

## New records for the flora of Angola: observations from Uíge and Cuanza Norte

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**Background and aims** – Located in the transition zone of Guineo-Congolian and Zambebian phytochoria, the Angolan provinces of Uíge and Cuanza Norte are of particular interest for floristic studies and high biodiversity is expected. Nevertheless, explorations of the vegetation are relatively rare. Our study aims to supplement a recent checklist of vascular plants of Angola.

**Methods** – Data were collected during 17 field trips between 2013 and 2018, during which herbarium specimens were prepared for later identification of plant species. The results were compared with the current checklist as well as with other floristic works, herbarium collections and online databases relevant for the region.

**Key results** – We document 20 new records of indigenous vascular plant species for the flora of Angola (19 species and one subspecies), including four new generic records. Furthermore, nine alien species are added to the checklist of the flora of Angola.

**Conclusion** – Our results confirm that the flora of northern Angola is composed by elements of various adjacent areas. However, not all species present are known yet. Further botanical investigation is needed to complete our floristic knowledge of the region.

**Keywords** – Northern Angola; checklist; distribution; native flora; alien species; new records.

### INTRODUCTION

Explorations of the vegetation of Angola are relatively rare (Dauby et al. 2016). First scattered collections date back to the 17<sup>th</sup> century (Goyder & Gonçalves 2019). Subsequently, several explorers studied the flora of the coastal plain and some interior parts of the country. Among them the Austrian Friedrich Welwitsch (1806–1872), the German Hugo Baum (1867–1950), and the Swiss Johannes Gossweiler (1873–1952) rank as the most important. Further valuable collections were made from the late 1950s to 1974, by Portuguese collectors such as Eduardo José Santos Moreira Mendes

(1924–2011), Joaquim Martinho Lopes de Brito Teixeira (1917–1969) and Luis A. Grandvaux Barbosa (1914–1983). António Rodrigues Fonseca Raimundo (1926–2014) actively collected plants in Uíge. Notwithstanding their extensive surveys, the north of Angola is still underrepresented in herbarium collections, not least because of wars lasting forty years and preventing any continuous botanical or ethnobotanical investigations (Figueiredo & Smith 2008; Sosef et al. 2017).

Following Brummitt (2001), Angola is part of South Tropical Africa. The Northern Province of Uíge borders the Democratic Republic of the Congo (further D.R. Congo) in

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the north and east, the Angolan provinces of Malanje, Cuanza Norte and Bengo in the south, and the Zaire province in the west. While most of the country is characterized by different savannah types, Uíge as well as parts of Cuanza Norte belong to the ecoregion called Western Congolian Forest-Savannah Mosaic (Olson et al. 2001). White (1983) concretised that elements of both the Guineo-Congolian and the Zambezi Regions are forming a Regional Transition Zone of high complexity. Even some pure Congolian forest patches exist along the big rivers such as the Cuango (Goyder & Gonçalves 2019). However, White (1983) depicted this area as grassland and wooded grassland secondarily formed following the destruction of the original vegetation.

Recent studies provide a more detailed picture of the area. During field trips in Uíge and Cuanza Norte we collected and identified 820 species of mosses (Müller 2015; Müller et al. 2019), ferns, gymnosperms and angiosperms being stored now in the Herbarium Dresdense (DR). In the mountain chain of Serra Pingano, an unknown *Impatiens* species was found and described as *Impatiens pinganoensis* Abrahamczyk et al. (2016). Furthermore, ethnobotanical surveys from the region were published during the last years (Göhre et al. 2016; Heinze et al. 2017; Lautenschläger et al. 2018).

The checklist of vascular plants of Angola (Figueiredo & Smith 2008) comprises 6735 native and 226 non-native species (Figueiredo et al. 2009; Smith & Figueiredo 2017). Here, we present new records of another 19 species and one subspecies as well as of nine alien species.

