



A synopsis of *Rhinacanthus* (Acanthaceae) in Angola and Namibia

Iain Darbyshire¹ , Leevi Nanyeni², Frances M. Chase² & Francisco M. P. Gonçalves³

Summary. The three species of the genus *Rhinacanthus* Nees occurring in Angola and Namibia are documented, including a full description of the new species *R. angolensis* I. Darbysh. and an expanded description of the scarce species *R. kaokoensis* K. Balkwill & S. D. Will. A key to their identification is provided, together with notes on their conservation status and species affinities.

Key Words. conservation, Guineo-Congolian, IUCN Red List assessment, justicioid, Kaokoveld, new species, taxonomy.

Introduction

The genus *Rhinacanthus* Nees (in Wallich 1832: 76) comprises 25 – 30 species, found mainly in tropical Africa, Madagascar and the Indian Subcontinent. Within the Acanthaceae, it is placed in the Diclipterinae clade of the “justicioid” lineage (McDade *et al.* 2000). *Rhinacanthus* is morphologically similar to *Justicia* L. sensu lato. It is distinguished by having the combination of a long, narrowly cylindrical corolla tube usually exceeding the length of the bilabiate limb and by the two stamens having bitheous anthers in which the thecae are offset and \pm oblique but, unlike in most *Justicia*, the lower thecae of each anther lacks a basal appendage or, if present, the appendage is poorly developed and inconspicuous (Darbyshire & Harris 2006). In addition, it has a long-stipitate and shortly beaked 4-seeded capsule.

The most recent molecular data on the “justicioid” lineage (Kiel *et al.* 2017) show that core *Rhinacanthus*, including species of the *R. nasutus* (L.) Kurz complex (sensu Darbyshire & Harris 2006), forms a clade within Diclipterinae. However, that study suggests that the delimitation of *Rhinacanthus* may need some refining, particularly with regard to the enigmatic Kenyan endemic *R. ndorensis* Schweinf. ex Engl. which appears to be both morphologically and phylogenetically distinct from core *Rhinacanthus*. The African forest species *R. virens* (Nees) Milne-Redh. is also resolved outside core *Rhinacanthus*, although it is morphologically close to the *R. nasutus* complex.

The taxonomy of *Rhinacanthus* has been studied across much of its African range in the recent past,

through a series of taxonomic papers and regional floristic treatments (Balkwill 1995; Darbyshire & Harris 2006; Ensermu Kelbessa 2006, 2009; Thulin 2006; Darbyshire *et al.* 2010; Darbyshire 2012; Darbyshire *et al.* 2015). These works have collectively added nine new or resurrected names in African *Rhinacanthus* as well as one new record for the continent. A new species from Sri Lanka, *R. flavovirens* Amaras. & Wijes., has also recently been described following studies of the genus in the southern Indian Subcontinent (Amarasinghe & Wijesundara 2011), but further work is still much needed on the Asian members of the genus. This is also true for Madagascar, where preliminary research has indicated that four out of seven endemic species on the island are undescribed (Madagascar Catalogue 2017).

The major taxonomic challenge in *Rhinacanthus* is the complex group of species around *R. nasutus*. In an earlier synopsis of the African members of this group, Darbyshire & Harris (2006) noted that two collections had been seen from south-western Angola (Pritchard 356 and Welwitsch 5010, both BM) that could not be placed with certainty. It was noted that, whilst these collections appear close to *R. zambesiacus* I. Darbysh. (wrongly named as *R. gracilis* Klotzsch in that paper; see Darbyshire 2012), they are geographically isolated from that species’ known distribution. A study of the Acanthaceae collections at the LUBA herbarium has revealed three further collections of the Angolan taxon. Detailed examination of the five available collections has confirmed this to be a further new species within the *R. nasutus* complex, and it is described as *Rhinacanthus angolensis* I.

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¹ Herbarium, Royal Botanic Gardens, Kew, Richmond, TW9 3AB, Surrey, UK. e-mail: i.darbyshire@kew.org

² National Herbarium of Namibia, Ministry of Agriculture, Water and Rural Development, National Botanical Research Institute, Private Bag 13184, Windhoek, Namibia.

³ Herbarium of Lubango, ISCED Huila, Sarmiento Rodrigues Str., C. P. 230, Lubango, Angola.

Darbysh. below. At the same time, *R. kaokoensis* K. Balkwill & S. D. Will. from northwest Namibia has been studied in detail by the authors of this paper for the forthcoming treatment of Acanthaceae in the new *Flora of Namibia* series (Chase 2017). New information on this species has come to light including confirmation of its presence in Angola. We therefore considered it useful to produce a synoptic treatment of the genus in Angola and Namibia here.

This work forms a part of ongoing taxonomic research into the Acanthaceae of Angola and Namibia. Acanthaceae species often form an ecologically important component of the vegetation in this region of Africa, with many species being locally abundant or dominant over large areas in the ground layer of open shrubland, desert and woodland. The Acanthaceae are also of potential conservation importance in view of the high number of localised and endemic species. For example, the genus *Petalidium* Nees has its centre of diversity in the Kaokoveld region of northwest Namibia and southwest Angola, “achieving densities unrivaled by other members of the family almost anywhere else on the planet” here, despite this being a hyper-arid region (Tripp *et al.* 2017: 3). Other important genera in terms of species richness and abundance in this region include *Monechma* Hochst. (sometimes treated as a synonym of *Justicia* L.), *Blepharis* Juss. and *Barleria* L. Recent studies in *Acanthopsis* Harv. (Steyn & van Wyk 2015, 2016, 2017), *Barleria* L. (Darbyshire *et al.* 2012 & in

prep.; Nyirenda 2012), *Hypoestes* R. Br. (Darbyshire 2015), and *Ruellia* L. and allies (Tripp & Dexter 2012; Tripp & Darbyshire 2017) have revealed a number of new species and taxonomic changes, and there are sure to be further new discoveries as other genera are studied in detail. Excluding checklists (for example Craven 1999; Welman 2003; Klaassen & Kwembeya 2013), the most recent treatment of the Acanthaceae of Namibia is by Meyer (1968), whilst there is no modern account of the family in Angola except for the checklist by Makholela (2008).

