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A new species of *Combretum* section *Ciliatipetala* (Combretaceae) from southern Africa, with a key to the regional members of the section

O. Maurin [a,*], A.E. van Wyk [b], M. Jordaan [c], M. van der Bank [a]

[a] *Molecular Systematics Laboratory, Department of Botany and Plant Biotechnology, APK Campus, University of Johannesburg, P.O. Box 524, Auckland Park 2006, South Afria*
[b] *H.G.W.J. Schweickerdt Herbarium, Department of Plant Science, University of Pretoria, Pretoria 0002, South Africa*
[c] *South African National Biodiversity Institute, Private Bag X101, Pretoria 0001, South Africa*

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Abstract

Combretum stylesii O.Maurin, Jordaan & A.E.van Wyk, a liana or slender tree with scrambling branches from the Tugela River Valley (KwaZulu-Natal), South Africa, is described. Molecular data supports its placement in subgenus *Combretum* section *Ciliatipetala* with its closest relative *Combretum edwardsii*. The new species differs from *C. edwardsii* in having, amongst others, a single mature leaf form, leaves softly textured, with whitish hairs, often with drooping habit, shorter leaf petioles (less than 5 mm), and less complex 8-celled leaf scales. A key to the species and infraspecific taxa of section *Ciliatipetala* in the *Flora of southern Africa* region is provided.

Keywords: *Ciliatipetala*; Combretaceae; *Combretum*; New species; South Africa; Taxonomy

1. Introduction

Combretum section *Ciliatipetala* is restricted to Africa and the Arabian Peninsula (Stace, 1980). Members of section *Ciliatipetala* are floriferous and characterised by flowers with petals that are small to absent. The petals are usually apically ciliate or pilose, hence the name of the section. *Combretum petrophilum* Retief and *C. psidioides* subsp. *glabrum* Exell are the only members of the section without such hairs (Stace, 1969; Exell, 1970, 1978; Wickens, 1973; Retief, 1986). The margin of the floral disc is short, free and pilose. The fruits are small, generally not larger than 20×20 mm, and 4-winged. In seedlings the paired cotyledons are produced at or below soil level, except in *C. albopunctatum* and *C stylesii*, in which they are produced well above soil level. Leaf scales in section *Ciliatipetala* vary in size from 40 to 120 μm in diameter, with 7–12 radial walls, often with additional tangential walls (Exell, 1978). Scale morphology is, however, not uniform in the section but varies from a simple 8-celled construction (e.g. *C. apiculatum*) to a more elaborate structure with large numbers of cells subdivided by tangential and concentric walls (e.g. *C. molle*, *C. moggii*), with all possible intermediate states (Stace, 1969).

The section currently comprises ten described species, namely *Combretum acutifolium* Exell, *C. albopunctatum* Suess., *C. apiculatum* Sond., *C. edwardsii* Exell, *C. moggii* Exell, *C. molle* R.Br. ex G.Don, *C. nigricans* Lepr. ex Guill & Perr., *C. petrophilum* Retief, *C. psidioides* Welw. and *C. viscosum* Exell, of which seven occur in southern Africa. A taxonomic reassessment of the section has revealed at least four undescribed species in Southern Africa, the designation following Maurin et al. (2010): *C.* sp. nov. A (from Sekhukhuneland, South Africa), *C.* sp. nov. B (from the Tugela River Valley, KwaZulu-Natal), *C.* sp. nov. *C* (from KwaZulu-Natal and southern Mozambique) and *C.* sp. nov. D (from KwaZulu-Natal and probably also southern Mozambique). Three of the new species are known from limited material only and will be described in a future publication pending further study. The fourth new species, *C.* sp. nov. B, is now known from ample herbarium material and was extensively studied in the field by Mr. David Styles. This species is formally described

* Corresponding author.
E-mail address: olive.maurin@gmail.com (O. Maurin).

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in the present paper. Macro- and micromorphology as well as molecular data (Maurin et al., 2010) support the taxonomic status and sectional position of the new species. We also provide a key to all members of *Combretum* section *Ciliatipetala* in the *Flora of southern Africa* region (South Africa, Namibia, Botswana, Lesotho and Swaziland).