## MATERIALS AND METHODS

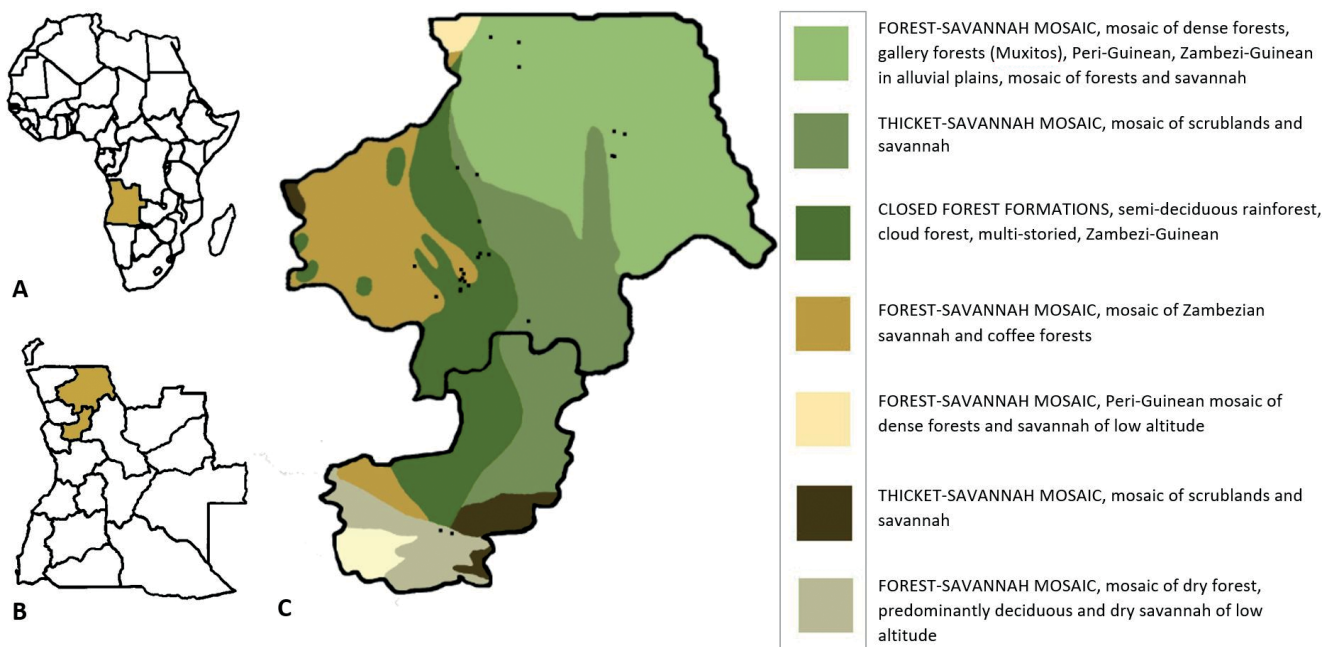
The data were collected during 17 field trips from 2013 to 2018. Data sampling was carried out between 5°58'59.2"S

and 9°40'60.5"S and between 14°10'37.0"E and 16°17'04.5"E (fig. 1). All the surveys were permitted and accompanied by the local authorities. The Ministry of the Environment, Republic of Angola, and the Province Government of Uíge issued the required collection and export permits. For documentation, plant voucher specimens, complemented by photographs, were collected, dried and stored at the Herbarium Dresdense (DR), Technische Universität Dresden, Germany. Voucher specimen numbers are given in the checklist below. All sample data are available at Virtual Herbaria JACQ (<https://herbarium.univie.ac.at/database/>). Due to CITES trade regulations one orchid species is documented by photo voucher only. In a Memorandum of Understanding signed in 2014, the Instituto Nacional da Biodiversidade e Áreas de Conservação (INBAC), Angola, and the Technische Universität Dresden, Germany, agreed upon that duplicates of herbarium vouchers will be returned to Angola as soon as appropriate conditions to store them are established. Identification of collected plant specimens and data analysis were completed in Dresden. For identification, relevant floristic works were used and listed in the particular species description.

Furthermore, for some plant groups, specialists were consulted. Plant families are treated alphabetically.

## RESULTS

Based on the checklist of the vascular plants of Angola (Figueiredo & Smith 2008), we present records of 20 native species new to the flora of Angola including three new genera (*Epithema*, *Mendoncia*, *Newbouldia*), and 9 neophytes (three new genera: *Eleutherine*, *Eryngium*, *Leptaspis*).



**Figure 1** – Study area. **A.** Location of Angola in Africa. **B.** Location of the provinces Cuanza Norte (south) and Uíge (north) in Angola. **C.** Vegetation zones in the study area according to Barbosa (2009), collection sites marked by a black dot.

## Native species

### Acanthaceae

*Asystasia vogeliana* Benth.

**Distribution** – West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa, East Tropical Africa.

**Habitat** – Rain forest.

**Notes** – The light mauve flowers are comparatively large with a corolla up to 5 cm. It keys out next to *Asystasia scandens* (Lindl.) Hook. from which it differs by its inflorescence being longer and less dense. Additionally, its corolla tube is much longer and not suddenly widened to become bell-shaped in the upper two thirds, like in *A. scandens*.

**Specimens examined** – **Angola: Uíge:** [Serra Pingano] 7°40'56.6"S, 14°56'03.8"E, 647 m alt., former coffee plantation, near waterfall, 24 Jul. 2014, *T. Lautenschläger 2014\_7\_23* (DR, [barcode 042826](#)); [Serra Uíge, Kilomosso] 7°39'35.1"S 14°58'56.3"E, 652 m alt., 17 Jul. 2015, *A. Göhre 2015-07a* (DR, [barcode 050877](#)).