Materials & Methods

This study is based primarily on the examination of herbarium specimens held at BM, K, LUBA and WIND, supplemented by field observations of *Rhinacanthus kaokoensis* and *R. virens*. All specimens cited in the “Collections studied” sections have been seen by the author except where indicated (“n.v.”).

The species conservation assessments are based on the Categories and Criteria of IUCN (2012). The Extent of Occurrence (EOO) was calculated using the Kew Geospatial Conservation Assessment Tool GeoCAT (geocat.kew.org; Bachman *et al.* 2011). Area of Occupancy (AOO) is not used as a range measure for *Rhinacanthus kaokoensis* or *R. angolensis* in view of the fact that the Angolan range of these species is under-botanised and so an accurate measure of AOO is not deemed possible based on the limited occurrence records.

Key to *Rhinacanthus* in Angola and Namibia

1. Corolla with upper lip ovate or triangular-ovate; anthers with a short appendage on lower theca; plants of wet lowland and riverine forest 3. **R. virens**
Corolla with upper lip lanceolate; anthers with lower theca acute at base, lacking a short appendage; plants of dry woodland and bushland 2
 2. Inflorescence lacking capitate glandular hairs, flowers laxly arranged along the spiciform inflorescence axis and (if present) branches, flowers paired or often solitary at each inflorescence node; mid-cauline leaves with base typically rounded, truncate or widely cuneate 1. **R. kaokoensis**
Inflorescence with numerous capitate glandular hairs, flowers held in fascicles at apices of inflorescence branches; mid-cauline leaves (if present at flowering) with base cuneate or attenuate 2. **R. angolensis**
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Taxonomic account

1. *Rhinacanthus kaokoensis* K. Balkwill & S. D. Will. (in Balkwill 1995: 14). Type: Namibia, “am Kunene (Ruacana) bei Baken 1”, 13 April 1966, *Giess* 9289 (holotype WIND [WIND000032181]; isotypes K [K000378862], M [M0110651], PRE [PRE0483959-0], WIND [WIND000032182]).

R. nasutus sensu auctt., non (L.) Kurz: Benoist (1950: 26); Makholela (2008: 24).

R. xerophilus sensu Meyer (1968: 63), non A. Meeuse.

Suffruticose perennial herb, up to 90 cm high, stems densely hairy with short spreading to antrorse and retrorse pale hairs giving the stem a grey appearance, basal stems and rootstock woody. *Leaves* on petiole to 13 mm long, uppermost leaves sessile; blade ovate

to broadly so (basal leaves more elliptic), (1.5 –) 2.5 – 8.7 × (0.7 –) 1.5 – 6.5 cm, base rounded, truncate or widely cuneate or upper leaf pairs cordate, margin entire or somewhat undulate, apex acute, obtuse or sub-attenuate, sometimes with an apiculum; surfaces puberulent to somewhat strigulose, mostly on the margin and veins beneath, hairs sparse to more numerous above; cystoliths numerous and conspicuous in dry state. *Inflorescence* either simply spiciform or more commonly branched, sometimes widely so and up to 25 × 17 cm, flowers laxly arranged along axes, solitary and sessile at each axil, opposite or more commonly monochasial, branching also sometimes monochasial, axes pale pubescent and with increasing density of puberulous hairs distally; bracts linear, 1.5 – 3.5 mm long or those subtending inflorescence branches more foliaceous and up to 18 × 10 mm long; bracteoles like linear bracts but somewhat shorter. *Calyx* divided almost to base into 5 linear lobes 2.8 – 4.5 mm long, pubescent and puberulous, the latter hairs glandular but not capitate. *Corolla* 18 – 28 mm long, white with a pale greenish tube, lower lip with purple to blackish nectar guides, with mixed longer eglandular and shorter glandular hairs externally and lips with few to numerous short glandular hairs internally; tube ± straight, narrowly cylindrical, 13.5 – 20 mm long; upper lip lanceolate, 4 – 7 × 1.5 – 3 mm; lower lip 5 – 9 mm long, lobes 2 – 4 × 2 – 3 mm. *Stamens* inserted just below corolla mouth; filaments 2.8 – 3.5 mm long; anthers with thecae almost superposed and somewhat oblique, upper theca 0.5 – 0.7 mm long, lower theca 0.8 – 1.1 mm long, the latter acute at base. *Ovary* 2 – 3 mm long, pubescent towards apex; style 14 – 22 mm long, pubescent. *Capsule* 13 – 17.5 mm long, including sterile stipe 6 – 10 mm long, external surface covered in spreading hairs, with or without few glandular hairs; seeds 2.5 – 3 mm long, light brown to very dark brown, verruculose. Figs 1A – C & 2J – K.