2. Species treatment

Combretum stylesii O.Maurin, Jordaan & A.E.van Wyk, sp. nov., *C. edwardsii simillima sed savannicola non silvatica, foliis uniformibus non biformibus, petalis apice pilis paucis albidis, non glabris, squamis foliorum 8-cellularibus, cellulis omnibus radialibus sine parietibus tangentialibus, non 16-cellularibus cum parietibus tangentialibus radialibusque ut in C. edwardsii, fructu non concpicue lepidoto, non laeviusculo, differt*.

Type. — South Africa, KwaZulu-Natal, Mabhobhane near Mapumulo, on the bank of the Tugela River, 2931AA, 29°7′ 30.0″S, 31° 7′ 30.0″ E, 2 November 2008, *D. Styles 2489* (NH, holo.; K, M, PRE, PRU, iso.).

Robust climber up to 14 m tall, twining to the right, or a scrambler, occasionally a lax, scandent tree, deciduous or semi-deciduous; bark ± smooth, greyish. *Young branches* pale greenish, becoming darker, densely tomentose with whitish to translucent indumentum. *Second year branches* pale brownish with first-formed bark showing slight longitudinal peeling. *Leaves* opposite, drooping, pale green and densely covered with whitish or greyish indumentum on both surfaces when young, becoming glabrescent to almost glabrous except along midrib with age, first leaves in spring often partly and temporarily yellowish pale on both surfaces but reddish above; lamina narrowly elliptic to lanceolate, (20–)25–75(–90) mm × (10–)15–30(–35) mm, base rounded to slightly cuneate, sometimes with tiny lobes, apex acute, sometimes apiculate or mucronate with mucro up to 1 mm long, margin ciliate; venation with midrib slightly sunken above towards base and generally remaining rather hairy, principal lateral veins usually opposite, 5–8 pairs; petiole 4(–5) mm long, persistently tomentose. *Inflorescences* few-flowered, of short axillary spikes (10–)12–20(–25) mm long; peduncle and rachis yellowish to pale green, glabrous; bracts linear, ±1 mm long, caducous; flowers distributed along spikes from 0.5 to 0.8 mm above base and more densely grouped apically. *Flowers* 4-merous, cream-coloured. *Lower hypanthium* ± 2–3 × 1 mm, sparsely tomentose to glabrous, glutinous; *upper hypanthium* ± 2–3 mm wide, visibly divided into lower ± tubular part containing disc and expanded ± cupuliform upper part, slightly pubescent, scales sometimes visible and producing glutinous secretions. *Sepals* ± deltate, ±1 mm long. *Petals* narrowly obovate, oblanceolate or elliptic, ± 2.5 × 1.5 mm, with scattered marginal hairs apically. *Stamens* 8, ± 1-seriate, inserted shortly above margin of disc; filaments ± 2–4 mm long; anthers ± 0.9 mm long. *Disc* free for ± 0.5 mm, glabrous with margin pilose and reddish. *Style* ± 5 mm long. *Fruit* a samara, (3)4-winged, broadly elliptic, circular to subcircular in outline, 11–22 × 16–24 mm, green when young, turning brownish when mature; apical peg ± 0.2 mm long or absent; wings 7–10 mm wide; stipe 3–7 mm long. *Scales* conspicuous on lower surface of leaf, often concealed by glutinous secretions in young leaves, absent or very rarely present above, usually 45–55 μm in diam., ± circular, 8-celled with 8 primary radial walls only, margin slightly undulate. *Cotyledons* 2, epigeal, first young leaves covered with long white hairs. Flowering recorded between October and December, but evidently commencing earlier in some cases as ripe fruits observed from October to March.