**References** – Burkill & Clarke (1899); Heine (1963a); Darbyshire et al. (2010).

*Mendoncia phytocrenoides* (Gilg ex Lindau) Benoist

**Distribution** – West Tropical Africa, West Central Tropical Africa.

**Habitat** – Rain forest.

**Notes** – The specimen is characterized by a long indumentum along the stem, the petioles and veins. The bracteoles are predominantly hispidly hairy, the pedicel is shorter than 15 mm (fig. 2E). The species is otherwise known from Cameroon, Equatorial Guinea, Gabon and highly disjunct from eastern Congo (Kinshasa). This is the first record of the genus *Mendoncia* in Angola.

**Specimen examined** – **Angola: Uíge:** [Serra Pingano] 7°40'22.7"S, 14°56'17.7"E, 615 m alt., rain forest, 2 Sept. 2019, *T. Lautenschläger 2018\_10\_13b* (DR, [barcode 056368](#)).

**Reference** – Breteler & Wieringa (2018).

### Annonaceae

*Monanthotaxis gillettii* (De Wild.) Verdc.

**Distribution** – West Tropical Africa, East Tropical Africa.

**Habitat** – Rain forest.

**Notes** – This species is easily recognized by the large leafy bract on the peduncle in combination with large erect hairs on the branches. Other species with large leafy bracts have appressed hairs.

**Specimen examined** – **Angola: Uíge:** [Serra Uíge] 7°37'56"S, 14°58'39"E, 774 m alt., rain forest, 23 Aug. 2014, *T. Lautenschläger 2014-58* (DR, [barcode 055033](#)).

**References** – Boutique (1951): under the synonym *Popowia gillettii* De Wild.; Verdcourt (1971).

### Araceae

*Anubias gillettii* De Wild. & T.Durand

**Distribution** – West Tropical Africa, West Central Tropical Africa.

**Habitat** – Submersed and emersed in river.

**Notes** – The species was identified from a living specimen collected at the locality given below and flowering later as a cultivated plant in the Botanical Garden of Dresden. It differs from the narrowly allied *Anubias hastifolia* Engl. by the position of the thecae (at the edge instead of partly or completely on top of the synandria), the form and size of the spathe and by the spathe in anthesis being reflexed (fig. 2A).

**Specimen examined** – **Angola: Uíge:** [Kivelu] 6°01'00.0"S, 15°24'49.1"E, 803 m alt., 25 Feb. 2017, *T. Lautenschläger 2017\_143* (DR, [barcode 049160](#)).

**Reference** – Crusio (1979).

### Balsaminaceae

*Impatiens burtonii* Hook.f. var. *burtonii*

**Distribution** – West Central Tropical Africa, East Tropical Africa.

**Habitat** – Understorey of cloud forest.

**Notes** – A number of African *Impatiens* species is characterized by spirally arranged leaves with petioles at least 1 cm long and up to 10 lateral veins, a much-reduced peduncle and a navicular lower sepal being abruptly constricted into a short filiform spur. Within this group, *I. burtonii* keys out by usually pubescent, 3–4 mm long lateral sepals without glandular teeth, petioles which are not fimbriate-glandular, lateral united petals without a filiform appendage extending into the spur and a relatively large flower size (fig. 2D). Three varieties can be distinguished on spur length (being 16–23 mm long in var. *angusticalcarata* (De Wild.) R.Wilczek & G.M.Schulze while only 5–9 mm long in *I. burtonii* var. *wittei* (G.M.Schulze) Grey-Wilson and var. *burtonii*) combined with leaf lamina size (shorter than 20 mm with 3–6 pairs of lateral veins in var. *wittei* while 25–160 mm long with 6 to 11 pairs of lateral veins in var. *burtonii*).

**Specimen examined** – **Angola: Uíge:** [Pambu] 7°25'56.0"S, 15°10'28.0"E, 1252 m alt., 17 Feb. 2015, *B. Ditsch BD 742* (DR, [barcode 050799](#)).

**Reference** – Grey-Wilson (1980).

### Begoniaceae

*Begonia johnstonii* Oliv. ex Hook.f.

**Distribution** – East Tropical Africa.

**Habitat** – On rocks.

**Notes** – Determination of *Begonia johnstonii* was carried out by a specialist (M. Hughes, Royal Botanic Gardens, Kew, UK, pers. comm. 2018). Up to now, this species was only known from Kenya and Tanzania. Taking into account the dust-like seeds freely floating in the air, some anemochorous long distance dispersal may have spread the seeds from eastern Africa to Angola, where again suitable habitats on rocks

within the forest may have facilitated successful establishment. According to Plana et al. (2004) the present distribution of *Begonia johnstonii*, *B. engleri* Gilg and *B. annobonensis* A.DC. could be the result of a climate change during the early Pliocene leading to rainforest expansion and isolating the populations of the three *Begonia* species which they described as functionally annual and well adapted to more seasonal conditions. In this case, the Angolan *Begonia johnstonii* might as well represent another relict population (fig. 2B).

