Plant Ecology and Evolution FastTrack: 1–37, 2012

REGULAR PAPER

Synopsis of the genus *Chlorophytum* (Asparagaceae) in Central Africa (Democratic Republic of the Congo, Rwanda, Burundi)

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Background and aims – The genus *Chlorophytum* is revised for the Democratic Republic of the Congo, Rwanda and Burundi, in order to prepare the treatment of the genus for the *Flore d'Afrique Centrale*.
Methods – Herbarium taxonomy and SE micrographs of seeds. All the material kept in BR, BRLU, BRVU, FT, K, B and KIP has been examined, supplemented with recent field observations in S Katanga. Nuclear and chloroplast DNA markers have been used to clarify the taxonomic position of some species.
Key results – A total of 65 taxa (D.R.Congo: 62, Burundi: 19, Rwanda: 8) are reported for the study area, i.e. fifty species, two subspecies, twelve varieties and one form. A total of 27 taxa are new to the D.R.Congo, five to Burundi and two to Rwanda. Three taxa are endemic to the D.R.Congo. Three new varieties are described (*Chlorophytum africanum* var. *nordalianum*, *C. colubrinum* var. *upembense*, *C. cameronii* var. *ruziziense*). Twelve new combinations, 16 new synonyms and one new name (*Chlorophytum sphagnicolum*) are proposed. An identification key is included. SEM pictures of seeds are included for fifteen taxa and colour photographs of living plants for fourteen taxa. A brief phytogeographic outline is provided. Upper Katanga, with 47 taxa, appears as a prominent center of diversity of the genus.

Key words – taxonomy, *Chlorophytum*, identification key, Central Africa, phytogeography, revision, Katanga, seed coat, SEM.

INTRODUCTION

"[…] Les Chlorophytum paraissent des végétaux extrêmement variables et […] les caractères sur lesquels on croirait pouvoir se baser pour les grouper d'une façon sûre, peuvent être, eux-mêmes, peut-être, sous la dépendance des conditions extérieures. […] Il ne nous est possible que de décrire, comme nouveautés, les plantes qui ne peuvent être rapportées, sans le moindre doute à un type ancien. Ce sera aux monographes de l'avenir à assigner à toutes ces espèces provisoires leur véritable place dans la classification."
(De Wildeman 1921b: 11)

The circumscription of the genus *Chlorophytum* Ker Gawl. (Asparagaceae in APG III 2009) was revised by Obermeyer (1962), Marais & Reilly (1978), Nordal et al. (1990) and Kativu & Nordal (1993) to include all the species formerly included in *Acrospira* Baker, *Debesia* Kuntze, *Dasystachys* Baker, *Verdickia* De Wild. and most of the African species formerly included in *Anthericum* L.

The genus *Chlorophytum* has recently been revised for the *Flora of Tropical East Africa* (FTEA) (Nordal et al. 1997), the *Flora Zambesiaca* (FZ) (Kativu et al. 2008) and the *Flore du Gabon* (Bjorå & Nordal 2010). In order to prepare the treatment of the genus for the *Flore d'Afrique Centrale* (FAC), we have critically revised all the material of *Chlorophytum* from the Democratic Republic of the Congo (D.R.Congo), Rwanda and Burundi. For a number of taxa, phylogenetic relationships within the genus have been investigated using molecular markers, the results of which are presented elsewhere. We here present a key to the species, a check-list with a revised synonymy, and a brief phytogeographic sketch of the genus within the study area. When our taxonomic treatment departs from FZ and FTEA, a concise justification is provided. New combinations are coined when necessary and new synonyms are reported. Detailed accounts of the taxa, including citation of all specimens studied, will be published in the *Flore d'Afrique Centrale*.

MATERIAL AND METHODS

All the relevant material from D.R.Congo, Rwanda and Burundi in BR, BRLU, BRVU, B, FT, K, KIP and LSHI has been examined. This material was supplemented with our own collections and field observations made in Upper Katanga in 2009 and 2010. No material pertaining to *Antericum* L. was found in the study area. No less than 69 names have been found that are typified by specimens collected in D.R.Congo and Burundi.

Conventional methods of herbarium taxonomy have been applied. Seed shape and details of seed testa have been studied with SEM. To reveal sister relations available species were analyzed phylogenetically using nuclear ITS and chloroplast *rps16* and *trnL-F* sequences (for methods see Bjorå et al. 2008). This information was also used to check consistency of our taxonomic views with other recent taxonomic publications. Our work has been considerably facilitated by the publication of the revision of the genus *Chlorophytum* in FTEA (Nordal et al. 1997) and FZ (Kativu et al. 2008), completed by Poulsen & Nordal (2005) for Guineo-Congolian taxa. Important references for the study area include De Wildeman (1909–1912, 1913c), Troupin (1955), the *Flore des Spermatophytes du Parc National Albert* (Robyns & Tournay 1955), the *Flore des Spermatophytes du Parc National de la Garamba* (Troupin 1956) and the *Flore du Rwanda* (Troupin 1988).

RESULTS AND DISCUSSION

In total, 65 taxa are recognized for the study area, i.e. fifty species, two subspecies, twelve varieties and one form. One species new to science was published separately (Meerts 2011). Three new varieties, one new name, twelve new combinations and sixteen new synonyms are proposed. No less than 27 taxa are new to D.R.Congo, five to Burundi and two to Rwanda (table 1). A key to identify all taxa is included. Photographs of living plants are included for fourteen taxa (figs 1–3). SE micrographs of seeds and seed coat structure are provided for fifteen taxa (figs 4–6). Seed shape and testa anatomy are variable within the genus *Chlorophytum* and provide important taxonomic characters (Marais & Reilly 1978, Nordal et al. 1990). The shape of the seed varies from disc-shaped to deeply cup-shaped, more or less folded. The periclinal walls of the testa cells vary from flat to convex, in a few cases with a distinct papilla up to 10 µm long, separated by more or less deep furrows. In some cases, seed traits are useful to discriminate species with very similar floral and vegetative traits in particular in the complex of Guineo-Congolian rain forest species (Poulsen & Nordal 2005).

In many cases, variation in the studied material was more extensive and complex than in adjacent regions (especially so for *C. blepharophyllum*, *C.* cf. *brachystachyum*, the *C. cameronii* complex, *C. macrophyllum*, *C. sparsiflorum*, *C. rubribracteatum*), and occasionally difficult to reconcile with other recent revisions.

Phytogeographic outline

Table 1 gives the distribution of taxa in Central Africa as presence/absence in Rwanda, Burundi and the nine phytogeographic regions of D.R.Congo as defined by Robyns (1948). Species richness in D.R.Congo, Rwanda and Burundi (50 species, 65 taxa) is very close to that in FTEA (52 species, 58 taxa) and FZ (56 species, 65 taxa). Upper Katanga stands out as an important centre of diversity of the genus for C Africa, with 47 taxa. Zambezian species are restricted mostly to that region of D.R.Congo. Only few species occur both in the Guineo-Congolian region and in Katanga (e.g. *C. blepharophyllum*, *C. sparsiflorum*, *C. stolzii*, *C. subpetiolatum*). The occurrence in Katanga of disjunct populations of Southern African species is remarkable (*C. recurvifolium*, *C. calyptrocarpum*, possibly also *C. macrosporum*). A few W African species are represented in Bas-Congo (*C. debile*, *C. staudtii*, *C. sphagnicolum*, *C. warneckei*).

Endemic taxa are surprisingly few (two species: *C. cordifolium*, *C. arcuatoramosum* and two varieties: *C. cameronii* var. *ruziziense* and *C. colubrinum* var. *upembense*) considering the large area covered by the flora. However, fifteen taxa have a restricted area, just extending to adjacent countries (table 1).

Upper Katanga alone counts 47 taxa i.e. by far the largest richness of all phytogeographic districts of D.R.Congo. The region of Lubumbashi, in particular, appears as an Eldorado with 29 taxa within a 1000 km² area. Although sampling bias cannot be ruled out, the high species density in that region fits in well with the high species richness in the adjoining regions of N Zambia (FZ), pointing to the "horn of Congo" as a most important centre of diversity for the genus *Chlorophytum* in tropical Africa. That region is currently under heavy anthropic pressure due to the rapidly increasing human population and dramatic deforestation, and therefore qualifies as a hotspot (sensu Myers et al. 2000) for the genus, with several taxa probably at risk.

Finally, it is significant that 25 taxa are known from less than six collections and six taxa by only one collection (table 1) highlighting the urgent need for new plant collecting efforts in D.R.Congo. Concerning *Chlorophytum,* future sampling effort should be directed to the Katangan highlands (Kundelungu, Mitwaba, Biano, Manika, Marungu), and the regions adjoining the Congo-Angola borderline.

Key to *Chlorophytum* species in D.R.Congo, Rwanda and Burundi

The identification of species requires fully developed material comprising underground parts, leaves, flowers, and mature fruits. Underground parts must be collected carefully as tuber shape, size and arrangement have high taxonomic value. Flower colour, and stamen arrangement (actinomorphic or zygomorphic) should be observed on fresh materials. In some cases, examination of seed surface at high magnification (20–40×) is required. Plant size and habit often change dramatically throughout the growing season. In particular, leaves are often incompletely developed or lacking altogether ("hysteranthous" plants) at the time of flowering and leaf measurements at that stage may be grossly underestimated.

Key to *Chlorophytum* species in D.R.Congo, Rwanda and Burundi

1. A single flower at each inflorescence node.....**Group A**
1. Flowers 2–5(–9) together, at least in part of the inflorescence nodes (look carefully for flower buds or naked pedicels at the base of flowers at lowermost inflorescence nodes).....2
2. Peduncle very short or lacking (< 3(–5) cm, to be measured from below the lowermost inflorescence branch or flower).....**Group B**
2. Peduncle > 5 cm.....3
3. Peduncle with bracts or leaves.....**Group C**
3. Peduncle naked, without bracts (except 1–2 immediately below inflorescence) (leaves can have a long sheathing base forming a pseudostem).....4
4. Plants having the following combination of characters: leaves distichous, pedicel articulated under the middle, mature fruit transversally ridged, seed coat irregularly folded.....**Group D**
4. Plants not having that combination of characters.....5
5. Inflorescence: a branched panicle.....**Group E**
5. Inflorescence: a raceme.....**Group F**

<u>Group A</u>: 1 flower at all inflorescence nodes

1. Peduncle with (1–)2–12 bract-like leaves.....2
1. Peduncle naked.....4
2. Perianth narrowly campanulate, constricted above the ovary; inflorescence generally a dense raceme; pedicels 1–3 mm; tepals 1-nerved.....*C. colubrinum*
2. Perianth widely open, not constricted; inflorescence lax, with rachis visible between flowers; pedicels 4–14 mm; tepals 3–5-nerved.....3
3. Leaves developed at flowering; bracts auriculate at base and glossy; pedicels c. 5 mm long in fruit.....*C. recurvifolium*
3. Leaves developing after flowering; bracts rounded at base and not glossy; pedicels 9–14 mm long in fruit.....*C. nubicum*
4. Inflorescence branched.....5
4. Inflorescence a raceme.....6
5. Plant < 20 cm high, with a rosette of 2–4 ovate leaves > 15 mm wide.....*C. perfoliatum*
5. Plant (20–)40–120 cm high, with leaves distichous, graminiform, < 12 mm wide (Fig. 2D).....*C. vestitum*
6. Leaves with ovate-elliptic lamina, contracted into a canaliculate petiole as long as the lamina and forming an angle with it; < 7 flowers to a plant; rain forest plant.....*C. occultum*
6. Leaves with filiform to ovate-elliptic lamina, not petiolate; > 7 flowers to a plant; grassland and woodland plants.....7
7. Leaves filiform to grass-like, 1–4(–6) mm wide.....8
7. Leaves linear to ovate-elliptic, 5–40 mm wide.....9
8. Fruit 2.5–4 mm; leaves and peduncles spreading in all directions; rachis smooth.....*C. warneckei*
8. Fruit 6–10 mm; leaves distichous and peduncles not spreading in all directions; rachis papillate.....*C. affine* var. *curviscapum*
9. Leaves distichous; raceme lax, with rachis visible; perianth 7–9 mm long; roots wiry with big distal tubers.....*C. affine* var. *affine*
9. Leaves rosulate; raceme dense, with rachis most often not visible; perianth 4–7 mm long; roots more or less fleshy, without distal tubers (but sometimes with subsessile tubers).....10
10. Lower (abaxial) leaf surface glabrous; fruit glabrous; peduncle glabrous or rarely pubescent; stolon lacking; rhizome very short without clavate tubers; plant 10–40 cm high at flowering.....*C. africanum*
10. Lower (abaxial) leaf surface pubescent; fruit papillate-hairy; peduncle pubescent; rhizome horizontal, elongate, occasionally stolon-like, bearing normal roots and clavate tubers; plant 3–10 cm at flowering.....*C. leptoneurum* var. *katangense*

<u>Group B</u>: Flowers 2–5 to a node; peduncle < 3(–5) cm

1. Inflorescence developing before the leaves; leaves distichous without a petiole; cataphylls with brown margin (fig. 2E).....*C. hysteranthum*
1. Inflorescence developing with or after the leaves; leaves rosulate, or, when distichous, with a distinct petiole; cataphylls uniform in color without brown margin.....2
2. Peduncle densely covered with long papillae; leaf margin strongly crispate.....*C. minor*
2. Peduncle smooth or scabrid; leaf margin smooth or undulate.....3

3. Raceme very lax, with internodes longer than flowers and rachis clearly visible between them.....4
3. Raceme dense with internodes shorter than flowers and rachis not visible.....9
4. Leaves filiform or linear, without a petiole.....5
4. Leaves with ovate lamina contracted into a canaliculate petiole.....8
5. Leaves attenuate in lower third, 5–12(–20) mm wide, laxly veined (space between nerves much wider than nerves themselves); bracts 5–10 mm long, longer than pedicels.....*C. debile*
5. Leaves parallel-sided, not attenuate at base, 1–4(–6) mm wide, closely veined (space between nerves narrower than nerves); bracts 1–5 mm long, shorter than pedicels.....6
6. Fruit 6–10 mm long; inflorescence a raceme, much shorter than leaves; peduncle and rachis papillate.. .....*C. affine* var. *curviscapum*
6. Fruit 2.5–4 mm long; inflorescence most often branched, equalling or longer than leaves; rachis smooth.....7
7. Roots wiry with big distal tubers; flower 5–8 mm long with anther 1.5–2.5 mm; leaves filiform, 1–2 mm wide; leaves erect.....*C. angustissimum*
7. Roots without tubers; flower 2.5–4 mm long with anthers 0.5–1.5 mm; leaves linear, 1 mm wide; leaves and peduncules spreading in all directions.....*C. warneckei*
8. Inflorescence < 6 cm long (including peduncle); pedicel with joint in upper half; flowers fewer than 7 to a plant; lamina < 8 cm long; tepals greenish; seed testa without apicules.....*C. occultum*
8. Inflorescence 5–30 cm long (including peduncle); pedicel with joint in lower half; flowers more than 7 to a plant; lamina > 8 cm long (at least in some leaves); tepals whitish; seed testa apiculate .....*C. alismatifolium*
9. Pedicel articulated at tip; raceme much longer than broad; bracts persisting, prominent, partly concealing young fruits, smooth and glabrous.....*C. stenopetalum*
9. Pedicel without a joint; raceme usually no longer than broad; bracts neither persisting nor concealing young fruits, often finely papillate on margin or abaxial surface and occasionally ciliate.....10
10. Peduncle and rachis virtually zero; inflorescence lax, with flowers more or less umbellate and pedicels much longer than flowers; leaf margin smooth.....*C.* sp. B *"near tetraphyllum"*
10. Peduncle and rachis distinct, though very short; inflorescence more congested, not umbellate, with pedicels shorter than flowers (but sometimes elongating in fruit); leaf margin often ciliate at places.....11
11. Leaves (in herbarium) thin, membranous and translucent, without a pseudopetiole; rhizome with small subsessile clavate tubers; fruiting pedicels < 10 mm long, straight; bracts thin, membranaceous, with nerves not prominent; seed testa with periclinal walls verrucose (figs 3A & 6B).....*C. pusillum*
11. Leaves (in herbarium) thick, more or less coriaceous, opaque, distinctly contracted into a pseudopetiole as long as inflorescence; roots with distal tubers; fruiting pedicels > 10 mm long, often recurved; bracts opaque, with prominent nerves; seed testa with periclinal walls smooth (fig. 6A)..... .....*C. geophilum*

<u>Group C</u>: Flowers 2–5 at a node; peduncle > 5 cm long with bracts or leaves

1. Flowers narrowly campanulate, not widely open, white; outer surface of tepals papillate.....2
1. Flowers more or less open (star shaped), green or white, not papillate.....3
2. Inflorescence a raceme or rarely with 1–2 branches; rachis densely papillate; leaves < 2.5 cm broad; plant < 1.2 m high.....*C. longifolium*
2. Inflorescence with 3–8 branches curved upwards; rachis smooth (rarely with sparse papillae); leaves > 2.5 cm broad; plant 1.7–3 m high (fig. 1A & B).....*C. arcuatoramosum*
3. Leaves < 5 mm wide; plant < 50 cm high.....4
3. Leaves > 5 mm wide; plant > 50 cm high.....5
4. Inflorescence developing after the leaves; tepals tightly pressed against the ovary after anthesis; roots spongy but not dilated into fusiform tubers; seeds c. 1 mm.....*C. calyptrocarpum*
4. Inflorescence developing before the leaves; tepals free from the ovary after anthesis; roots dilated into spindle-shaped tubers; seeds c. 2 mm.....*C. nubicum*
5. Anthers > 8 mm long; inflorescence simple or basally with 1–5 short erect branches.....6
5. Anthers < 8 mm long; inflorescence a panicle with long spreading branches.....7
6. Leaves glabrous; shoot base abruptly dilated into a corm more than 4 cm broad, with concentric ridges bearing regularly arranged fibrous remains < 1 cm long.....*C. stolzii*
6. Leaves with velvety pubescence; shoot base little dilated, less than 3 cm thick, without concentric ridges but with irregularly arranged, fibrous remains > 1 cm long (fig. 3E).....*C. velutinum*
7. All leaves spaced along the stem; fruit < 4.5 mm long.....*C. ruahense*
7. All leaves in a large rosette; fruit 4–15 mm long.....8

8. Leaves, peduncle and pedicels pubescent.....*C. hirsutum*
8. Leaves, peduncle and pedicels glabrous.....9
9. Perianth greenish, campanulate with lower part of tepals enclosing ovary; tepals 3-nerved, > 15 mm long.....*C. andongense*
9. Perianth white, stellate; tepals 5–7-nerved, c. 8–12 mm long.....*C.* sp. A *"near comosum"*

<u>Group D</u>: Flowers 2–5 to a node; peduncle > 5 cm long, naked, often flat; leaves distichous; pedicel articulated below middle; mature fruit with transversal ridges; seed coat irregularly folded

1. Cataphylls and outer leaf sheaths with purplish spots or stripes.....*C. cameronii* var. *cameronii*
1. Cataphylls and outer leaf sheaths without spots or stripes, but sometimes uniformly reddish.....2
2. Tip of outer tepals blackish (fig. 3B).....*C. sphacelatum*
2. Tip of outer tepals white, or sometimes pink or greenish.....3
3. Inflorescence with 1–5 branches.....4
3. Inflorescence a simple raceme.....5
4. Inflorescence branches 1–5, spreading, divaricate; tepals 8–15 mm long; lowest bract not foliaceous, < 15 mm long; leaves 4–15 mm wide; plant not forming dense tufts.....*C. galpinii*
4. Inflorescence branches (0–)1(–2), erect, not spreading and divaricate; tepals < 9 mm long; lowest bract foliaceous, 1–4 cm long; leaves 2–4 mm wide; plant forming dense tufts.....*C. staudtii*
5. Leaf margin and lower surface of midrib with very long cilia.....*C. pilosicarinatum*
5. Leaf margin and lower surface of midrib glabrous or with short hairs.....6
6. Cataphylls (and, often, bracts) with reddish tinge; leaves graminiform, < 5(–10) mm broad (fig. 2F)... .....*C. rubribracteatum*
6. Cataphylls green; leaf width variable.....7
7. Leaves filiform to linear, 0.7–3 mm wide, conduplicate.....8
7. Leaves linear 3–30 mm wide, flat to folded.....9
8. Stamens not in two groups, much shorter than perianth, with anthers ≤ 2.5 mm; tepals 5–10 mm long; leaves filiform 0.7–2 mm wide, erect; bracts ± scariose with prominent nerves; peduncle flattened to terete, with prominent ribs (in herbarium); plant in dense tufts; in moist soil, W Congo.... .....*C. sphagnicolum*
8. Stamens in two groups, slightly shorter than perianth and with anthers > 2.5 mm; tepals 7–15 mm; leaves 2–3 mm wide, spreading; bracts not scariose with nerves not prominent; peduncle flattened; plant not cespitose; in dry soil, E Congo and Burundi.....*C. cameronii* var. *ruziziense*
9. Cataphylls with brown band at margin (fig. 2E); inflorescence developing before the leaves, not exceeding 15 cm long including the peduncle.....*C. hysteranthum*
9. Cataphylls without brown band at margin; inflorescence generally > 13 cm including peduncle, developing before or after the leaves.....10
10. Roots thick, carrot-like, without distal tubers .....*C. subpetiolatum*
10. Roots wiry, with distal tubers.....11
11. Leaves (3–)4–30 mm wide, with margin and lower surface of mid-nerve smooth to papillose, not denticulate; inflorescence unbranched, without a foliaceous bract; tepals 7–15 mm; anther 4–6 mm; fruit 5–7 mm long.....*C. cameronii* var. *pterocaulon*
11. Leaves 2–4 mm wide, with margin scabrid-denticulate to ciliate and lower surface of midrib denticulate-scabrid; inflorescence often with one slender basal branch subtended by a foliaceous bract 1–4 cm long; tepals 7–10 mm; anther 3–4 mm; fruit < 5.5 mm long.....*C. staudtii*

<u>Group E</u>: Flowers 2–5 to a node; peduncle > 3 cm long, without bracts; fruit smooth, not transversally ridged; inflorescence branched (exceptionally robust specimens of group F, with branched inflorescence, may key out here)

1. Inflorescence with sterile plantlets.....2
1. Inflorescence without sterile plantlets.....3
2. Tepals 8–10 mm long, 5-nerved; anthers 4–5 mm long; inflorescence (with peduncle) 50–150 cm high; leaves 10–20 mm wide, linear, parallel-sided, without a pseudopetiole.....*C.* sp. A *"near comosum"*
2. Tepals 5–8 mm long, 3-nerved; anthers 2–3 mm long; inflorescence (with peduncle) 10–60 cm high; leaves 10–55 mm wide, linear or elliptic with a pseudopetiole.....*C. sparsiflorum*
3. Leaves hairy or ciliate at places.....4
3. Leaves glabrous or papillate.....8
4. Leaves < 3 mm wide, filiform to linear.....5
4. Leaves > 3 mm wide, of variable shape.....6
5. Roots wiry with terminal tubers; fruit about as long as broad, emarginate.....*C. angustissimum*
5. Roots fleshy without tubers; fruit longer than broad, not emarginate.....*C. calyptrocarpum*

