

Benishangul Gumuz Region in Ethiopia: a centre of endemism for *Chlorophytum* — with a description of *C. pseudocaulis* sp. nov. (*Anthericaceae*)

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Summary. The Benishangul Gumuz Region in western Ethiopia is one of the least botanically explored regions and several new records have been published as additions in the *Flora of Ethiopia and Eritrea*. A new species is described, *Chlorophytum pseudocaulis* Tesfaye & Nordal, and phytogeographic aspects of the endemism of *Chlorophytum* in western Ethiopia are discussed.

Key words. *Anthericaceae*, *Chlorophytum*, Flora of Ethiopia, Benishangul Gumuz, Phytogeography.

Introduction

The vegetation of the western Ethiopian escarpment, named by White (1983), as ‘undifferentiated woodlands (Ethiopian type)’ has an interesting and partially unique flora (Sebsebe Demissew *et al.* 2005). Much of this vegetation type is more or less intact in the Benishangul Gumuz Region and is characterised by broadleaved deciduous trees. The most common tree species are *Anogeissus leiocarpa* Guill. & Perr., *Balanites aegypticus* Wall., *Boswellia papyrifera* Hochst., *Combretum collinum* Fresen., *Dalbergia melanoxylon* Guill. & Perr., *Lannea fruticosa* Engl., *L. welwitschii* (Hiern) Engl., *Lonchocarpus laxiflorus* Guill. & Perr., *Pterocarpus lucens* Guill. & Perr., *Ptilostigma thonningii* (Schumach.) Milne-Redh., *Stereospermum kunthianum* Cham., *Terminalia laxiflora* Engl. and *T. macroptera* Guill. & Perr. The solid-stemmed bamboo *Oxytenanthera abyssinica* Munro is common on escarpments and hilly areas. The ground cover is dominated by geophytes such as *Chlorophytum* Ker Gawl., *Costus* L., *Criminum* L., *Dorstenia* L., *Drimiopsis* Lindl. & Paxton, *Eulophia* R. Br. ex Lindl., *Habenaria* Willd., *Hypoxis* L. and *Ledebouria* Roth at the beginning of the rainy season (May and June). Towards the end of the rainy season (September and November), a tall stratum of perennial grasses, including species of *Andropogon* L., *Cymbopogon* Spreng., *Hyparrhenia* Andersson ex E. Fourn., *Panicum* L., *Pennisetum* Pers. and *Rottboellia* L. f. becomes dominant. This vegetation is adapted to annual fires, which mostly occur in December and January.

Benishangul Gumuz Region is little-known botanically and several new records from the region have been published as additions to the *Flora of Ethiopia and Eritrea* (Edwards *et al.* 2000). New species are also being found in the region and two new species of *Chlorophytum* were recently described, namely *C. herrmannii* Nordal & Sebsebe and *C. serpens* Sebsebe & Nordal (Sebsebe Demissew *et al.* 2005). During field work in the area one of us (T.A.) collected a plant that was not included in the *Flora of Ethiopia and Eritrea* (Nordal 1997), nor in the *Flowers of Ethiopia and Eritrea — Aloes and other Lilies* (Sebsebe Demissew *et al.* 2003). The same taxon also turned up in the collections of Christof Herrmann from the region. It does not fit with any described taxon so far. The aim of this paper is to describe the new species and to discuss phytogeographic aspects of the endemism of *Chlorophytum* in western Ethiopia.

***Chlorophytum pseudocaulis* Tesfaye & Nordal sp. nov.** *Chlorophytum viridescens* Engl. affinis, sed pseudocaulis distincto; foliis latioribus (5 – 5 – 6 cm non 1 – 2.5), non undulatis; floribus bruneolis, non albidis; filamentis filiformis, non fusiformis. Typus: Ethiopia, Benishangul Gumuz National Regional State, Hoha Valley, 15 km NE of Asosa, 10° 08.42'N 34° 38.17'E, 1430 m, 3 June 2000, Christof Herrmann 127 (holotypus ETH).

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Herb up to 105 cm high. Rhizome short with several, extensive, thick, spongy roots without tubers. Leaf bases forming a distinct pseudostem up to 40 cm long, surrounded by cataphylls almost without lamina in lower (outer) part, inner leaves with well developed lamina up to 40 cm long, 5–6.5 cm wide, with 20–28 spaced veins and a distinct midrib. Peduncle with 1–2 bract-like leaves, 10–13 cm long, 1–1.5 cm wide, below the inflorescence. Inflorescence a much-branched panicle with 2–3 flowers at each node; bracts of the side branches up to 5 cm long, floral bracts up to 0.7 cm long. Pedicel up to 10 mm, jointed below the middle, pale brown above the articulation, green below. Flowers urceolate, pale brown; tepals 6 mm long, 1–1.5 mm wide, reflexed and 3-veined; filaments filiform, scabrid, subequal longer ones 4–5 mm long, shorter ones 3 mm; anthers 0.7 mm, curved, versatile; style exerted, slightly bent. Capsules 3-locular c. 5 mm long, 5 mm wide. Seeds 2–4 per locule, slightly saucer-shaped, 2 mm in diam. Fig. 1.