**Specimen examined** – Angola: Uíge: [Bombo] 7°31'11.0"S, 14°34'16.0"E, 446 m alt., 12 Oct. 2016, *T. Lautenschläger 2016-54* (DR, [barcode 051995](#)).

**References** – de Wilde (2002); Hughes et al. (2015).

### Bignoniaceae

*Newbouldia laevis* (P.Beauv.) Seem. ex Bureau

**Distribution** – West Tropical Africa, West Central Tropical Africa.

**Habitat** – In village.

**Notes** – This species is frequently grown as boundary in the north of the province Uíge, but also found roadside. The same was recorded in the neighbouring province Kongo Central of the D.R. Congo (Latham & Konda ku Mbuta 2014). This is the first record of the monotypic genus *Newbouldia* in Angola (fig. 2G).

**Specimen examined** – Angola: Uíge: [Kivala] 5°58'59.2"S, 15°11'15.4"E, 977 m alt., 25 Nov. 2015, *A. Kempe TL 80* (DR, [barcode 043913](#)).

**Reference** – Heine (1963b).

### Commelinaceae

*Polyspatha hirsuta* Mildbr.

**Distribution** – West Tropical Africa, West Central Tropical Africa, East Tropical Africa.

**Habitat** – Rain forest.

**Notes** – While the inflorescence-axis bearing spathes is comparatively longer in the related *P. paniculata* Benth., here it does not exceed 4 cm.

**Specimen examined** – Angola: Uíge: [Serra Pingano] 7°40'56.0"S, 14°56'05.0"E, 687 m alt., rain forest near waterfall, 18 Jul. 2015, *T. Lautenschläger 2015-23a* (DR, [barcode 050882](#)).

**Reference** – Brenan (1968).

### Fabaceae

*Baphia chrysophylla* Taub.

**Distribution** – West Central Tropical Africa.

**Habitat** – Savannah.

**Notes** – The 8–9 mm long calyx spathaceously dividing by only one longitudinal fissure as well as the ratio of leaf lamina length and width clearly determine the species.

**Specimen examined** – Angola: Uíge: [Kibokolo] 6°36'55.2"S, 16°12'12.6"E, 861 m alt., 18 Feb. 2015, *B. Ditsch BD 762* (DR, [barcode 046846](#)).

**References** – Soladoye (1985); Goncharov et al. (2011).

### Gesneriaceae

*Epithema tenue* C.B. Clarke

**Distribution** – West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa, East Tropical Africa.

**Habitat** – Secondary forest, on wet rocks (fig. 2C).

**Notes** – This is the first record of the genus *Epithema* in Angola.

**Specimens examined** – Angola: Uíge: [Serra Pingano] 7°40'22.1"S, 14°56'17.2"E, 615 m alt., 16 Feb. 2015, *B. Ditsch BD 735* (DR, [barcode 050939](#)); [Bombo] 7°31'09.5"S, 14°33'53.7"E, 446 m alt., 12 Oct. 2016, *A. Kempe 2016 40* (DR, [barcode 044456](#)); [Quijoao] 7°43'08.0"S, 14°44'45.0"E, 600 m alt., 19 Feb. 2017, *T. Lautenschläger 2017-95* (DR, [barcode 050787](#)).

**Reference** – Darbyshire (2006).

### Marattiaceae

*Ptisana salicifolia* (Schrad.) Senterre & Rouhan

**Distribution** – South Tropical Africa, Southern Africa, West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa, East Tropical Africa, Western Indian Ocean.

**Habitat** – Rain forest.

**Notes** – According to M. Lehnert (Martin-Luther-Universität Halle-Wittenberg, Germany, pers. comm. 28 Aug. 2019), two herbarium specimens of *P. salicifolia* from Angola were filed as *Ptisana fraxinea* (Sm.) Murdock: US Catalog No.: 3001336 ([barcode 01403971](#)) and US Catalog No.: 3001339 ([barcode 01403957](#)). However, the locations indicated are certainly located in D.R. Congo. The French labelling also supports this assumption.

**Specimens examined** – Angola: Uíge: [Serra Pingano] 7°40'22.7"S, 14°56'17.7"E, 615 m alt., 18 Jul. 2015, *T. Lautenschläger 21* (DR, [barcode 052154](#)); [Serra Uíge] 7°37'03.0"S, 14°57'11.0"E, 872 m alt., 28 Oct. 2013, *B. Ditsch BD 505* (DR, [barcode 050952](#)).

**Reference** – Schelpe (1970).

### Melastomataceae

*Calvoa orientalis* Taub.

**Distribution** – West Central Tropical Africa.

**Habitat** – Forest edge.

**Notes** – Glabrous herb, leaf lamina with the base rounded and more than 1.5 cm wide. The capsules of the specimen exhibit a 5-lobed crown that is exerted for 3 mm and winged with bright lobes.

