{1}{2}$ - $6\frac{1}{2}$ × $1\frac{1}{2}$ -6 cm. Petiole $3\frac{1}{4}$ - $3\frac{1}{2}$ cm. Dry leaves membranous (herbaceous) to thinly coriaceous, ± greyish green beneath, distinctly finely reticulately veined, without whitish "hairs". Glands at blade base laterally at the apex of the petiole, not extending on the membranous 1(-2) mm broad peltate blade-base. *Inflorescences* 1-4 cm peduncled, provided with a tendril, axillary to normal leaves. *Male flowers* including the 13-18 mm long stipe 28-40 mm; sepals 12-16 mm long. Filaments ($4\frac{1}{2}$ -) 5-7 mm, free or up to 1(-2) mm connate into a tube at the base, usually well extending beyond the hypanthium. *Anthers* $4\frac{1}{2}$ -7 mm. *Female flowers & fruit* not known.

Southern part of Madagascar; 400-1200 m alt.

TYPE: *Humbert 6712*, bassin du Mandrare, Sud-Est, Madagascar (holo-, P). Pl. 1, a-a".

OTHER MATERIAL EXAMINED:

MADAGASCAR: *Herb. d'Alletzette 2608 b. pp* (L.), Isalo; *Cloisel s.n.* (P), Fort Dauphin; *Decary 3266* (P), Ambovombe; *Humbert 3018* (P), vallée d'Ihosy; *6832* (P), bassin du Mandrare; *11621* (P), Betroka; *12953* (P), vallée de la Manambolo; *13119* (P), vallée de la Manambolo; *Seyrig 102* (P), et *102 B* (P), Bekely à Tsivory.

NOTES: This species seems most related to *A. antongilliana* and *A. isaloensis*, especially to the former, from which it mainly differs by the relatively much longer flower stipe. From *A. isaloensis* it differs by the larger flowers, larger anthers, the different position of the glands at the blade-base, and the less coriaceous and much less grey-glaucous leaves.

A large part of the specimens cited by PERRIER DE LA BÂTHIE under his *A. sphaerocarpa* *ssp. isaloensis* belongs to the present species.

Adenia firingalavensis (Drake ex Jumelle) Harms

IN ENGL. & PRANTL, *Natürl. Pflanzenfam.*, ed. 21 : 490 (1925).

BAS. : *Ophiocaulon firingalavense* Drake ex Jumelle, *Compt. Rend. Acad. Sc. Paris* 137 : 206 (1903) — TYPE : *Perrier de la Bâthie 760*, Firingalava, Madagascar (holo-, P).

var. *firingalavensis* — Pl. 1, e-e'.

OTHER MATERIAL EXAMINED:

MADAGASCAR: *Appert 27* (Z), Befandriana-Sud; *Decary 18767* (P), Morombé; *Grevé 222a* (pp) (P), env. de Morondava; *222 b* (P), *do.*; *Humbert 11406* (P), Morondava à Tsiribihina; *18910-bis* (P), Plateau de l'Ankarana; *Humbert & Capuron 24392* (P), env. de Sumbave; *Perrier de la Bathie 2278* (K, P), Ambogo; *6751* (P), vallée du Sambirano; *6759* (P), Boina; *6760* (P), Ankarafantsika; *6761* (P), Ambongo; *15866* (P), Ankarafantsika; *18713* (P), Lokobe (Nossi-Bé); *Service Forester 24* (P), Ankarafantsika; *Thompson s.n.* (BM), *s.loc.*

Rather large liana. Thickened basal part of main stem more or less longly conical, up to 2 m long, up to 50 cm broad, abruptly narrowed at the apex into the climbing stem. *Leaves* mostly large, 3-10 (-17) × 2½-10 (-18) cm, envire or 3-lobed, apex acute or acuminate. Petiole 2-10 (-12) cm. Leaves herbaceous or thinly coriaceous, grey-glaucous beneath, distinctly reticulately veined beneath, without whitish "waxy" hairs. Glands at blade base situated lateral at the apex of the petiole, not or only very slightly extending on the ½-1 mm broad membranous, not thickened, peltate blade-base. *Inflorescences* mostly sessile, without tendrils, axillary to much reduced leaves arranged in short-shoots of ½-10 (-15) cm. *Male flowers* particularly slender, 30-55 mm long, with very slender 15-30 mm long sepals. Filaments 4½-8½ mm long, free or only up to 1 mm connate at the base, well emerging beyond the hypanthium. Anthers small, 4-5½ × ¼-1½ mm. *Female flowers* large, 30-40 mm. Pistil 12-14 mm. Stigma's subsessile on a 1½-2½ mm long common style, not on free style-arms. *Fruit* ovoid, excluding the short, 2-5 mm long gynophore 6-7 × 3-4 cm; dry valves coriaceous, c. ½ mm thick.