DISTRIBUTION. *Rhinacanthus kaokoensis* is largely restricted to the Kaokoveld centre of endemism, in Kunene region of northwest Namibia and Namibe and Cunene Provinces of southwest Angola. To date, it is known from ten collections (Map 1, red squares).

SPECIMENS EXAMINED. ANGOLA. Mossamedes [Namibe Prov.], Tampa, fl., 1 June 1937, *Exell & Mendonça* 2389 (BM); Huila [now Cunene Prov.], Vila Pereira d'Eça [Ondjiva], fl. & fr., 11 June 1937, *Exell & Mendonça* 2933 (BM). **NAMIBIA.** 20 miles S of Ruacana, fl. & fr., 14 June 1963, *Giess & Leippert* 7587 (WIND); am Kunene (Ruacana) bei Baken 1, fl. & fr., 13 April 1966, *Giess* 9289 (WIND holotype; K, PRE isotypes); Opuwo Distr., track from Ruacana to Etoto village fl. & fr., 7 March 2003, *Klaassen* EK 967 (WIND); Opuwo Distr., 18 km W of Okanguati on the road to Etengua, fl. & fr., 2 Feb. 2006, *Kolberg & Tholkes* HK 1974 (WIND);

idem, fl. & fr., 15 April 2015, *Nanyeni et al.* LN 1044 (K, WIND); Opuwo Distr., on the bank of Oiva R., W of Ruacana, closer to Kunene Island Campsite, fl., 16 April 2015, *Nanyeni et al.* LN 1047 (WIND); Opuwo Distr., 10 miles away from Kunene R., at Ruacana Falls at the border, fl., 17 April 2015, *Nanyeni et al.* LN 1048 (WIND); Opuwo Distr., downstream from Ruacana falls at Namibia and Angolan border, fl. & fr., 17 April 2015, *Nyatoro et al.* TN 0033 (K, WIND).

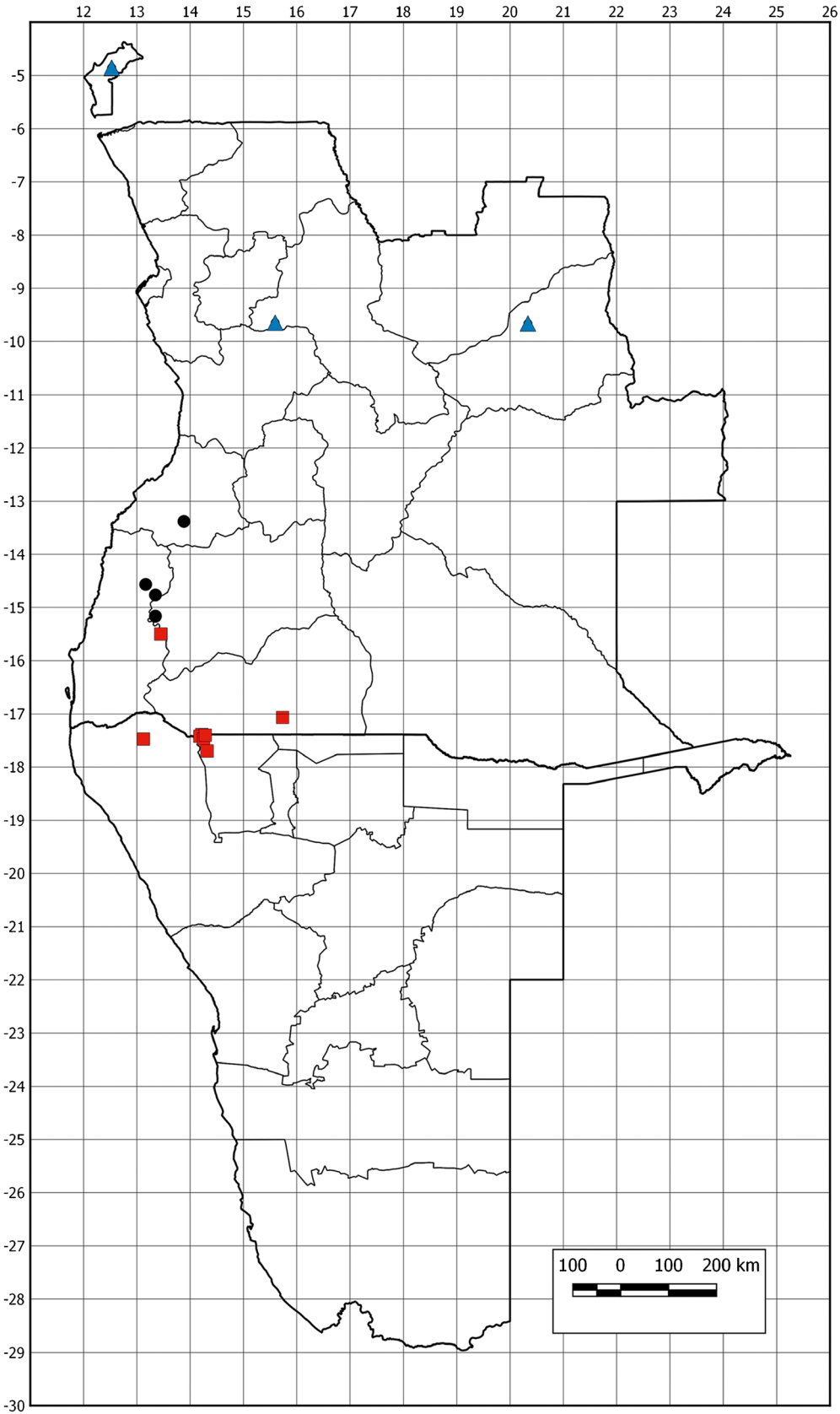
HABITAT & ECOLOGY. This species occurs in dry bushland and woodland, typically in open *Colophospermum mopane* woodland, growing on gravel and granite hills or koppies. In some areas the plant grows in washes and on the banks of rivers especially in the Ruacana area. It occurs at 800 – 1250 m elevation.

