

# A PRELIMINARY ANALYSIS OF *CLEMATIS* (RANUNCULACEAE) IN SUB-SAHARAN AFRICA

Frederick B. Essig

*Institute for Systematic Botany  
Department of Biology SCA 110  
University of South Florida  
Tampa, Florida 33620 U.S.A.*

## ABSTRACT

Based on a survey of the literature and a representative sampling of herbarium material, it appears that the approximately 70 published binomials for *Clematis* in sub-Saharan Africa can be reduced to 10-13 distinct species or species complexes. A key to these species, along with a commentary on each, is provided as a preliminary guide for further floristic and taxonomic studies.

## RESUMEN

Basado en una revisión de la literatura y una prueba representativa del material herbario, parece que los aproximadamente 70 binómenes publicados para las clemátides del África sub-Sahariana pueden ser reducidos a 10-13 complejos de especies, o especies distintas. Se proporciona una clave para estas especies, junto con un comentario para cada una, como una guía preliminar para estudios adicionales florísticos y taxonómicos.

## INTRODUCTION

This report originated as part of an effort to develop tentative hypotheses about the number and distribution of the species of *Clematis* in various parts of the world. It was found, however, that the literature referencing *Clematis* in sub-Saharan Africa, in which approximately 70 species have been named, was confusing, patchy, inconsistent and often contradictory. The goal of this exercise was therefore to make the first continent-wide survey of sub-Saharan *Clematis* in Africa, combining study and synthesis of the diverse literature on the subject with a limited but representative herbarium study, in order to provide a preliminary overview of the number, correct names, and distribution of the species. North African species were excluded because they are more naturally a part of the Mediterranean flora. It is hoped that this preliminary report will provide a framework, some meaningful hypotheses, and a stimulus for regional African botanists to take up the detailed work that needs to be done. A comprehensive treatment of African *Clematis* will require extensive study in the herbaria of Europe and Africa, as well as a great deal of fieldwork in all parts of this large continent.

Since the study was initiated, global surveys of *Clematis*, including the African species, have been completed by Johnson (1997) and Grey-Wilson

(2000). Both authors have great familiarity with *Clematis* and each brings some interesting perspectives to the study of this genus, but neither addressed the many taxonomic and nomenclatural problems of the African *Clematis* in any depth. The relationship of the African species with those of other parts of the world is of great interest, but no definitive phylogenetic studies have been completed. Grey-Wilson considers the African species, with the exception of *C. grandiflora* and the species of section *Pseudanemone*, to constitute a subsection of the section *Meclatis*. This is an interesting and feasible hypothesis, but needs to be born out by formal phylogenetic studies. Other authors, such as Tamura (1967) and Johnson (1997) have considered the African species to be part of the subgenus or section *Clematis*, which includes similar white-flowered species in Eurasia and the Americas.

Even under the best of circumstances *Clematis* is a taxonomically difficult genus, due to great variability within species and minimal diagnostic differences in floral morphology between species, at least as can be seen in herbarium material. Previous work with North American *Clematis* (Essig 1990) had suggested that taxonomic problems in this genus might be largely resolved through careful analysis of existing herbarium material. In that study, the two widespread and frequently confused white-flowered species in eastern North America were found to be distinguishable by subtle morphological features plus differences in blooming season and substrate preferences. Such studies are feasible for taxa that are readily collected by generalists, and hence abundantly represented in herbaria. This study was initiated with the anticipation that this would be true of African *Clematis* as well.

#### MATERIALS AND METHODS

The survey of herbarium material was based on the collection of African *Clematis* at the Missouri Botanical Garden (MO), consisting of some 550 specimens. The Missouri Botanical Garden has a strong history and a sizeable ongoing program of fieldwork in Africa, and probably the best herbarium collection of African plants in North America. The collection includes sets of duplicates from important collectors in all parts of Africa, including Exell & Mendonca in Angola, deWilde, Ash, Westphal and Pichi-Sermolli in Ethiopia, Pawek, Phillips and Brass in Malawi, Reekmans in Burundi, Richards in Zambia and Tanzania, and countless other collectors who have collectively made a huge contribution. Table 1 shows the origin, by country, of the collections at Missouri. The best represented areas in the Missouri collections are the African upland areas stretching from South Africa to Ethiopia. Weakly represented areas include tropical west Africa from Senegal to Angola, the northern tier of the savanna belt running from Senegal to the Sudan, and the east coastal regions from Mozambique through Tanzania. These results probably reflect both the abun

TABLE 1. Collections in the Missouri Botanical Garden Herbarium (MO) by country of origin.