W, NW. and N. Madagascar; 0-500 m alt.

NOTE: Male specimens are quite characteristic and, in combination with the leaf-characters, easily recognized by the long slender flowers with slender thread-like sepals; the flowers are (sub) sessile and arranged along short-shoots.

var. *stylosa* (H. Perr.) de Wilde, *stat. nov.*

BAS.: *Adenia epigea* H. Perr. var. *stylosa* H. Perr., Not. Syst. 9: 53 (1940) — TYPE: *Perrier de la Bathie 6756*, vallée de la Loky, Madagascar (holo-, P) — Pl. 1, f-f'.

OTHER MATERIAL EXAMINED:

MADAGASCAR: *Hamolle 292* (P), Prov. de Diégo-Suarez; Sakarany; 308 (P), *do.*; 324 (P), *do.*; 357 (P), *do.*; *Humbert 18910-ter* (P), Plateaux de l'Ankarana; *18996-bis* (P), *do.*

Small liana, with a smaller, more spherical, thickened basal part. *Leaves* 3-7 cm long, apex rounded to acute, otherwise ± as in the type-variety. Petiole 2-5 cm. Leaves sometimes with sparingly whitish "waxy" hairs beneath. Glands at blade-base as in the type-variety.

Inflorescences mostly 1-7 cm peduncled, axillary to normal leaves, provided with a tendril. *Male flowers* small, 22-27 mm long; sepals 9-11 mm. Filaments c. 4 mm, free or nearly so, included in the hypanthium. Anthers 4-4½ × 1/4-1/3 mm. *Female flowers* 12-17 mm. Pistil 6½-8 mm. Stigma's sessile, on a c. 1 mm long common style. *Fruit* ovoid; dry valves coriaceous, 1½-3 mm thick.

N. Madagascar: apparently endemic in the province of Diégo-Suarez; 100-250 m alt.

NOTES: This variety was originally described by PERRIER DE LA BATHIE under *A. epigea*, but as appears already from his own comments, it does not belong there. On account of the general shape of the flowers, the very small anthers, and the basal glands of the leaves similar to those of *A. firingalavensis*, I have placed it under the latter species. The small male flowers are reminiscent of those of *A. isaloensis*, but in this species the basal leaf-glands are quite differently situated. In *A. isaloensis*, moreover, the stigma's are situated on distinctly free style-arms.

***Adenia cladosepala* (Baker) Harms**

in ENGL. & PRANTL, *Natürl. Pflanzenfam. Nachtr.* 1: 256 (1897).

BAS.: *Modacca cladosepala* Baker, *Journ. Linn. Soc.* 25: 317 (1890) — TYPE: Baron 5705, NW. Madagascar (holo-, K; iso-, P) — Pl. I, h-h".

SYN.: *Adenia ambongensis* Claverie, *Ann. Mus. Col. Marseille* 2, 7: 49 (1909) — TYPE: Perrier de la Bédhie 1473 bis, Manongarivo (Ambongo), Madagascar (holo-, P; iso-, K).

OTHER MATERIAL EXAMINED:

MADAGASCAR: Bossier 16665 (P), Mandritsara; Decary 15540 (P), Belo; 15674 (P), Soalala; Grévé 222a (pp.) (P), env. de Morondava; *Herb. Jard. Bot. Tananarive* 1188 (P), rocaille J.B.; Perrier de la Bédhie 1795 (P), Ambongo; 1969 (P), Tampoketsa (Ambongo); 6747 (P), Sekena; 16537 (P), SW. du Betsileo; 16600 (P), bassin du Filherena; 17838 (P), près de Soalala (Ambongo).