CONSERVATION STATUS. This species is restricted to the Namibia-Angola border region, with an EOO of 36,073 km² which is beyond the 20,000 km² upper limit for the Vulnerable category under IUCN criterion B1. It is currently known from only five locations (considering the sites in the Ruacana area to be a single location). That said, in view of the distance between the two known Angolan locations, it is likely to be found in a number of additional sites there following more thorough investigation. In Namibia, the paucity of collections indicates that this species is scarce, although the steep, rocky terrain over large areas of northwest Namibia does mean that it is underbotanised away from the rather few roads. It was not found to be common either at Ruacana or near Okanguati during surveys in 2015 (I. Darbyshire & L. Nanyeni, pers. obs.) and was not found in apparently suitable habitat elsewhere. At Ruacana, there has been some disturbance of suitable habitat associated with the hydro-electric dam and related infrastructure, together with expansion of the population around Ruacana town. One of the two known Angolan sites, Ondjiva, may also have been impacted by urbanisation. This town is the capital of Cunene Province, is situated c. 40 km from one of the main Namibian border crossings and has experienced significant expansion post civil-war. Further, the whole Angolan-Namibian border region has experienced strong population growth over several decades (Pröpper 2009) and increased land use change is also expected to occur in the Cunene River Basin with rehabilitation and expansion of large irrigated schemes, targeting small, medium and large commercial farmers (see <http://www.riverawarenesskit.com/>). However, there is still extensive intact habitat across most of its range. In view of its scarcity and the threats to some of its known locations, it is provisionally assessed as **Near Threatened** (NT) under criterion B but this may be downgraded to Least Concern if it is found to be more common in southern Angola.

NOTES. *Rhinacanthus kaokoensis* has previously been reported from Angola (Darbyshire & Harris 2006: 417)



Fig. 1. Photographs of *Rhinacanthus* in the field. **A – C** *R. kaokoensis*, **A** and **B** in flower, Ruacana Falls, Namibia (collected as *Nanyeni et al.* LN 1048), **C** in fruit, W of Okanguati, Namibia (collected as *Nanyeni et al.* LN 1044). **D** *R. virens*, from Guinea (collected as *P. K. Haba* 490). PHOTOS: **A – C** I. DARBYSHIRE; **D** X. VAN DER BURGT.



Map 1. Distribution of *Rhinacanthus* species in Angola and Namibia. *R. kaokoensis* (red squares), *R. angolensis* (black circles) and *R. virens* (blue triangles).

but without specimen citations, and it was not listed in the *Plants of Angola* checklist (Makholela 2008). The two Angolan specimens cited here have a more widely branched inflorescence than in the Namibian material but are otherwise a close match. In view of the fact that these specimens and a number of new collections from Namibia have come to light since the protologue showing a wider range of morphological variation, a full description is provided.

This species is easily separated from its allies within the *Rhinacanthus nasutus* (L.) Kurz complex by lacking broad capitate (“mushroom-shaped”) glandular hairs on the inflorescence. It is otherwise similar to *R. xerophilus* A. Meeuse from southeast Botswana, southern Zimbabwe, southern Mozambique and northeast South Africa (Balkwill 1995; Darbyshire *et al.* 2015). It shares with that species broadly ovate leaves and rather small corollas with a straight tube, but, it additionally differs in the foliage being less densely hairy when young and in the inflorescences being predominantly monochasial rather than having mostly opposite flowers along the axes, at least on the lateral inflorescence branches.

2. *Rhinacanthus angolensis* I. Darbysh. sp. nov. Type: Angola, Moçamedes [Namibe], Vila Arriaga [Bibala], fl. & fr., 22 June 1959, *Teixeira & Santos* 41 (holotype LUBA [LUBA000576-0]).

<http://www.ipni.org/urn:lsid:ipni.org:names:77176548-1>

Rhinacanthus communis sensu auctt. pro parte quoad *Welwitsch* 5010, non Nees: Clarke (1900: 224); Hiern (1900: 823).

Rhinacanthus nasutus sensu Makholela (2008: 24), pro parte, non (L.) Kurz.

Perennial herb, possibly sometimes short-lived, 15 – 90 cm high, proximal portion of stems can be prostrate, distal portion ascending; stems somewhat angular, pubescent with mixed pale antrorse and retrorse hairs throughout, hairs becoming more sparse on mature stems, basal-most stems somewhat woody but rootstock small (*Pritchard* 356). *Leaves* can be largely absent at flowering; petiole up to 23 mm long; lower cauline leaves with blade ovate to elliptic, up to 11 – 12.7 × 5.5 – 6.8 cm, base cuneate, attenuate, margin entire, apex acute or sub-attenuate; uppermost cauline leaves sessile or shortly petiolate, 2.7 – 4.7 × 1 – 2.5 cm, base can be rounded; surfaces pubescent, hairs most numerous on veins beneath, sparse above particularly at maturity; lateral veins 4 – 7 pairs, pale beneath. *Inflorescence* a lax panicle up to 20 – 60 × 7 – 20 cm when mature but can be smaller, lateral branching often partially or wholly monochasial, sometimes with