6. Leaf surface glabrous; margin ciliate (cilia sometimes caducous).....*C. blepharophyllum*
6. Leaf surface hairy.....7
7. Leaves graminiform, < 12 mm wide, distichous.....*C. vestitum*
7. Leaves elliptic, 40–80 mm wide, rosulate.....*C. hirsutum*
8. Flower > 15 mm long, greenish, urn-shaped; tepals with short ligule above perianth constriction .....*C. andongense*
8. Flower 3–10 mm long, greenish or white, not urn-shaped; tepals without a ligule.....9
9. Leaves graminiform, < 15 mm wide, neither attenuate in lower half nor petiolate, distichous.....10
9. Leaves narrowly to broadly ovate or elliptic, petiolate or attenuate, or strap-shaped but, then, rosulate (not distichous).....11
10. Pedicels and flowers papillate-pubescent.....*C. pubiflorum*
10. Pedicels and flowers glabrous.....*C. polystachys*
11. Seeds 3–5 mm; leaves distichous; lamina angular-ovate, forming an angle with the petiole and more or less horizontal.....*C. alismatifolium*
11. Seeds < 3.5 mm; leaves rosulate; lamina elliptic, ovate, or linear, not forming an angle with the petiole.....12
12. Plant with leaves developing after the inflorescence, linear, < 10 mm wide..... .....*C. gallabatense* var. *micranthum*
12. Plant with leaves developing before the inflorescence, linear or elliptic, > 10 mm wide.....13
13. Pedicels and rachis with hairs or cylindric papillae c. 0.4 mm long....*C. gallabatense* var. *floribundum*
13. Pedicels glabrous or rough with papillae < 0.2 mm.....14
14. Tepals 7–10 mm long, 5-nerved, anthers 4–5 mm.....*C.* sp.A *"near comosum"*
14. Tepals 4–7 mm long, 3-nerved; anthers 1–3.5 mm.....15
15. Lamina abruptly contracted into a distinct petiole, with base truncate or rounded.....16
15. Lamina progressively attenuated towards base, or strap-shaped, without a distinct petiole.....19
16. Petioles sheathing peduncule and forming a pseudostem (fig. 3F).....*C. zingiberastrum*
16. Petioles not sheathing peduncle; pseudostem lacking.....17
17. Robust plants, with at least one leaf > 45 × 6 cm, drying black.....*C. orchidastrum*
17. Medium robust plants, with all leaves < 38 × 6 cm, drying blackish or greenish.....18
18. Lamina widest in the lower one-third, 7–15 × 2–4.5 cm; petiole longer than lamina; plants most often drying blackish green to black; rachis smooth; anther 1–1.5 mm.....*C. lancifolium*
18. Lamina broadest near the middle, 12–25 × 4.5–6 cm (measurements only for forms with petiolate leaves); pseudopetiole shorter than lamina; plants drying greenish; rachis most often scabrid; anther 2–3 mm.....*C. sparsiflorum*
19. Tubers on lateral rootlets; plant not blackening in herbarium; inflorescence generally with 2 branches or more.....*C. gallabatense* var. *gallabatense*
19. Tubers on main roots or lacking; plants blackening or not; inflorescence generally with 0–1 branch (when more than 3 branches then leaves petiolate).....20
20. Robust plants, drying black, with at least one leaf > 38 × 4.5 cm; capsules 7–12 mm long..... .....*C. filipendulum*
20. Less robust plants, with all leaves < 38 ×4.5 cm; leaves blackening or not; capsules 3.5–8 mm long..... 21
21. Lamina widest in the lower one-third, equalling pseudopetiole or shorter than it; plants drying dark green to blackish; rachis smooth; anthers 1–1.5 mm.....*C. lancifolium*
21. Lamina widest near the middle, longer than the pseudopetiole; plant blackening or not (when blackening: leaves strap-shaped); rachis most often scabrid; anthers 2–3 mm.....*C. sparsiflorum*

<u>Group F</u>: Flowers 2–5 to a node; peduncle > 3 cm long, without bracts; fruit not transversally ridged; inflorescence a raceme (depauperate specimens of group E with simple raceme may occasionally key out here)

1. Inflorescence with sterile plantlets.....2
1. Inflorescence without sterile plantlets.....3
2. Tepals 8–10 mm long, 5-nerved; anthers 4–5 mm long; inflorescence (with peduncle) 50–150 cm high; leaves linear, 10–20 mm wide, not attenuate in lower half.....*C.* sp. A *"near comosum"*
2. Tepals 5–8 mm long, 3-nerved; anthers 2–3 mm long; inflorescence (with peduncle) 10–60 cm high; leaves linear or elliptic with a pseudopetiole.....*C. sparsiflorum*
3. Leaf margin ciliate; leaves not distichous.....4
3. Leaf margin not ciliate or rarely ciliate but then leaves distichous.....5

4. Flowers pure white; fruits generally verrucose or tuberculate, slightly trigonous; leaves thin and membranaceous, spreading, rosulate, not sheathing the peduncle at fruiting stage (though sheathing when flowering); leaf margin generally undulate or crispate, neither thickened nor recurved (fig. 1D & E).....*C.* cf. *brachystachyum*
4. Flower colour variable, never pure white: yellowish, greenish, brownish, purplish; fruit not verrucose, sharply triquetrous; leaves thick and somewhat fleshy to fibrose, tightly sheathing the base of the peduncle at fruiting stage, thus appearing superposate; leaf margin not undulate, often recurved or thickened.....*C. blepharophyllum*
5. One leaf, broadly ovate, abruptly contracted into a canaliculate petiole which tightly clasps the peduncle.....*C. cordifolium*
5. Almost always 2 leaves or more; when a single leaf, petiole not clasping the peduncle.....6
6. Rachis and upper part of peduncle shortly pubescent; leaves generally distichous.....7
6. Rachis and upper part of peduncle glabrous or papillate; leaves rosulate or, more rarely, distichous but then rachis not pubescent.....9
7. Roots carrot-like, i.e. thick at base and progressively attenuate, without tubers; leaves narrowly ovate-elliptic, more or less contracted into a pseudopetiole (sometimes very short < 5 mm); seed coat irregularly folded.....*C. subpetiolatum*
7. Roots wiry, with distal tubers; leaves linear, never attenuate near base; seeds disk- or saucer-shaped.....8
8. Cataphylls with brown margin; plant < 15 cm high at flowering, with leaves appearing after the flowers (fig. 2E).....*C. hysteranthum*
8. Cataphylls without brown band; plant 15–60 cm high at flowering, with leaves appearing before the flowers.....*C. affine* var. *affine*
9. Leaves markedly distichous; lamina angular-ovate, broadest under middle, abruptly contracted into a canaliculated petiole and forming an angle with it; seeds 3–5 mm.....*C. alismatifolium*
9. Leaves rosulate; lamina linear to narrowly elliptic, progressively attenuate at base, without a canaliculated petiole and usually not forming an angle with it; seeds 1.5–2.5 mm.....10
10. Leaves linear to narrowly elliptic, < 6 mm wide; bracts purplish-brown; roots thick at base, distally attenuate; leaves appearing before the flowers (fig. 1F).....*C. burundiense*
10. Leaves linear to elliptic 5–80 mm wide (when 5 mm wide, then leaves appearing after the inflorescence); bract green to whitish; roots not thick at base, generally with distal tubers.....11
11. Tepals 5–6-nerved, 7–13 mm long; bracts 10–30(–50) mm long, often whitish and very conspicuous before anthesis, soon withering and turning brown; anthers 3–5 mm long.....12
11. Tepals 3(–5)-nerved, 3.5–8 mm long; bracts 2–10 mm long, not whitish before anthesis; anthers 1.5–3.5 mm.....14
12. Inflorescence (with peduncle) 50–150 cm high, often pseudoviviparous, very lax with rachis visible; leaves linear, 10–20 mm wide, not attenuate in lower half; bracts 5–10 mm long, never whitish and conspicuous.....*C.* sp. A *"near comosum"*
12. Inflorescence (with peduncle) < 60 cm high, never pseudoviviparous, relatively dense with rachis often concealed by fruits; leaves 25–80 mm broad, attenuate in lower half; bracts 10–30(–50) mm long, whitish and very conspicuous before anthesis.....13
13. Fruit obtusely trigonous to rounded in cross-section, not emarginate; seeds variable in shape, from saucer-shaped to strongly plicate (fig. 5A); seed testa with raised periclinal walls (fig. 5B); raceme 5–20 cm long, dense, with fruits concealing rachis and lowermost nodes not distant; tepals 7–9 mm; anthers 3–4 mm, equalling filament; tubers lateral; pedicel articulated at tip (fig. 2A–C).....*C. clarae*
13. Fruit trigonous to triquetrous, emarginate; seeds flat to slightly saucer-shaped (fig. 5E); seed testa with periclinal walls shallowly convex or flattened (fig. 5F); raceme 15–45 cm long, lax to moderately dense, with rachis visible and lowermost nodes often distant; tepals 8–13 mm; anthers 4–5 mm, longer than filament; tubers on main roots; pedicels articulated in upper half.....*C. macrophyllum*
14. Plant with inflorescence appearing before the leaves; leaves linear, < 1.0 cm wide; rootstock with fibres.....*C. gallabatense* var. *micranthum*
14. Leaves completely developed at flowering, narrowly to broadly elliptic 12–60 mm wide; rootstock not fibrous.....15
15. Pedicel articulated at the tip; raceme densely flowered, with rachis not visible; rachis smooth.....*C. stenopetalum*
15. Pedicel articulated below the tip; raceme less densely flowered, generally with rachis visible; rachis smooth or papillate.....16

16. At least one leaf longer than 38 cm or wider than 5 cm; plant blackish in herbarium; peduncle robust and stiff, generally > 2.5 mm thick below lowermost flower (in herbarium), always rough... .....*C. filipendulum*
16. All leaves < 38 cm long and with lamina < 5 cm wide; plant blackish or green in herbarium; peduncle more slender, generally < 2.5 mm thick below the lowermost flower (in herbarium), rough or smooth.....17
17. Lamina ovate, broadest below the middle, abruptly contracted into a petiole as long as or longer than lamina; plant blackish-green in herbarium.....*C. lancifolium*
17. Lamina elliptic to sublinear, broadest at the middle, progressively attenuate at base; plant blackish or green in herbarium (when blackish, leaves linear).....18
18. Seed testa with periclinal walls flat to convex; pedicel articulated near or above the middle, straight; fruit (3–)4–7(–8) × (4–)5.5–7(–9) mm; leaves 12–50 mm wide, with more than (17–)21 nerves..... .....*C. sparsiflorum*
18. Seed testa with periclinal walls apiculate; pedicel articulated below the middle, often recurved when fruiting; fruit c. 3–4 × 4 mm; leaves 5–15(–25) mm wide, with 11–19 nerves.....*C. debile*

Chlorophytum species are often polymorphic. The key allows to some extent for variation of polymorphic species, which key out at different places. However, it does not allow for exceptional character states. The key is based mostly on original observations on material from D.R.Congo, Rwanda and Burundi, supplemented by literature data when the material collected in the study area was too scarce.

For the description of leaf shape, we follow the recommendations of Anonymous (1962) and, in particular, we avoid the word "lanceolate". For conduplicate leaves, leaf width is expressed as twice the apparent width.

Check-list of species with synonyms

In the following check-list, citation of synonyms is limited to (i) new synonyms, (ii) all the names typified by type specimens collected in the study area (D.R.Congo, Burundi, Rwanda), (iii) all the names that were used in one of the following references: Durand & Durand (1909), De Wildeman (1909–1912, 1921a), Lebrun et al. (1948), Robyns & Tournay (1955), Troupin (1956, 1988), Schmitz (1971), Lewalle (1972).

In this account, only one representative specimen is cited for each phytogeographic district of D.R.Congo as defined by Robyns (1948). Occasionally, more specimens are cited for taxa of particular interest. Full species descriptions and extensive lists of specimens studied will be published in the Flore d'Afrique Centrale.

1. *Chlorophytum affine* Baker (1875: 160 & tab. 104); Baker (1876: 327); Baker (1898: 507); Hanid (1974: 586); Kativu (1994: 49); Nordal et al. (1997: 23); Kativu et al. (2008: 60). – Type: Tanzania, Tabora Ditrict, Unyamwezi, Rubugwa, 1860, *Speke & Grant* s.n. (holo-: K, barcode K000257040).

Two varieties can be recognized:

1. Peduncle erect, straight, > 10 cm long; inflorescence about as long as the leaves; leaves > 10 mm wide..... .....*C. affine* var. *affine*
1. Peduncle curved at base, more or less flexuous, < 6 cm long; inflorescence shorter than the leaves; leaves < 8 mm wide.....*C. affine* var. *curviscapum*

1a. *Chlorophytum affine* Baker var. ***affine***

Other representative specimen examined – **D.R.Congo**: XI: Lubumbashi, 1939, *Salésiens* 1147 (BR).

Bodenghien 331 (BR) is an extremely robust specimen with a raceme of up to 22 cm long.

1b. *Chlorophytum affine* Baker var. ***curviscapum*** (Poelln.) Hanid (Hanid 1974: 588); Nordal et al. (1997: 23); Kativu et al. (2008: 61). – *Chlorophytum curviscapum* Poelln. (Poellnitz 1942: 122). – Type*:* Tanzania, Dodoma dist., Uyansi, near Chaya, 3 Jan. 1926, *Peter* 45827 (holo-: B).

Other representative specimens examined – **Burundi**: Territ. Bubanza, Plaine de la Rusizi, 800 m, 30 Oct. 1973, *Reekmans* 2872 (BR).
Rwanda: Parc Nation. Kagera, Gabiro, savane herbeuse à *Themeda-Hyparrhenia*, alt. 1500 m, 3 Dec. 1944, *Germain* 2858 (BR, K).
Cultivated: Yangambi, originaire de la Kagera, *Germain* 7499 (BR, K).

A dwarf plant, 5–13 cm high, with grass-like leaves 2–5 mm wide, very short papillate peduncle, and more or less prostrate inflorescence. The cited collections are somewhat atypical in having smooth leaf margins and recurved fruiting pedicels. They are superficially similar to *C. inconspicuum* (Baker) Nordal, but with ovoid distal tubers, not progressively dilated roots.

C. affine var. *curviscapum*, though widespread in Zambia and Tanzania, has apparently not been collected yet in D.R.Congo. *Duvigneaud* 4380 (BRLU) approaches var. *curviscapum*, but it has erect peduncle, filiform leaves, and tubers with a reticulate surface. More material is needed.

2. *Chlorophytum africanum* (Baker) Engl. (Baker & Engler 1892: 470); Kativu (1994: 51); Nordal et al. (1997: 21); Kativu et al. (2008: 66). – Type: Tanzania, Tabora Dist., Rubuga (Rubugwa) 1860, *Grant* s.n. (lecto-: K, barcode K000365093).

Table 1 – Check-list of *Chlorophytum* species in the Democratic Republic of the Congo, Rwanda and Burundi, with their geographic distribution.
Numbering of phytogeographic districts of D.R.Congo after Robyns (1948): I: Côtier; II: Mayombe; III: Bas-Congo; IV: Kasaï; V: Bas-Katanga; VI: Forestier central; VII: Ubangi-Uele; VIII: Lac Albert; IX: Lacs Edouard & Kivu; XI: Haut-Katanga.

	I	II	III	IV	V	VI	VII	VIII	IX	XI	Burundi	Rwanda	Observations	number of collections if ≤5	Distribution
affine var. *affine*										x			new to D.R.Congo	4	Sudano-Zambezian
affine var. *curviscapum*											x	x	new to Burundi and Rwanda	2	Sudano-Zambezian
africanum var. *africanum*										x					Zambia, Tanzania, S Katanga
africanum var. *nordalianum*										x			new to D.R.Congo		S Katanga, N Zambia
africanum var. *silvaticum*									x	x	x		new to Burundi		Zambezian-E African
alismatifolium					x	x	x								Guineo-Congolian
andongense							x			x					Sudano-Zambezian
angustissimum									x		x		new to D.R.Congo		Sudanian – E trop. African
arcuatoramosum					x					x					Endemic D.R.Congo
blepharophyllum var. *amplexicaule*							x		x	x			new to D.R.Congo		Katanga, N Zambia, W Tanzania
blepharophyllum var. *blepharophyllum*			x	x	x	x	x	x	x	x	x	x			Afro-tropical
cf. *brachystachyum*										x			new to D.R.Congo		Sudano-Zambezian
burundiense											x				Burundi, W Tanzania
calyptrocarpum										x			new to D.R.Congo		Zambezian-S African
cameronii var. *cameronii*				x	x		x			x	x	x			Afro-tropical
cameronii var. *grantii*										x			new to D.R.Congo	5	E tropical Africa
cameronii var. *pterocaulon*					x		x			x	x				Afro-tropical
cameronii var. *ruziziense*									x		x		new to D.R.Congo and Burundi		E D.R.Congo, Burundi

Table 1 (continued) – Check-list of *Chlorophytum* species in the Democratic Republic of the Congo, Rwanda and Burundi, with their geographic distribution.

	I	II	III	IV	V	VI	VII	VIII	IX	XI	Burundi	Rwanda	Observations	number of collections if ≤ 5	Distribution
clarae					x					x			new to D.R.Congo		Katanga, N Zambia, SW Tanzania
colubrinum var. *colubrinum*			x	x	x					x	x	x			Broad Zambezian
colubrinum var. *upembense*										x			new to D.R.Congo	3	Endemic D.R.Congo (Upper Katanga)
cordifolium										x				5	Endemic D.R.Congo (Upper Katanga)
debile		x	x										new to D.R.Congo	3	W African
filipendulum				x	x	x	x	x	x						Guineo-Congolian
gallabatense var. *floribundum*										x			new to D.R.Congo	2	Zambezian
gallabatense var. *gallabatense*				x	x		x	x		x					Sudano-Zambezian
gallabatense var. *micranthum*							x	x	x		x	x			E African-Sudanian
galpinii var. *matabelense*										x				3	Zambezian - S African
geophilum							x			x			new to D.R.Congo		Sudanian, E African
hirsutum									x		x				Albertine rift
hysteranthum										x				4	S Katanga, N Zambia
lancifolium subsp. *cordatum*							x	x		x					C African
lancifolium subsp. *lancifolium*										x	x			3	C African
lancifolium subsp. *togoense*						x									W Guineo-Congolian
leptoneurum var. *katangense*										x				3	Katanga, Zambia, Malawi
longifolium var. *aureum*							x							3	Sudanian
macrophyllum			x			x				?	x				Sudano-Zambezian
minor										x			new to D.R.Congo	1	SW Tanzania, N Zambia, S Katanga

Table 1 (continued) – Check-list of *Chlorophytum* species in the Democratic Republic of the Congo, Rwanda and Burundi, with their geographic distribution.

	I	II	III	IV	V	VI	VII	VIII	IX	XI	Burundi	Rwanda	Observations	number of collections if ≤ 5	Distribution
nubicum										x			new to D.R.Congo	2	Sudano-Zambezian
occultum						x								1	N D.R.Congo, Uganda
orchidastrum		x	x		x	x	x	x							Guineo-Congolian
perfoliatum										x			new to D.R.Congo	1	Zambia, Malawi, Katanga
pilosicarinatum										x			new to D.R.Congo	2	Angola, Katanga
polystachys										x			new to D.R.Congo	1	Sudano-Zambezian
pubiflorum										x			new to D.R.Congo	1	Zambezian
pusillum										x					Sudano-Zambezian
recurvifolium										x			new to D.R.Congo	3	S African
ruahense										x			new to D.R.Congo	4	Katanga, W Tanzania, N Zambia
rubribracteatum										x	x				Zambezian
sparsiflorum	x	x	x	x	x	x	x	x	x	x	x	x			Afro-tropical
sphacelatum		x	x	x						x					Zambezian
sphagnicolum			x	x									new to D.R.Congo		Angola-Congo
staudtii			x	x									new to D.R.Congo	5	W C African
stenopetalum var. *latifolium*										x			new to D.R.Congo		S Katanga, N Zambia
stenopetalum var. *stenopetalum*					x	x	x			x					Sudano-Zambezian
stolzii		x	x	x	x	x				x	x				broad Zambezian
subpetiolatum var. *pilosifolium*										x					S Katanga, N Zambia, SW Tanzania
subpetiolatum var. *subpetiolatum*			x	x	x	x	x		x	x	x	x			Sudano-Zambezian

Table 1 (continued) – Check-list of *Chlorophytum* species in the Democratic Republic of the Congo, Rwanda and Burundi, with their geographic distribution.

	I	II	III	IV	V	VI	VII	VIII	IX	XI	Burundi	Rwanda	Observations	number of collections if ≤ 5	Distribution
subpetiolatum var.						x	x			x	x		new to D.R.Congo	1	W African
subpetiolatum f. *variegatum*										x	x		new to D.R.Congo and Burundi		Zambezian
velutinum											x	x	new to Burundi and Rwanda		?
vestitum subsp. *pilosissimum*										x			new to D.R.Congo	2	?
warneckei										x				4	D.R.Congo, Congo, Sudan, Cameroon
zingiberastrum										x					Zambia, Malawi, S Katanga
Sp. A "near *comosum*"															Zambezian
Sp. B "near *tetraphyllum*"															

The pattern of pubescence is variable and of taxonomic value. Three varieties can be recognized, of which the first two were treated as distinct species by FTEA and FZ.

1. Leaf margin with dense, crispate, reddish hairs..... .....*C. africanum* var. *africanum*
1. Leaf margin glabrous or, more rarely, with short pallid cilia.....2
2. Peduncle and abaxial surface of cataphylls pubescent throughout.....*C. africanum* var. *nordalianum*
2. Cataphylls glabrous; peduncle glabrous or sparsely pubescent in upper part...*C. africanum* var. *silvaticum*

2a. ***Chlorophytum africanum*** (Baker) Engl. var. ***africanum*** – *Caesia africana* Baker (Baker 1875: 160 & tab. 103a). – *Dasystachys africana* (Baker) T.Durand & H.Durand (Durand & Durand 1909: 569). – *Dasystachys grantii* Benth. (Bentham & Hooker 1883: 789); Baker (1898: 513); De Wildeman (1921a: 29), **nom. illeg.**

Acrospira giorgii De Wild. & Ledoux (De Wildeman 1930: 92). – Type: Env. Lubumbashi, 1923, *De Giorgi* s.n. (holo-: BR, barcode BR0000008767325), **synon. nov.**

Other representative specimens examined – **D.R.Congo**: XI: Paturage de la Karavia, ferme CSK, Dec. 1933, *Quarré* 3645 (BR).

A rare taxon in the study area apparently restricted to the region of Lubumbashi.

2b. *Chlorophytum africanum* (Baker) Engl.
var. ***nordalianum*** Meerts, **var. nov.**

A typo differt pedunculo et rachide omnino pubescente, cataphyllis extus pubescentibus et foliis marginibus non ciliatis. – Type: D.R.Congo, Haut-Katanga, 5 km NW of Lubumbashi, dembo de la Kiamalale, 14 Nov. 1961, *Schmitz* 7498 (holo-: BR). Fig. 4A & B.

Other representative specimens examined – **D.R.Congo**: XI: Lubumbashi, Katuba, dalle latéritique, Dec. 1952, *Schmitz* 4261 (BR, KIP); Keyberg, forêt claire sur sol relativement frais, Dec. 1947, *Schmitz* 1250 (BR); Lubumbashi, Kasapa, 23 Oct. 1961, *Poelman* 74 (BR); Lubumbashi, Keyberg, Vallée Katapa, 21 Nov. 1956, *Detilleux* 135 (BR, KIP); Kasumbalesa, savane dérivée en contrebas de la colline boisée, 3 Dec. 1959, *Duvigneaud* 4377L (BRLU).

Other collections examined – **Zambia**: Ndola, 1957, *Duvigneaud* s.n. (BRLU); Ndola, 27 Nov. 1953, *Fanshawe* F518 (BR, K); Kitwe, gravelly roadsides, 25 Dec. 1966, *Mutimushi* 1696 (K); Kitwe, miombo on laterite, 23 Nov. 1968, *Mutimushi* 2836 (K).

This new variety is well characterized by a pubescent peduncle, rachis and abaxial side of the cataphylls. The cataphylls have a network of dark green veins. It also differs from var. *silvaticum* in its seed testa structure, having strongly buldging, hemisphaeric periclinal walls (Fig. 4A & B) (vs. flat to conical periclinal walls in var. *silvaticum*). *C. africanum* var. *nordalianum*, having a pubescent peduncle, can be confounded with *C. leptoneurum*. The latter species is usually less robust, has a pubescent abaxial leaf surface and a creeping rhizome.

Plants with the distinctive traits of var. *nordalianum* had already been reported from N Zambia by Kativu et al. (2008: 66).

Var. *nordalianum* appears to be endemic to the extreme south-east of D.R.Congo and adjoining regions of Zambia.

2c. *Chlorophytum africanum* (Baker) Engl. var. ***silvaticum*** (Dammer) Meerts, **comb. & stat. nov.**
Chlorophytum silvaticum Dammer, Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 48: 365. 1912 (Dammer 1912); Kativu (1994: 75); Nordal et al. (1997: 20); Kativu et al. (2008: 65). – Type: Tanzania, Kilwa Dist., Donde, near Kwa Mpanda, 22 Dec. 1900, *Busse* 1310 (holo-: B, iso-: EA).

Other representative specimens examined – **D.R.Congo**: IX: Plaine de la Rusizi, Feb. 1950, *Germain* 6084 (BR); XI: Territ. Mitwaba, Simama, sur riv. Dikuluwe, plaine alluviale Dikuluwe-Lufira, 19 Jan. 1956, *Brynaert* 436 (BR).