DISTRIBUTION. Ethiopia (Map 1).

ETHIOPIA. NE of Asosa, 1430 m, 10°08.42'N, 34°38.17'E, *Herrmann* 127 (holotype ETH) & 128 (ETH); S of Asosa, 1560 m, 10°02.46'N, 34°31.40'E, *Tesfaye* 1148, (ETH).

HABITAT Open bushy meadows with grey clay soil dominated by geophytes including *Crinum ornatum* Herb., *Drimiopsis botryoides* Baker, *Gladiolus roseolus* Chiov., *Habenaria perbella* Rchb. f. and *Ledebouria revoluta* (L. f.) Jessop. The dominant bush in the meadows is *Kotschyia africana* Endl. *Cyperus* spp. and grasses such as *Cymbopogon* and *Hyparrhenia* have the highest cover. The dominant trees in the bamboo woodland around the meadows include *Combretum collinum*, *Piliostigma thonningii*, *Stereospermum kunthianum*, *Terminalia laxiflora*, *T. macroptera* and *Vitex doniana* Sweet; alt. 1430–1560 m.

PHENOLOGY. Flowering June, fruiting July.

NOTES. *Chlorophytum pseudocaulis* belongs to a group of *Chlorophytum* with thick spongy roots without tubers, richly branched panicles and usually greenish to whitish urceolate flowers. The group includes *C. andongense* Baker, *C. macrosporum* Baker and *C. viridescens* Engl. It differs from all of them in possessing a well developed pseudostem. It also has smaller flowers than the two first mentioned species, and larger leaves than the third. *C. ruahense* Engl. and *C. nyassae* (Rendle) Kativu are also related to this group, but both are distinct, the first by having large clasping leaves all along the peduncle, the second by its scale-like leaves on the peduncle and the open stellate flowers. *C. hirsutum* A. D. Poulsen & Nordal, a narrow endemic from open forest in the border areas between Burundi, Congo and Uganda, also belongs to this group. This species is hairy and lacks a pseudostem. There is no doubt that the two known

populations of the pseudostemmed taxon deserve recognition at the species level.