more than one branch developing at an inflorescence node, branches divergent giving the inflorescence an angular appearance; flowers held in fascicles of 2 – 5 at apices of ultimate branches, fascicle peduncles typically 10 – 23 mm long, or fascicles rarely sessile; proximal portion of main inflorescence axis with indumentum as that of stems, distal portion and main lateral branches mixed patent eglandular- and glandular-puberulous, the glandular hairs with a broad capitate gland-tip, and with ± numerous longer patent eglandular-pilose hairs to 1 mm long; fascicle peduncles usually with these longer hairs few or lacking; bracts along main inflorescence axis foliaceous, can be caducous, gradually reducing in size upwards, those in mid-portion of inflorescence typically elliptic to lanceolate, 18 – 45 × 7 – 19 mm; fascicle bracts and bracteoles minute, linear-lanceolate, 1 – 2 mm long. *Calyx* divided almost to base into 5 linear lobes 2.3 – 3.7 mm long in flower, marginally longer in fruit, puberulous with mixed eglandular and capitate-glandular hairs externally. *Corolla* 25 – 32 mm long, white or pink, with purple (?) markings on palate of lower lip, pubescent externally with mixed eglandular and glandular hairs, lips with few short glandular hairs internally; tube at first straight but becoming ± curved upwards at anthesis, narrowly cylindrical, 18.5 – 23 mm long; upper lip lanceolate, 5 – 7 × 2.5 – 2.7 mm; lower lip 7 – 10 mm long, lobes 3 – 5 mm long. *Stamens* inserted just below corolla mouth; filaments 2.8 – 3.5 mm long; anthers with thecae almost superposed and somewhat oblique, upper theca 0.75 – 0.9 mm long, lower theca 1 – 1.25 mm long, the latter acute at base. *Ovary* ± 2 mm long, sparsely pubescent towards apex; style 18 – 22 mm long, sparsely pubescent mainly in proximal half. *Capsule* 13.5 – 14.5 mm long, including sterile stipe 6.5 – 7.5 mm long, external surface eglandular- and glandular-puberulous; seeds black, lenticular, ± 2.5 mm in diameter, minutely verruculose. Fig. 2 A – H.

RECOGNITION. *Rhinacanthus angolensis* differs from all the other known African species of the *R. nasutus* complex (sensu Darbyshire & Harris 2006) in having long patent eglandular hairs on the inflorescence axes in addition to being glandular- and eglandular-puberulous (but see Notes section below). It otherwise most closely resembles *R. latilabiatum* (K. Balkwill) I. Darbysh. from South Africa, sharing a similar inflorescence form in which the flowers are held in fascicles terminating the inflorescence branches. The new species differs in (1) the stems being only subangular with inconspicuous ridges and evenly distributed hairs, vs hairs concentrated on the prominent pale ridges in *R. latilabiatum*; (2) the corolla tube being curved upwards at maturity, vs straight; and (3) the leaves being broader, with a length : width ratio 1.7 – 2.1 : 1,