**Specimen examined** – Angola: Uíge: [Murro] 6°46'54.5"S, 16°12'30.7"E, 1056 m alt., edge of rain forest; 22 Jul. 2015, *A. Göhre 148* (DR, [barcode 043332](#)).





**Figure 2** – Selected species. **A.** *Anubias gillettii*. **B.** *Begonia johnstonii*. **C.** *Epithema tenue*. **D.** *Impatiens burtonii* var. *burtonii*. **E.** *Mendoncia phytocrenoides*. **F.** *Microcoelia macrorhynchia*. **G.** *Newbouldia laevis*. **H.** *Uncaria africana* subsp. *africana*. A, D, F, H photographed by Barbara Ditsch; B, C, E, G photographed by Thea Lautenschläger.

**Reference** – Figueiredo (2001).

*Calvoa seretii* De Wild. subsp. *seretii*

**Distribution** – West Central Tropical Africa.

**Habitat** – Swampy forest.

**Notes** – Glabrous herb, leaf lamina longer than 3 cm, attenuate at base, apex acute. The capsules of the specimen exhibit a 5-lobed crown, exerted for only 1.5 mm. The petal lobes are reddish.

**Specimens examined** – **Angola: Uíge:** [Mucaba] 7°12'53.0"S, 15°05'52.0"E, 1182 m alt., swampy forest; 25 Jul. 2014, *T. Lautenschläger 2014\_7\_25* (DR, [barcode 054210](#)); [Mucaba] 7°12'53.0"S, 15°05'52.0"E, 1182 m alt., swampy forest; 16 Oct. 2016, *T. Lautenschläger 2017\_132* (DR, [barcode 045050](#)).

**Reference** – Figueiredo (2001).

## Orchidaceae

*Microcoelia macrorhynchia* (Schltr.) Summerh.

**Distribution** – South Tropical Africa, West Tropical Africa, West Central Tropical Africa, East Tropical Africa.

**Habitat** – Epiphytic, rain forest.

**Notes** – The species is characterized by sheathing floral bracts, and shortly pedicelled flowers; the obtuse mid-lobe of the labellum is apically fringed and folded to give an emarginated appearance, the apex of the curved spur shows a conical inflation, the acute rostellum lobes are as long as or longer than the tepals (fig. 2F).

**Specimen examined** – **Angola: Uíge:** [Kikuambalembua] 6°53'59.1"S, 15°04'25.0"E, 984 m alt., 24 Feb. 2015, *B. Ditsch PVI* (only photo voucher due to CITES trade regulations).

**References** – Jönsson (1981); Geerinck (1992).

## Pedaliaceae

*Sesamum radiatum* Thonn. ex Hornem.

**Distribution** – West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa.

**Habitat** – Near village, roadside.

**Notes** – The specimens exhibit heteromorphic leaves up to 9 cm long with distinct petioles up to 15 mm. The corolla is large (3 cm) but never achieves 7 cm (*Sesamum angolense* Welw.). The blades of the specimens also differ from those of *S. angolense* (broad, blunt tips, more hairy). *S. radiatum* was mentioned for Angola in the *Flore du Gabon* (Bedigian 2011), but up to now no herbarium specimen was known from this country, according to D. Bedigian (Missouri Botanical Garden, USA, pers. comm. 24 Jul. 2019).

**Specimens examined** – **Angola: Uíge:** [Macocola] 6°46'51.5"S, 16°11'45.7"E, 1070 m alt., 15 Nov. 2014, *T. Lautenschläger 2014\_11-71* (DR, [barcode 042742](#)); [Kivelu] 6°11'22.9"S, 15°25'28.3"E, 880 m alt., 26 Nov. 2015, *T. Lautenschläger 101* (DR, [barcode 043918](#)).

**References** – Heine (1963d); Bedigian (2011).

## Phyllanthaceae

*Antidesma laciniatum* Müll.Arg. subsp. *membranaceum* (Müll.Arg.) J.Léonard

**Distribution** – West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa, East Tropical Africa.

**Habitat** – Rain forest.

**Notes** – The species differs from other Western and Central African members of the genus by lacinate stipules. The subspecies is characterized by a persistent ferruginous indumentum including long candelabra-like trichomes on the nerves of the lower leaf surface. The stipules of our samples are deeply lobed, with lobes sometimes branched. The branchlets, petioles, midribs and stipules are covered with long spreading hairs up to 1 mm long.

**Specimens examined** – **Angola: Uíge:** [Kikuambalembua] 6°53'59.1"S, 15°04'25.0"E, 984 m alt., 24 Feb. 2015, *B. Ditsch BD 832* (DR, [barcode 043267](#)); [Kunga Quiximba] 7°36'17.8"S, 14°57'34.5"E, 880 m, 15 Mar. 2013, *B. Ditsch BD 274* (DR, [barcode 057588](#)).

