

Schistostephium crataegifolium (Compositae: Anthemideae), a new generic record for Angola

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Background: The African genus *Schistostephium* has eight species in southern and south tropical Africa. The most widely distributed species, *Schistostephium crataegifolium*, occurs in upland or montane areas towards the eastern side of the continent.

Objectives: The objective of this study was to document a new geographic distribution record of this species from the Bié Plateau of central Angola.

Method: Specimens of *S. crataegifolium* were collected near Chitembo, Bié Province, during fieldwork for the Future Okavango Project grant 01LL0912A, task SP05, a project aimed at providing scientific support for sustainable land and resource management of the Okavango basin of Angola, Namibia and Botswana. The specimen was identified at the Herbarium of the Royal Botanic Gardens, Kew, UK.

Results: The collection represents a new generic record for Angola, which is disjunct from the nearest population in Katanga by approximately 1000 km.

Conclusion: New generic records such as this underline the need for basic botanical inventories in the large, ecologically diverse but poorly documented country of Angola.

Introduction

The African genus *Schistostephium* Less. (Lessing 1832:251) was revised by Harris (2012), who recognised eight species. Five of these have restricted distributions in South Africa and Swaziland, but three species are recorded from tropical Africa. *Schistostephium oxylobum* S. Moore (1911:117) occurs in the eastern Highlands of Zimbabwe and neighbouring Mozambique, and *Schistostephium heptalobum* Oliv. & Hiern (Oliver & Hiern 1877:399) is found in southern Zambia, northern and eastern Zimbabwe and central Mozambique. *Schistostephium crataegifolium* (DC.) Fenzl ex Harv. (De Candolle 1838:134; Harvey 1865:169) is by far the most widely distributed species in the genus and ranges from southern Tanzania and the Katanga region of the Democratic Republic of Congo through to the Eastern Cape Province of South Africa. However, neither this species nor indeed the genus has been recorded from Angola, Botswana or Namibia (Figueiredo, Beentje & Ortíz 2008; Harris 2012; Setshogo 2005).

Schistostephium can be distinguished from related genera in the subtribe Cotulinae Kitt by its four-lobed rather than five-lobed corollas. All species are herbs or shrubs, and specific delimitation relies on vegetative characters, on the shape and size of the capitulum and the number of florets. *Schistostephium crataegifolium* has deeply dissected leaves distributed along the main stem and relatively small, non-cylindrical capitula.

Research method and materials

Material

The specimen was collected in May 2013, during fieldwork in the Cusseque core site for the Future Okavango Project, in one central 100 m² subplot of a 20 m × 50 m plot (Felfili, Carvalho & Haidar 2005). The other two records were collected in a general walking survey method (Filgueiras *et al.* 1994). Fertile material was collected and prepared using traditional botanical methods (Fish 1999; Victor *et al.* 2004). A set of duplicate specimens was prepared and sent to Kew Herbarium, where the specimen was determined.

Procedure

The collection was identified in consultation with the author of the recent taxonomic revision of *Schistostephium*, applying the characters listed in that work, and by comparison of the material with herbarium collections at Kew, British Museum of Natural History (BM) and electronic

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resources available through JStor Plants and the LISC online catalogue. The specimen was mounted and labelled in LUBA, the barcode was created from collector number and printed in Zebra Printer (TLP 2844), the digitalisation was done in a Scan Epson (10000 XL), following JStor protocols, and the resultant image was saved in standardised format.

Ethical considerations

Permits

Collection of biological materials in Angola is not currently regulated by specific legislation. The project during which the material was collected comes under the framework of a bilateral agreement between Angola, represented by the Instituto Superior de Ciências de Educação da Huíla (ISCED – Huíla) in Lubango, and Germany, represented by the University of Hamburg (UHH). Transfer of biological material to Kew was approved by Provincial Department of Agriculture, Fisheries and Environment. All International Conventions, to which Angola is signatory, such as Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973), Convention on Biological Diversity (1992), International Treaty on Plant Genetic Resources for Food and Agriculture (2004), and all other national and international relevant instruments concerning biodiversity were taken into consideration.