Burundi: Plaine de la Rusizi, *Germain* 5546 (BR); Territ. Bujumbura, Gihungwe, savane, alt. 850 m, 26 Nov. 1972, *Reekmans* 2182 (BR).

Intermediates between var. *africanum* and var. *silvaticum* (short, pallid marginal hairs) are occasionally found (e.g. *Germain* 5524 (BR, K)).

3. ***Chlorophytum alismatifolium*** Baker (Baker 1876: 324); Baker (1898: 496); Engler (1908: 308, fig. 208 A, B); Troupin (1956: 188); Hepper (1968b: 102); Poulsen & Nordal (2005: 13, figs 1H, 4, 5, 28); Bjorå & Nordal (2010: 4). – Type: Equatorial Guinea, banks of the Gaboon river, Jul. 1861, *Mann* 1030 (holo-: K).

Other representative specimens examined – **D.R.Congo**: V: Upemba, Rivière Kanonga, galerie forestière, *De Witte* 5588 (BR); VI: Penghe, forêt ombragée au bord de l'Ituri, 5 Feb. 1914, *Bequaert* 2312 (BR); VII: Parc Nat. Garamba, Galerie à *Irvingia*, 15 May 1950, *Noirfalise* 387 (BR).

The material from D.R.Congo is more variable than reported by Poulsen & Nordal (2005). Leaf length often exceeds 25 cm, pedicels are up to 10 mm (vs. 5–8 mm), bracts are larger (10 × 3 mm vs. 5 × 1 mm), and tepals are often longer (up to 7 mm vs. 3–4 mm). Some collections from Sudanian Congo (Garamba) have lateral tubers [*De Saeger* 1207, 1342 (BR)], a trait typical of the East African, closely related, *C. holstii* Engl. More material is needed.

Troupin 1802 (BR, K) has obovoid fruits which are much longer than wide (9 × 5 mm) and pedicels articulated above the middle, but other traits correspond to those of *C. alismatifolium*. *Keay* 58 (K), from a plant cultivated at Kew, is atypical in having leaves up to 42 cm long, and an 80 cm long inflorescence with most flowers replaced by plantlets.

Louis 11815 (BR, BRLU, K) with very long (up to 20 cm) foliaceous lowermost bracts has sometimes been misidentified as *C. bracteatum* Hua, but other traits are typical of *C. alismatifolium*.

4. *Chlorophytum andongense* Baker (Baker 1878a: 260); Baker (1898: 506); Troupin (1956: 188); Obermeyer (1962: 698); Hepper (1968b: 102); Kativu (1994: 52); Nordal et al. (1997: 10); Kativu et al. (2008: 70, fig. 13.1.12). – Type: Angola, Pungo Andongo, Dec. 1856, *Welwitsch* 3770 (holo-: BM, iso-: K). Fig. 4C.

Chlorophytum longipes Baker (Baker 1878b: 325); De Wildeman (1913c: 15; 1921a: 28). – Types: Sudan, Jur Ghattas, 30 May 1869, *Schweinfurth* 1801 (syn-: K) & 10 Jul. 1869, *Schweinfurth* 2045 (syn-: K).

Other representative specimens examined – **D.R.Congo**: VII: Parc Nat. Garamba, Bagbele, *Noirfalise* 521 (BR); XI: Lubumbashi, termitière en forêt claire, 13 Jan. 1954, *Schmitz* 4545 (BR).

C. andongense is closely related to the southern African species *C. macrosporum* Baker. The latter is said to have longer fruits (11–15 mm vs. 5–9 mm in *C. andongense*) and narrower leaves (1.4–2.5 cm wide vs. 2.5–9 cm in *C. andongense*). A few collections from Katanga have long fruits and relatively narrow leaves (e.g. *Billiet & Jadin* 4150 (BR)). Katangan collections are variable in leaf width from narrowly strap-shaped with more or less undulate margin (traits of *C. macrosporum*) to elliptic (trait of *C. andongense*) (e.g. *Quarr*é 2733 (BR, P). *Duvigneaud* 5416A&C (BRLU) is another critical specimen with "*macrosporum*-like" fruits and "*andongense*-like" leaves. We feel that *C. andongense* and *C. macrosporum* might actually not be distinct at species rank. The group definitely needs revision and, after much hesitation, we provisionally keep all Katangan collections under *C. andongense*.

5. *Chlorophytum angustissimum* (Poelln.) Nordal (Nordal et al. 1997: 42). – *Anthericum angustissimum* Poelln. (Poellnitz 1942: 26). – Type: Tanzania, Tabora District, Ngulu, from Malongwe to Nyahua, Jan. 1926, *Peter* 34505 (holo-: B, not seen). Fig. 4E & F.

Anthericum nigericum Hepper (Hepper 1968a: 459, 455 fig. 5/4-6); Hepper (1968b: 97). – Type: Nigeria, Zaria Prov., Anaria Forest reserve, 1 Jul. 1957, *Keay* 37081 (holo-: K).

Other representative specimens examined – **D.R.Congo:** IX: Vallée de la Rusizi, groupement de Luberidi, Centre zootechnique, Paddock III, 14 Jan. 1954, *J.F. Laurent* 1015bis (BR); Plaine de la Ruzizi, savane à *Themeda*, alt. 800 m, Jan. 1950, *Germain* 5541 (K).

Burundi: Prov. Bubanza, Gihungwe, steppe à *Bulbine abyssinica*, 8 Mar. 1981, *Reekmans* 9802 (BR, BRVU, K).

This species was erroneously referred to as *Anthericum calyptrocarpum* Baker by Lewalle (1972).

Collections from the study area often have peduncle > 5 cm, i.e. longer than reported in FTEA. *Lukuesa* 941 (K), from Katanga, is an exceptionally large specimen with inflorescence up to 56 cm including 22–34 cm peduncle. It may represent a distinct taxon, but more material is needed.

6. *Chlorophytum arcuatoramosum* R.B.Drummond (Drummond 1953: 120). – Type: D.R.Congo, Mutuy, Feb. 1931, *Quarré* 2465 (holo-: BR). Fig. 1A & B, fig. 4G & H.

Other representative specimens examined – **D.R.Congo**: V: Kisamba, ferme Selemo, Jan. 1931, *Quarré* 2350 (BR, K); XI: Tenke, colline Shimbidi, savane steppique sur sol faiblement cuprifère, Feb. 2010, *Meerts* 2010/54 (BRLU).

One of the largest *Chlorophytum* species in tropical Africa. It is obviously related to *C. longifolium* (perianth papillate) and to *C. colubrinum* (perianth constricted above ovary). Seed testa (fig. 4G & H) is similar to that of *C. longifolium*, with strongly convex, rugose, periclinal walls and perforate furrows (though perforations are narrower: com-

pare with Nordal et al. 1990: 548, fig. 6E). Extraordinary dimensions (1.7–3 m high), inflorescence architecture (3–7 branched) and smooth rachis justify species rank.

C. arcuatoramosum forms a well-supported clade with species that were formely assigned to the genus *Dasystachys* Baker (cf. Bjorå 2008).

7. *Chlorophytum blepharophyllum* Baker (Baker 1876: 327); Baker (1898: 501); Kativu (1994: 53); Troupin (1955: 234); Troupin (1956: 189); Hepper (1968b: 100); Troupin (1988: 42; 45, fig. 15/1); Nordal et al. (1990: 547); Nordal et al. (1997: 51); Kativu et al. (2008: 74). – Types: Sudan/Ethiopian border, Gallabat, around Matamma, 14 Jun. 1865, *Schweinfurth* 9 (lecto-: K, **here designated**, isolecto-: P); Zimbabwe, Lower Gwelo R., 22 May 1870, *Baines* s.n. (syn-: BM, n.v.).

The *C. blepharophyllum* complex appears to be much more variable in Katanga than in most other regions of tropical Africa. Kativu et al. (2008) recognized subsp. *rubropygmaeum* (dwarf plants with reddish cataphyll-like leaves) and subsp. *pendulum* (pendulous inflorescence) and separated *C. amplexicaule* (broad leaves clasping peduncle) as a distinct species. In Katanga, plant size, intensity of purplish colours, leaf width and inflorescence habit are combined in various ways sometimes within a single population. None of the aforementioned traits appears to be of high taxonomic value in the abundant materials we have seen. Pending a phenetic analysis with a populational sampling, we feel that the best option at the moment is a very synthetic treatment, recognizing "*amplexicaule*" only at varietal rank.

1. Cataphylls prominent with spreading lamina broadly ovate to cordate, clasping stem; leaves 4–10(–12) cm broad; plant 15–80 cm high..... .....*C. blepharophyllum* var. *amplexicaule*
1. Cataphylls not prominent, with small lamina not clasping stem; leaves 0.5–4 cm broad; plant 5–40 cm high.....*C. blepharophyllum* var. *blepharophyllum*

7a. *Chlorophytum blepharophyllum* Baker var. ***blepharophyllum***

Chlorophytum fibrosum Engl. & K.Krause (Engler & Krause 1910: 132); De Wildeman (1912a: 344). – Types: Cameroon, between Duka and Dangadji, May 1909, *Ledermann* 3647 (syn-: B); Korrowalplateau, May 1909, *Ledermann* 3890 (syn-: B); near Balda, May 1909, *Ledermann* 4031 (syn-: B).

Chlorophytum longebracteatum De Wild. (De Wildeman 1911a: 275); De Wildeman (1912a: 345). – Type: D.R.Congo, Vankerckhovenville, Apr. 1906, *Seret* 539bis (holo-: BR)

Chlorophytum nigrescens De Wild. (De Wildeman 1911a: 275); De Wildeman (1912a: 346). – Type: D.R.Congo, Gunbari, 26 Feb. 1906, *Seret* s.n. (holo-: BR, barcode BR0000008766328).

Chlorophytum kerstingii Dammer (Dammer 1912: 363); De Wildeman (1913c: 14; 1921a: 28). – Type: Togo, Sokodé-Basari, near Aledyo, Feb. 1901, *Kersting* 314 (holo-: B, not seen).

? *Anthericum ruwense* De Wild. (De Wildeman 1913a: 508); De Wildeman (1913c: 9; 1921a: 27). – Type: D.R.Congo, Katanga, Ruwe, Oct. 1911, *Hock* s.n. (holo-: BR, barcode BR0000008769534).

Other representative specimens examined – **D.R.Congo**: III: Région de Kisantu, 1907, *J. Gillet* s.n. (BR); IV. Mabete, savane guinéenne, 2 Apr. 1955, *Devred* 1781 (BR); V: 8°S 23°E, groupement plus ou moins forestier en bordure d'une galerie, 9 Oct. 1957, *Liben* 3834 (BR); VII: Parc National de la Garamba, mont Bawesi, savane arbustive, alt. 700 m, 11 Mar. 1941, *Germain* 627 (BR); VIII: Kerekere (Aru), alt. 1350 m, savane, 4 Apr. 1960, *D. Froment* 692 (BR); IX: Plaine de la Rusizi, rives Sange, galerie, Jan. 1950, *Germain* 5819 (BR); XI: 20 km NE Lubumbashi, forêt claire sur sol argileux rouge, 23 Nov. 1955, *Schmitz* 5092 (BR).

Rwanda: Préfect. Kibungo, route Lulama-Gabiro, km 6, savane arborée, 13 Jan. 1972, *Bamps* 2957 (BR).

Burundi: Territ. Bubanza, Randa, alt. 900 m, savane boisée, 29 Oct. 1968, *Lewalle* 3061 (BR).

A very variable taxon. Size is more variable than previously reported, with many collections < 10 cm high and with leaves < 1 cm wide. Hysteranthous forms are sometimes observed [*Reekmans* 7091 (BR)]. Plants from Rwanda tend to have more densely ciliate leaf margin (up to 200 cilia/cm vs. c. 50 cilia/cm in general).

Bouxin & Radoux 1054 (BR), from Rwanda, with small (5 mm long), hanging flowers probably deserves taxonomic recognition, but more material is needed.

7b. *Chlorophytum blepharophyllum* Baker var. ***amplexicaule*** (Baker) Meerts, **comb. & stat. nov.**
Chlorophytum amplexicaule Baker, Journal of the Linnean Society 15: 325. 1876 (Baker 1876); Baker (1898: 501); Poellnitz (1946: 277). – Type: Tanzania, near Lake Tanganyika, Feb. 1875, *Cameron* s.n. (holo-: K, barcode K000256904). Fig. 1C.

Chlorophytum homblei De Wild. (De Wildeman 1913a: 514); De Wildeman (1913c: 13, Plate III); De Wildeman (1921a: 28; 1930: 95). – Type: D.R.Congo, Lubumbashi, Feb. 1912, *Homblé* 153bis (holo-: BR), **synon. nov.**

Other representative specimens examined – **D.R.Congo**: VII: Près de la rivière Ndondo, savane à *Lophira*, 9 Jul. 1955, *Boutique* 201 (BR). IX: Plaine de la Rusizi, Feb. 1950, *Germain* 266 (BR); XI: Kiswishi, monastère des sept sources, forêt claire à *Marquesia*, Jan. 2010, *Meerts* 2010/14 (BRLU).

Var. *amplexicaule* occurs mostly in miombo woodland and derived savannas in Katanga, Tanzania and Zambia.

We have maintained var. *amplexicaule* with some scepticism, as intermediates exist with var. *blepharophyllum* in Upper Katanga. It also appears to be extremely variable in marginal cilia density (cilia sometimes almost lacking) and extent of reddish tinge; the most vigorous forms occasionally have a pendulous inflorescence [*Meerts* 2010/36 (BRLU); *Duvigneaud* 4432L (BRLU)]. It may eventually turn out to be an aggregate of convergent forms of *C. blepharophyllum* having little in common beyond extreme robustness.

Hysteranthous forms with deep purple leaves are occasionally observed [*Meerts* & *Muding* 58 (BRLU); *Schmitz* 4523 (BR)] (fig. 1C); such forms approach subsp. *rubropygmaeum* Bjorå & Nordal, but intermediates exist with normal forms.

In preliminary phylogenetic analyses this complex has strong support as a clade, but little internal structure. Both the Congolese [*Meerts* 2010/36 (BRLU)] and the Zambian [*Hoell & Nordal* 134 (O)] specimens of var. *amplexicaule* cluster within the clade, as do purple-leaved ones [*Meerts & Muding* 58 (BRLU); *Nordal & Bjorå* 4578 (O)].

8. *Chlorophytum cf. brachystachyum* Baker (Baker 1893: 710); Baker (1898: 502); Kativu (1994: 54); Nordal et al. (1997: 52); Kativu et al. (2008: 77, fig. 13.1.14). – Type: Malawi, Shire Highlands, fl. at Kew 1893, *Buchanan* s.n. (holo-: K, barcode K000401063). Fig. 1D & E; fig. 4I & J.

Other representative specimens examined – **D.R.Congo**: XI: Sur la piste de la ferme de la Kando, sur termitières, Oct. 1988, *Schaijes* 4139 (BR); Kiubo, savane arborée sur le rebord des grès de Kiubo dominant les chutes, 15 Jan. 1960, *Duvigneaud* 5047 (BRLU); Lubumbashi, Campus de la Kasapa, termitière dans l'arboretum, Nov. 2009, *Meerts et al.* 77 (BRLU).

Specimens from D.R.Congo are undoubtedly members of the *C. brachystachyum*-*C. pauper* complex (fruit verrucose to tuberculate, leaf margin ciliate), but they are variable and their status is critical. They are often much more robust than both of these species, and the rachis is occasionally papillose (e.g. *Duvigneaud* 5047Ch), a trait not mentioned in previous descriptions of those species. Fruit surface is also variable in roughness, sometimes within the same population. Bracts are generally not ciliate. Leaf margin is undulate and has long cilia (traits of *C. brachystachyum*) but tubers are lateral (trait of *C. pauper*). In preliminary phylogenetic analyses the Congolese *C.* cf. *brachystachyum* [*Meerts & Muding* 77 (BRLU)] clusters with *C. pauper*, however, weekly supported. It does not form a monophyletic group with the Zambian specimen of *C. brachystachyum* [*Bjorå* 615 (O)] and further studies are therefore needed to clarify its taxonomic status.

9. *Chlorophytum burundiense* Meerts (Meerts 2011: 233). – Type: Burundi, Territ. Muramvya, sommet du Mont Teza, prairie d'altitude, 8 Dec. 1972, *Baudet* 304 (holo-: BR; iso-: K). Fig. 1F.

Other representative specimens examined – **Burundi**: Territ. Bururi, Tora, steppe, alt. 2450 m, 7 Feb. 1971, *Lewalle* 5131 (BR).

10. *Chlorophytum calyptrocarpum* (Baker) Kativu (Kativu & Nordal 1993: 62); Kativu (1994: 55); Kativu et al. (2008: 53, Fig. 13.1.9). – *Anthericum calyptrocarpum* Baker (Baker 1878: 258); Baker (1898: 480); Poellnitz (1943a: 62). – Type: Angola, Huilla, between Mumpulla and Lopollo, Dec. 1859, *Welwitsch* 3786 (holo-: BM, iso-: K).

Other representative specimens examined – **D.R.Congo**: XI: Lubumbashi, Mine de l'Etoile, Cu-Co mineralized substrate, 2 Apr. 1990, *Tropmetex* 50 (BR, MO, K, MPN, WAG, C, IBE, P, PRE).

Almost all collections come from the Lubumbashi area, most often on Cu-mineralised substrate. All records of *C. calyptrocarpum* from Burundi (e.g. Lewalle 1972) are erroneous and belong in *C. angustissimum*.

Congolese collections lack the glands on the peduncle reported in the FZ area.

11. *Chlorophytum cameronii* (Baker) Kativu (Kativu & Nordal 1993: 62); Nordal & Thulin (1993: 262); Kativu (1994: 55); Nordal (1997: 102); Nordal et al. (1997: 30); Kativu et al. (2008: 44). – *Anthericum cameronii* Baker (Baker 1876: 314); Troupin (1988: 31, fig. 9/2; 32). – Type: Tanzania, Kigoma Dist., S of Kawele, Feb. 1875, *Cameron* s.n. (holo-: K, barcode K000257044).

A very variable taxon. Four varieties are here recognized.

1. Base of leaves and cataphylls with purple spots or stripes.....*C. cameronii* var. *cameronii*
1. Base of leaves and cataphylls unicolourous.....2
2. Lower leaf surface, peduncle and rachis pubescent..... .....*C. cameronii* var. *grantii*
2. Leaves, peduncle and rachis glabrous (but leaf margin occasionally shortly ciliate).....3
3. Leaves tightly conduplicate, filiform to narrowly graminiform, 2–3 mm wide, with margin generally ciliate at base; inflorescence 2–5 cm long with 1–5 nodes.....*C. cameronii* var. *ruziziense*
3. Leaves flat or folded, not tightly conduplicate, linear, 4–25 mm wide, generally not ciliate; inflorescence (4–)7–12 cm long with 4–20 nodes..... .....*C. cameronii* var. *pterocaulon*

11a. *Chlorophytum cameronii* (Baker) Kativu var. ***cameronii*** (Nordal et al. 1997: 31); Kativu et al. (2008: 44).

Anthericum uyuiense Rendle (Rendle 1895: 415); Baker (1898: 485); Troupin (1956: 185 & 186, fig. 30); Hepper (1968b: 97). – Type: Tanzania, between Uyui and the coast, 1886, *W.E. Taylor* s.n. (holo-: BM, barcode BM000911753).

Anthericum congolense De Wild. & T.Durand (De Wildeman & T. Durand 1899: 60); De Wildeman & T. Durand (1901: 242); Durand & Durand (1909: 568); De Wildeman (1921a: 26; 1930: 94). – Type: D.R.Congo, environs de Lùbunda (Loubounda), Sep. 1896, *Dewèvre* 1029 (holo-: BR).

Anthericum congolense De Wild. & T.Durand var. *elongatum* De Wild. (De Wildeman 1910b: 265); Troupin (1955: 233). – Type: D.R.Congo, Kasaï, Katola, 8 Apr. 1906, *Sapin* s.n. (holo-: BR, barcode BR0000005749973).

Other representative specimens examined – **D.R.Congo**: IV: Kapanga, savane boisée, Nov. 1933, *Overlaet* 1089 (BR); V: La Pastorale, section 2, Oct. 1931, *Quarré* 2739 (BR); VII: Parc nation. Garamba, Crête Congo-Nil, forêt claire à *Isoberlinia doka*, 16 Jun. 1952, *Troupin* 1246 (BR); XI: Upemba, rive gauche de la Lufira vers Mabwe, alt. 920 m, 27 Oct. 1947, *de Witte* 03024 (BR).

Rwanda: Territ. Kibungu, colline Muhororo, alt. 1400 m, savane à bosquets, 26 Nov. 1958, *Troupin* 8860 (BR).

Burundi: Territ. Cibiteke, savane boisée, alt. 1000 m, 26 May 1967, *Lewalle* 1964 (BR).

Collections from Rwanda generally have leaves narrower than in other regions (2–6 mm).

11b. *Chlorophytum cameronii* (Baker) Kativu var. ***grantii*** (Baker) Nordal (Nordal et al. 1997: 32). – *Anthericum grantii* Baker (Baker 1875: 160 & tab. 103b); Baker (1898: 488). – Type: Mozambique, Mgunda Mkali, Bass Rock, Dec. 1860, *Speke & Grant* s.n. (holo-: K, barcode K000257053).

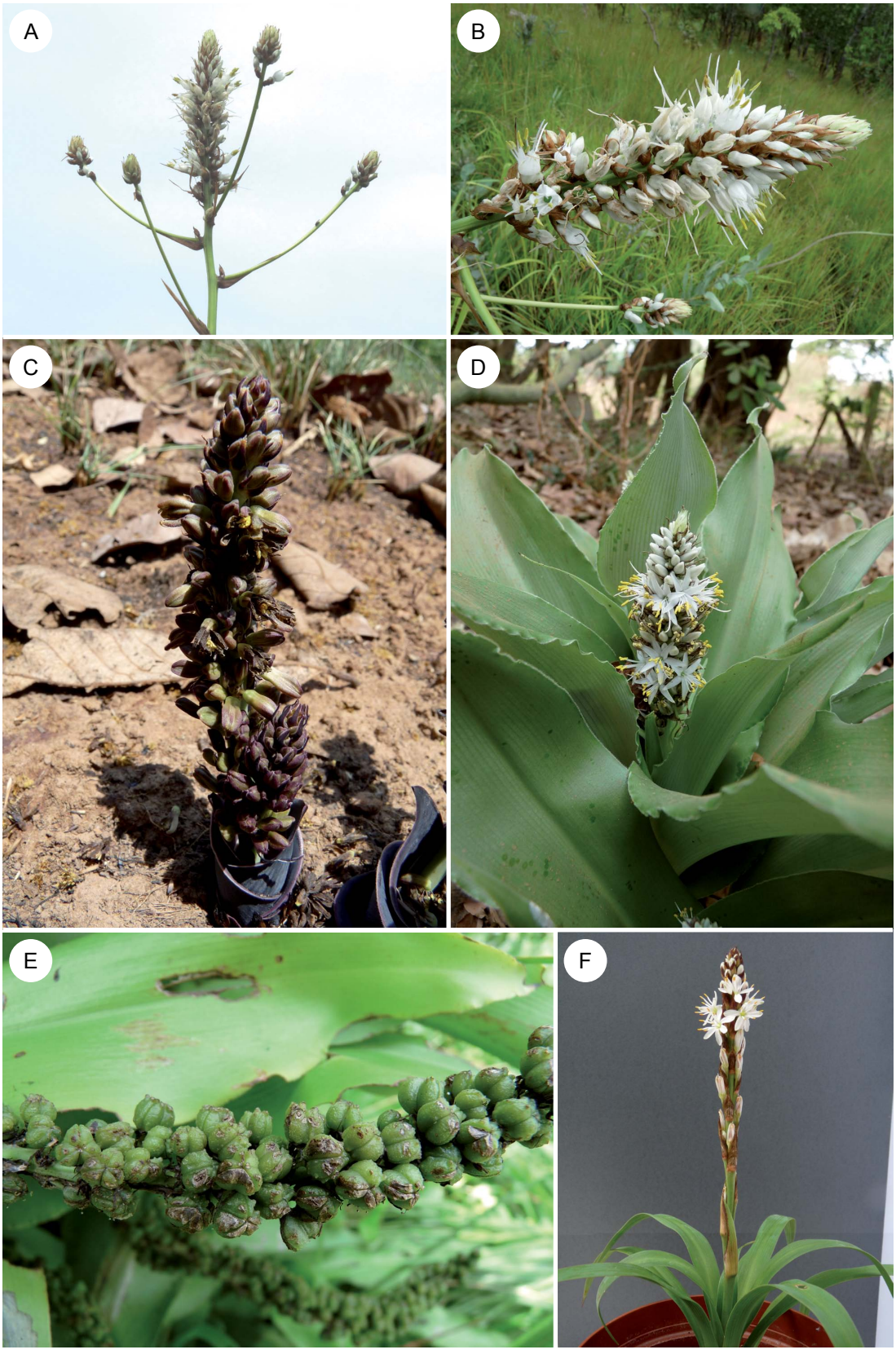

Figure 1 – Photographs of living plants. A, B, *Chlorophytum arcuatoramosum* (D.R.Congo, Tenke, Shimbidi, Feb. 2010, *Meerts* 2010/54); C, *C. blepharophyllum* var. *amplexicaule*, hysteranthous purple-leaved phenotype approaching *C. blepharophyllum* subsp. *rubropygmaeum* (D.R.Congo, Kiswishi, Nov. 2009); D, *C.* cf. *brachystachyum* (D.R.Congo, Lubumbashi, Kasapa, termite mound, Nov. 2009); E, *C.* cf. *brachystachyum* in fruit (D.R.Congo, Kipopo, Jan. 2010); F, *C. burundiense,* cultivated, from Mt. Teza (Burundi).