3. Diagnostic characters

Based on morphological and especially molecular (Maurin et al., 2010) evidence, *Combretum stylesii* is closely related to *C. edwardsii*. In addition to the sharing of sectional floral characters, morphological similarities between the two species include a pronounced creeping habit, branchlets hairy, scales that are not glistening and with similar outline and distribution density, leaf blades with reticulation (abaxial) plane or slightly raised and apices non-apiculate, autumn colours orange to red-tinged and fruit (mature but not yet dry) hairless, without glutinous secretions, greenish yellow, flushed with pink to dark red. *Combretum stylesii* differ from *C. edwardsii* by the monomorphic leaves, similar in form both at the base of the plant and on the canopy. In *C. edwardsii* the leaves are clearly dimorphic. Base leaves of *C. edwardsii* are also softly textured, more hairy and narrower than canopy leaves. The mature canopy leaves of *C. edwardsii* are coriaceous, stiff and erect, broadly elliptic, usually wider than 30 mm (up to 52 mm), with short reddish brown hairs and with a lobed leaf base which are sometimes asymmetric and with longer petioles, usually longer than 5 mm. The leaves of *C. stylesii* are very softly textured, usually drooping on the plant, with longish white indumentum, narrowly elliptic usually not wider than 30 mm, with rounded but not lobed leaf bases and are shortly petiolate, up to 5 mm long. The two species differ also in details of the flowers, leaf scales and fruit surface. The petals of *C. stylesii* have a few whitish hairs at the tip, whereas those of *C. edwardsii* are glabrous except for few hairs on the petal margins. The leaf scales of *C. stylesii* are 8-celled, with all the cells radially arranged and without subdividing tangential walls, whereas those of *C. edwardsii* are more complex, with 16-cells and additional tangential and radials walls. The fruit of *C. edwardsii* are lepidote, conspicuously and densely covered with scales, whereas the fruit of *C. stylesii* are smooth (Figs. 1 and 2).

4. Distribution and habitat

The earliest known herbarium collection of *Combretum stylesii* dates from 2004. Although moderately abundant where it occurs, the species is very localised, and at present is known only from along a stretch of about 10 km along the Tugela River Valley in KwaZulu-Natal, South Africa (Fig. 3). Extensive surveys within the valley and surrounding area will be necessary to assess its full distribution range. *C. stylesii* normally occurs in Eastern Valley Bushveld (Rutherford et al., 2006), a savanna type lacking species of *Acacia*. Plants are mainly associated with *Combretum woodii* Dümmer, *Spirostachys africana* Sond. (Euphorbiaceae; often dominant), *Euphorbia tirucalli* L. (Euphorbiaceae), and *Vitellariopsis dispar* (N.E.Br.) Aubrév.

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Fig. 1. *Combretum stylesii*. Herbarium specimen (*Styles 2489*) with details of flower (*Styles 3309*) and fruit (*Styles 2489*).

(Sapotaceae), the latter an endemic to the Tugela River Valley. The climate is characterised by summer rainfall (mean 750 mm per annum), infrequent frost and a mean monthly temperature varying between 9 °C in June and 29 °C in December (Schulze, 1997).

5. Eponymy

The specific epithet honours Mr. David Gordon Alexander Styles [b. 1968], an amateur botanists from Durban, KwaZulu-Natal, who appears to have been the first person to collect material