Ethiopia 45	Uganda 20	Kenya 20	Burundi/Rwanda 33
Tanzania 46	Malawi 77	Zambia/Zimbabwe 67	Zaire 31
Angola 30	Namibia/Botswana 12	South Africa 101	Mozambique 13
Tropical West Africa 36			

dance of *Clematis* and the intensity of botanical activity in these areas, but suggest a reasonably balanced coverage of the continent, sufficient for at least the preliminary survey undertaken here.

### RESULTS

The collections of the Missouri Botanical Garden were readily sorted into 10 broadly distributed groups that can be interpreted as species or potentially as species complexes. These were identified using the earliest validly published name applicable to each group, as determined through examination of type materials, and/or original descriptions/diagnoses of the many species described in the literature. These widespread and variable taxa include *C. villosa*, *C. uhenensis*, *C. chrysocarpa*, *C. grandiflora*, *C. longicauda*, *C. dolichopoda*, *C. hirsuta*, *C. simensis*, *C. brachiata*, and *C. welwitschii*. This is a conservative interpretation, a hypothesis of what appears to be the minimum number of distinct species in Africa. Support for an additional three narrowly distributed species recognized by some authorities (*C. burgensis*, *C. sigensis*, and *C. viridiflora*), was weak or lacking in the Missouri collections, but are worth considering further and included in this treatment. In addition, the subspecies of *Clematis villosa* and *C. chrysocarpa* recognized by Brummitt (2000) are well-supported by this study, and may be nearly as distinct as the other species recognized. The preliminary nature of this study is stressed. Additional species may very well emerge after more exhaustive study.

The species have distinctive but overlapping geographic and altitudinal ranges. A number of intermediate specimens suggest hybridization or incomplete separation of the taxa, but most specimens fall clearly into one taxon or another. The taxa are defined primarily on the number, size, and shape of the leaflets, and in some cases by significant differences in flower size. Otherwise, flowers in African *Clematis* are relatively uniform with respect to morphology. All are bisexual and of a nodding habit (different from white-flowered species elsewhere, in which flowers are erect). Sepals vary only in size and slightly in texture, vestiture or color. Stamens are numerous, and all have hairy filaments. Carpels are numerous, all developing into achenes with long, plumose tails. Floral characters referred to by earlier authors (e.g. anther shape) have been found to vary as much within taxa as between taxa. Finally, ecological separation is suggested by some differences in blooming season and altitudinal range, but

data on habitat and soil type were meager and inconsistent. Other subtle biological differences, such as differences in floral fragrance and flower color, are hinted at sporadically on labels, and need to be investigated in the field.

A key to these species, and discussion of each, follow.