Anthericum durum Poelln. (Poellnitz 1941: 232). – Type: D.R.Congo, Katanga, Kapiri, Oct. 1911, *Hock* s.n. (lecto-: BR, barcode BR0000008767035, **here designated**) & D.R.Congo, Katanga, Lukoni, 6 Oct. 1911, *Hock* s.n. (syn-: BR, barcode BR0000008769350), **synon. nov.**

Anthericum rigidum De Wild. (De Wildeman 1913a: 507; 1913c: 8); De Wildeman (1921a: 27; 1930: 94); **nom. illeg.** non *Anthericum rigidum* Krause.

A. rigidum De Wild. var. *breviscapum* De Wild. (De Wildeman 1915: 5) **nom. illeg.** – Type: D.R.Congo, Katanga, Plateau de la Manika, environs de Katentania, Nov. 1912, *Homblé* 754 (holo-: BR).

Other representative specimens examined – **D.R.Congo**: XI: Lubumbashi, galerie forestière, Nov. 1927, *Quarré* 903 (BR); s.l., s.d., *Quarré* 1512 (KIP); s.l., s.d., *Quarré* 3684 (KIP); Territ. Mitwaba, Vibijo, alt. 1700 m, savane herbeuse, 27 Mar. 1970, *Coget* 154 (BR); Tilwizembe, steppe sur pente rocheuse, légèrement métallifère en Cu et Co, 8 May 1957, *Duvigneaud* 3077L (BRLU); env. Fungurume, Kavifwafwaulu, sous forêt claire, 24 Nov. 2008, *Malaisse et al*. 428 (BR).

Anthericum durum Poelln., described from Congolese materials, was erroneously reduced to *C. galpinii* var. *galpinii* by Kativu et al. (2008). The latter has a branched inflorescence (sometimes a raceme, but with a long aristate lower bract), and 3-veined tepals. In *Anthericum durum,* the inflorescence is always simple, with a short lower bract and the tepals have 5 widely spaced veins. Collections from Katanga are variable in size, pubescence and bract shape. Pubescent forms of *C. cameronii* might represent a heterogeneous assemblage.

Duvigneaud 3082L (BRLU) from Tilwizembe copper hill with a forked raceme and scabrid leaves may belong here.

11c. *Chlorophytum cameronii* (Baker) Kativu var. ***pterocaulon*** (Baker) Nordal (Nordal et al. 1997: 32); Kativu et al. (2008: 45). – Type: Angola, Pungo Andongo, s.d., *Welwitsch* 3795 (holo-: BM, iso-: K).

Anthericum korrowalense Engl. & K.Krause (Engler 1910: 125); Troupin (1956: 184). – Type: Cameroon, Korrowal plateau, May 1909, *Ledermann* 3832 (B, holo-, not seen).

Anthericum speciosum Rendle (Rendle 1895: 413); Baker (1898: 486); Lebrun et al. (1948: 35). – Type: Tanzania, between Zanzibar and Uyui, Feb. 1887, *W.E. Taylor* s.n. (holo-: BM, barcode BM000911768).

Other representative specimens examined – **D.R.Congo**: V: Kuakidi, alt. 730 m, savane arbustive, 7 Dec. 1957, *Lukuesa* 464 (BR); VII: Parc Nat. de la Garamba, savane herbeuse sur alluvions de vallée, 1 Jun. 1951, *De Saeger* 01170 (BR); X: Makamba, 42 km S de Bururi, savane herbeuse sur argile rouge, 6 Jan. 1938, *Robert* 20 (BR); XI: Kilata, zone Sakania, 11 Nov. 1986, *D'Hose* 34b (BR).

Burundi: Territ. Ruyigi, Kigamba, savane arborée, alt. 1500 m, 2 Jan. 1975, *Reekmans* 4108 (BR).

In its typical form (peduncle flat, rachis undulate, inflorescence distichous, pedicels shorter than flowers), *C. cameronii* var. *pterocaulon* is easily recognized. However, many collections depart from that description in one or several traits. Var. *pterocaulon* is more variable than var. *cameronii* and is possibly a paraphyletic aggregate. Some collections have an inflorescence with 1–3 branches [*De Witte* 3088 (BR) and 5557 (BR) from l'Upemba].

A few collections from Upper Katanga (region of Fungurume) [*FC* 12 (BR)] have red-coloured cataphylls and leaf margins. They may well deserve taxonomic recognition, but more material is needed.

11d. *Chlorophytum cameronii* (Baker) Kativu var. ***ruziziense*** Meerts, **var. nov.**

A typo differt foliis tenuissimis, conduplicatis, 2–3 mm latis, 13–17 nervatis, marginibus saepe ciliatis, cum vaginibus non purpureo maculatis. – Type: Burundi, Bubanza, Gihungwe, alt. 800 m, 23 Nov. 1974, *Reekmans* 3955 (holo-: BR, iso-: K).

Other representative specimens examined – **D.R.Congo**: IX: Plaine de la Ruzizi, piste Kabunambo-rivière Ruzizi, savane herbeuse, Jan. 1950, *Germain* 5517 (BR, FT); Plaine de la Ruzizi, env. Kihombo, savane à *Themeda* et *Bulbine*, Feb. 1950, *Germain* 6008 (BR, K); Plaine de la Rusizi, Jan. 1929, *Humbert* 7301 (BR, K, B).

Burundi: Bubanza, Plaine de la Ruzizi, km 30, savane à *Bulbine*, alt. 800 m, 25 Nov. 1973, *Reekmans* 2929 (BR).

This new variety has extremely narrow, conduplicate leaves 2–3 mm wide, with 13–17 nerves, most often ciliate in lower third (though not in the membranaceous sheath), not purple-spotted. It is variable in size, from 20 cm in collections from high altitude in Burundi to 90 cm in collections from the Ruzizi plain. This variety is close to *C. zanguebaricum* (Baker) Nordal, another narrow-leaved variant of the *C. cameronii* complex, but this does not have tightly conduplicate leaves and leaf margin is not ciliate. More research is needed on the narrow-leaved forms within the *C. cameronii* complex.

Germain (1952) referred to this plant as "*C. gracillimum* V.D.", a nomen nudum (see under *C. warneckei*).

In the preliminary phylogenetic analyses the Congolese *C. cameronii* var. *ruziziense* [*Reekmans* 3955 (K, BR)] resolves as sister to the Ethiopian *C. cameronii* in a well supported clade of species that previously were included in the genus *Anthericum*.

12. *Chlorophytum clarae* Bjorå & Nordal (Bjorå et al. 2008: 232, fig. 5; 233 figs 7–9; 236 fig. 21). – Type: Zambia, Northern region, Mansa District, 4 Dec. 2002, *Nordal & Bjorå* 4542 (holo-: O, not seen). Fig. 2A–C; fig. 5A & B.

Representative specimens examined – **D.R.Congo**: V: Kiala, Feb. 1954, *Thiébaud* 383 (BR); XI: Kiswishi, monastère ND des sept sources, base de termitière en forêt claire, Jan. 2010, *Meerts* 2010/23 (BRLU); rivière Mashinji, 10°23'S 25°17'E, forêt galerie, 19 Feb. 1987, *Billiet & Jadin* 4191 [BR, with photographs of plant cultivated in greenhouse (S 1975; 87-0156)]; Tenke, fossé ombragé dans le dembo d'empoisonnement de la colline cuprifère de Kabwelunono, Feb. 2010, *Meerts* 2010/37 (BRLU); Galerie de la Lofoï, Jul. 1939, *Quarré* 5724 (BR).

This taxon has long been confounded with *C. macrophyllum* (see discussion under that species). It is clearly distinct by its seeds, variable in shape, from more or less saucer-shaped to very irregularly angulose-plicate (flat to slightly saucer-shaped in *C. macrophyllum*), and by its seed coat with raised periclinal walls and wide furrows (shallowly convex

periclinal walls and narrow furrows in *C. macrophyllum*, fig. 5C–F). Other differences include lateral tubers (terminal in *C. macrophyllum*), more or less rounded fruits (strongly trigonous in *C. macrophyllum*), and a denser raceme. Therefore, collections without mature fruits or well-collected belowground organs cannot be identified. Other characters are variable, including anther length (3–5 mm), tepal length (7.5–12 mm), leaf width (3–8 cm), raceme length (4–25 cm) and fruit surface (smooth to slightly rugose-verrucose). Collections from Katanga have a more variable seed shape than reported for Zambia (Bjorå et al. 2008).

It is still unclear whether genuine *C. macrophyllum* occurs in Katanga.

13. *Chlorophytum colubrinum* (Baker) Engl. (Engler 1892: 162); Poellnitz (1946: 353); Kativu (1994: 56); Nordal et al. (1997: 19); Kativu et al. (2008: 66, fig. 13.1.12). – *Dasystachys colubrina* Baker (Baker 1878a: 256 & tab. 35, figs 5–10); De Wildeman (1913c: 12; 1921a: 28; 1930: 96). – Type: Angola, Huilla, Empalanca, Jan. 1860, *Welwitsch* 3784 (lecto-: BM; isolecto-: K, B, P).

Two varieties can be recognized.

1. Raceme cylindrical, 4–30 cm long, 4–20 times as long as wide; leaves 3–40 mm wide; bracts not or only shortly ciliate; cataphylls glabrous..... .....*C. colubrinum* var. *colubrinum*

1. Raceme subglobose to ovoid, 1.5–4 cm long, less than 2 times as long as wide; leaves 2–4 mm wide; bracts long ciliate; cataphylls pubescent..... .....*C. colubrinum* var. *upembense*

13a. *Chlorophytum colubrinum* (Baker) Engl.
var. ***colubrinum***

Dasystachys verdickii De Wild. (De Wildeman 1902: 10); Durand & Durand (1909: 569); De Wildeman (1921a: 29; 1930: 96) – *Chlorophytum verdickii* (De Wild.) Poelln. (Poellnitz 1945: 232) – Type: D.R.Congo, Katanga, Lofoi, 1899, *Verdick* s.n. (holo-: BR, barcode BR0000008768872).

Dasystachys hockii De Wild. (De Wildeman 1911a: 264); De Wildeman (1913c: 11; 1921a: 29). – Type: D.R.Congo, Katanga, Vallée de la Luembe, Feb. 1910, *Hock* s.n. (holo-: BR, barcode BR0000008764348).

Dasystachys bequaertii De Wild. (De Wildeman 1913b: 294); De Wildeman (1921a: 28). – Type: D.R.Congo, Katanga, Elisabethville [Lubumbashi], 15 Apr. 1912, *Bequaert* 333 [published as 533] (holo-: BR).

Chlorophytum subpapillosum Poelln. (Poellnitz 1945: 232). – Type: D.R.Congo, Lubembe, 27 Jan. 1908, *Kassner* 2394 (holo-: B, iso-: BR).

Chlorophytum poggei Engler. ex Poelln. (Poellnitz 1945: 232). – Type: D.R.Congo, Mukenge, 27 Apr. 1882, *Pogge* 1491 (holo-: B).

Dasystachys pulchella P.A.Duvign. & Dewit (Duvigneaud & Denaeyer-De Smet 1963: 149, fig. 11). – *Chlorophytum linearifolium* Marais & Reilly (Marais & Reilly 1978: 660). – Type: D.R.Congo, Kolwezi, Dikuluwe, 21 Jan. 1960, *Duvigneaud* 5141D (holo-: BRLU).

Chlorophytum decoratum (Baker) Marais & Reilly (Marais & Reilly 1978: 659); Troupin (1988: 44). –Type*:* Zambia, Fwambo, Sep. 1893, *Carson* 26 (holo-: K).

Other representative specimens examined – **D.R.Congo**: III: Route de Kenge, Vallée de la Black River, 30 Jul. 1974, *Pauwels* 5142 (BR); IV: Mayi a Kantshia, Kazumba; savane, Oct. 1978, *Mabika* 0168 (BR); V: Gandazjika (Kasaï), savane, 24 Feb. 1953, *Risopoulos* 37 (BR); XI: Katanga, Plateau de la Manika, riv. Potopoto, savane steppique, 24 Dec. 1988, *Schaijes* 4232; Mine de Luiswishi, 14 Feb. 1982, *Malaisse & Robbrecht* 2118 (BR).

Rwanda: Rusumo, route vers Nyarubuye, savane arbustive sur sol rocailleux, 25 Jan. 1998, *Bridson* 306 (BR).

Burundi: Prov. Bururi, Gitwe (Rumonge), forêt claire à *Brachystegia*, dans un petit ravin, 24 Feb. 1980, *Reekmans* 8622 (BR).

The species is extremely variable in the size of all its parts. Part of the variation is correlated to habitat and seems to be genetic. The most vigorous forms with a very dense raceme, long tepals (up to 11 mm), big fruits (up to 10 mm) and a compact infrutescence 25–40 mm wide [*Dasystachys verdickii* De Wild.; *Chlorophytum poggei* Engl. ex Poelln.; e.g. *Quarré* 8045 (BR)] are striking. However, they are linked to normal forms by a range of intermediates. At the opposite extreme of the variation range, slender few-flowered forms from copper-rich soil in Upper Katanga were described as a distinct species (*Dasystachys pulchella* P.A.Duvign. & Dewit; *Chlorophytum linearifolium* Marais & Reilly) [Cu-soil: e.g. *Malaisse & Robbrecht* 2398 (BR, WAG, MO, K, P), *Duvigneaud* 4670 (BRLU); non mineralized soil: *Duvigneaud* 5292D (BRLU)]. However, intermediates exist between those and more robust forms even on copper-rich soil and it does not seem possible to maintain that taxon even at varietal rank (Faucon et al. 2010).

Some collections from Katanga have ovate-elliptic leaves with length/width ratio unusually low [50–100 × 20–30 mm: *de Witte* 65 (BR); *Malaisse* 4907 (BR)]. Small forms with hysteranthous flowers sometimes occur [*Quarré* 1990 (BR)]. A variant with a ramified inflorescence is rarely encountered [e.g. env. Kibunda, forêt sèche, 28 Apr. 1953, *Callens* 4074 (K)] corresponding to *C. pleiostachyum* (Baker) T.Durand & Schinz, but this does not seem to warrant taxonomic recognition.

Many collections have purple-spotted leaf sheaths but the taxonomic value of this trait is unclear.

13b. *Chlorophytum colubrinum* (Baker) Engl.
var. ***upembense*** Meerts, **var. nov.**

A typo differt racemo sugloboso aut ovoideo, 15–30 mm longo, cataphyllis pubescentibus et bracteis longe ciliatis. – Type: D.R.Congo, Haut-Katanga, Parc national de l'Upemba, Buyé-Bala, affl. Muyé, savane marécageuse, alt. 1750 m, 30 Mar. 1948, *de Witte* 03596 (holo-: BR).

Other representative specimen examined – **D.R.Congo**: XI: Parc nation. Upemba, savane herbeuse d'altitude autour de la tête de source de la riv. Kalumengongo, alt. 1830 m, 31 Mar. 1949, *de Witte* 05970 (BR).

This variety is well-characterized by a subcapitate to ovoid inflorescence, long ciliate bracts and hairy cataphylls. It has very narrow leaves (2–4 mm), but this trait is occasionally found in var. *colubrinum*, especialy in populations on copper-rich soil.

14. *Chlorophytum cordifolium* De Wild. (De Wildeman 1914: 111); De Wildeman (1921a: 27). – Type: D.R.Congo, Katanga, env. Katentania (Plateau de la Manika, Biano), Nov. 1912, *Homblé* 766 (holo-: BR, barcode BR0000006420581; iso-: BR, barcode BR0000006420314).

Chlorophytum unifolium Malaisse & Bamps (Malaisse & Bamps 2009: 225-229, figs 1 & 2). – Type: D.R.Congo, Katanga, Kavifwafwaulu, Nov. 2006, *Malaisse, Kisimba & Saad* 598 (holo-: BR), **synon. nov.**

Other representative specimens examined – **D.R.Congo**: XI. Biano Hôtel, Forêt claire à *Brachystegia* et *Monotes* sur sol profond et léger, 8 Dec. 1959, *Duvigneaud* 4459L (BRLU).

A remarkable, very distinct species collected only on few occasions since its description in 1914. Rediscovered in 2006 it was then erroneously described as a new species. Apparently a narrow endemic of the Tenke-Biano area.

15. *Chlorophytum debile* Baker (Baker 1878a: 260). – Type: Angola, Ambriz, ad rupes, *Welwitsch* 3769 (holo-: BM; iso-: K, P). Fig. 5G & H.

Chlorophytum gilletii Compère (Compère 1962: 211). – *Chlorophytum gracile* De Wild. (De Wildeman 1911a: 274); De Wildeman (1912a: 344) **nom. illeg.** – Type: D.R.Congo, Bas-Congo, environs de Kisantu, 1906, *Gillet* 3963 (holo-: BR), **synon. nov.**

Chlorophytum laxum auct. W Afr. (e.g. Baker 1898: 503; Hepper 1968b: 100; Vanden Berghen 1988: 425, fig. 349; 426) non *Chlorophytum laxum* R.Br.

Other representative specimen examined – **D.R.Congo**: III. Territ. Songolo, Kiandu, galerie forestière de la Lunionzo, 16 Dec. 1959, *Compère* 1049 (BR, K).

This species can be confounded with slender forms of *C. sparsiflorum*. The seed testa however is very different, with smooth periclinal walls in *C. sparsiflorum* and apiculate periclinal walls in *C. debile* (fig. 5G & H). The species is very variable in size (6–40 cm high, with inflorescence more or less prostrate in the smallest forms). The type specimen originates from NW Angola, i.e. not far from Congolese collections. Specimens from D.R.Congo and the type of *C. debile* perfectly match collections from W Africa to which the name "*C. laxum*" has long been wrongly applied based upon a type specimen from Australia (Poulsen & Nordal 2005). In our opinion, *C. debile* may be the correct name for most if not all collections of *C. laxum* auct. from W Tropical Africa. Xylem vessel anatomy also indicated that Asian and African collections of "*C. laxum* auct." are not conspecific (Naik & Nirgude 1981).

Donis 177 (BR), cited in Compère (1962), has blackening leaves, an unusual trait for *C. debile*. As it lacks flowers and fruits, identification is uncertain.

16. *Chlorophytum filipendulum* Baker (Baker 1878a: 260); Baker (1898: 499); Rendle (1899: 54); Nordal et al. (1997: 59); Poulsen & Nordal (2005: 16, figs. 12 & 13); Bjorå & Nordal (2010: 4). – Type: Angola, Golungo Alto, s.d., *Welwitsch* 3776 (holo-: BM, iso-: K, P).

Chlorophytum macrophyllum sensu Robyns & Tournay (1955: 354) non *C. macrophyllum* (A.Rich.) Aschers.

Other representative specimens examined – **D.R.Congo**: IV: Kamembele, galerie forestière, 12 Jan. 1957, *Liben* 2257 (BR); V: Kamalenge, galerie forestière, 10 Feb. 1948, *Mullenders* 2039 (BR); VI: Yangambi, km 13 route N'gazi, sous-bois forêt primitive ombrophile, 12 Jan. 1938, *Louis* 7466 (BR, K); VII: Mapere-Suronga, forêt, 20 Dec. 1905, *Seret* 399 (BR); VIII: Kima Kima (Mahagi), alt. 1700 m, galerie forestière, 27 May 1959, *D. Froment* 459 (BR); IX: Mutsora, galerie forestière de la Ngokoye, endroit fort ombragé, 2 Aug. 1952, *de Witte* 7816 (BR).

C. filipendulum has been much underrecorded until now due to confusion with *C. macrophyllum* (see discussion under the latter species).

C. filipendulum is closely related to and sometimes difficult to discriminate from *C. sparsiflorum*. In particular, small forms with incompletely blackening leaves are puzzling. Introgression might explain the existence of more or less intermediate forms.

17. *Chlorophytum gallabatense* Schweinf. ex Baker (Baker 1876: 325); Baker (1898: 504); Troupin (1955: 235); Troupin (1956: 190); Hepper (1968b: 99); Troupin (1988: 43, fig. 4/2; 44); Kativu (1994: 60); Nordal et al. (1997: 45); Kativu et al. (2008: 81). – Type: Sudan/Ethiopian border, Gallabat, Matamma, Jul. 1865, *Schweinfurth* 10 (lecto-: K; isolecto-: B, P).

Three varieties, treated as distinct species in FZ and FTEA.

1. Rachis and pedicels densely covered with hairs or cylindric papillae 0.3–0.5 mm long; lower leaf surface often papillate on veins; fruits c. 7 mm long, generally longer than broad.....*C. gallabatense* var. *floribundum*

1. Rachis and pedicels glabrous or scabrid with conical papillae < 0.3 mm long; lower leaf surface glabrous; fruits 4–6 mm long, no longer than broad.....2

2. Leaves developing after inflorescence, linear, < 1 cm wide; inflorescence: a raceme or a poorly ramified panicle with 1–2 branches; rootstock with copious fibrous remains of leaves; tubers 15–20 mm long, mostly terminal.....*C. gallabatense* var. *micranthum*

2. Leaves well developed at flowering, narrowly elliptic to almost linear, attenuate towards base, 12–40 mm wide; inflorescence with 3–15 branches; rootstock most often without fibers; tubers < 12 mm, mostly on lateral rootlets.....*C. gallabatense* var. *gallabatense*

17a. *Chlorophytum gallabatense* Schweinf. ex Baker var. ***gallabatense***. Fig. 5I & J.

Chlorophytum psammophilum Engl. & Gilg (Engler & Gilg 1903: 188). – Type: Angola, between Kiubango and Kuito, alt. 1200 m, 9 Dec. 1899, *Baum* 517 (holo-: B; iso-: Z, K), **synon. nov.**

Chlorophytum ramulosum De Wild. (De Wildeman 1911a: 275); De Wildeman (1912a: 346; 1921b: 19). – Type: D.R.Congo, route Bambili-Amadi, 4 Mar. 1905, *Seret* 244 (holo-: BR).

Chlorophytum katangense De Wild. (De Wildeman 1911a: 277); De Wildeman (1913c: 14; 1921a: 28; 1930: 95). – Type: D.R.Congo, Katanga, Vallée de la Luembe, Feb.