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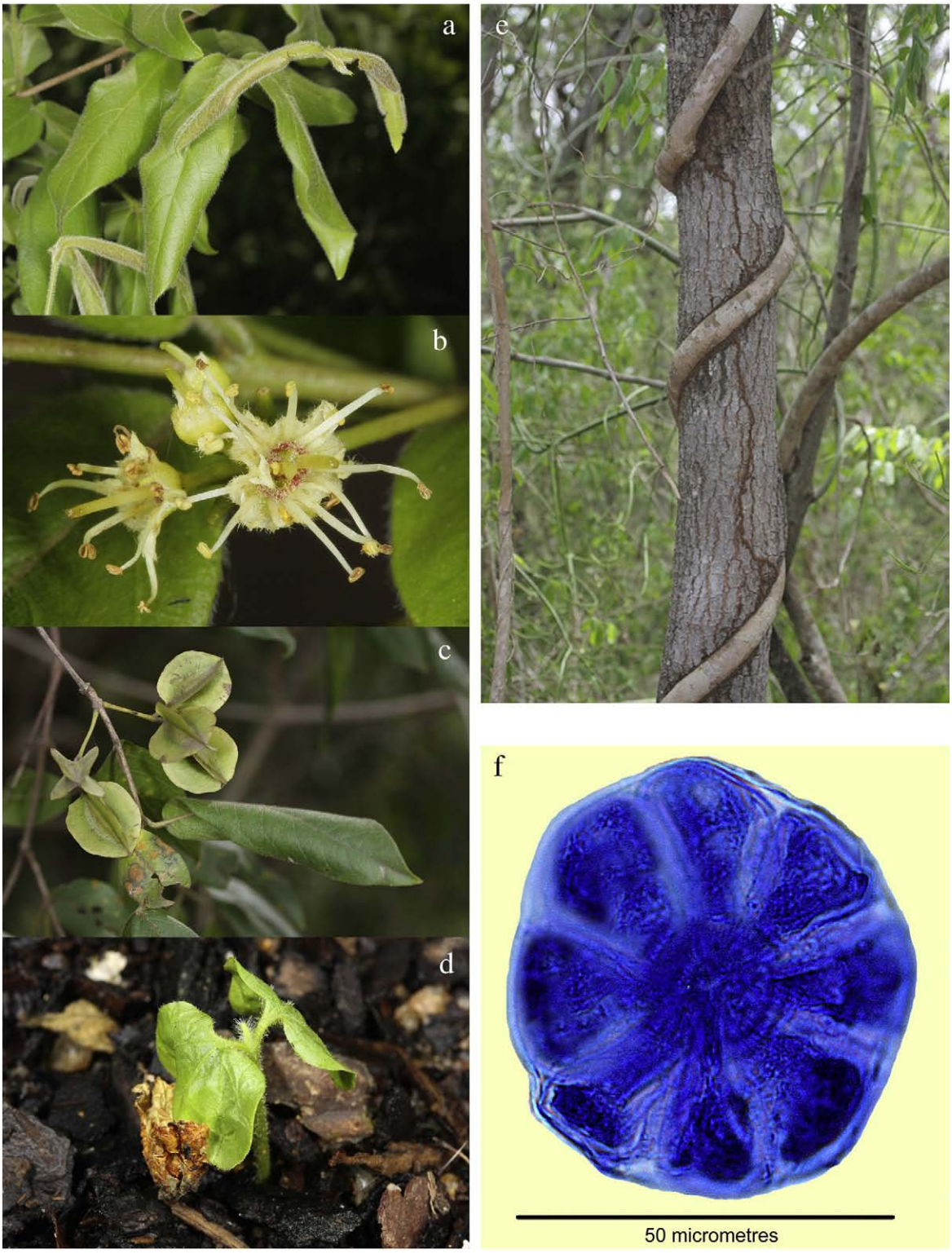

Fig. 2. *Combretum stylesii*, (a) young leaves; (b) flower details; (c) fruit details; (d) germinating seed; (e) climbing habit showing stem strangling *Euphorbia tirucalii* Photographs. D. Styles; (f) scale structure. Photograph. A.E. van Wyk.

of the new species. Mr. Styles has conducted extensive field work in KwaZulu-Natal and the Eastern Cape and through his herbarium collections and observations have made significant contributions to our knowledge of the flora of these regions. He is also editor of the journal *PlantLife* and the founder and coordinator of the popular Yahoo! discussion group Plant-chat, a forum that posts information on native plants from the eastern region of southern Africa.