Rather robust liana, with a cylindrical, not thickened, stem-base. *Leaves* entire or shallowly 3-lobed, apex acute to obtuse, 3-14 × 2-13½ cm. Petiole 1½-5½ cm. Dry leaves thinly to thickly coriaceous, distinctly reticulately veined, distinctly grey-glaucous beneath, and mostly densely set with minute thick whitish, "waxy", hair-like appendages well visible with a lens. Basal glands largely situated on the apex of the petiole, but also more or less extending to on the ± thickened, slightly peltate semi-circular or ± bi-lobed median "bulge" of the blade-base. *Inflorescences* (sub-) sessile, without tendrils, axillary to much reduced leaves arranged in up to 10 cm long short-shoots. *Male flowers* 35-55 mm, sepals 13-22 mm long. Filaments 5½-9 mm, free or up to 3½ mm connate at the base, considerably emerging beyond the hypanthium. Anthers 6-8 (-9½) mm. *Female flowers* 35-57 mm; pistil 15-20 mm long. Stigma's on distinct, 1½-2 mm long free style-arms. *Fruit* ovate-ellipsoid, excluding the c. 5 mm long gynophore 5-7 × 2½-3 cm.

W. Madagascar; 0-800 m alt.

NOTES: Characterized by the large flowers and the inflorescences without tendrils arranged in short-shoots. Differs from the resembling *A. sphaerocarpa* by the different position of the basal leaf-glands, the glaucous or even \pm whitish lower leaf surface with numerous white hair-like appendages (only well visible with a lens), and the reticulate venation, which is in *A. sphaerocarpa* trabeculate.

The position of the basal glands resembles that of *A. isaloensis*. The species is distinguished from *A. firingalavensis* e.g. by the less slender male flowers, the larger anthers, the stalked, not sessile, stigma's, and the position of the basal leaf-glands.

Adenia sphaerocarpa Claverie

Ann. Mus. Col. Marseille 2, 7 : 38 (1909); *Perrier de la Bâthie*, Not. Syst. 9 : 55 (1940) emend. — LECTOTYPE: *Perrier de la Bâthie 15865*, bassin de la Bebakoly, Boina, Madagascar (P).

SYN. : *Adenia sphaerocarpa* Claverie subsp. *mandrorensis* H. Perr., Not Syst. 9 : 56 (1940) — LECTOTYPE : *Humbert & Swingne 5665* (P; iso, K). — Pl. 1, j-j^p.

OTHER MATERIAL EXAMINED:

MADAGASCAR : *Hb. Cambéssedes s.n.* (MPU), Fort Dauphin; *Commerson s.n.* (P), Fort Dauphin; *Decary 4716* (P), moyen Mandrara; *Descoings 3628* (P), Ihosy; *Herb. Jard. Bot. Tananarive 1187* (P), s. loc.; *Perrier de la Bâthie 1473* (P), Andriba; *1504* (P), Boina; *6744* (P), vallée d'Ihosy; *15865 bis* (P), Boina; *15865 ter.* (P), do.; *15866-bis* (P) do.; *Petit, s.n.* (P), Rés. du Bemaraka (Antsalova à Tsiandro); *Seyrig s.n.* (P), Belky à Tsiivory; *866-B* (P), do.; *Waterlot 184* (P), Soalabia.

Rather robust liana, with cylindrical, not thickened stem base. Leaves entire or more or less deeply 3-5 lobed, apex acute, rarely obtuse, 4-20 \times 3½-20 cm. Petiole 2-12 cm. Dry leaves thinly coriaceous, pale greenish beneath, without "waxy" hairs, with distinct venation which is trabeculate between the main-nerves. Glands at blade-base on two auricles lateral at the apex of the petiole; the auricles very slightly petalately connate over the apex of the petiole. Inflorescences sessile, without tendrils, axillary to much reduced leaves arranged in up to 15 cm long short-shoots. Male flowers 28-47 mm, sepals 10-15 mm long. Filaments 3-6 mm long, the basal 1-4 mm connate, rarely \pm free, entirely included in the hypanthium. Anthers 7-9 mm. Disk consisting of a continuous fleshy rim, or of 5 broad, contiguous parts, not lingulate and spaced. Female flowers 22-36 mm. Pistil 12-15 mm. Stigma's on rather short, ½-1 mm long free style-arms born on a 2-3 mm long common style. Fruit \pm fusiform, excluding the c. 5 mm long gynophore c. 6 \times 2½-3 cm.