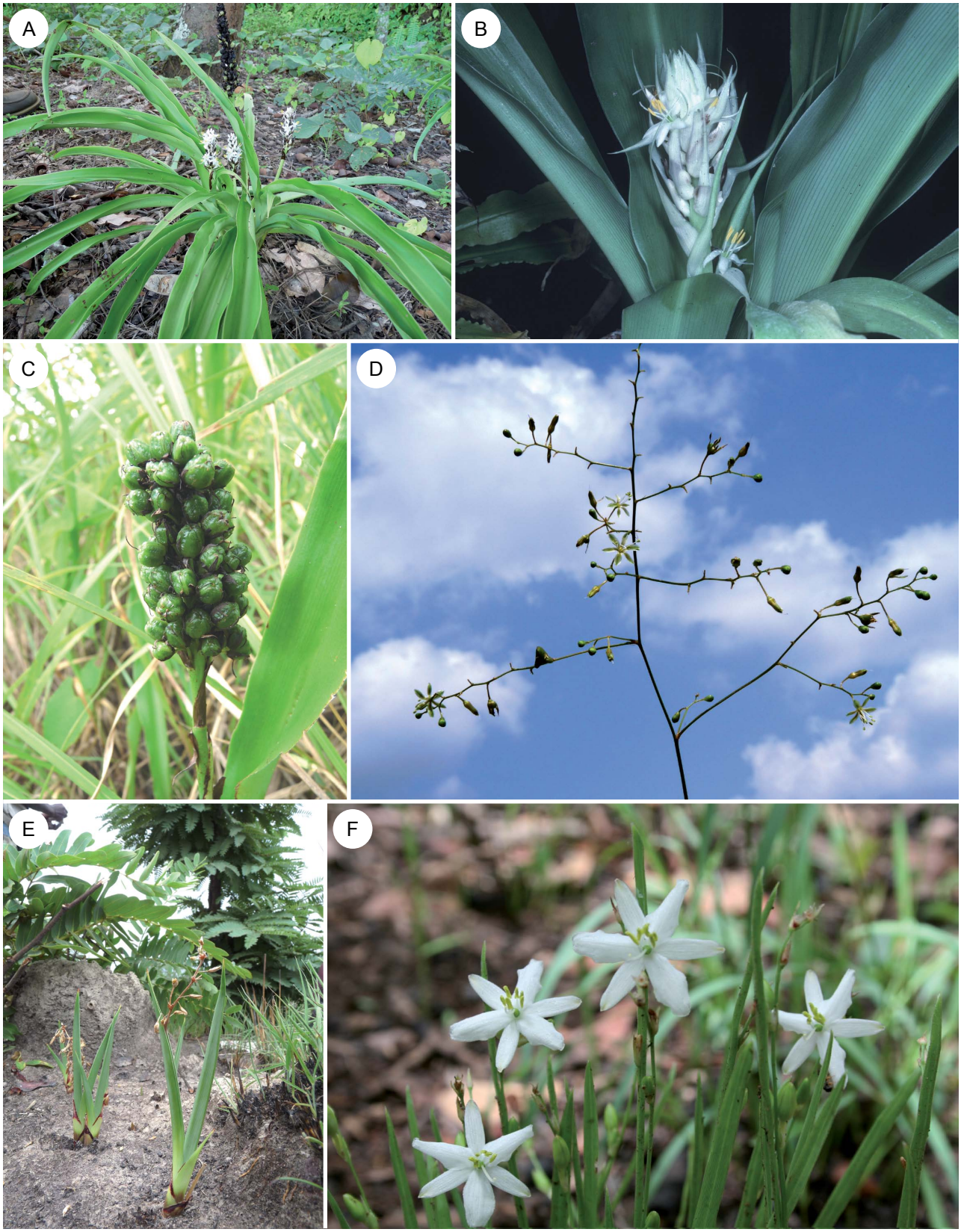

Figure 2 – Photographs of living plants (photos P. Meerts except otherwise stated). A, *C. clarae*, in flower (D.R.Congo, Kiswishi, termite mound in miombo, Nov. 2009); B, *C. clarae*, cultivated in greenhouse (D.R.Congo, from *Billiet & Jadin* 4191; photo F. Billiet); C, *C. clarae*, in fruit (D.R.Congo, Fungurume, Feb. 2010); D, *C. vestitum* subsp. *pilosissimum* (D.R.Congo, Kipopo, Jan. 2010); E, *C. hysteranthum* (D.R.Congo, Kipopo, Nov. 2009; *Meerts & Muding* 73); F, *C. rubribracteatum* (D.R.Congo, Kiswishi, Nov. 2009).

1910, *Hock* s.n. (holo-: BR, barcode BR0000008766618), **synon. nov.**

Chlorophytum breviflorum De Wild. (De Wildeman 1913a: 513; 1913c: 12); De Wildeman (1921a: 27; 1930: 95). – Type: D.R.Congo, Lubumbashi, Feb. 1912, *Homblé* 153 (holo-: BR).

Chlorophytum hockii De Wild. (De Wildeman 1913a: 514); De Wildeman (1913c: 13; 1921a: 27). – Type: D.R.Congo, Katanga, Lubumbashi, Oct. 1911, *Hock* s.n. (holo-: BR, barcode BR0000008768124).

Other representative specimens examined – **D.R.Congo**: IV: Topo-Guilu-Kwango, savane guinéenne, 28 Mar. 1955, *Devred* 1713 (BR); V: Kiala, savane ensoleillée, Dec. 1954, *Thiébaud* 397 (BR); VII: Faradja, Kibale-Ituri, savane arbustive, Jul. 1931, *Lebrun* 3409 (BR); VIII: Kasengi, Nov. 1935, *Brédo* 1893 (BR); XI: Plateau de la Manika, Biano, env. Katentania, termitière, Nov. 1912, *Homblé* 760 (BR); Kimilolo, 10 Feb. 1927, *Quarré* 128 (BR); Piste Kolwezi-Musokantanda, 0.35 km avant la piste du détournement, 10°45'39"S 25°20'59"E, 1459 m, sur haute termitière en zone déboisée près d'un village, 7 Dec. 1986, *Schaijes* 3228 (BR, MO).

Var. *gallabatense* is variable. It is often said to have glabrous rachis and pedicels (e.g. Kativu et al. 2008: 39, 82), thus contrasting with the papillate var. *floribundum*. This is not true, as many specimens of var. *gallabatense* have a papillate rachis too (e.g. *C. katangense* De Wild.), but the size and shape of papillae is different (see key) and the distal part of pedicels is usually smooth in var. *gallabatense*. In FZ, var. *gallabatense* is said to have long anthers (4 mm), longer than filaments, but materials from D.R.Congo have variable anther size (1–3.5 mm), often shorter than filaments. Articulation of pedicel is also variable, from lower half to upper half.

FZ recognizes *Chlorophytum psammophilum* Engl. & Gilg, said to have narrower leaves, shorter pedicels and tepals, stamens longer than perianth (vs. shorter in *C. gallabatense*) and white petals (vs. greenish in *C. gallabatense*). Some collections from Katanga resemble the type specimen of that taxon [e.g. *Duvigneaud* 4455Ch (BRLU)]. However, we have not been able to find reliable diagnostic characters and *C. psammophilum* is here reduced to *C. gallabatense* var. *gallabatense*.

17b. *Chlorophytum gallabatense* Schweinf. ex Baker var. ***floribundum*** (Baker) Meerts, **comb. & stat. nov.**
Chlorophytum floribundum Baker, Bulletin of Miscellaneous Information, Kew 1897: 285. 1897 (Baker 1897b); Baker (1898: 505); Kativu (1994: 60); Nordal et al. (1997: 47); Kativu et al. (2008: 82). – Type: Malawi, Zomba, Dec. 1896, *Whyte* s.n. (holo-: K, barcode K000256938, iso-: B, barcode B100168008).

Other representative specimen examined – **D.R.Congo**: XI: Vallée de la Lofoi, Lukafu, sol forestier peu ombragé d'éboulis de pente, 17 Oct. 1948, *Schmitz* 2082 (BR).

Symoens 12825j (BRVU), from Lubumbashi, may well belong here but the plant is very young. Var. *floribundum* has never been collected in the fruiting state in D.R.Congo and the character of fruit length mentioned in the key is based on material from Zambia.

17c. *Chlorophytum gallabatense* Schweinf. ex Baker var. ***micranthum*** (Baker) Meerts, **comb. & stat. nov.**
Chlorophytum micranthum Baker, Journal of Botany, British and foreign 16: 325. 1878 (Baker 1878b); Baker (1898: 507); Troupin (1956: 191); Nordal & Thulin (1993: 269). – Type: Sudan, Jur, s.d., *Schweinfurth* 1745 (holo-: K, iso-: B).

Chlorophytum bequaertii De Wild. (De Wildeman 1921b: 14); Robyns & Tournay (1955: 356, Plate XLIX); Hepper (1968b: 102). – Type: D.R.Congo, Kabare, 22 Aug. 1914, *Bequaert* 5397 (lecto-: BR, isolecto-: K, **here designated**) & *Bequaert* 5410 [syn-: BR (3 sheets)], **synon. nov.**

Other representative specimens examined – **D.R.Congo**: VII: Kurukwata (Aba), savane, endroit pierreux, 20 Feb. 1957, *Gérard* 3100 (BR); VIII: Parc national de la Garamba, crête Congo-Nil, km 10, forêt à *Isoberlinia*, 4 Mar. 1952, *Troupin* 286 (BR); IX: env. d'Uvira, Plaine de la Rusizi, alt. 800 m, Jan. 1929, *Humbert* 7307 (BR, P).

Burundi: Territ. Bubanza, Gihungwe, steppe à *Bulbine*, alt. 800 m, 30 Nov. 1974, *Reekmans* 3954 (BR, K).

Rwanda: Parc Nation. Kagera, Runyonza, savane à *Acacia* et *Aloe* brûlée, 20 Aug. 1948, *Robyns* 3434 (BR).

All collections from Rwanda previously referred to as "*C. gallabatense*" (e.g. in Troupin 1988) belong here.

This taxon was treated at species rank by FTEA, but it was indicated to "be a small and hysteranthous (fire adapted?) form, not deserving more than subspecific rank", and this view is supported here. Tepal length, often used to discriminate *C. micranthum* and *C. gallabatense,* shows broad overlap between the two taxa. Var. *micranthum* often has yellowish flowers, but this is not a constant character. Collections from the Rusizi plain show fully developed leaves, c. 9 mm wide and 20–35 cm long (fully developed leaves not observed in FTEA).

C. bequaertii was reduced to *C. micranthum* by Marais & Reilly (1978) and to *C. gallabatense* by FZ. Narrow leaves, sparingly branched inflorescence, copious leaf remains and terminal tubers suggest it belongs here.

The taxonomic significance of tuber position needs further investigation, as tubers are rarely collected.

18. *Chlorophytum galpinii* (Baker) Kativu var. ***matabelense*** (Baker) Kativu (Kativu & Nordal 1993: 63); Kativu (1994: 6); Kativu et al. (2008: 47, fig. 13.1.7). – *Anthericum matabelense* Baker (Baker 1898: 484). – Type: Zimbabwe, Bulilamangwe Dist., on banks of Matengwe R., May 1883, *Holub* s.n. (holo-: K, barcode K000256914).

Anthericum kapiriense De Wild. (De Wildeman 1915: 4); De Wildeman (1921a: 26). – Type: D.R.Congo, Katanga, Vallée Kapiri, Feb. 1913, *Homblé* 1092 (holo-: BR).

Other representative specimens examined – **D.R.Congo**: XI: Plateau de la Manika, savane steppique au nord de la tête de source de la rivière Luilu, 1500 m, 8 Feb. 1987, *Schaijes* 3322 (BR); Piste Nzilo-Kyamasumba à 10.5 km par la piste du centre urbain de Nzilo, forêt claire, 01 Aug. 1987, *Schaijes* 3575 (BR).

C. galpinii var. *galpinii* was reported by error from D.R.Congo by FZ (Kativu et al. 2008) (see discussion under *C. cameronii* var. *grantii*).

19. *Chlorophytum geophilum* Peter ex Poelln. (Poellnitz 1943b: 127; 1946: 292); Hepper (1968b: 100); Kativu (1994:

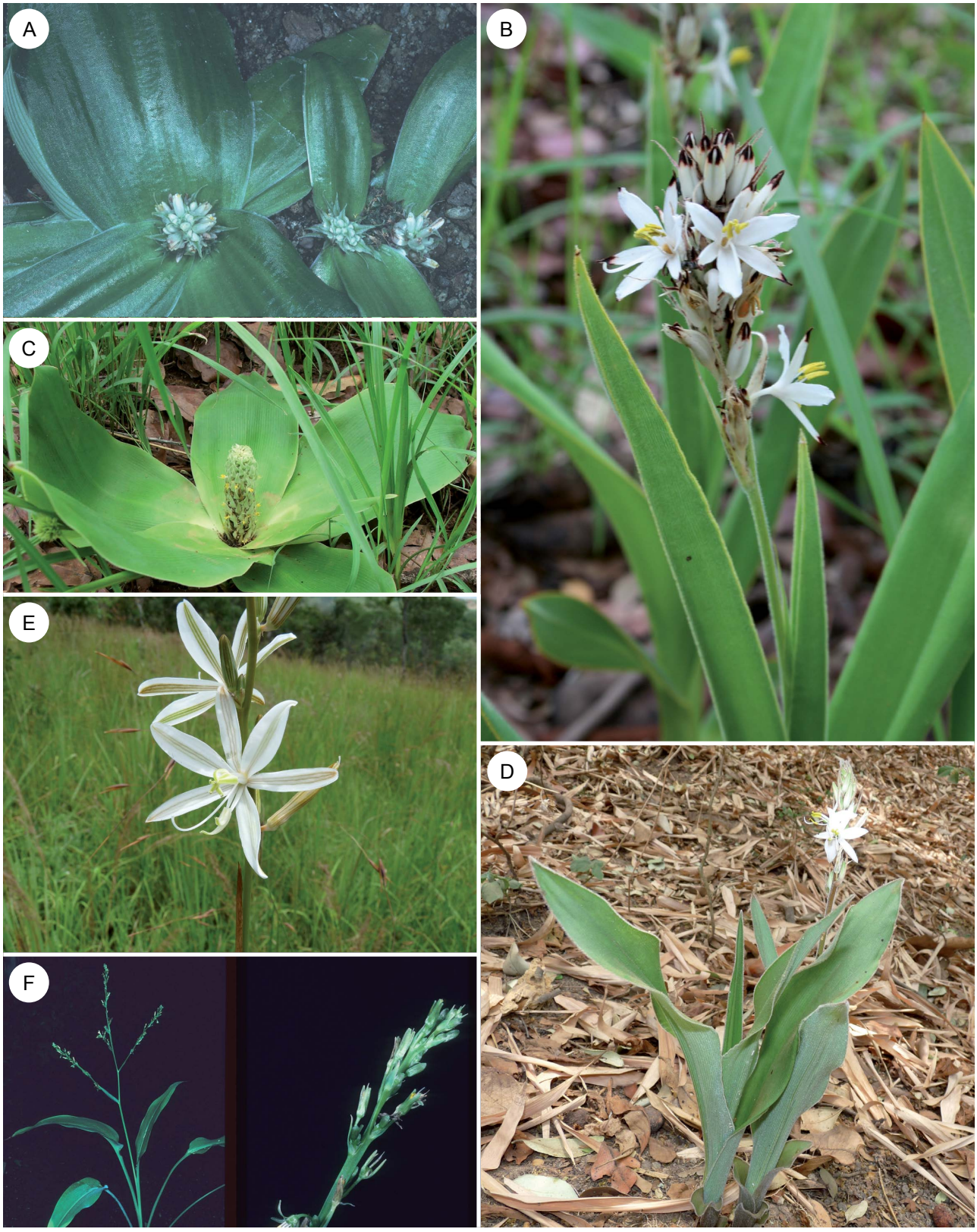

Figure 3 – Photographs of living plants (photos P. Meerts except otherwise stated). A, *C. pusillum* (cultivated in greenhouse, from *Billiet & Jadin* 4151; photo F. Billiet); B, *C. sphacelatum* (D.R.Congo, Kiswishi; photo J. Piqueray); C, *C. stenopetalum* var. *latifolium* (D.R.Congo, Kiswishi; photo J. Piqueray); D, *C. subpetiolatum* var. *pilosifolium* (D.R.Congo, Lubumbashi, Kasapa, termite mound, Nov. 2009); E, *C. velutinum* (D.R.Congo, Fungurume, copper hill, Feb. 2010); F, *C. zingiberastrum* (cultivated in greenhouse, from *Billiet & Jadin* 4195; photo F. Billiet).

63); Nordal et al. (1997: 54, fig. 11); Kativu et al. (2008: 87, fig. 13.1.15). – Type: Tanzania, Tabora Dist., Unyamwesi, Kombe, 24 Jan. 1926, *Peter* 35409 (holo-: B). Fig. 6A.

Chlorophytum pusillum sensu Troupin (Troupin 1956: 191).

Other representative specimens examined – **D.R.Congo**: VII: Parc Nation. Garamba, savane arbustive, 5 Jun. 1950, *Noirfalise* 441 (BR). XI: Bunkeya, plaine, Dec. 1948, *Hoffmann* 889 (BR).

C. geophilum and *C. pusillum* are two closely related species and intermediate specimens exist. The collections from the Parc National de la Garamba are critical.

20. *Chlorophytum hirsutum* Poulsen & Nordal (Poulsen & Nordal 1999: 941). – Type: Uganda, Bundibugyo Distr., Bwamba County, near Sempaya, 22 Jul. 1938, *Thomas* 2311 (holo-: K; iso-: BR).

Other representative specimens examined – **D.R.Congo**: IX: Territ. Uvira, Lubarika, savane à *Loudetia*, 29 May 1959, *A. Léonard* 4463 (BR).

Burundi: Territ. Bubanza, alt. 1100 m, bord de forêt, Dec. 1967, *Lewalle* 2549 (BR).

21. *Chlorophytum hysteranthum* Kativu (Kativu & Nordal 1993: 63); Kativu (1994: 64); Kativu et al. (2008: 49). – *Anthericum breviscapum* De Wild. (De Wildeman 1913a: 507); De Wildeman (1913c: 7; 1921a: 26), non *Chlorophytum breviscapum* Dalzell or *Chlorophytum breviscapum* Dammer. – Type: D.R.Congo, Katanga, Lubumbashi, Sep. 1911, *Hock* s.n. (holo-: BR, barcode BR0000008222695). Fig. 1K.

Other representative specimens examined – **D.R.Congo**: XI: Kipopo, 25 km NO Lubumbashi, dembo d'argile grise alternativement marécageuse et très sèche, 28 Sep. 1952, *Schmitz* 4093 (BR); ibid., Nov. 2009, *Meerts & Muding* 73 (BRLU).

A rare species with a restricted distribution range in S Katanga and N Zambia. The few collections from D.R.Congo all come from a restricted area in the vicinity of Lubumbashi. *Rogers* 10076 (K) has unusually large leaves up to 20 cm long suggesting that *C. hysteranthum* is closely related to *C. affine*.

22. *Chlorophytum lancifolium* Baker (Baker 1878a: 260); Baker (1898: 498); Kativu (1994: 65); Nordal et al. (1997: 60); Poulsen & Nordal (2005: 16-17); Kativu et al. (2008: 83). – Type: Angola, Pungo Andongo, Nov. 1856, *Welwitsch* 3772 (lecto-: BM, isolecto-: K); *Welwitsch* 3773 (syn-: BM, K).

1. Seed testa apiculate....*C. lancifolium* subsp. *cordatum*
1. Seed testa not apiculate.....2
2. Leaf base most often attenuate, flowers greenish to yellowish.....*C. lancifolium* subsp. *togoense*
2. Leaf base most often truncate to cordate, flowers whitish.....*C. lancifolium* subsp. *lancifolium*

22a. *Chlorophytum lancifolium* Baker subsp. ***lancifolium*** [Poulsen & Nordal (2005: 17, figs 1J; 18, 19, 35)].

Other representative specimens examined – **D.R.Congo**: XI: Sakania, forêt claire mélangée sur terre rouge, 31 Jan. 1960, *Duvigneaud* 5357 (BRLU).

Burundi: Ruyigi, colline Nyabitangu, sous-bois de forêt à *Julbernardia*, 8 Feb. 1979, *Reekmans* 7661 (BR, K).

Subsp. *lancifolium* has been much less collected than the other two subspecies.

22b. *Chlorophytum lancifolium* Baker subsp. ***cordatum*** (Engl.) Poulsen & Nordal (Poulsen & Nordal 2005: 16, fig. 1K; 16, 17, 34). – *Chlorophytum cordatum* Engl. (Baker & Engler 1892: 468). – Type: Soudan, Jebel Bangenze, Niamniamland, am Baginse, 25 May 1870, *Schweinfurth* 173 (holo-: B).

Other representative specimens examined – **D.R.Congo**: VII: Montagne Kundungu, 560 m, village Masabe, à 40 km au N de Bondo, forêt dense primaire sur rocher granitique, 3 Jul. 1978, *Lejoly* 4118 (BRLU, BR, K, WAG); Parc nation. Garamba, Dedegwa, galerie à la tête de source de la Dedegwa, 17 May 1952, *De Saeger* 2606 (BR, K); VIII: Bunia, Mont Hoyo, ravin, sur rochers humides, 5 Aug. 1976, *Pauwels* 5751 (BR); XI: Route Kolwezi-Kyamasumba, rivière Mushingi, 19 Feb. 1987, *Billiet & Jadin* 4192 (BR; cultivated in greenhouse: S 1945).

Subsp. *cordatum* mostly occurs in NE Congo (Poulsen & Nordal 2005); however, the record from Upper-Katanga [*Billiet & Jadin* 4192 (BR)] (seed testa checked with SEM) is widely disjunct from the main area of the subspecies indicating that subsp. *lancifolium* and subsp. *cordatum* are not completely allopatric.

22c. *Chlorophytum lancifolium* Baker subsp. ***togoense*** (Engl.) Poulsen & Nordal (Poulsen & Nordal 2005: 17, fig. 1L; 20, 21, 36). – *Chlorophytum togoense* Engl. (Engler 1902: 92); Hepper (1968b: 99). – Type: Togo, Jaggebach, bei Misa Höhe, 5 Sep. 1890, *Büttner* 172 (lecto-: B, **here designated**); Togo, Fasugu, 30 May 1891, *Büttner* 665 (syn-: B).

Chlorophytum ealaense De Wild. (De Wildeman 1911a: 274); De Wildeman (1912a: 343; 1916: 164; 1921b: 15). – Type: D.R.Congo, Eala, Oct. 1907, *Pynaert* 1040 (lecto-: BR; isolecto-: B); D.R.Congo, Eala, s.d., *Pynaert* 557 (syn-: BR); D.R.Congo, Eala, s.d., *Pynaert* 1777 (syn-: BR).

Other representative specimens examined – **D.R.Congo**: VI: Prov. Equateur, près de la rivière Ikilemba, 26 Aug. 1914, *Nannan* 63 (BR, K).

Subsp. *togoense* has a western Guineo-Congolian distribution, having its eastern limit in W D.R.Congo in the region of Eala. Some collections [(e.g. Gombe (Equateur), Aug. 1903, *M. Laurent* s.n. (BR, barcode BR0000005720651)] are more or less intermediate between *C. lancifolium* and *C. sparsiflorum*, and might be of hybrid origin.

C. lancifolium is often said to have a scabrid leaf margin (Nordal et al. 1997, Nordal & Poulsen 2005), but in most collections examined leaf margin is smooth.