**References** – Keay (1958a) as *A. laciniatum* Müll.Arg. var. *membranaceum* Müll.Arg.; Léonard (1988).

*Uapaca vanhouttei* De Wild.

**Distribution** – West Tropical Africa, West Central Tropical Africa.

**Habitat** – Swampy forest.

**Notes** – In contrast to other species from Guineo-Congolian forests the stipules of this species are linear, up to 10 mm long, and lack a distinct midrib. Several specimens were found in proximity to known populations from D.R. Congo.

**Specimen examined** – **Angola: Uíge:** [Kibulamakatenda] 6°38'00.0"S, 16°16'56.8"E, 801 m alt., 19 Feb. 2015, *B. Ditsch BD 889* (DR, [barcode 044171](#)).

**Reference** – Breteler (2013).

## Poaceae

*Leptaspis zeylanica* Nees

**Distribution** – South Tropical Africa, West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa, East Tropical Africa, Western Indian Ocean.

**Habitat** – Understory of rain forest.

**Notes** – The achenes of this forest grass are enclosed in inflated conchiform lemmas densely covered by minute hooked hairs which favour epizoochory. *Leptaspis zeylanica* is a widespread species that also occurs in Madagascar and further east across to the Solomon Islands (Soderstrom et al. 1987). Nevertheless, this is the first record of the genus *Leptaspis* in Angola.

**Specimen examined** – **Angola: Uíge:** [Kunga Quiximba] 7°36'38.4"S, 14°57'49.2"E, 875 m alt., 13 Mar. 2013, *B. Ditsch BD 254* (DR, [barcode 041877](#)).

**Reference** – Clayton (1972): under the synonym *Leptaspis cochleata* Thwaites.



## Rubiaceae

### *Atractogyne gabonii* Pierre

**Distribution** – West Central Tropical Africa.

**Habitat** – Rain forest.

**Notes** – This liana bears fusiform fruits that reach a length of 10 cm. The only previous known species from Angola, *Atractogyne bracteata* (Wernham) Hutch. & Dalziel, is a shrub with fruits up to 3 cm long.

**Specimen examined** – Angola: Uíge: [Serra Pingano] 7°40'23.0"S, 14°56'18.0"E, 615 m alt., 3 Dec. 2015, *J. Lau 2015-11-197* (DR, [barcode 051946](#)).

**Reference** – Hepper & Keay (1963).

### *Uncaria africana* G. Don subsp. *africana*

**Distribution** – West Tropical Africa, West Central Tropical Africa, Northeast Tropical Africa, East Tropical Africa, Western Indian Ocean.

**Habitat** – Forest edge.

**Notes** – Another subspecies, *Uncaria africana* G. Don subsp. *angolensis* (Havil.) Ridsdale, was previously recorded from Uíge, based on *Gossweiler 7338* (Figueiredo 2008a, 2008b). The two subspecies can be distinguished on flowers being pedicellate in subsp. *angolensis*, whereas in subsp. *africana* they are sessile (fig. 2H).

**Specimen examined** – Angola: Uíge: [Camancoco] 7°26'14.3"S, 15°06'04.6"E, 857 m alt., 11 Feb. 2017, *T. Lautenschläger 2017-06* (DR, [barcode 045095](#)).

**References** – Hepper & Keay (1963); Figueiredo (2008a, 2008b); Turner (2018).

## Alien species

## Apiaceae

### *Eryngium foetidum* L.

**Distribution** – Central America, South America.

**Habitat** – Roadside.

**Notes** – Leaves of this short-lived species are characterized by a strong smell similar to that of *Coriandrum sativum* L. Like *Coriandrum* they are used as flavouring in many tropical and subtropical regions of the world (Menhglan & Watson 2005), including parts of Africa (Cannon 1958). We found plants of different ages indicating that the species is self-reproducing at the locality where it was found. This is the first record of the genus *Eryngium* in Angola.

**Specimen examined** – Angola: Uíge: [Cassechi] 7°34'36.6"S, 14°57'44.3"E, 880 m alt., footpath bordering secondary forest; 12 Mar. 2013, *B. Ditsch BD 242* (DR, [barcode 041882](#)).

**Reference** – Cannon (1958).

## Asteraceae

### *Acanthospermum australe* (Loefl.) Kuntze

**Distribution** – Central America, South America.

**Habitat** – In a village, likely escaped.

**Notes** – In contrast to *Acanthospermum hispidum* DC. hitherto recorded from Angola (Figueiredo & Smith 2008) the achenes of this species lack two large erect apical spines. The website Invasive Species Compendium (CABI 2019) documented unintentional vector transmission by humans or animals for this species and identified it as potentially invasive.