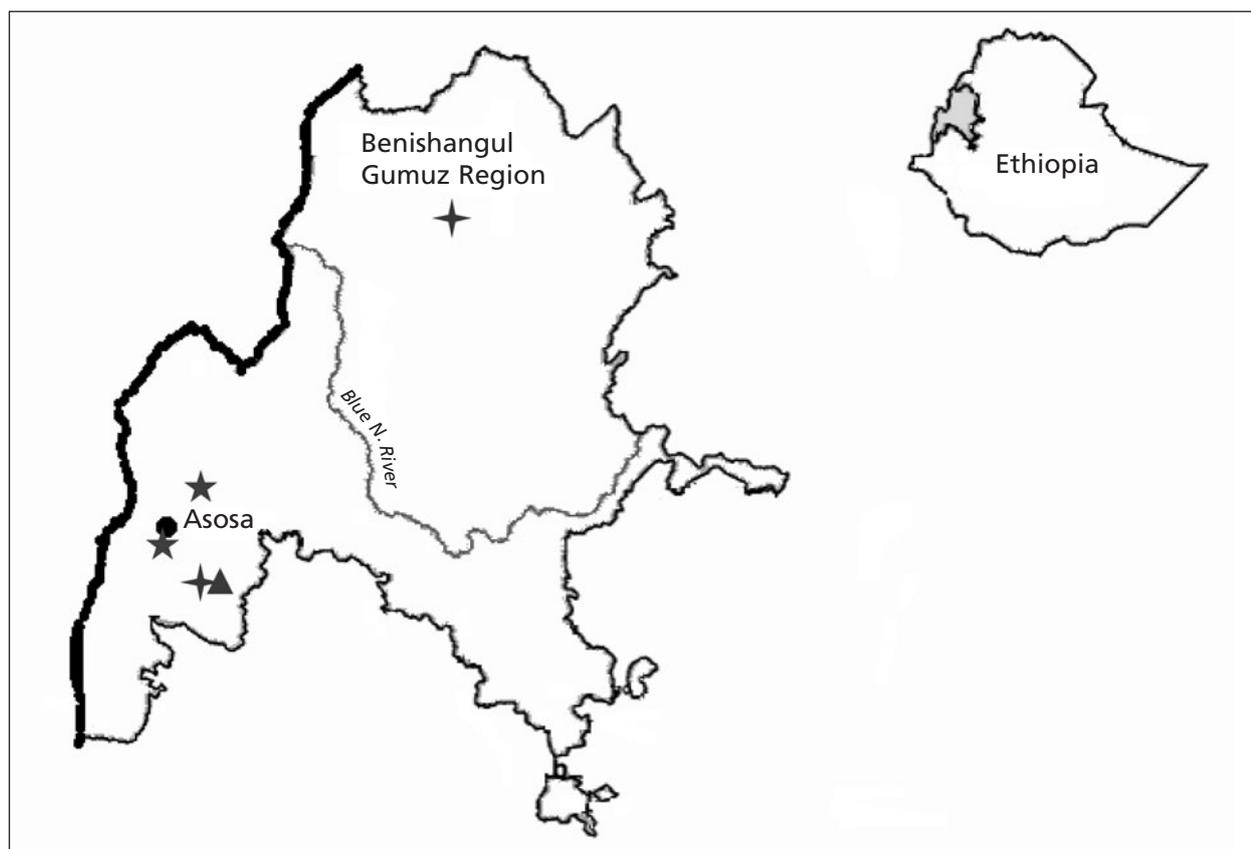
Three species of *Chlorophytum* are endemic to the Benishangul Gumuz Region (Map 1), i.e. about 12% of the species found in Ethiopia. *C. pseudocaulis* is related to a group that is widespread in the Sudano-Zambesian phytochorion. *C. serpens* belongs in the widespread, heterogeneous *C. comosum* (Thunb.) Jacques complex with a mainly Guineo-Congolese affinity. *C. comosum* is found in the shade of rainforest and riverine forest on brown to black loamy clay soil in south-western Ethiopia (Illubabor and Kafa regions); it is found throughout tropical Africa south to the Cape (Sebsebe Demissew *et al.* 2003). *C. serpens* grows in *Combretum-Terminalia* woodland and *Oxytenanthera abyssinica* dominated woodland on reddish sandy soil, between 1100 and 1460 m. *C. herrmannii* grows on rocky outcrops in *O. abyssinica* dominated closed woodland, around 1600 m. Morphologically, *C. herrmannii* is similar to another fairly narrow Ethiopian endemic, *C. neghellense* Cufod., growing in *Acacia-Combretum-Commiphora* dominated woodland, often heavily grazed, on red sandy soils between 1000 and 1700 m in Sidamo (Sebsebe Demissew *et al.* 2003, 2005). The three endemic species show relationships with rather different groups ecologically and geographically. They are restricted to fragmented wetter habitats of Benishangul Gumuz Region, which are probably the result of recent anthropogenic influence rather than geological and climatological events in the past.

Endemism in sub-Saharan Africa is hypothesised to be related to paleoclimatic fluctuations (Linder 2001). It has further been suggested that centres of endemism would be in places that have shown climatic stability over longer periods (Lovett & Friis 1996). In general, vicariance or fragmentations of distributional ranges by geological or climatological events are the most widely accepted causes of endemism (Evans *et al.* 2004).

There is no clear evidence yet to explain the mechanisms of evolution of an endemic flora in the Benishangul Gumuz Region. However, Sebsebe Demissew *et al.* (2005) suggested that the complex topography and the relatively reliable orographic rain on the western Ethiopian escarpment, together with the hinterland of deep river valleys, provided small refugia during the periods of adverse climatic conditions. This may have secured niches of very restricted range where species could survive unfavourable periods. The best conditions for such niches are likely to have been in the most topographically and geologically complex areas in the lower reaches and at the mouth of the biggest river system in western Ethiopia, the gorges of the Blue Nile River and its tributaries, an area that approximately agrees with the extension of the Benishangul Gumuz National Regional State. The other area with a high



Fig. 1. A – B *Chlorophytum pseudocaule* based on Herrmann 127 and 128, ETH. **A** complete plant; **B** inflorescence. DRAWN BY SVETLANA VORONKOVA.



Map 1. Distribution of *Chlorophytum hermannii* (▲), *C. serpens* (◆) and *C. pseudocaulis* (★).

concentration of endemic *Chlorophytum* species within Ethiopia is the lowland surrounding the Bale Mountains. Here also, plants might have found rather stable niches moving up and down the mountain slopes according to changes in climate.

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