23. *Chlorophytum leptoneurum* C.H.Wright
var. ***katangense*** (De Wild.) Meerts, **comb. & stat. nov.**
Verdickia katangensis De Wild. Annales du Musée du Congo, Botanique, série 4,1: 7. 1902 (De Wildeman 1902); Engler (1908: 309); Durand & Durand (1909: 569); De Wildeman (1921a: 27). – Type: D.R.Congo, Katanga, Lukafu, terrains

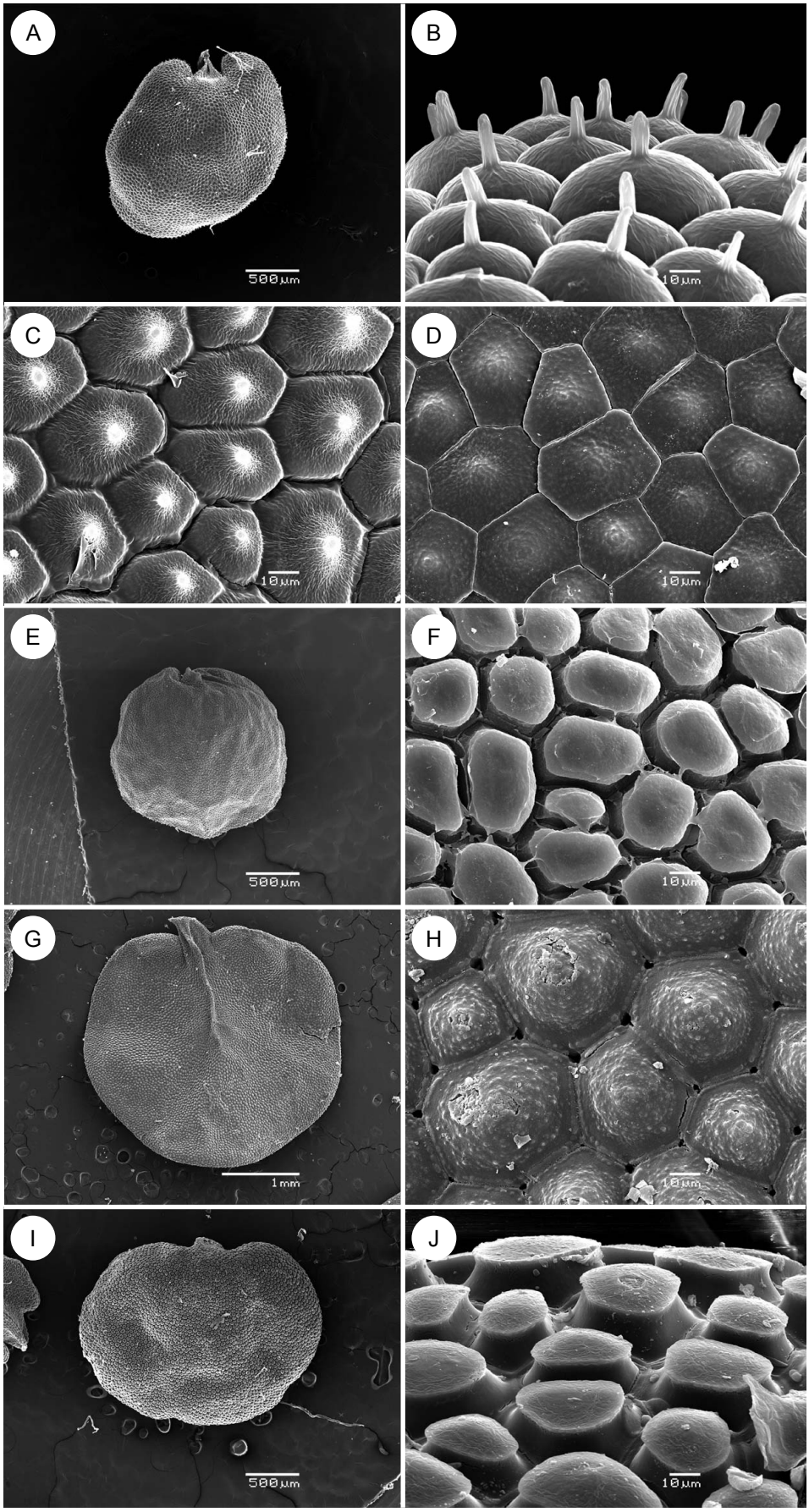

Figure 4 – Scanning electron microscope images of seeds and seed testa. A & B, *Chlorophytum africanum* var. *nordalianum*, seed and seed testa (*Schmitz* 4261); C, *C. andongense* (short-fruited form), seed testa (*Schmitz* 4545); D, *C. andongense* (long-fruited form), seed testa (*Billiet & Jadin* 4150); E & F, *C. angustissimum*, seed and seed testa (*Lewalle* 6452); G & H, *C. arcuatoramosum*, seed and seed testa (*Mullenders* 142); I & J, *C.* cf. *brachystachyum*, seed and seed testa (*Quarré* 1950).

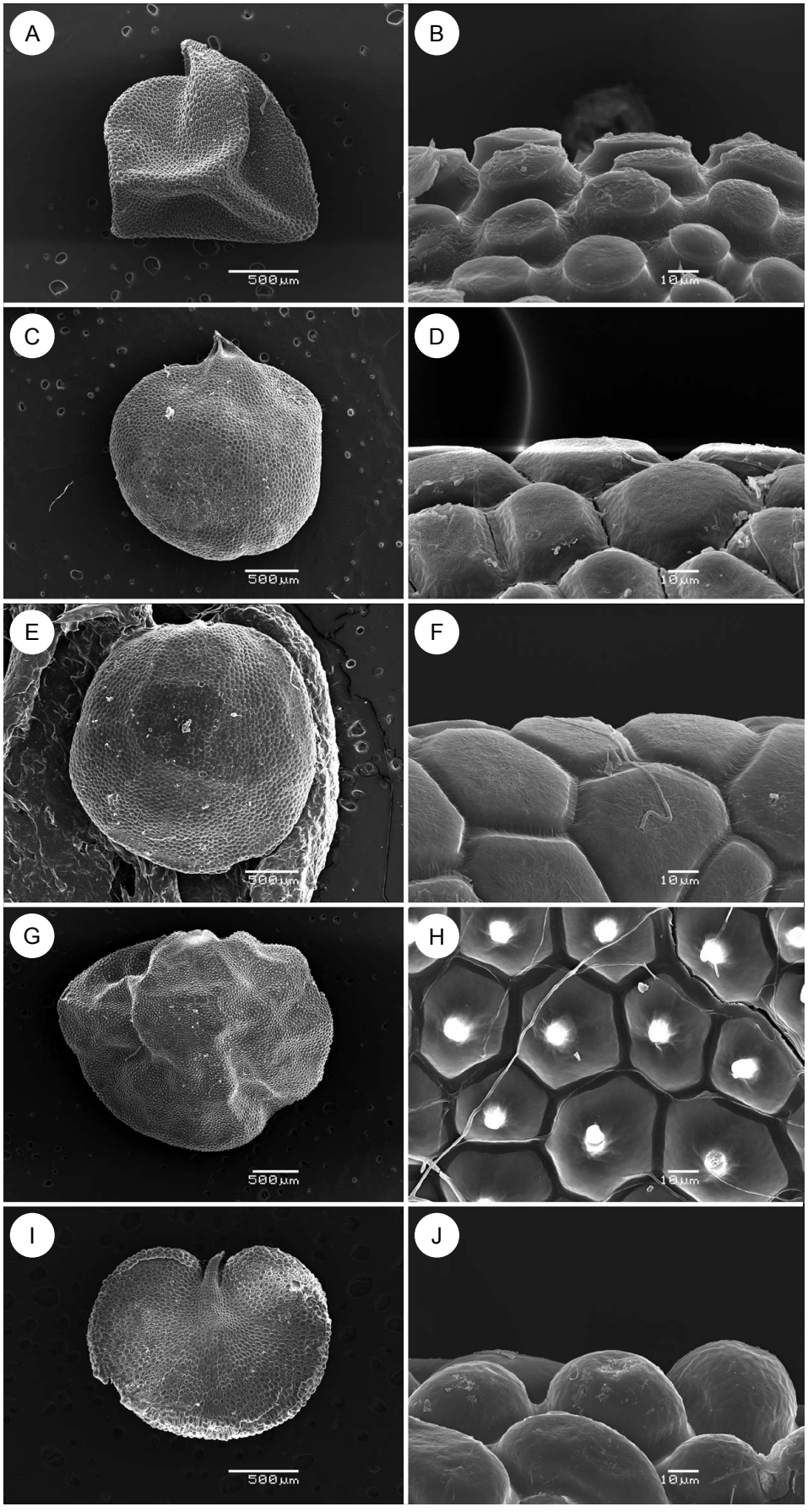

Figure 5 – Scanning electron microscope images of seeds and seed testa. A & B, *C. clarae*, seed and seed testa (*Meerts* 2010/37). C & D, *C. macrophyllum*, seed and seed testa (*Schimper* 1837); E & F, *C. macrophyllum*, seed (*Allard* 370) and seed testa (*Vanderyst* 38806); G & H, *C. debile*, seed and seed testa (*Compère* 1049); I & J, *C. gallabatense* var. *galabatense*, seed and seed testa (*Homblé* 1150).

argileux, Dec. 1899, *Verdick* 329 (holo-: BR); non *Chlorophytum katangense* De Wild. Fig. 6C, D & I.

Other representative specimens examined – **D.R.Congo**: XI: Keyberg, Katuba, prairie sur sol superficiel à dalle latéritique, 28 Nov. 1947, *Schmitz* 1052 (BR); pâturage artificiel du dembo de la Katuba, Jan. 1934, *Quarré* 3741 (BR).

Other specimens examined – **Malawi:** N. Prov., Mzimba dist., 6 miles NE Mzambazi, edge dambo, very sandy, 22 Jan. 1978, *Pawek* 13667 (BR, K).

Zambia: dist. Luanshya, 23 Jan. 1956, *Fanshawe* 2708 (BR, K, NDO) [cited by Kativu et al. (2008) as *C. macrorhizum*].

The three collections from D.R.Congo are indisputably members of the *C. leptoneurum*-*C. macrorhizum* complex. A striking finding is the observation of hairs on the fruits [a mixture of obtuse flattened papillae c. 0.2–0.4 mm high on faces and elongate acute hairs up to 0.7 mm long on angles (fig. 6I)], apparently a unique condition in African species of *Chlorophytum*. This observation prompted us to check fruits of collections stored under *C. leptoneurum* and *C. macrorhizum* in BR. *Fanshawe* 2708 from Zambia, and *Pawek* 13667 from Malawi proved to have the same fruits and very similar habit compared to the Congolese collections. These five collections share many traits and obviously represent a distinct variety with an original combination of traits in the complex. These collections also highlight the narrow affinities between *C. leptoneurum* and *C. macrorhizum*. They have a striking horizontal rhizome, but of variable thickness from very thin and *leptoneurum*-like to thick and more or less *macrorhizum*-like. Leaves and bracts often have a reddish tinge, a trait said to be typical of *C. macrorhizum*. Seed testa has convex periclinal walls, without spines (fig.6 C & D).

See also note under *C. africanum* var. *nordalianum.*

24. *Chlorophytum longifolium* Baker (Baker 1876: 327); Baker (1898: 507); Kativu (1994: 66); Nordal et al. (1997: 17); Kativu et al. (2008: 63). – Type: Sudan/Ethiopian border, Gallabat, Matamma, Aug. 1865, *Schweinfurth* 8 (lecto-: P, **designated here**).

Chlorophytum papillosum Rendle (Rendle 1895: 422); De Wildeman (1921a: 28); Nordal et al. (1990: 547 fig. 5e, 548 fig. 6E). – Type: Tanzania, Between Zanzibar and Uyui, 1886, *Taylor* s.n. (holo-: BM, barcode BM000911761).

This species is represented in D.R.Congo by a variety with golden-yellow pubescence on young flower buds.

24a. *Chlorophytum longifolium* Baker
var. ***aureum*** (Engl.) Meerts, **comb. & stat. nov.**
Chlorophytum aureum Engl., Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 15: 469. 1892 (Baker & Engler 1892); Troupin (1955: 234; 1956: 189); Hepper (1968b: 99). – Type: Sudan, Niamniamland, river Huuh, 21 May 1870, *Schweinfurth* 3752 [lecto-: B (2 sheets: B100249010 & B100277295), **here designated**; isolecto-: K]; Sudan, Dschurland, bei der grossen Seriba Kutschuk Ali, 29 Apr. 1896, *Schweinfurth* 1504 (syn-: K); Wando, steppen in der Wälden, s.d., *Schweinfurth* 3570 (syn-: K).

Other representative specimens examined – **D.R.Congo:** VII: Parc Nation. Garamba, savane arbustive, 26 May 1950, *Noirfalise* 429 (BR); Uele, Guvane, savane arbustive, May 1931, *Lebrun* 2881 (BR, K).

This variety has a Sudanian distribution, while the typical variety is mostly Zambezian.

25. *Chlorophytum macrophyllum* (A.Rich.) Aschers. (Schweinfurth 1867: 294); Baker (1876: 323); Baker (1898: 498); Engler (1908: 308, fig. 208 C & D); Kativu (1994: 67); Nordal et al. (1997: 49, fig. 9); Bjorå et al. (2008: 233, fig. 6, 10, 11); Kativu et al. (2008: 85). – *Anthericum macrophyllum* A.Rich. (Richard 1851: 334). – Type: Ethiopia, Djeladjekanne, Jun. 1840, *Quartin-Dillon* s.n. (lecto-: P, barcode P01851321); Ethiopia, Djeladjeranne, 24 Oct. 1840, *Schimper* 1837 (syn-: P, isosyn-: BR, B, MPU). Fig.5 E & F.

Chlorophytum fuchsianum De Wild. (De Wildeman 1904: 102 as *fuchsianus*); De Wildeman (1905: 38 & Plate XVI; 1909: 54 & Plate 1, figs 1 & 2); Durand & Durand (1909: 568). – Type: D.R.Congo, Kisantu, s.d., *Gillet* 902 (lecto-: BR).

Other representative specimens examined – **D.R.Congo**: III: Bas-Congo, Mbanza Ngungu, entrée de la petite grotte, 3 Mar. 1987, *Billiet & Jadin* 4264 (BR); Mvuasi, îlot forestier, 17 Dec. 1947, *Devred* 4 (BR, K); VI: Eala, s.d., *Goossens* s.n. (BR).

Burundi: Ubimbi, prairie, 8 Dec. 1965, *Lewalle* 63 (BR).

C. macrophyllum has long been misinterpreted in D.R.Congo. Our revision shows that actually only few collections belong to that species, nearly all originating from SW D.R.Congo. Most other records of that species actually belong in *C. filipendulum.* At the flowering stage, *C. macrophyllum* and *C. filipendulum* cannot be confounded. At the fruiting stage, *C. filipendulum* is recognized by its blackish colour in herbarium (pale brownish to brownish-green in *C. macrophyllum*), papillate rachis (smooth in *C. macrophyllum*), and strongly saucer-shaped seeds (disk-shaped to slightly saucer-shaped in *C. macrophyllum*).

The name *C. macrophyllum* has been applied to plants with large flowers (> 8 mm long), with 5-nerved tepals and long anthers (> 3 mm) and large whitish bracts. We have found that two closely related taxa with that combination of traits have been confounded in D.R.Congo until now. i.e. *C. macrophyllum* and *C. clarae*. See discussion under the latter species. Fig. 5C–F shows that seed shape and seed coat details are very similar for a syntype of *C. macrophyllum* from Ethiopia and for a number of collections from W D.R.Congo.

26. *Chlorophytum minor* Kativu (Kativu 1993: 502); Kativu (1994: 68); Kativu et al. (2008: 81). – Type: Zambia, Mbala Dist., Itembwe Gap and Gorge, 7 Jan. 1968, *Richards* 22872 (holo-: K).

Other representative specimens examined – **D.R.Congo**: XI: Route Mitwaba-Manono, km 45, riv. Kalumengongo, 3 Feb. 1986, *Bamps & Malaisse* 8619 (BR).

A rare species, restricted to SW Tanzania, N Zambia and Katanga.

27. *Chlorophytum nubicum* (Baker) Kativu (Kativu & Nordal 1993: 63); Kativu (1994: 69); Nordal et al. (1997: 15); Kativu et al. (2008: 55). – *Anthericum nubicum* Baker (1876:

301); Baker (1898: 484). – Type: Sudan, Jur, White Nile, Nyangara, s.d., *Petherick* s.n. (holo-: BM, n.v.).

Other representative specimens examined – **D.R.Congo**: XI: ancienne piste Kolwezi-Likasi, 10°42'54"S 25°35'09"E, savane arborescente en forêt claire, alt. 1375 m, 21 Aug. 1986, *Schaijes* 3051 (BR).

Two collections from l'Upemba [*de Witte* 03621 & 07289 (BR)] key out here but are atypical, having a short peduncle with only 1(–2) bracts and inflorescence nodes with only one flower. They probably represent a distinct taxon, but more material, especially with fruits, is needed.

C. nubicum is very close to *C. nidulans*. The former can be distinguished by spindle-shaped tubers and anthers > 2 mm.

28. *Chlorophytum occultum* Poulsen & Nordal (Poulsen & Nordal 1999: 944, figs. 2C–F, 3, 4); Poulsen & Nordal (2005: 17, fig. 1G; 22, 23, 37). – Type: Ouganda, Masindi Dist., Budongo Forest Reserve, 2 Oct. 1995, *Poulsen*, *Nkuutu & Dumba* 975 (holo-: C, iso-: MHU, EBB; not seen).

Other representative specimens examined – Not seen. Key after description in Poulsen & Nordal (2005).

29. *Chlorophytum orchidastrum* Lindl. (Lindley 1824: 79); Baker (1898: 500); Hepper (1968b: 101, 102 fig. 351); Panigrahi (1975: 563); Poulsen & Nordal (2005: 18, fig. 1M, 24); Bjorå & Nordal (2010: 5). – Type: Cultivated "at the garden of the Horticultural Society, from a plant sent from Sierra Leone, in 1822, by their collector Mr. George Don H.HS., 1824" (holo-: CGE).

Chlorophytum seretii De Wild. (De Wildeman 1909: 56; Plate 2 & 3); De Wildeman (1921b: 21). – Type: D.R.Congo, env. de Gombari, 26 Apr. 1906, *Seret* 577 (holo-: BR).

Chlorophytum seretii De Wild. var. *likimensis* De Wild. (De Wildeman 1911b: 289); De Wildeman (1912b: 526). – Type: D.R.Congo, env. de Likimi, 21 Apr. 1910, *Malchair* 262 (holo-: BR).

Other representative specimens examined – **D.R.Congo**: II: Territ. Seke-Banza, Gimbi, vieille forêt secondaire à *Terminalia superba*, 15 Sep. 1959, *Compère* 384 (BR, K); III: Gimbi, jachères secondaires humides, 15 Jun. 1948, *J. Laurent* 691 (BR); V: Région de Pene-Yumbi, sous-bois de forêt primitive, Jun. 1952, *Germain* 7810 (BR); VI: Panga, forêt humide sur terre riche en humus, 16 Dec. 1913, *Bequaert* 1500 (BR); VIII: Irumu, galerie forestière dans la savane, 13 Mar. 1914, *Bequaert* 2966 (BR).

30. *Chlorophytum perfoliatum* Kativu (Kativu 1993: 503); Kativu (1994: 71); Kativu et al. (2008: 69, Fig. 13.1.10). – Type: Zambia, Kasama Dist., 95 km E of Kasama, among rocks, s.d., *Robinson* 4344 (holo-: K).

Other representative specimen examined – **D.R.Congo**: XI: Tilwizembe, végétation d'une termitière dans la plaine au nord du gisement, 15 Dec. 1959, *Duvigneaud* 4601T (BRLU).

A rare species restricted to Zambia, Malawi and Katanga, with only one collection in D.R.Congo.

31. *Chlorophytum pilosicarinatum* (Poelln.) Meerts, **comb. nov.**

Anthericum pilosicarinatum Poelln., Boletim da Sociedade Broteriana. XVII, 2A serie: 89. 1943 (Poellnitz 1943a). – Type: Angola, Bié, Ufer des Cubango, Vila da Ponte, 1906, *Gossweiler* 4018 (lecto-: K, **here designated**).

Other representative specimen examined – **D.R.Congo**: XI: Tilwizembe, alignement métallifère rocheux, steppe sur schiste cobaltifère, 15 Dec. 1959, *Duvigneaud* 4590L1 (BRLU).

The other syntypes, *Gossweiler* 2039 & 2663, have not been found.

The cited collection is apparently the first record of that taxon since its description. *C. pilosicarinatum* belongs in the *C. cameronii* complex and might best be treated at varietal rank within this latter species, but more material is needed. It is easily recognized by its unique pattern of leaf pubescence, with glabrous leaf surface and long ciliate leaf margins and lower mid nerve; the hairs are retrorsely oriented at their base; bracts have the same pattern of pubescence in the examined collection, but less clearly so in the type specimen. *Chlorophytum galpinii* var. *norlindhii* has a more or less similar pattern of pubescence, but in the latter taxon the inflorescence is lax and branched (vs. unbranched, < 5 cm long in *C. pilosicarinatum*), bracts are attenuate in a long fine point (vs. bracts ovate without a long point), tepals are 3-veined (vs. 5-nerved) and pedicels are terete (vs. narrowly winged in the upper part).

Mortelmans 142 (BR) may belong here: it is a dwarf plant with three very narrow cataphyll-like leaves with the characterictic pattern of pubescence of the species.

32. *Chlorophytum polystachys* Baker (Baker 1878b: 326; 1898: 509); Hepper (1968b: 496); Kativu (1994: 71); Nordal et al. (1997: 43); Kativu et al. (2008: 61). – Type: Sudan, Jur Ghattas, 2 Jul. 1869, *Schweinfurth* 1838 (holo-: K, 2 sheets, iso-: B, 3 sheets).

Other representative specimens examined – **D.R.Congo**: XI: Lubumbashi, dembo de la Kiboko, 20 Nov. 1957, *Schmitz* 6037 (BR).

Apparently a rare species with a single collection in the study area. This specimen is remarkable by its big fusiform distal tubers, a character rarely reported for that species.

33. *Chlorophytum pubiflorum* Baker (Baker 1876: 329); Baker (1898: 509); Kativu (1994: 73); Nordal et al. (1997: 44). – Type: Mozambique, Delta du Zambèze, Dec. 1862, *Kirk* s.n. (holo-: K, barcode K000256948).

Other representative specimens examined – **D.R.Congo**: XI: Musosa, 28 Feb. 1940, *Brédo* 4019 (BR).

The single collection examined originates from the Congo-Zambia borderline, possibly on Zambian territory. The species should be sought for in the floodplain of the Luapula River.

34. *Chlorophytum pusillum* Baker (Baker 1878b: 325); Baker (1898: 502); Hepper (1968b: 100); Kativu (1994: 73); Nordal et al. (1997: 55); Kativu et al. (2008: 87, 88, fig. 13.1.15); non *C. pusillum* sensu Troupin (1956: 191). – Type: Sudan, Jur, 10 Jul. 1869, *Schweinfurth* 2043 (holo-: K, iso-: B (3 sheets), P, PRE). Figs 3A & 6B.

Other representative specimens examined – **D.R.Congo**: XI: Lubumbashi, arboretum de l'Etoile, sur termitière, 17 Jan. 1948, *Schmitz* 1241 (BR); Mont Mamuntamba, 1987, *Billiet & Jadin* 4151 (BR, MO, P; cultivated in greenhouse: S 2072, Photo 87-0116).

Specimens from D.R.Congo have papillate bracts, which had not been noticed previously. Seed testa has raised periclinal walls which are verrucose (fig. 6B) and distinct from the convex periclinal walls of *C. geophilum* (fig. 6A). See also under that species.

35. *Chlorophytum recurvifolium* (Baker) C.Archer & Kativu (Archer & Kativu 2001: 31); Kativu et al. (2008: 17). – *Anthericum recurvifolium* Baker (Baker 1906: 28). – Type: Zimbabwe, 6-miles spruit, near Harare, s.d., *Cecil* 143 (holo-: K).

Anthericum longistylum Baker (Baker 1876: 305); Obermeyer (1962: 686, 687: Fig. 2). – Type: South Africa, Gold fields, 1870, *Baines* s.n. (holo-: K, barcode K000256975).

Other representative specimens examined – **D.R.Congo**: XI: Kisenge, colline de Mn, bosquet d'*Uapaca robynsii*, 1956, *Duvigneaud* 2342Li (BRLU); s.l. "Mn", s.d., *Joris* D30 (BRLU); Bunkeya, Dec. 1942, s. rec. 457 (BRLU).

A phytogeographically very interesting record, as this species has a southern African distribution, reaching its northern limit in Zimbabwe. Katangan populations are widely disjunct.

36. *Chlorophytum ruahense* Engl. (Engler 1900: 361); Poellnitz (1946: 332); Kativu (1994: 75); Nordal et al. (1997: 13); Kativu et al. (2008: 74, fig. 13.1.13). – Type: Tanzania, Iringa Dist., Uhehe, hanging cliff on Ruaha R., 10 Jan. 1899, *Goetze* 461 (holo-: B).

Other representative specimens examined – **D.R.Congo**: XI: Baya-Pierkat, végétation d'une colline rocheuse de calcaires de la Mofya, 7 Jan. 1960, *Duvigneaud* 4953L1 (BRLU); Route Nguba-Mokabe Kasadi, à 2 km au S de Kate, forêt claire, 7 Nov. 1988, *Pauwels* 7211 (BR).

Katangan collections extend the distribution area of this rare species, otherwise confined to SW Tanzania and N Zambia, somewhat to W. The seeds are echinulate (seed not seen in FZ). The leaves of the Congolese collections are variable in width.

37. *Chlorophytum rubribracteatum* (De Wild.) Kativu (Kativu & Nordal 1993: 64); Kativu (1994: 75); Nordal et al. (1997: 36); Kativu et al. (2008: 50). – *Anthericum rubribracteatum* De Wild. (De Wildeman 1913a: 508; 1913c: 9); De Wildeman (1921a: 27). – Type: D.R.Congo, Lubumbashi, Nov. 1911, *Hock* s.n. (holo-: BR, barcode BR0000008761583). Fig. 2F.