**Specimens examined** – Angola: Uíge: [Mabaya Mafixa] 6°51'06.8"S, 14°55'05.8"E, 812 m alt., 15 Jul. 2015, *T. Lautenschläger 201* (DR, [barcode 04336](#)); [Kamankoko] 7°26'56"S, 15°05'39" E, 930m, 10 Nov. 2014, *T. Lautenschläger 2014-11-53* (DR, [barcode 042726](#)); [Kivala] 05°58'59"S, 15°11'15"E, 977m, 25 Nov. 2015, *T. Lautenschläger 2015-11-74* (DR, [barcode 050836](#)).

**References** – Blake (1921); Adams (1963): under the synonym *Acanthospermum brasilium* Schrank; Wild (1967); Lisowski (1991).

### *Galinsoga quadriradiata* Ruiz & Pav.

**Distribution** – Central America, South America.

**Habitat** – In a village, likely escaped.

**Notes** – So far, only *Galinsoga parviflora* Cav. is recorded for Angola (Bossard 1996). Compared to this species the stems of *G. quadriradiata* are hispid with long spreading hairs and long-stalked glands (not glabrous or nearly so), the receptacle scales are simple to shortly lacinate (not trifid), and the pappus scales are shorter than the corolla of the disc florets (not longer). Schulz (1981) remarked that plants without any pappus scales are documented in the species as well. *G. quadriradiata* is known to occur in Cameroon and Northern Africa (e.g. *Cheek M.R. 9027* (WAG), *Cheek M.R. 8315* (KUPE)). CABI (2019) identified this species as potentially invasive.

**Specimen examined** – Angola: Uíge: [Dimuca] 7°53'18.5"S, 15°30'27.2"E, 1291 m alt., 2 May 2014, *A. Göhre 384* (DR, [barcode 043142](#)).

**Reference** – Adams (1963): under the synonym *Galinsoga ciliata* (Raf.) Blake.

## Convolvulaceae

### *Ipomoea hederifolia* L.

**Distribution** – Central America, South America.

**Habitat** – Secondary rain forest.

**Notes** – The salver-shaped, brightly scarlet flowers with distinctly awned sepals differ clearly from all the 48 *Ipomoea* species Figueiredo & Smith (2008a) compiled for Angola. *I. hederifolia* is an annual plant long known to occur as an ornamental weed in many tropical countries including parts of Africa (see references). In contrast to *I. purpurea* (L.) Roth and *I. tricolor* Cav. Gossweiler (1950) did not mention it as a subsponaneous ornamental from garden cultivation in Angola. Lejoly & Lisowski (1992) listed herbarium specimens of *I. hederifolia* from various regions of the D.R. Congo. They include Angola into the area of distribution, but no proof is given for the occurrence of the species there. CABI (2019) identified this species as potentially invasive.

**Specimen examined** – Angola: Uíge: [Serra do Uíge] 7°36'17.0"S, 14°57'34.0"E, 881 m alt., 15 Mar. 2015, *B. Ditsch* BD 281-2 (DR, [barcode 052097](#)).

**References** – Baker & Rendle (1905): under the synonym *Quamoclit coccinea* Moench, Heine (1963c); Gonçalves (1987).

## Euphorbiaceae

*Jatropha gossypifolia* L.

**Distribution** – Central America, South America.

**Habitat** – In a village near river, likely escaped.

**Notes** – In contrast to other *Jatropha* species, leaves are 3–5-lobed and purple-tinged. Keay (1958a) classified this species as widely distributed in the tropics. CABI (2019) identified this species as potentially invasive.

**Specimen examined** – Angola: Cuanza Norte: [Muco-so] 9°40'60.5"S, 14°22'99.0"E, 39 m alt., 28 Jul. 2015, *C. Heinze* 35 (DR, [barcode 043966](#)).

**Reference** – Keay (1958a).

## Fabaceae

*Erythrina poeppigiana* (Walp.) O.F.Cook.

**Distribution** – Central America, South America.

**Habitat** – Forest edge.

**Notes** – The tall tree has got glabrous leaves with rhombic pinnae up to 20 cm long. Conspicuous conical stipels below the lateral leaflets (not the paired stipules at the base of the petiole!) reach up to 4 mm. The campanulate puberulent calyx with very short teeth is about 5 mm long and may be shortly spurred on the upper crest. All petals are orange, the standard being up to 55 mm long and 20 mm broad, the wing petals not much longer than the calyx, and the keel petals up to 35 mm long. None of the other *Erythrina* species recorded for Africa fit this description. Hepper (1958) reported the species for Sierra Leone and south Nigeria. It is widely planted as shade tree for coffee e. g. in Nicaragua (Oliver 1871; Hepper 1958; Torre 1966; Mackinder 2001; Neill 2001) and probably was so during colonial period in Angola. Now it is found naturalized in the surroundings of the villages.

**Specimen examined** – Angola: Uíge: [Kamancoco] 7°27'06.0"S, 15°05'40.0"E, 937 m alt., 19 Jul. 2015, *T. Lautenschläger* 2015-36a (DR, [barcode 050869](#)).