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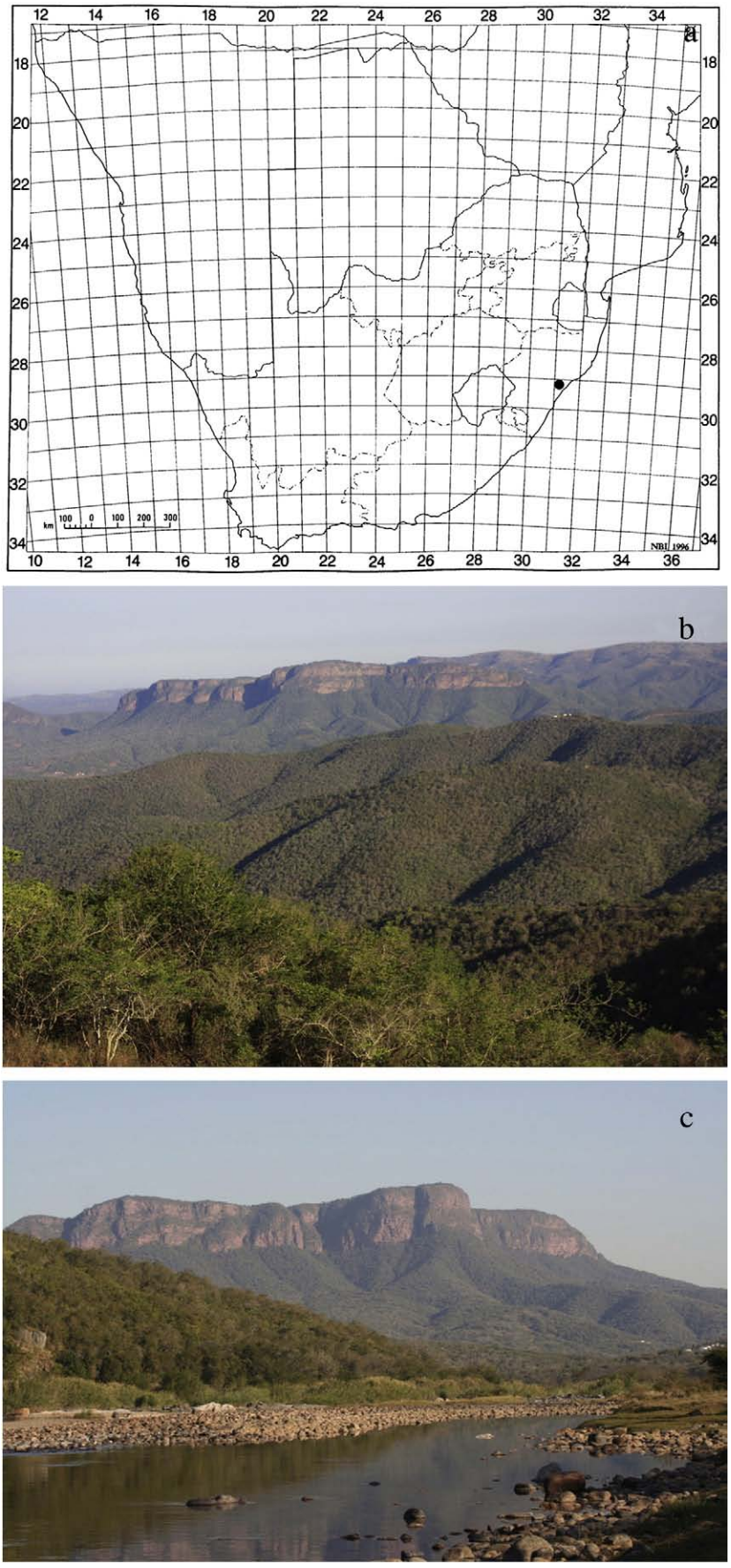

Fig. 3. (a) *Combretum stylesii*, known distribution; (b and c) Tugela Valley, KwaZulu-Natal; habitat of *Combretum stylesii*. Photographs. D. Styles.

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6. Conservation status

Combretum stylesii appears to be a highly localised endemic. Much of the habitat in the vicinity of the known populations is still intact and only low numbers of homesteads are located in the area. However, the impact of human residents is visible on the woody vegetation in the surrounding areas, and in some places only *Euphorbia tirucalli* L. remains since it is not useful as firewood. *Croton menyhartii* Pax (Euphorbiaceae) seems to proliferate in the area since it is unpalatable or toxic to livestock. Naturalised alien invader vegetation is also becoming more abundant in this area. Potential future threats to the species include the development of homesteads along new roads through the area.