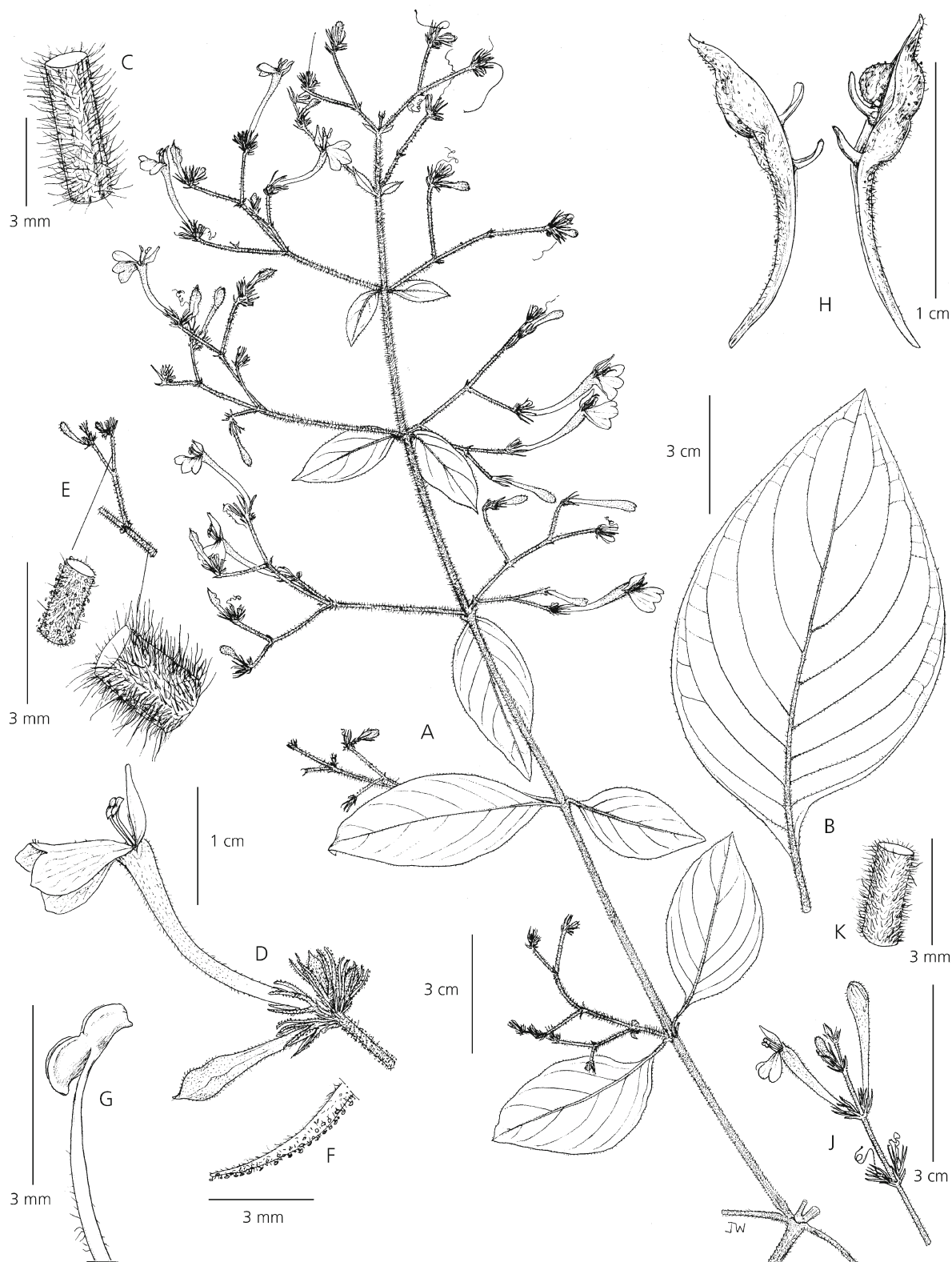


Fig. 2. A – H *Rhinacanthus angolensis*. A habit, flowering stem; B mature leaf, abaxial surface; C detail of stem indumentum; D partial inflorescence with mature corolla; E details of inflorescence indumentum including long spreading eglandular hairs and short glandular hairs; F detail of calyx lobe; G stamen; H capsule, opened, one valve with seed. J, K *Rhinacanthus kaokoensis*. J partial inflorescence with corolla; K detail of inflorescence indumentum. A, C, D, F & G from Teixeira & Santos 41, B & H from Correia 761, E from Pritchard 356, J & K from Nyatoro et al. TN 0033. DRAWN BY JULIET WILLIAMSON.

vs typically 2.3 – 4.4 : 1 in *R. latilabiatum*. The new species is also similar to *R. zambesiacus* I. Darbysh. from southern tropical Africa but is easily separated by the differing inflorescence form, *R. zambesiacus* having flowers laxly arranged in pairs or singly along the spiciform inflorescence axis and (if present) branches rather than in terminal fascicles. *Rhinacanthus zambesiacus* also has a straight or at most very shallowly curved corolla tube. *Rhinacanthus dichotomus* (Lindau) I. Darbysh. from East Africa often has an intermediate inflorescence form in which some flowers are clustered at the ends of the branches with others arranged in pairs or singly along the axes. It could, therefore, be confused with *R. angolensis* but clearly differs by its leaves being glabrous adaxially, the blade of the lower cauline leaves more elliptic or obovate, the corolla tube being more markedly sigmoid-curved and in the lower lip of the corolla either being speckled throughout (var. *dichotomus*) or completely lacking markings (var. *emaculatus*) rather than in having markings in the throat and central palate only. See Table 1.

DISTRIBUTION. *Rhinacanthus angolensis* is restricted to southwest Angola, where it is recorded from Benguela, Huíla and Namibe provinces (Map 1, black circles).

SPECIMENS EXAMINED. ANGOLA. Distr. Bumbo, Serra de Chela, fl., Oct. 1859, *Welwitsch* 5010 (BM, LISU); Tchivinguiro, fl. & fr., 3 Aug. 1954, *Pritchard* 356 (BM 2 sheets); Moçamedes [Namibe], Vila Arriaga [Bibala], fl. & fr., 22 June 1959, *Teixeira & Santos* 41 (holotype LUBA); Moçamedes [Namibe], entre Montipa e Perangombe, fl., 22 June 1959, *Teixeira & Santos* 3867 (LUBA); Benguela, próxim. Caporolo (R. Caporolo), fl., 24 June 1959, *Correia* 761 (LUBA).

HABITAT & ECOLOGY. Habitat information for this species is limited; Pritchard recorded it from amongst calcareous rocks by the roadside, whilst *Teixeira & Santos* (3867) recorded it from shaded places in areas of low moisture. From its known range, it is likely to be found in dry woodland and bushland, occurring at c. 600 – 1700 m elevation.

CONSERVATION STATUS. This species is currently known from five collections of which the Welwitsch specimen has not been precisely located. Based on the remaining four collections, the EOO is 3890 km² which would potentially fall within the Endangered category under IUCN (2012) criterion B1. Pritchard recorded it as common at Tchivinguiro in 1954, but analysis of Google Earth imagery and personal observations (F. M. P. Gonçalves) shows that this area of the Lubango escarpment is now extensively settled with considerable loss of natural habitat due primarily to increasing demand for charcoal production. The same is true of the Bibala area, where clearance of large dry forest patches for charcoal can be seen along the escarpment. However, as with most of Angola, this species' range remains under-botanised and it is quite possible that *Rhinacanthus angolensis* is more common or

widespread than it currently appears. Without recent information on the status and threats to its populations, and with very little habitat information available, *R. angolensis* must currently be considered **Data Deficient** (DD).