W. and S. Madagascar; 200-800 m alt.

NOTES: Distinguished by various good characters, e.g. by the position of the basal leaf-glands on distinct auricles, by the leaves which are greenish, \pm trabeculate-veined beneath, by the often longly-connate filaments (sometimes inserted rather high in the hypanthium) which are

entirely included in the hypanthium, and by the disk consisting of a continuous ring or of 5 broad contiguous segments; in all other members of the present group the disk glands are lingulate and distinctly spaced.

Beside *A. longestipitata* the following five new species from Madagascar are described:

Adenia ecirrosa de Wilde, *sp. nov.*

Suffrutescens erecta, 2-3 m alta, ecirrosa. *Folia* 4-9 × 4-8 cm, profunde 3 (-5) lobata, lobis integris vel lobatis, 2-6 × 1-3½ cm, apice acuto ad obtuso. *Petiolus* 1½-4½ cm. *Glandulae* 2 folio basi instructae, collateraliter appendice mediana subbiloba glanduliformi insertae, appendice transitione folii ad petiolum sita. *Inflorescentiae* sessiles vel pedunculo usque ad ½ cm longo, ecirrosae. *Flores masculi* teneri c. 20 mm longi, stipite c. 5 mm longo incluso. *Sepala* c. 7½ mm longa. *Filamenta hypanthio* fauce inserta, c. 1½ mm longa, libera. *Antherae* c. 5 mm. *Flores feminei* ac fructus ignoti.

SW. Madagascar; at low altitudes.

TYPE: Herb. Jard. Bot. Tananarive 1141, rocailles JB., Madagascar (holo-, P).

OTHER MATERIAL EXAMINED:

MADAGASCAR: *Perrier de la Bâthie 19036* (P), Manampetsa.

Adenia Boivinii de Wilde, *sp. nov.*

Liana sat mediocris, ut videtur *Adenia peltata* (Baker) Schinz et *Adenia refracta* (Tul.) Schinz affinis, sed differt lamina glandulis 2 conspicuis munita. *Folia* 2-6½ × 2-3½ cm, integra, late ovata usque ad oblonga, basi peltata, truncata vel rotunda, 1-2 mm lata, apice acuta vel acuminata, acumine usque ad 2 mm longo. *Petoli* 2-3½ cm. *Folia membranacea*, 3-5-plinervia, interdum costa paria 0-3 nervorum primariorum emittente. Lamina in folii parte peltata glandula basali una munita, glandula recte infra marginem vel in parte mediana marginis posita, plerumque sat prope axillas nervorum basaliū validissimorum glandulis conspicuis (1-) 2. *Stipulae* minuae, longe triangulares, c. ½ mm longae. *Flores* ac fructus ignoti.

N. Madagascar: Prov. de Diégo-Suarez; limestone; 300-350 m.

TYPE: Boivin s.n., Nossi-Bé I., Loconbé, Madagascar (holo-, P)

OTHER MATERIAL EXAMINED:

MADAGASCAR: *Humbert 19068-bis* (P), Plateaux de l'Aukarana; *18983-bis*, pp. (P) *do.*

NOTE: The species is dedicated to *L. H. Boivin* (1808-1852), who made important collections (1846-1852) in E. Africa, several islands in the Indian Ocean and Madagascar.

Adenia pachyphylla de Wilde, *sp. nov.*

Liana usque ad 15 m longa. *Folia* 5-12 × 2-4 1/2 cm, integra, oblonga, basi acuta, apice acuminata, acumine usque ad 1 cm longo. *Petioles* 3/4-2 1/4 cm, post foliorum lapsum cicatricem distincte elevatam exhibentes. *Folia* coriacea crassa, 3 (-5)-subplinervia, nitentia. *Glandulae* 2 folio basi instructae, fere contiguae, appendice mediana glanduliformi instructae, appendice in petioli apice ad paginam superiorem sita. *Cirri* simplices vel trifidi. *Inflorescentiae* sessiles ecirrosae, in fasciculis parvis vel juxta brachyblastos dispositae. *Flores masculi* anguste campanulati, 19-22 × 2 1/2-3 mm, stipite 10-12 mm longo incluso. *Hypanthium* elongato-cupuliforme, 2-4 mm longum. *Calycis* tubus (0-) 1/4-1 1/4 mm longus. *Sepala* oblonga, obtusiuscula, 4-5 mm longa. *Petala* prope hypanthii faucem inserta, oblonga, 3 1/2-4 1/2 mm longa. *Filamenta* hypanthio ad basin posita, 2-3 1/2 mm longa, parte basali per 1 mm connata. *Antherae* c. 3 mm longae. *Septa* c. 1 mm alta. *Corona* nulla. *Disci glandulae* lingulatae, capitatae, c. 1/2 mm longae. *Ovarium rudimentarium* c. 1 mm longum, *gynophorium* c. 1 mm longo instructum. *Flores feminei* ac fructus ignoti.