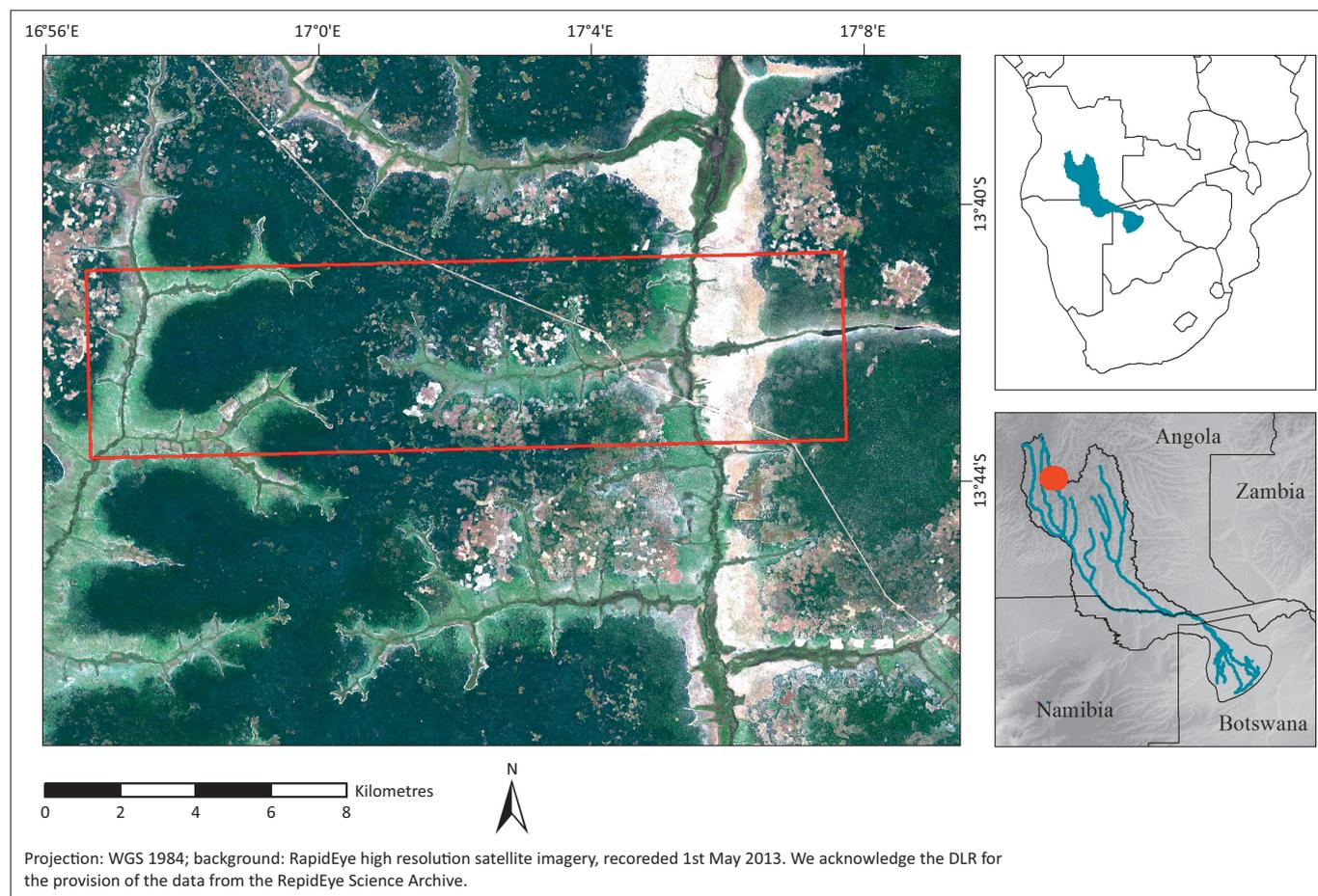
Taxonomic treatment

Schistostephium crataegifolium (DC.) Fenzl ex Harv. Compositae. In: W.H. Harvey & O.W. Sonder, *Flora Capensis* 3: 169 (1865). Basionym: *Tanacetum crataegifolium* DC.: 134 (1838).

Type: SOUTH AFRICA. [Eastern Cape Province], between Grahamstown and Blue Krantz, 08 Sept. 1813, *Burchell* 3619 (G-DC lectotype, designated by Harris (2012:108), K001044982! isolectotype).