NOTES. *Rhinacanthus angolensis* is compared to three fully documented species of the *R. nasutus* complex in the Recognition section above and a summary of the diagnostic characters is provided in Table 1; *R. kaokoensis* is also included in that table for completeness as it is geographically closest to *R. angolensis*. One further, incompletely known species from southern Tanzania is also worthy of note here: *R. sp. A* (= Ward U70) of *Flora of Tropical East Africa* (Darbyshire *et al.* 2010). The single collection known of that taxon lacks leaves, but it shares with *R. angolensis* the long patent hairs in addition to the shorter glandular and eglandular indumentum on the inflorescence, albeit more sparsely so and largely confined to the main inflorescence axis. It also has similarly fascicled flowers. It differs primarily in having larger capsules 17 – 21 mm long and seeds 3.2 – 3.8 mm in diameter, and in having a shallowly sigmoid-curved corolla tube similar to *R. dichotomus*. A close relationship between these two taxa seems improbable in view of the wide geographic separation. That said, several cases of disjunctions in African Acanthaceae are not wildly dissimilar. In *Barleria*, *B. pseudomalina* I. Darbysh. is known from a small area of central Tanzania and a single collection from NE Namibia (Darbyshire *et al.* 2012); and a close similarity has been noted between the variant of *Barleria taitensis* S. Moore found in central Tanzania and *B. taitensis* var. *occidentalis* S. Moore from NW Namibia and SW Angola (Darbyshire *et al.* 2010 & in prep.). In *Ruellia*, *R. bignoniifolia* S. Moore also has a marked east-west disjunction; it occurs from Ethiopia and South Sudan south to Zimbabwe and Mozambique, but is also recorded from Angola (including the type locality) and Namibia (Tripp & Dexter 2012; Vollesen 2013).

3. *Rhinacanthus virens* (Nees) Milne-Redh. (in Exell 1956: 37); Heine (1963: 425 excl. var. *obtusifolius*; 1966: 201, pl. 42); Darbyshire & Harris (2006: 414); Daniel & Figueiredo (2009: 666); Darbyshire *et al.* (2010: 603; 2015: 229). Type: Gabon, “Gaboon coast”, fr., 1787, *Middleton* s.n. (holotype K [K000378880]). Fig. 1D. *Leptostachya virens* Nees (1847: 378).

Rhinacanthus dewevrei De Wild. & T. Durand (in Durand & De Wildeman 1899: 105); Exell (1944: 263). Type: D. R. Congo, Bokakata, fl., 6 Feb. 1896 [recorded as 10 March 1896 in protologue], *Dewèvre* 804 [no. not listed in protologue] (holotype BR [BR000000629409, BR000000851635]; isotype K [K000378881]), see note.

Table 1. Diagnostic characters separating *Rhinacanthus angolensis* from morphologically allied species in the *R. nasutus* complex.

Character	<i>R. angolensis</i>	<i>R. latilabiatus</i>	<i>R. zambesiacus</i>	<i>R. dichotomus</i>	<i>R. kaokoensis</i>
<i>Stem characteristics and indumentum</i>	Subangular, pubescent, hairs ± evenly distributed	Markedly 6-angular with pale prominent ridges, pubescent on ridges	Subangular, pubescent, hairs ± evenly distributed	Subangular, pubescent, hairs ± evenly distributed	Subangular, densely pubescent, hairs ± evenly distributed
<i>Lower/mid cauline leaf shape</i>	Ovate to elliptic	Narrowly ovate, rarely elliptic	Ovate, rarely elliptic	Obovate to elliptic	Ovate or broadly so
<i>Upper cauline leaf base</i>	Cuneate to rounded	Cuneate to rounded	Rounded to shallowly cordate, rarely obtuse	Acute to obtuse	Cordate or truncate
<i>Indumentum of upper leaf surface (between veins)</i>	(Sparsely) pubescent	Pubescent	(Sparsely) pubescent	Glabrous	(Sparsely) puberulent to strigulose
<i>Inflorescence form</i>	Terminal, widely branched, but can be interrupted by foliaceous primary bracts; flowers held in fascicles terminating inflorescence branches	Axillary and terminal cymes with foliaceous primary bracts, usually few-branched; flowers in fascicles terminating inflorescence branches occasionally also with few solitary flowers along axis	Terminal, spiciform to widely branched, flowers solitary or often paired along axes	Terminal, widely branched, flowers in fascicles terminating inflorescence branches and often also solitary or paired along axes	Terminal, simple-spiciform to widely branched, flowers solitary or paired along axes
<i>Inflorescence: capitata glandular hairs</i>	Present	Present	Present	Present	Absent
<i>Inflorescence: patent long eglandular hairs to 1 mm long on axes</i>	Present	Absent	Absent	Absent	Absent
<i>Corolla tube length and shape</i>	18.5 – 23 mm, shallowly upcurved towards mouth	(15.8 –) 19.5 – 27 (– 30) mm, ± straight	(18 –) 22 – 30 mm, ± straight	(20 –) 22 – 28 mm, downcurved to centre then ± strongly upcurved towards mouth	13.5 – 20 mm, ± straight
<i>Lower corolla lip length</i>	7 – 10 mm	(4.2 –) 6 – 9 (– 12) mm	(6.2 –) 8 – 13.5 (– 14.5) mm	(7 –) 10 – 14 mm	5 – 9 mm
<i>Lower corolla lip speckling</i>	Speckled in the throat and central surface	Speckled in the throat and central surface or unspeckled	Speckled in the throat and central surface or unspeckled	Speckled throughout or unspeckled	Speckled in the throat and central surface

Rhinacanthus parviflorus T. Anderson, nom. nud.; Durand & De Wildeman (1899: 106, in obs.).