Central Madagascar; c. 1200 m; once found.

TYPE: Cours 2864, Amparihifa-rambolosy, Madagascar (holo-, P).

NOTE: Related to *A. fasciculata* and *A. acuta*.

Adenia fasciculata de Wilde, *sp. nov.*

Liana usque ad 10 m longa. *Folia* 4-8 × 2 1/2-6 cm, integra, ovalia, basi rotunda, apice rotunda vel subacuta. *Petioles* 1-2 1/2 cm, post foliorum lapsum cicatricem distincte elevatam exhibentes. *Folia* coriacea 3-5-subplinervia vel plus minusve pinninervia, cineraceo-viridia opaca. *Glandulae* 1-2 folio basi instructae, transitione folii ad petiolum sitae, folii basi leviter peltata. *Cirri* simplices vel trifidi. *Inflorescentiae* sessiles ecirrosae, in fasciculis parvis vel juxta brachyblastos dispositae. *Flores masculi* ignoti. *Flores feminei* anguste campanulati, 8-12 × 2-3 mm, stipite 2 1/2-3 1/2 mm longo incluso. *Hypanthium* cupuliforme, 1 1/2-2 1/2 mm longum. *Calycis* tubus nullus. *Sepala* oblonga, obtusiuscula, 3 1/2-6 mm longa. *Petala* oblonga vel obovata, obtusa vel acuta, 1 1/3-2 × 1/4-3/4 mm, inter calycis lobos inserta. *Staminodia* 1 1/2-2 1/2 mm longa, parte basali per 1 mm connata, hypanthio ad basin posita. *Septa* 1/2-1 mm alta. *Corona* plus minusve nulla. *Disci glandulae* lingulatae, 1 1/4-2 mm longae. *Ovarium* ellipsoideum vel globosum, 2 1/2-3 × 2 1/4-3 mm. *Gynophorium* 1-2 mm longum. *Styli* c. 1 mm longi, liberi vel ad basin leviter connati. *Stigmata* subglobosa, lanato-papillata, c. 1 mm diam. *Fructus* in eadem inflorescentia 1-5-fasciculati, globosi vel ovoides, apice obtusiusculi usque ad acuti, 1 3/4-3 1/2 × 1 1/2-2 1/2 mm, *gynophorio* 4-8 mm longo excluso.

Central Madagascar; 850-1400 m.

TYPE: Cours 2086, Ankaraoaka, Madagascar (holo-, P).

OTHER MATERIAL EXAMINED:

MADAGASCAR: Bosser 17551 (P), *s. loc.*; *Perrier de la Bâthuz 6738* (P), NE, d'Ankazobe.

Adenia acuta de Wilde, *sp. nov.*

Liana sat mediocris usque ad 10 m longa. Folia $4-5\frac{1}{2} \times 2-3\frac{1}{2}$ mm, integra, ovato-ovalia, basi obtusa vel rotunda, apice acuta usque ad acuminata. Petioli $1-1\frac{1}{2}$ cm, post foliorum lapsum cicatricem distincte elevatam exhibentes. Folia leviter coriacea, pinninervia, supra nitentia, subtus opaca. Lamina in folii parte peltata glandula basali una munita, glandula recta infra marginem vel in parte mediana marginis posita, folii basi distincte peltata, 1-2 mm lata. Cirri simplices vel bi- vel trifidi. Inflorescentiae sessiles ecirrosae, pauciflorae, solitariae vel in fasciulis parvis. Flores ignoti. Fructus in eadem inflorescentia fasciculati 1-2 (-3), sessiles, ovaes (vel subglobosi), apice obtusi, $2-2\frac{1}{2} \times 1\frac{1}{2}-2$ cm, gynophorio c. 4 mm longo excluso.

Central Madagascar; c. 1000 m.

TYPE: d'Alleizelle 666 m, Analamazoatra, Madagascar (holo-, P).