Anthericum roseum Poelln. (Poellnitz 1942: 114); Lewalle (1972: 173). – Type: Tanzania, Songea dist., E of Ungoni, Mampyuy, s.d., *Busse* 727 (holo-: B, not seen; iso-: EA).

Other representative specimens examined – **D.R.Congo**: XI: Luiswishi, colline cuprifère, 18 Nov. 1980, *Malaisse* 11220 (BR, WAG, MO); Kipopo, dembo sur plateau latéritique, 30 Jan. 1962, *Schmitz* 7570 (BR).

Burundi: Territ. Bubanza, ferme de la Randa, savane boisée, s.d., *Lewalle* 1254 (BR).

The species is well characterized by the red-coloured cataphylls, narrowly graminiform leaves, and lax inflorescence often with remote lower nodes. Bracts are generally carinate, erect, and often clasping the peduncle. However, *C. rubribracteatum* is much more variable than mentioned in FZ and FTEA, especially in intensity of red coloration (often lacking on bracts), pubescence (from glabrous to shortly pubescent on lower leaf surface and peduncle), height (5–80 cm) and leaf width (1–10 mm). Size tends to be negatively correlated with pubescence. In Katanga, the largest specimens occur in tall vegetation on moist soil (e.g. *Duvigneaud* 5055 (BRLU)). All collections from Burundi also belong to the robust form. More research is needed to decide if robust forms deserve taxonomic recognition.

Some collections with broad leaves, pale coloration and dense pubescence on lower leaf surface and peduncle approach *C. cameronii* var. *grantii* [e.g. *Van Meel* 805 (BR); *Schmitz* 3633 (BR); *Duvigneaud* 4769C & 4772A (BRLU)].

Robyns 1646 (BR) is an extreme dwarf form with prostrate peduncle, which may belong here. More material is needed.

38. *Chlorophytum sparsiflorum* Baker (Baker 1876: 325); Baker (1898: 498); Hepper (1968b: 100); Troupin (1988: 43, fig. 4/1; 44); Bjorå & Nordal (2010: 6). – Type: Equatorial Guinea, Fernando Po, Apr. 1860, *Mann* 388 (holo-: K).

Chlorophytum semlikiense De Wild. (De Wildeman 1921b: 20); Robyns & Tournay (1955: 356). – Type: D.R.Congo, Kasonsero, Vallée de Semliki, s.d., *Bequaert* 5041 (holo-: BR).

Chlorophytum beniense De Wild. (De Wildeman 1921b: 13); Lebrun et al. (1948: 36); Robyns & Tournay (1955: 354); Troupin (1988: 42; 45, fig. 15/2). – Type: D.R.Congo, Mayolo (Beni), s.d., *Bequaert* 3981 (holo-: BR).

Chlorophytum elongato-fusiforme De Wild. (De Wildeman 1921b: 15). – Type: D.R.Congo, en aval de Panga, 15 Dec. 1913, *Bequaert* 1485 (holo-: BR).

Chlorophytum ituriense De Wild. (De Wildeman 1921b: 17); Troupin (1956: 191). – Type: D.R.Congo, Penghe, 17 Feb. 1914, *Bequaert* 2513 (syn-: BR), Irumu, 12 Mar. 1914, *Bequaert* 2398 (syn-: BR).

Chlorophytum butaguense De Wild. (De Wildeman 1921b: 19); Robyns & Tournay (1955: 354). – Type: D.R.Congo, Ruwensori (Butagu), 15 Apr. 1914, *Bequaert* 3686 (lecto-: BR, barcode BR0000006420253, **here designated**); Ruwensori, 16 May 1914, *Bequaert* 4292 (syn-: BR).

Chlorophytum kirkii sensu Robyns & Tournay (1955: 356) non *Chlorophytum kirkii* Baker.

Chlorophytum comosum sensu Baker (1876: 329); Baker (1897a: 400); Troupin (1988: 42; 45, fig. 15/3); Nordal et al. (1997: 55); Poulsen & Nordal (2005: 15), Kativu et al. (2008) non *Chlorophytum comosum* (Thunb.) Jacques.

Other representative specimens examined – **D.R.Congo**: II: Luki, est du village de Kimbuya, association végétale sur le replat du somet du rocher de granit, lisière de la forêt à *Gilletiodendron*,

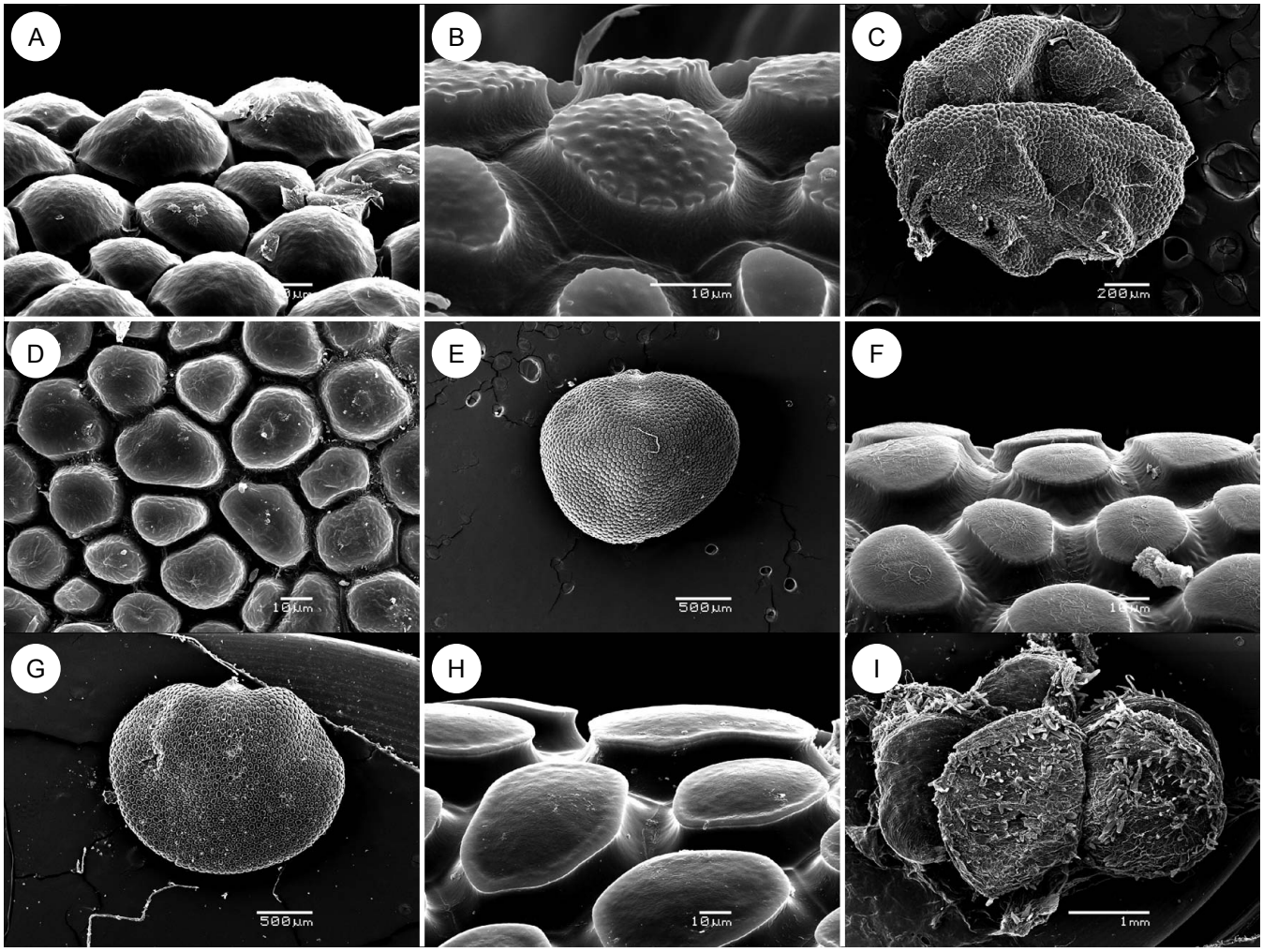

Figure 6 – Scanning electron microscope images of seeds and seed testa. A, *C. geophilum*, seed testa (*Noirfalise* 441); B, *C. pusillum*, seed testa (*Billiet & Jadin* 4151); C & D, *C. leptoneurum* var. *katangense*, seed and seed testa (*Quarré* 3741); E & F, *C. stenopetalum* var. *stenopetalum*, seed and seed testa (*Seret* 196); G & H, *C. stenopetalum* var. *latifolium*, seed and seed testa (*Detilleux* 570); I, *C. leptoneurum* var. *katangense*, fruit (*Quarré* 3741).

2 Aug. 1957, *Wagemans* 1594 (BR); IV. Kwango, Kisantu, Panzi, 1925, *Vanderyst* 16195 (BR); VI: Prov. Orientale, Territ. Mambasa, rivière Lemda, région Ndesa, 700 m, clairière humide dans forêt à *Gilbertiodendron dewevrei*, 8 Jun. 1956, *Christiaensen* 1763 (BR); Yangambi, au pied du plateau de l'Isalowe, alt. 470 m, forêt primitive ripicole le long du fleuve Congo, 18 May 1938, *Louis* 9437 (BR); Rivière Dhi, pont de l'ancienne route Djugu-Nioka, sous-bois ombragé humide de la forêt galerie, 19 Apr. 1991, *Dhtechuvi* 1128 (BR); VIII: Mont Aboro, pied du versant W, alt. 2200 m, forêt de montagne à *Chrysophyllum fulvum*, 15 Apr. 1958, *Bamps* 154 (BR); Ituri, Djugu (Kibali), alt. 1780 m, forêt, Sep. 1931, *Lebrun* 3942 (BR); IX: Territ. Kabare, Kahusi, le long d'un caniveau, alt. 2000 m, 11 Feb. 1959, *A. Léonard* 2983 (BR); XI: Parc Nation. Upemba, Katongo, alt. 1750 m, galerie forestière, 16 Apr. 1948, *de Witte* 3713 (BR).

Rwanda: Gisakura (Cyangugu), alt. 1950 m, plantation de thé, 23 Jul. 1954, *Auquier* 3330 (BR); Territ. Shangugu, Rugege, alt. 2000 m, forêt de montagne, 21 Mar. 1956, *Christiaensen* 1488 (BR).

Burundi: Territ. Bururi, Rumonge, alt. 1000 m, talus ombreux, 16 Mar. 1969, *Lewalle* 3338 (BR).

This taxon has been known as *C. comosum* auct. A recent molecular phylogenetic study (Bjorå et al. 2008) has shown that this taxon is not monophyletic. In particular, accessions from C Africa and S Africa belong in different clades. Since the type specimen originates from S Africa, the epithet "*comosum*" can no longer be applied to C African material.

C sparsiflorum is an extremely polymorphic taxon. A multivariate statistical analysis (Poulsen & Nordal 2005) concluded that three infraspecifc taxa can be recognized, i.e. one with strap-shaped, blackening leaves ("*Chlorophytum comosum* var. *comosum*"), a second with elliptic, non blackening, leaves more or less attenuate into a pseudopetiole ("var. *sparsiflorum*") and a third with elliptic, non blackening leaves, abruptly contracted into a petiole ("var. *bipindense*"). We have not been able to settle the objective limits of those taxa in the abundant material examined. Leaf width and shape and colour in herbarium (blackening or not) show an almost continuous pattern of variation in material from Central Africa. Therefore, the placing of many collections is problematic. Molecular markers may hopefully provide new insight into this taxonomic conundrum.

Collections from S Katanga [*Schmitz* 2752 (BR), *Vandenberghe* 56 (BR), *Bodenghien* 89 (BR), all from "muhulu" gallery forests] have long, obcordate fruits 10 × 7 mm, and narrow 20-nerved leaves; seeds however are typical.

Bequaert 2081 (BR) has densely papillate bracts, a character diagnostic of the W African *C. inornatum* (Poulsen & Nordal 2005), but it lacks mature seeds. More material is needed.

Collections from eastern D.R.Congo and Burundi with narrow, not blackening, leaves are problematic and need revision [e.g. *Deville* 257 (BR), *Froment* 492 (BR)].

Some collections in W D.R.Congo (region of Eala) [e.g. Gombe (Equateur), août 1903, *M. Laurent* s.n. (BR, barcode BR0000005720651)] are intermediate between *C. lancifolium* subsp. *togoense* and *C. sparsiflorum*, and might be of hybrid origin.

Lejoly 4402 (BR, BRLU), from Kisangani, has 4–5-nerved tepals, anthers equalling filaments and long bracts, and therefore appears somewhat intermediate between *C. sparsiflorum* and the *C. macrophyllum* complex.

The name "*Chlorophytum laxum*" has sometimes been improperly used for slender, narrow-leaved *C. sparsiflorum*.

See also notes under *C. filipendulum*, *C. debile*, and *C.* "sp. A near *comosum*".

39. *Chlorophytum sphacelatum* (Baker) Kativu (Kativu & Nordal 1993: 64); Kativu (1994: 76); Nordal et al. (1997: 34); Kativu et al. (2008: 42). – *Anthericum sphacelatum* Baker (Baker 1876: 303); Baker (1898: 489); De Wildeman (1905: 39); Durand & Durand (1909: 568). – Type: Angola, 112 km from Ambriz, Jun. 1873, *Monteiro* s.n. (holo-: K, barcode K000256908). Fig. 3B.

Anthericum lukiense De Wild. (De Wildeman 1911a: 273); De Wildeman (1912a: 341). – Type: D.R.Congo, Luki, 1909, *Brixhe* 6 (holo-: BR).

A. lukiense De Wild. var. *intermedium* De Wild. (De Wildeman 1911a: 273); De Wildeman (1912a: 342). – Type: D.R.Congo, env. Kisantu, 1909, *Gillet* s.n. (lecto-: BR, barcode BR0000008551863, **here designated**), D.R.Congo, Mayombe, 1909, *Deleval* s.n. (syn-: BR, barcode BR0000008551559).

A. lukiense De Wild. var. *kionzoense* De Wild. (De Wildeman 1911a: 273); De Wildeman (1912a: 342). – Type: D.R.Congo, Région du Kionzo, 1907, *Gillet* 4001 (holo-: BR).

Anthericum hockii De Wild. (De Wildeman 1911a: 265); De Wildeman (1913c: 8; 1921a: 26). – *Chlorophytum sphacelatum* (Baker) Kativu var. *hockii* (De Wild.) Nordal (Nordal et al. 1997: 35); Kativu et al. (2008: 44). – Type: D.R.Congo, Katanga, vallée de la Luembe, Feb. 1910, *Hock* s.n. (holo-: BR, barcode BR0000008552211), **synon. nov.**

Anthericum velutinum De Wild. (De Wildeman 1913a: 508; 1913c: 10); De Wildeman (1921a: 27). – Type: D.R.Congo, Lubumbashi, Dec. 1911, *Hock* s.n. (holo-: BR, barcode BR0000008551542).

Anthericum homblei De Wild. (De Wildeman 1914: 108); De Wildeman (1921a: 26; 1930: 94). – Type: D.R.Congo, Katanga, Région du Lualaba, Vallée Kapanda, Dec. 1912, *Homblé* 967 (holo-: BR).

Chlorophytum sphacelatum (Baker) Kativu var. *milanjianum* (Rendle) Nordal (Nordal 1997: 35); Kativu et al. (2008: 43). – Type: Malawi, Mt. Mulanje, Oct. 1891, *White* 123 (holo-: BM), **synon. nov.**

Other representative specimens examined – D.R.Congo: II: Luki, sentier vers Kiobo, 4 Feb. 1947, *Devred* 3101 (BR); III: Gumbi Plateau, savane à *Hymenocardia*, 27 Dec. 1948, *Toussaint* 694 (BR); XI: Lubumbashi, savane sèche boisée et base des termitières, Feb. 1912, *Homblé* 129 (BR); Lubumbashi, herbe de plaine, Dec. 1912, *De Giorgi* 318 (BR); Kipopo, sol argileux rouge, graveleux, en forêt claire, 28 Nov. 1962, *Schmitz* 8093 (BR).

The species is very variable, though always easy to recognize by its black-tipped tepals. FZ and FTEA recognize three varieties (var. *sphacelatum*, var. *hockii* (De Wild.) Nordal, var. *milanjianum* (Rendle) Nordal), based upon peduncle hairiness and shape (terete or flattened) and inflorescence shape (globose or racemose). In material from D.R.Congo, the aforementioned traits are often uncorrelated and many specimens are difficult to assign to one of those taxa, which is why we do no longer distinguish them.

Some forms have yellowish velvety pubescence [*Schmitz* 8093 (BR)].

Dwarf variants (< 12 cm) occur under poor, dry or otherwise stressful conditions, e.g. *de Witte* 07112 (BR) with 2 mm-wide leaves and *Duvigneaud* 2130L (BRLU) from Kasompi copper-hill with short tepals (5–7 mm) and very short pedicels. Such forms approach *C. graniticola* Kativu and *C. pygmaeum* (Weim.) Kativu.

40. *Chlorophytum sphagnicolum* Meerts, **nom. nov.**
Anthericum andongense Baker, Transactions of the Linnean Society, Ser. 2, 1: 257. 1878 (Baker 1878a); Baker (1898: 482); Poellnitz (1943a: 57). – Type: Angola, Pungo Andongo, s.d., *Welwitsch* 3798 (holo-: BM, iso-: P), non *Chlorophytum andongense* Baker.

Other representative specimens examined – D.R.Congo: III: Rivière Luvu entre Ngidinga et Kimvula, 12 Apr. 1948, *Duvigneaud* 704 (BRLU); IV: Entre Giugungi et Popokabata, savane à sable blanc, Dec. 1929, *Lebrun* 79 (BR).

In D.R.Congo, this species has the narrowest leaves and the smallest flowers in the *C. cameronii* complex. It is also characterized by short anthers (2.5 mm) equalling filaments and by thin roots (< 0.7 mm in herbarium). It has quite unusual habitat requirements occurring on moist nutrient-poor sand or occasionally in *Sphagnum* bogs.

The W African *Chlorophytum immaculatum* (Hepper) Nordal resembles this taxon (see Hepper 1968a: 457, fig. 6/1-3, 458; Vanden Berghen 1988: 417; Fig. 343) and further research is needed to decide if they are actually distinct. We have kept them distinct due to differences in the bracts (bracts membranaceous, hyaline, often lobed in *C. immaculatum,* vs. scariose, entire, with prominent nerves in *C. sphagnicolum*). Should they turn out to be conspecific, the name *C. immaculatum* would have precedence.

Anthericum andongense Baker has been reported from Katanga by De Wildeman (1913c: 6, 1921a: 26), based upon

Kassner 2462 (K); in our opinion this collection is a depauperate specimen of *C. rubribracteatum*.

41. *Chlorophytum staudtii* Nordal (Kativu & Nordal 1993: 64). – *Anthericum zenkeri* Engl. (Engler 1902: 91), Hepper (1968b: 97). – Type as *C. staudtii.* – Type: Cameroon, Yaounde, Mar. 1894, *Zenker & Staudt* 268 (holo-: B (†?), iso-: K, S).

Other representative specimens examined – **D.R.Congo**: III: vers Kilongo, territ. Popokabaka, savane, 28 Oct. 1958, *Pauwels* 444 (BR); IV. Gana, Région des Bamfunuka, Jun.–Jul. 1915, *Vanderyst & Lambrette* 5653 (BR).

An insufficiently known species closely related to *C. cameronii* and possibly best treated at varietal rank. More material is needed. Narrow-leaved forms of the *C. cameronii* complex need revision preferably with molecular markers.

Pauwels 2544 (BR), with 9-mm wide leaves with 23 nerves and 3 inflorescence branches 6–11 cm long, is intermediate between *C. staudtii* and the W African *C. limosum* (Baker) Nordal.

42. *Chlorophytum stenopetalum* Baker (Baker 1876: 331); Baker (1898: 502); Hepper (1968b: 100); Kativu (1994: 78); Nordal et al. (1997: 54); Kativu et al. (2008: 86). – Type: Niger, Niger R, Nupe, 1859, *Barter* s.n. (holo-: K000407093).

The species is variable in peduncle length, raceme density, leaf width and bract size. Two varieties can be recognized.

1. Peduncle 0–1 cm; raceme compact and rigid, with pedicels 0–2 mm; bracts prominent and persisting, concealing young fruits; leaves 4–9 cm wide, broadly ovate, broadly elliptic or obovate, more or less appressed on the ground (fig. 3C)..... .....*C. stenopetalum* var. *latifolium*

1. Peduncle 1–5(–15) cm; raceme not rigid, with pedicels 2–8 mm; bracts not concealing young fruits; leaves 1–4.5 cm wide, narrowly elliptic or elliptic, erect to spreading.....*C. stenopetalum* var. *stenopetalum*

42a. *Chlorophytum stenopetalum* Baker var. ***stenopetalum*** – *Chlorophytum schweinfurthii* Baker (1898: 503); De Wildeman (1912a: 347); Troupin (1956: 192; fig. 31). – Type: Sudan, Jur Ghattas, 21 May 1869, *Schweinfurth* 1968 (lecto-: K; isolecto-: B); 12 Jul. 1869, *Schweinfurth* 2068 [syn-: P, K (2 sheets)]. Fig. 6E & F.

Other representative specimens examined – **D.R.Congo**: V: La Pastorale, section Lualu, vallées et endroits humides, Nov. 1931, *Quarré* 2757 (BR); VI: Uele, env. Bambesa, 1936, *Pittery* 532 (BR); VII: Parc Nation. Garamba, piste centrale vers km 30, alt. 700-800 m, savane arbustive, 30 Apr. 1952, *Troupin* 861 (BR); XI: Kiubo, à l'ouest de la route vers Bunkheya, 5 km sud du pont, sol rouge brun sur schistes, 27 Jan. 1954, *van Oosten* 211 (BR).

Exceptionally robust forms with peduncle up to 15 cm with one foliaceous bract, forked raceme are occasionnally found in Katanga [e.g. *Pogge* 1479 (B), referred to as *C. macrophyllum* by Baker (1898: 498) and Durand & Durand (1909: 568); *Quarré* 2209 (BR); *Bamps & Malaisse* 8009 (BR); *Duvigneaud* 5229 (BRLU)]. They can be confused with *C. macrophyllum*. In the latter species, however, anthers are longer (4–5 mm vs. 2–3 mm), fruiting pedicels are longer (10–20 mm vs. 3–10 mm), bracts are not persisting and seed testa is different (raised periclinal walls with acute ridge, vs. flat to very shallowly convex periclinal walls in *C. macrophyllum*). Such robust forms may deserve taxonomic recognition but more material is needed.

42b. *Chlorophytum stenopetalum* Baker var. ***latifolium*** (Engl. & K.Krause) Meerts, **comb. & stat. nov.**
Chlorophytum latifolium Engl. & K.Krause, Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 45: 134. 1910 (Engler & Krause 1910: 134). – Type: Zambia, Broken Hill, 17 Dec. 1907, *Kassner* 2014 (holo-: B; iso-: K). Fig. 3C; fig. 6G & H.

Chlorophytum geophilum sensu Kativu et al. (2008: 87) quoad *Hoell & Nordal* 20.

Other representative specimens examined – **D.R.Congo**: XI: Entre Likasi et Kambove, forêt claire sur terre rouge profonde, 27 Dec. 1959, *Duvigneaud* 4786 (BRLU); Lubumbashi, Keyberg, Kisanga, barrage, terre rouge jaunâtre en sous-bois, 21 Feb. 1957, *Detilleux* 570 (BR); Sanctuaire Mikembo, forêt claire, 16 Jan. 2010, *Meerts* 2010/24 (BRLU).

C. stenopetalum var. *latifolium* is one of the most widespread *Chlorophytum* species in miombo woodland in the Lubumbashi plain. It was reported with doubt from N Zambia in FZ (Kativu et al. 2008: 89).

We prefer to treat this taxon at varietal rank because broad leaves and short peduncle are not always correlated in the examined materials, with some collections being intermediate between var. *latifolium* and var. *stenopetalum*.

43. *Chlorophytum stolzii* (K.Krause) Kativu (Kativu & Nordal 1993: 64); Kativu (1994: 78); Nordal et al. (1997: 15); Kativu et al. (2008: 58, fig. 13.1.10); Bjorå & Nordal (2010: 9). – Type: Tanzania, Rungwe Dist., Kyimbila, Mulinda, 12 Oct. 1910, *Stolz* 339 (holo-: B, iso-: K).