Rhinacanthus communis sensu auctt., non Nees: Clarke (1900: 224, 514), pro parte; Hutchinson & Dalziel (1931: 266).

Rhinacanthus subcaudatus C. B. Clarke (1900: 225). Types: Guinea [see note], near the Scarcies R., Wallia, *Scott-Elliot* 4276 (syntype K [K000378884]) & near Sasseni, Scarcies, fl. & fr., 13 Jan., *Scott-Elliot* 4428 (syntype K [K000378885]); without location [presumed to be from Sierra Leone], *Afzelius* 2 [no. not recorded in protologue] (syntype BM [BM001209603])

Siphonoglossa rubra S. Moore (1906: 88). Type: Uganda, Entebbe, fl. 15 Nov. 1905, *Bagshawe* 750 (holotype BM [BM000931254]).

Rhinacanthus minimus S. Moore (1920: 47); Darbyshire & Harris (2006: 416). Type: D. R. Congo, Bukala, fl. & fr., 1914, *Vanderyst* 4972 (holotype BM [BM000931255]; isotype BR [BR0000008516183]).

DISTRIBUTION. *Rhinacanthus vivens* is widespread in the Guineo-Congolian phytogeographical region, extending from Sierra Leone to Uganda, NW Tanzania, D. R. Congo, NW Zambia and N Angola. In Angola it is recorded in Cabinda, Cuanza Norte and Lunda Sul Provs., but is also likely to occur in Lunda Norte Prov. (Map 1, blue triangles).

SPECIMENS EXAMINED. ANGOLA. Pungo Andongo, Mata de Pungo, fl., May 1857, *Welwitsch* 5191 (BM); at the Furnas [?] Antonio Victorino, R. Lococuto, Bucu Zau, fl., 9 Aug. 1916, *Gossweiler* 6576 (BM); Maiombe, Bucu-Zau, near official residence at Belize, fl. & fr., 16 Nov. 1918, *Gossweiler* 7564 (BM, LISC 2 sheets). Lunda Sul Prov.: tributary of R. Chikapa [Chicapa], Saurimo, fl. & fr., 5 Aug. 1932, *Young* 393 (BM, LISC).

HABITAT & ECOLOGY. This species is recorded from wet forest including riverine fringing forest. In Angola it is recorded at c. 50 – 1000 m elevation.

CONSERVATION STATUS. *Rhinacanthus vivens* is widespread and common in the Guineo-Congolian forest region and is assessed as of **Least Concern** (LC) (Ghogue 2010). The EOO is over 5,000,000 km². It is localised in Angola, but Gossweiler noted it as “common skirting the forests” in the Maiombe region.

NOTES. Detailed descriptions of this species are available in Heine (1966), Daniel & Figueiredo (2009) and Darbyshire *et al.* (2010, 2015) and are not repeated here. The material seen from Angola is very variable, reflecting the considerable variation within this species as a whole. The collection from Lunda Sul is of a slender, small-flowered form with corollas up to 15 mm long and calyx lobes c. 3 mm long, resembling plants from west Zambia described in Darbyshire *et al.* (2015). Very similar plants are found elsewhere in the range of *R. vivens*, for example in Sierra Leone and Guinea. *Gossweiler* 7564 from Cabinda has markedly larger flowers up to 24 mm long with calyx lobes c. 4.5 mm long, typical of the widespread Congolian form of

this species. However, that specimen also differs markedly from the second collection from Cabinda (*Gossweiler* 6576) in having much narrower leaves and partial inflorescences with more flowers.

The two *Scott-Elliot* syntypes of *Rhinacanthus subcaudatus* were made under the Sierra Leone Boundary Commission and the collecting localities have previously been listed as being in Sierra Leone (Darbyshire *et al.* 2010). However, Gledhill (1969) notes that Wallia and Sasseni are both in modern-day Guinea and that the collecting locality on the Scarcies River near Sasseni is also likely to have been on the Guinea side of the border. The type of *R. deweyi* was listed in the protologue as having been collected on 10 March 1896 and no collecting number was cited. The labels on one of the BR sheets (BR000000851635) and on the Kew isotype have been added later and give the date of collection as 6 February 1896 and the collecting number as *Dewey* 802. It is not clear which date is correct for this collection.

As noted in the Introduction, recent molecular evidence (Kiel *et al.* 2017) places *Rhinacanthus vivens* outside of the core *Rhinacanthus* clade. Instead, it forms one of two basal lineages in the Diclipterinae clade and is sister to the rest of Diclipterinae including core *Rhinacanthus*. Kiel *et al.* (2017) note the differing ecology (wet forest vs more arid habitats) together with the broader, triangular ovate upper lip (see Fig. 1D), shortly appendaged lower anther theca and pollen with insulae (vs bands in core *Rhinacanthus*) as evidence to support its separation. That said, *R. vivens* is still morphologically similar to the *R. nasutus* complex and, indeed, was included within a broadly circumscribed *R. communis* (= *R. nasutus*) by Clarke (1900). For a more complete understanding of the relationship between *R. vivens* and core *Rhinacanthus*, the other forest species of *Rhinacanthus* — *R. obtusifolius* (Heine) I. Darbysh., *R. submontanus* T. Harris & I. Darbysh. and *R. selousensis* I. Darbysh. (see Darbyshire & Harris 2006) — should be prioritised for sequencing in future molecular studies. For the present time, *R. vivens* is maintained in *Rhinacanthus* sensu lato.

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