7. Additional specimens examined

KwaZulu-Natal, Mapumulo, Tugela Valley, Mabhobhane, 2931AA, 29°7′30.0″S, 31° 7′30.0″E, 6 October 2004, *D. Styles 2067* (NH); 2931AA, 29°7′30.0″S, 31° 7′30.0″E, 2 November 2008, *D. Styles 3309* (NH); 2931AA, 29°7′30.0″S, 31° 7′30.0″E, 2 November 2008, *D. Styles 2034* (NH).

8. Key to the species and infraspecific taxa of *Combretum* section *Ciliatipetala* in the *Flora of southern Africa* region

1a Leaf apex usually apiculate and often twisted; shrubs or trees:
- 2a Leaf lamina narrowly ovate to elliptic, usually narrower than 22 mm; leaf-base often asymmetrical; South Africa (Limpopo and Mpumalanga)..... *C. petrophilum*
- 2b Leaf lamina broadly ovate to obovate or oblong, broader than 30 mm; leaf-base usually symmetrical; widespread :
  - 3a Leaves glabrous or with hairs only on margin and midrib; hair-tuft domatia present in axils of veins below; widespread..... *C. apiculatum* subsp. *apiculatum*
  - 3b Leaves sparsely to densely persistently pubescent on both surfaces; hair-tuft domatia absent in axils of veins below; Namibia and Botswana..... *C. apiculatum* subsp. *leutweinii*

1b Leaf apex variously rounded, obtuse, acute or abruptly to long acuminate, rarely apiculate; shrubs, trees or climbers:
- 4a Leaf surface glabrous except for scattered hairs along midrib and sometimes margins towards base; fruit glabrous; Maputaland (northeastern KwaZulu-Natal and southern Mozambique:
  - 5a Leaf apex abruptly acuminate, rarely apiculate; margin glabrous, often undulate and revolute when dry..... *C.* sp. nov. C
  - 5b Leaf apex rounded to acute; margin flat, ciliate towards base, not revolute when dry..... *C.* sp. nov. D
- 4b Leaf surface hairy, and margin ciliate; fruit glabrous or hairy; widespread:
  - 6a Woody climbers or scrambling shrubs with trailing branches:
    - 7a Leaf base rounded, lobed or subcordate; hairs on leaves dark brown or reddish brown..... *C. edwardsii*
    - 7b Leaf base broadly cuneate to rounded, not lobed; hairs on leaves whitish..... *C. stylesii*
  - 6b Multi-stemmed shrubs or single-stemmed trees:
    - 8a Bark of branchlets peeling off in large, ± cylindrical or hemicylindrical pieces revealing an exposed cinnamon-red surface..... *C. psidioides* subsp. *dinteri*
    - 8b Bark of branchlets peeling off in untidy, irregular, fibrous strips or threads:
      - 9a Plants with tendency to form thickets, sometimes with scrambling branches; scales glistening; fruit with stipe up to 8 mm long; northern parts of Botswana and Namibia, Zambia and Zimbabwe .....*C. albopunctatum*
      - 9b Plants free-standing and well spaced, not forming thickets, without scrambling branches; scales not glistening; fruit with stipe up to 3(5) mm long; mostly southeastern parts of Botswana, Swaziland, South Africa, also in tropical Africa:
        - 10a Usually single-stemmed trees growing in a broad range of habitats; leaves densely hairy; lamina with reticulate venation conspicuously and prominently raised below..... *C. molle*
        - 10b Usually multi-stemmed shrubs; growing between rocks; leaves less densely hairy; lamina with reticulate venation conspicuous but not prominently raised below:
          - 11a Plants with silky silvery appearance; fruit densely covered with longish appressed hairs over whole surface; Gauteng, KwaZulu-Natal, Limpopo Province, Mpumalanga, Swaziland..... *C. moggii*
          - 11b Plants not with silky appearance; fruit glabrous except for few scales on body, sometimes glutinous; Sekhukhuneland (South Africa)..... *C.* sp. nov. A.

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