Description (adapted from Harris 2012)

Erect woody herb or small shrub to 1.2 m with striate pubescent stems. *Leaves* distributed along the main stem, alternate, sessile or shortly petiolate, blade variably pinnatisectly divided, often with two or three orders of branching, pubescent on both surfaces. *Capitula* solitary or in branched clusters, involucre broadly and shallowly campanulate, (4–)6 mm – 8 mm diameter; phyllaries c. 30, multiseriate and subequal but apex and margins of inner phyllaries becoming more hyaline; receptacle broadly domed and hollow. *Florets*: outermost florets female, 5 or fewer (often absent), corolla yellow, tube 1.6 mm – 2.3 mm long, glabrous, lobes 0.2 mm – 0.4 mm long, acute and slightly inturred, style drying yellow. *Cypselas* of female florets flattened and



Source: DLR-German Aerospace Center; RapidEye Science Archive

Note: Okavango basin follows the definition of the 'The Future Okavango' project (<http://www.future-okavango.org>, Wehberg & Weinzierl 2013).

FIGURE 1: Location of the Okavango basin in southern Africa and the Cusseque core site denoted in red, where *Schistostephium crataegifolium* was collected.

winged, c. 0.8 mm × 0.6 mm; pappus absent. Inner florets hermaphrodite, 30–60(–110), corolla yellow, tube c. 1.5 mm long, lobes 0.3 mm – 0.4 mm long, acute and slightly inturred forming a hood, outer surface of lobe apex with granular yellow glands; anthers yellow, c. 0.8 mm long, anther appendages acute or rounded, base acute, anther collar pigmented. *Cypselas* of hermaphrodite florets c. 1.3 mm long, sometimes glandular, innermost achenes sometimes with apparently unicellular setulae on inner angle; pappus absent.

Distribution and ecology

Schistostephium crataegifolium occurs from the Eastern Cape of South Africa through to southern Tanzania and the Katanga region of the Democratic Republic of Congo, mostly following the more upland or montane regions towards the eastern side of the continent. The new record represents a westward disjunction of around 1000 km from Katanga (Democratic Republic of Congo) to the Bié Plateau of central Angola (Figure 1), where it occurs at moderate altitude (c. 1560 m) in an area with mean annual precipitation of around 1000 mm per year (Gröngröft *et al.* 2013; Weber 2013). Two other records were made by a team member in the study area (13.699870 S, 17. 074210 E) and close by Comuna do Mumbué

(13.931679 S, 197102 E). The area where the species was collected is covered in moist miombo woodland dominated by *Brachystegia* spp., *Julbernardia paniculata* and *Cryptosepalum exfoliatum* subsp. *pseudotaxus* (Barbosa 1970; Revermann & Finckh 2013; Revermann *et al.* 2013; Figure 2).

New record

ANGOLA. Bié Province: Cusseque study area, Chitembo, 13.70056 S, 17.05258 E, 14 May 2013, *Maiato FM971* (K!, LUBA!) (Figures 3 and 4).

Conclusion

This new generic record for Angola is a reflection of the uneven collecting activity and consequent inadequacies in the documentation of the flora of this large and ecologically diverse country. Despite the relatively recent publication of a national checklist of vascular plants (Figueiredo & Smith 2008), field surveys in several parts of the country conducted by the last author (D.J.G.) and colleagues have added over 70 species to this list and many potentially new species. All botanical inventories undertaken by this author in Angola over the last 5 years have resulted in new records for the country or for regions within it.



Source: Francisco M.P. Gonçalves photo archive

FIGURE 2: Open woodlands in Cusseque area, Bié Plateau, where the species was collected, dominated by *Brachystegia* spp., *Julbernardia paniculata* and *Cryptosepalum exfoliatum* subsp. *pseudotaxus*.



Source: Image supplied by LUBA

FIGURE 3: Digitised image of *Schistostephium crataegifolium* (DC.) Fenzl ex Harv.



Source: Rasmus Revermann photo archive

FIGURE 4: *Schistostephium crataegifolium* (DC.) Fenzl ex Harv. as found in the Cusseque study area.

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Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this manuscript.

Authors' contributions

F.M.P.G. conducted the fieldwork during which the new record was collected and co-wrote the account with the other two authors. J.J.T. performed all the herbarium work, including the digitalisation of the specimen for the manuscript and D.J.G. identified the specimen duplicate and contributed

towards writing the manuscript. The authors contributed equally during the revision process of the manuscript.

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