Acrospira asphodeloides Baker (Baker 1878a: 255 & tab. 34 figs. 4-7); Baker (1898: 477); Rendle (1899: 50); De Wildeman (1905: 38; 1910b: 264, Plates 42 & 43; 1912a: 370; 1916: 163; 1930: 92); Durand & Durand (1909: 567) non *Chlorophytum asphodeloides* C.B.Wright – Type: Angola, Pungo Adongo, Mar. 1857, *Welwitsch* 3777 (lecto-: BM); *Welwitsch* 3778, 3779 (syn-: BM).

Anthericum russissiense Poelln. (Poellnitz 1942: 70). – Type: Deutsch-Ost-Africa [Burundi], Seengebiet, Usumbura [Bujumbura], steppen der Russissi-Ebene, 31 Mar. 190?, *Keil* 278 (holo-: B).

Other representative specimens examined – **D.R.Congo**: III: Mvuazi, dans la savane, 19 Aug. 1957, *Delhaye* 177 (BR); IV: Vers Kipindi, Territ. Popokabaka, savane arborée, 4 Jul. 1959, *Pauwels* 3755 (BR); V: Mugonda, route Abville-Kabambara, 12 Jul. 1932, *Luxen* 166 (BR); VI: Gombe, moerasje bij den Congo, 11 Apr. 1947, *Jans* 456 (BR); XI: Route Kolwesi-Likasi, 13 km à l'est du carrefour avec les pistes Tenke-Kando, rudéral, 16 Jul. 1983, *Schaijes* 1931 (BR).

Burundi: Territ. Bujumbura, route Bujumbura-Bugarama, savane sur talus, 9 Apr. 1972, *Lewalle* 6705 (BR).

See note under *C. velutinum.*

44. *Chlorophytum subpetiolatum* (Baker) Kativu (Kativu & Nordal 1993: 64); Kativu (1994: 79); Nordal et al. (1997: 36); Kativu et al. (2008: 50, fig. 13.1.8). – *Anthericum subpetiolatum* Baker (Baker 1876: 302); Baker (1898: 481); Troupin (1955: 232; 1956: 184; 1988: 32, fig. 9/1); Hepper (1968b: 96). – Type: Mozambique, Morrumbala Mt, lower Zambezi R., 18 Jan. 1863, *Kirk* s.n. (holo-: K, barcode K000256915).

An extremely variable species, though generally easy to recognize by its pubescent peduncle, carrot-like roots, large flowers, and distichous leaves. A robust pubescent form in Katanga deserves taxonomic recognition.

1. Leaves rosulate, softly pubescent on abaxial side, 4–8 cm wide, up to 60 cm long when fully developed; rhizome > 3 cm in diameter; on termite mounds in miombo woodland (fig. 3D).....*C. subpetiolatum* var. *pilosifolium*

1. Leaves distichous or nearly so, glabrous or, rarely, shortly pubescent on abaxial side on nerves, 0.4–3 cm wide, 6–40 cm long when fully developed; rhizome < 3 cm in diameter; in open habitats and woodland.....*C. subpetiolatum* var. *subpetiolatum*

44a1. *Chlorophytum subpetiolatum* (Baker) Kativu var. ***subpetiolatum***

Anthericum monophyllum Baker (Baker 1878b: 324); Lewalle (1972: 173). – Type: Sudan, Djur, Seriba Ghattas, 28 May 1869, *Schweinfurth* 1793 (holo-: K).

Anthericum laurentii De Wild. (De Wildeman 1905: 39). – Type: D.R.Congo, Bas Kasaï, 10 Nov. 1903, *E. & M. Laurent* s.n. (holo-: BR, barcode BR0000008807335; iso-: BR, barcode BR0000008807304).

Acrospira laurentii De Wild. (De Wildeman 1906: 211); Durand & Durand (1909: 568). – Type: D.R.Congo, Kasaï, Gambumi, 31 Mar. 1905, *M. Laurent* 449 (holo-: BR), **synon. nov.**

Anthericum claessensii De Wild. (De Wildeman 1911a: 272); De Wildeman (1912a: 340). – Type: D.R.Congo, env. de Bakulu, Oct. 1909, *Claessens* 119 (holo-: BR).

Anthericum hecqii De Wild. (De Wildeman 1911a: 277); De Wildeman (1913c: 7; 1921a: 26). – Type: D.R.Congo, 1899, *Hecq* s.n. (holo-: BR, barcode BR0000008552204).

Anthericum malchairii De Wild. (De Wildeman 1911a: 274); De Wildeman (1912a: 343; 1916: 164). – Type: D.R.Congo, Likimi, 05 May 1910, *Malchair* 320 (holo-: BR).

Anthericum tuberosum De Wild. (De Wildeman 1913a: 508); De Wildeman (1913c: 10) **nom. illeg.**, non Roxb. – Type: D.R.Congo, Kambove, Oct. 1911, *Hock* s.n. (holo-: BR, barcode BR0000008807342).

Acrospira breviscapa De Wild. (De Wildeman 1915: 3); De Wildeman (1921a: 26). – Type: D.R.Congo, env. Katentania (Biano), Nov. 1912, *Homblé* 746 (holo-: BR, 2 sheets), **synon. nov.**

Anthericum laurentii De Wild. var. *minor* De Wild. (De Wildeman 1921a: 10). – *Debesia minor* (De Wild.) Robyns & Tournay (Robyns & Tournay 1955: 352). – Type: D.R.Congo, Kabare, 31 Aug. 1914, *Bequaert* 5503 (holo-: BR).

Acrospira kapiriensis De Wild. & Ledoux (De Wildeman 1930: 91). – Type: D.R.Congo, Kapiri, 6 Nov. 1913, *Charlier* s.n. (holo-: BR, barcode BR0000008767653), **synon. nov.**

Anthericum tropicum Poelln. (Poellnitz 1941: 232) **nom. nov.** for *Anthericum tuberosum* De Wild.

Anthericum unifolium Poelln. (Poellnitz 1942: 78). – Type: Deutsch-Ost-Africa [Burundi], Seengebiet, Usumbura [Bujumbura], 22 Oct. 1905, *Keil* 201 (holo-: B).

Anthericum urumburense Poelln. (Poellnitz 1942: 135). – Type: Deutsch-Ost-Africa [Burundi], Seengebiet, Usumbura [Bujumbura], 10 Jul. 1904, *Keil* 76 (holo-: B).

Debesia contorta Lebrun & L.Touss., substitute name (Lebrun 1947: 268).

Other representative specimens examined – **D.R.Congo:** III: 1899, *Hecq* s.n. (BR); IV: Territ. Dibaya, Badibanga, savane, 17 Oct. 1956, *Liben* 1721 (BR); V: Basase, champs sur terre sablonneuse, 13 Oct. 1936, *Matagne* 235 (BR); VI: Mringa-Lopozi, village Pumbi, Oct. 1912, *Dauvrin* 8 (BR); VII: Bili, lambeau forestier, May 1931, *Lebrun* 2823 (BR); IX: Parc des Virunga, région du camp de la Rwindi, vers les Monts Mitumba, 1025 m, savane à succulentes, 27 Aug. 1956, *de Witte* 13333 (BR); XI: Parc de l'Upemba, Kalungwe, alt. 1740 m, savane brûlée, 6 Aug. 1947, *de Witte* 2752 (BR).

Burundi: Bujumbura, alt. 850 m, savane, 24 Nov. 1969, *Lewalle* 4116 (BR).

Rwanda: Parc nation. Kagera, région du Lac Kivumba, Kibongo, alt. 1300 m, savane arborescente sur sol brun foncé, 16 Jan. 1970, *Bouxin & Radoux* 1375 (BR).

Part of the variation is correlated to the habitat and seems to be genetic. Populations from burnt steppic savanna on poor Kalahari sand or copper soil have one or two small xeromorphic leaves and are generally hysteranthous. Populations from less stressful habitats have more numerous, softer and larger leaves.

Plants with glabrous peduncle and rachis are rarely encountered [*Michel & Reed* 571 (BR)].

Plants from Burundi often have only 1 narrow linear leaf sheathing the peduncle and have been referred to as *Anthericum monophyllum* Baker. However, intermediates exist with other forms and this taxon is not recognized here.

An unusual dwarf variant with tufted habit and erect, linear leaves is found in Upper Katanga in steppe on copper contaminated soil [*Malaisse et al*. 215 (BR)].

Plants with yellow-striped leaves have been collected on several occasions in NE Congo. They were first described at varietal rank but this character seems of low taxonomic value and the rank of form appears more appropriate.

44a2. *Chlorophytum subpetiolatum* (Baker) Kativu var. ***subpetiolatum*** f. ***variegatum*** (De Wild.) Meerts, **comb. & stat. nov.**

Acrospira laurentii De Wild. var. *variegata* De Wild., Enumération des plantes récoltées par Emile Laurent. III: 212. 1906 (De Wildeman 1906); Durand & Durand (1909: 568). – Type: D.R.Congo, Eala, 10 Jul. 1919, *M. Laurent* 784 (holo-: BR).

Chlorophytum variegatum Schweinf. ex Poelln. (Poellnitz 1945: 227); De Wildeman (1912a: 347). – Type: Sudan, Land der Monbuttu, bei Munsa, 1870, *Schweinfurth* 3365 (holo-: B), **synon. nov.** non *Anthericum variegatum* Hort.

Other representative specimens examined – **D.R.Congo**: VI: Territ. Bambesa, Senza, village, Apr. 1921, *Claessens* 524 (BR); VII: Bas-Uele, dans un champ de maïs, 20 May 1935, *Dewulf* 855 (BR); Tukpo, savane, s.d., *Du Bois* 687 (BR); Yangambi, cultivé, plante récoltée dans la savane arbustive des env. d'Ango (Uele), 19 Dec. 1947, *Germain* 485 (BR).

Other materials examined – **Congo (Brazzaville)**: Pays des Bondjos, sur l'Oubangui, 13 Aug. 1902, *A. Chevalier* 5162 (P).

This striking form with yellow striped leaves is said to be cultivated in villages for its supposed magic properties. It is probably a mutant favoured by cultivation. Apart from D.R.Congo and Congo (Brazzaville), this form has also been reported from Cameroun and the Sudan (Poellnitz 1945: 228).

Some collections have a long, apparently not moniliform, rhizome unusual for *C. subpetiolatum* [*M. Laurent* 784 (BR)]. If this trait turns out to be constant, a higher rank might be justified. More material is needed.

44b. *Chlorophytum subpetiolatum* (Baker) Kativu var. ***pilosifolium*** (De Wild.) Meerts, **comb. & stat. nov.**
Acrospira breviscapa De Wild. var. *pilosaefolia* De Wild., Contribution à la flore du Katanga. Supplément III: 90. 1930 (De Wildeman 1930). – Type: D.R.Congo, Katanga, Kafubu, ferme Granat, 8 Nov. 1927, *Quarré* 775 (holo-: BR). Fig. 3D.

Chlorophytum unyikense Engl. (Engler 1901); Poellnitz (1946: 346). – Type: Tanzania, Mbeya, Dist., Mbosi Mt, 11 Nov. 1899, *Goetze* 1426 (holo-: B, iso-: P, PRE), **synon. nov.**

Other representative specimens examined – **D.R.Congo**: XI: 9 km NE Lubumbashi, savane de la Luiswishi, alt. 1250 m, 19 Oct. 1973, *Bulaimu* 714 (BR); savane de la Luiswishi, 26 Oct. 1970, *Malaisse* 6686 (BR, K); Lubumbashi, campus de la Kasapa, pied de termitière boisée, Nov. 2009, *Meerts & Muding* 76 (BRLU).

Other specimens examined – **Zambia**: Northern region, Nkolemfumu, miombo woodland, alt. 1100 m, 3 Dec. 2007, *Hoell & Nordal* GH126 (K, O); Solwezi district, Mwilunga-Solwezi road, alt. 1200 m, on ant hill in red clay soil, 24 Nov. 1962, *Richards* 17494 (K); Mufulira, ant hill on plateau woodland, 11 Nov. 1953, *Fanshawe* F494 (K).

This variety is not rare on termite mounds in the region of Lubumbashi. Plants having the distinctive traits of this variety had already been reported from N Zambia by Kativu et al. (2008: 54).

In preliminary phylogenetic analyses the Congolese *C. subpetiolatum* var. *pilosifolium* [*Meerts & Muding* 77 (BRLU)] forms a highly supported clade with *C. subpetiolatum* from a wide distribution range from Ethiopia [*Herrmann* 206 (ETH)] in the North to Zambia in the South [*Hoell & Nordal* 15 (O)]. *C. subpetiolatum* shows extensive morphological variation, but forms a monophyletic group with *C. suffruticosum* as the closest sister species, both highly supported.

45. *Chlorophytum velutinum* Kativu (Kativu & Nordal 1993: 503); Kativu (1994: 81); Kativu et al. (2008: 58, fig. 13.1.10). – Type: Zambia, Luano, in crevices on rock outcrop, s.d., *Fanshawe* 9628 (holo-: K, iso-: NDO). Fig. 3E.

Acrospira homblei De Wild. (De Wildeman 1915: 4); De Wildeman (1921a: 26). – Type: D.R.Congo, Katanga, Vallée de Kapiri, Feb. 1913, *Homblé* 1119 (holo-: BR), non *Chlorophytum homblei* De Wild., **synon. nov.**

Other representative specimens examined – **D.R.Congo**: XI: 20 km au N de Luambo, route Likasi-Kolwesi, forêt claire, 12 Mar. 1983, *Schaijes* 1861 (BR); Fungurume, hill V, steppic savanna on Cu/Co mineralization substrate, 6 Apr. 1990, *Tropmetex* 160 (BR, K, MPN, WAG); Katwe, Kundelungu Plateau, rough grassland with bare patches, 7 Mar. 1975, *Hooper & Townsend* 607 (P, K).

This species was first described by De Wildeman in 1915 as *Acrospira homblei.* In 1993 it was described again as a new species by Kativu as *Chlorophytum velutinum*, without reference to De Wildeman's name. The epithet "*homblei*" should have precedence. However, the combination "*Chlorophytum homblei*" is illegitimate because *C. homblei* De Wild. (= *C. blepharophyllum*) was described in 1913. Therefore *C. velutinum* remains the legitimate name of that species.

C. velutinum has long been confounded with *C. stolzii*. Collections from D.R.Congo depart from the description given in FZ (Kativu et al. 2008: 58) in having broader leaves (up to 15(–22) mm vs. 4–6 mm in FZ), higher shoots (up to 2 m vs. 95 cm), longer stamens (25 mm vs. 12 mm) and bigger seeds (2.5 mm vs. 1 mm).

The Congolese *C. velutinum* [*Meerts* 2010/32 (BRLU)] forms a strongly supported clade with *C. stolzii* [*Hoell & Nordal* 101 (O)] from Zambia.

46. *Chlorophytum vestitum* Baker subsp. ***pilosissimum*** (Engl. & K.Krause) Meerts, **comb. nov.**
Chlorophytum pilosissimum Engler & K.Krause, Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 45: 139. 1910. (Engler & Krause 1910); De Wildeman (1913c: 15; 1921a: 28). – Type: D.R.Congo, Lubembe, 02 Feb. 1908, *Kassner* 2436 (holo-: B, iso-: BR, K). Fig. 2D.

Chlorophytum vestitum sensu Nordal et al. (1997), Kativu et al. (2008).

Other representative specimens examined – **D.R.Congo**: XI: Kipopo, bord de route en forêt claire, 8 Feb. 1961, *Schmitz* 7010 (BR).

In a preliminary phylogenetic analysis the Congolese *C. vestitum* subsp. *pilosissimum* [*Meerts* 2010/53 (BRLU)] resolves as a sister to the Zambian *C. pubiflorum* Baker [*Nordal* 4561 (O)] in a clade with species with distichous leaf arrangement.

This taxon is referred to as *C. vestitum* in FZ (Kativu et al. 2008) and FTEA (Nordal et al. 1997). However, the type specimen of *C. vestitum* Baker from Mozambique (*Kirk* s.n., K, barcode K000256947) differs in having a peduncle < 10 cm and a simple or poorly ramified inflorescence. We consider *C. pilosissimum* to be conspecific (similar leaves, flowers and fruits), though differing by a much longer peduncle and a much more ramified panicle. Since the two morphs are apparently not sympatric (the dwarf variant does not occur in D.R.Congo), a subspecific rank seems appropriate.

47. *Chlorophytum warneckei* (Engl.) Marais & Reilly (Marais & Reilly 1978: 662); Raadts (1984: 658). – *Anthericum warneckei* Engl. (Engler 1902: 91); Hepper (1968b: 97); Lisowski (2009: 421). – Type: Togo, prope Lome, *Warnecke* 304 (holo-: B (†?), iso-: P, BM) non *Anthericum warneckei* sensu Vanden Berghen (1988: 420; fig. 345bis).

Chlorophytum gracillimum Dammer (De Wildeman 1912a: 345), **nomen nudum**.

Other representative specimens examined – **D.R.Congo**: Savane sud-occidentale du Congo, mission Cabra, 1899, *Tilman* s.n. (BR).

A W African species (Ghana, Guinea, Senegal, Togo), apparently with disjunct populations in SW Congo, but the precise locality is not known. It has sometimes been confounded with *C. inconspicuum* (Baker) Nordal, an E African species which differs by bigger fruits, and a much reduced inflorescence (Nordal et al. 2007).

48. *Chlorophytum zingiberastrum* Nordal & Poulsen (Nordal et al. 1997: 48); Nordal & Poulsen (1998: 937; 938: Fig. 1); Kativu et al. (2008: 73). – Type: Malawi, Mzimba Dist., Mzuzu, Marymount, 25 Jan. 1974, *Pawek* 7987 (holo-: WAG). Fig. 3F.

Other representative specimens examined – **D.R.Congo**: XI: Keyberg, forêt claire sur sol rouge et frais, 5 Feb. 1948, *Schmitz* 1155 (BR); Kipopo, forêt claire, pied de termitière sur sol rouge, Mar. 2010, *Meerts* 2010/63 (BRLU); Route Kolwesi-Kyamasumba, rivière, Mushingi, forêt galerie, alt. 1010 m, *Billiet & Jadin* 4195 (BR; also cultivated in greenhouse: S 2063). **Burundi**: Butare, forêt claire à *Brachystegia* sur le mont au N de la Nyakende, 6 Feb. 1952, *Michel & Reed* 1113 (BR).

49. *Chlorophytum* sp. A "*near comosum*"

A most distinctive member of the *C. sparsiflorum*-*C. comosum* complex. Leaves rosulate, linear, 20–50(–75) cm × 10–15(–25) mm, not blackening in herbarium. Inflorescence 60–90(–150) cm (including peduncle), erect or decumbent; peduncle with 1–2 foliaceous bracts up to 20 cm long; flowers often replaced by rosettes of linear leaves (pseudovivipary); flowers 10 mm long; tepals minutely papillate on inner side with 5–7 equally spaced nerves; anthers 3–4 mm, shorter than filament (6 mm); filament scabrid distally and flattened at base. In swamps and marshes, generally in herbaceous vegetation.

Specimens examined – **D.R.Congo**: IX: Lac Kivu, forêt à l'W de Tshibinda, près du marais Kanzibi, alt. 2000–2400 m, s.d., *Humbert* 7415 (BR). Rwanda: Forêt de Nyungwe, route Butare-Cyangugu, sentier au km 100, bord de ruisseau en sous-bois, alt. 2000 m, plante de 80–150 cm, fleurs verdâtres, 21 Aug. 1969, *Bouxin & Radoux* 714 (BR); Territ. Shangugu, tourbière Kamiranzovu, km 85 route Astrida–Bukavu, alt. 1950 m, Juncetum, 22 Aug. 1957, *Deuse* 1063 (BR); Territ. Shangugu, route Bukavu–Astrida, marais à *Cyperus latifolius*, 23 Jul. 1959, *A. Leonard* 5098 (BR); Territ. Shangugu, route Bukavu–Astrida, env. Uwinka, alt. 1900 m, marais, 2 Feb. 1959, *Troupin* 9707 (BR); Territ. Shangugu, Kamiranjovu, alt. 2000 m, fond de vallée, 22 Mar. 1956, *Christiaensen* 1514 (BR); Territ. Cyangugu, forêt Nyungwe, env. Gisakura, alt. 2000 m, marais à *Syzygium*, 12 Jun. 1971, *Bouxin* 968 (BR).

Burundi: Territ. Muramwya, Mont Manga, alt. 2300 m, bord de ruisseau, 19 Nov. 1972, *Reekmans* 2078 (BR, BJA).

The *C. comosum*-*C. sparsiflorum* complex is poorly understood (see comments under *C. sparsiflorum*). Pending a thorough taxonomic revision based upon molecular markers, we prefer not to describe a new species.

50. *Chlorophytum* sp. B "*near tetraphyllum*"

A very small plant without a peduncle with long pedicellate, more or less umbellate flowers. It closely ressembles *C. tetraphyllum* (L.f.) Baker a species known only from Ethiopia, from which it differs by the non ciliate leaf margin. However, more material is needed to decide on its taxonomic status.

Specimens examined – **D.R.Congo**: XI: Kansenia, 8 Nov. 1958, *Schmitz* 6220 (BR, KIP); Kansenia gare, dépressions herbeuses sans géofrutex dans le steppe à géofrutex et *Tephrosia* et *Crotalaria*, 8 Dec. 1959, *Duvigneaud* 4467L (BRLU).

Uncertain species and names rejected

Chlorophytum huyghei De Wild. (De Wildeman 1909: 55, Plate 1, figs. 3 & 4). – Type: D.R.Congo, Bokele, 1908, *Huyghe* s.n. (BR, photograph); cultivated in greenhouse, 17 Mar. 1922, (BR, Herb. Plant Cult.: 314). – The diagnose and the accompanying photographs suggest it may have been *C. sparsiflorum*.

Chlorophytum laurentii De Wild. *in schedis*. – This name was handwritten by De Wildeman himself on a sheet (barcode BR0000008766946) with the indication "coll. E. Laurent, cult. Gembloux 1901". This sample is *C. macrophyllum*. The name *Chlorophytum laurentii* does not seem to have been published.

"*Chlorophytum dewildemanianum* Tournay", cited in Schmitz (1971). – Neither the type specimen nor the protologue was found and this name is therefore a **nomen nudum**.

"*Chlorophytum luembense* Tournay", cited in Schmitz (1971). – Neither the type specimen nor the protologue was found and this name is therefore a **nomen nudum**.

"*Chlorophytum gracillimum* Dammer" (De Wildeman 1912a: 345) and "*Chlorophytum gracilimum* VD." [sic], cited in Germain (1952). – Names sometimes found *in schedis* for slender, narrow-leaved forms of the *C. cameronii* complex in E D.R.Congo and Burundi. Neither the protologue nor the type specimen was found and this name is therefore a **nomen nudum**. See note under *C. warneckei*.

Species excluded

Anthericum malosanum Baker, cited in Lebrun et al. (1948: 34) belongs in *Trachyandra*.

SUPPLEMENTARY DATA

Supplementary data are available at *Plant Ecology and Evolution*, Supplementary Data Site (http://www.ingentaconnect.com/content/botbel/plecevo/supp-data), and consist of a check list of taxa names (pdf format).

ACKNOWLEDGEMENTS

This work was completed while P.M. was on sabbatical leave. The Université Libre de Bruxelles (Fonds Cassel) and FRS-FNRS (Belgium) are gratefully acknowledged for financial support, the Université de Lubumbashi for logistic support, and the Jardin botanique national de Belgique for hosting P.M. as a visiting scientist in BR. Inger Nordal (Oslo) is gratefully acknowledged for her seminal contribution to *Chlorophytum* taxonomy, without which the present work would not have been possible. P.M. is grateful to the curators of B, BR, BRLU, BRVU, FT, K, KIP, LSHI and especially to Odile Weber (K) and Sarah Bollendorf (B) for their kind assistance. Frank Vankaekenberghe (BR) is gratefully acknowledged for SEM pictures. Frieda Billiet and Julien Piqueray kindly provided some of the photographs. Daniel Geerinck is gratefully acknowledged for fruitful discussion and advice. Ferdinand Nyiongabo kindly provided living plants of *Chlorophytum burundiense* from Mt. Teza (Burundi). Elmar Robbrecht and two anonymous referees are gratefully acknowledged for their detailed comments. This work is dedicated to the memory of Karl von Poellnitz (1896–1945) who saved the *Chlorophytum* herbarium specimens from destruction by the bombing raid on Berlin on 3d March, 1943.

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Manuscript received 25 Apr. 2011; accepted in revised version 12 Jan. 2012.

Communicating Editor: Elmar Robbrecht.