**References** – Oliver (1871); Louis (1935); Krukoff (1938); Hepper (1958); Torre (1966); Guillarmod et al. (1979); Mackinder (2001); Neill (2001).

*Mimosa diplotricha* Sauvalle var. *inermis* (Adelb.) Veldkamp

**Distribution** – Central America, South America.

**Habitat** – In a village, likely escaped.

**Notes** – Unarmed species of *Mimosa*. Stems of *M. diplotricha* var. *inermis* are pubescent, leaves with up to 10 pairs of leaflets on a long petiole ( $\leq 8$  cm). The pinkish flowers are arranged in globose heads with a diameter of 12 mm.

**Specimens examined** – Angola: Uíge: [Kunga Quiximba] 7°36'51.0"S, 14°58'59.3"E, 810 m alt., 19 Nov. 2014, *A. Göhre* 124 (DR, [barcode 042779](#)); **Cuanza Norte**: [N'Dalatando] 9°20'03.4"S, 14°53'55.8"E, 772 m alt., 10 Nov. 2016, *C. Heinze* 110 (DR, [barcode 044449](#)).

**References** – Keay (1958b); Brenan & Brummitt (1970): under the synonym *Mimosa invisiva* Mart. var. *inermis* Adelb.

## Iridaceae

*Eleutherine bulbosa* (Mill.) Urb.

**Distribution** – Central America, South America.

**Habitat** – In a village, likely escaped.

**Notes** – The bulbous rootstock with a length around 5 cm and a width of 3 cm is characteristic for *E. bulbosa*. The bulb is fleshy and reddish. The white flowers are organized in compound inflorescences. The species has its origin in Central and South America, but is widely introduced and distributed in Asia, Indochina and Africa. CABI (2019) identified this species as potentially invasive. This is the first record of the genus *Eleutherine* in Angola.

**Specimen examined** – Angola: Cuanza Norte: [Zavula] 9°20'04.5"S, 14°46'27.1"E, 697 m alt., 17 Nov. 2015, *C. Heinze* 51 (DR, [barcode 043996](#)).

**Reference** – Prameela et al. (2018).

## Lamiaceae

*Hyptis suaveolens* (L.) Poit.

**Distribution** – Central America, South America.

**Habitat** – In a village, likely escaped.

**Notes** – In contrast to other species, *H. suaveolens* is pubescent and the veins on the lower side of the leaf are white-tomentose. The flowers are organised in axillary cymes. According to Morton (1963), the species is native to tropical America and now widespread in tropical Africa. CABI (2019) identified this species as potentially invasive.

**Specimen examined** – Angola: Uíge: [Kunga Quiximba] 7°36'51.0"S, 14°58'59.3"E, 810 m alt., edge of village; 19 Nov. 2015, *A. Göhre* 99 (DR, [barcode 043097](#)).

**Reference** – Morton (1963).

## DISCUSSION

The main objective of our investigations was to collect and document ethnobotanical knowledge, not to carry out comprehensive floristic field studies on biodiversity. However, the results presented indicate that new records are very likely to be documented with ongoing field work and botanical exploration in northern Angola. According to Olson et al. (2001) four ecoregions important for conservation of global biodiversity are less than 1000 km away from Uíge, the centre of our present study: Congolian Coastal Forests (300 km to the northwest), Western Congo Basin Moist Forests and Central Congo Basin Moist Forests (700 km to the north and northeast respectively), and the Central and Eastern Miombo Woodlands (800 km to the east and south). Being part of a transition zone, remnant forests, woodlands and savannahs in



the study area provide suitable habitats for isolated populations of plants from all these ecoregions. Our knowledge of the species richness and the composition of fauna and flora of northern Angola is still limited (Figueiredo & Smith 2008; Goyder & Gonçalves 2019). Further studies must prove whether the relevance of the area in the context of global biodiversity conservation may be higher than estimated so far, especially as Angola is one of the botanically least explored countries in Sub-Saharan Africa (Sosef et al. 2017).

All of the nine new records of alien species presented here originate from the Neotropics. The strong historical connection between the West coast of Africa and the New World might explain this fact. Slaves from Angola were shipped to Brazil, both Portuguese colonies; plants with an economic value were transferred to Africa. But even before the peak of slave trade was reached in the 18<sup>th</sup> century a botanical homogenization between the two continents had taken place. The environmental historian Crosby (2003) termed the early transatlantic trade of slaves, livestock and cultivated plants “Columbian Exchange”. A transculturation of plant use traditions in Africa as well as America was one of its manifold profound effects (Voeks 2013).

Eight of the nine newly recorded alien species can be classified as weeds that were introduced to the region unwillingly. However, the distribution paths are difficult to reconstruct. Nevertheless, as five of the here listed nine species are classified as potentially invasive (CABI 2019), strong efforts to avoid their further distribution need to be undertaken.

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