#### KEY TO THE SPECIES OF *CLEMATIS* IN SUB-SAHARAN AFRICA

1. Plants erect, stiff-stemmed, perennial herbs; flowers with sepals imbricate in bud (species formerly segregated as the genus *Clematopsis*, key based on Brummitt, 2000):
  2. Achenes with golden-brown hairs; flowers solitary; leaves with 1–2 (very rarely 3) pairs of pinnae \_\_\_\_\_ (***C. chrysocarpa***)
  3. Leaves mostly trifoliolate; sepals 32–55 mm long; achenes (including plumose style) 55–70 mm long. Angola, Zaire \_\_\_\_\_ ***C. chrysocarpa*** subsp. ***chrysocarpa***
  3. Leaves mostly 5–7-foliolate; sepals 20–32 mm long; achenes 35–50 mm long. Malawi, Tanzania and Mozambique \_\_\_\_\_ ***C. chrysocarpa*** subsp. ***bijuga***
  2. Achenes with gray hairs; flowers 1-many per stem; leaves simple to tripinnate.
    4. Leaves simple; flowers solitary; sepals 32–60 mm long. Angola and Zaire to Tanzania \_\_\_\_\_ ***C. uhehensis***
    4. Leaves trifoliolate to tripinnate; flowers 1-many per stem; sepals 17–33 mm long \_\_\_\_\_ (***C. villosa***)
      5. Leaves trifoliolate or occasionally 5-foliolate, flowers 1–5 per stem. Cameroun and Nigeria to Tanzania \_\_\_\_\_ ***C. villosa*** subsp. ***oliveri***
      5. Leaves pinnate to tripinnate, rarely trifoliolate; flowers 1-many per stem.
        6. Leaves tripinnate with segments 1–5(–8) mm broad; flowers 1–5 per stem; Zambia to Namibia and S. Africa \_\_\_\_\_ ***C. villosa*** subsp. ***stanleyi***
        6. Leaves pinnate to bipinnate, with segments 5–40 mm broad; flowers 1-many per stem.
          7. Leaves densely sericeous beneath, pinnae lobes up to 15 mm broad and usually rounded at the apex; flowers 1–7(–13) per stem; W. Zaire, Angola, S. Uganda, W. Tanzania \_\_\_\_\_ ***C. villosa*** subsp. ***villosa***
          7. Leaves sparsely to densely appressed-pubescent beneath, pinnae lobes up to 40 mm broad and acute at apex; flowers 5-many per stem; S. Zaire, Tanzania, Mozambique, Malawi, Zambia \_\_\_\_\_ ***C. villosa*** subsp. ***kirkii***
  1. Plants vining or trailing; flowers with sepals valvate in bud.
    8. Flowers large, solitary or in clusters of 3, with sepals 15–45 mm long; carpels 50–200 per flower.
      9. Flowers campanulate, sepals strongly ribbed, greenish to yellowish or cream-colored, mostly more than 2.5 cm long (but with some specimens as short as 1.8 cm); leaves mostly 3–5-foliolate, with leaflets mostly more than 50 mm long.
        10. Leaves mostly 5-foliolate, leaflets lanceolate-ovate, rarely lobed, finely and regularly toothed; west equatorial Africa, from Guinea to Angola, 300–1600 m \_\_\_\_\_ ***C. grandiflora***
        10. Leaves mostly 3-foliolate, leaflets broadly 3-lobed, irregularly toothed, foliage conspicuously reddish-golden pubescent; Ethiopia, 1350–2100 m \_\_\_\_\_ ***C. longicauda***
      9. Flowers with spreading to reflexed sepals, sepals mostly 15–25 mm long; leaflets mostly less than 5 cm long.

11. Leaves 3–5-foliolate, leaflets broadly to narrowly ovate, abaxially reddish-golden pubescent; flowers white, reddish-golden pubescent externally, the sepals somewhat ridged; occurring in evergreen montane forest, Tanzania, Burundi, 1000–2500 m \_\_\_\_\_ **C. dolichopoda**
11. Leaves mostly twice pinnate, leaflets ovate-apiculate to linear-elliptic, subglabrous to moderately white-hirsute; flowers white to cream-colored or rarely tinged with pink, sepals not conspicuously ribbed; occurring in open woodland, Angola to Zaire, Tanzania, Malawi, & Zimbabwe, 400–1600 m \_\_\_\_\_ **C. welwitschii**
8. Flowers small, numerous, with sepals mostly less than 15 mm long (to 20 mm long in some populations of *C. hirsuta*), white, cream, greenish or yellowish; leaves mostly 5- or more foliolate, of various shapes; carpels fewer than 50 per flower.
12. Leaves 3–5-foliolate with leaflets ovate-lanceolate, rarely lobed.
13. Leaflets regularly and finely toothed. Ethiopia to Zaire and Nigeria \_\_\_\_\_ **C. simensis**
13. Leaflets with margins essentially entire.
14. Achenes with style 50–70 mm long; sepals 12–15 mm long. Kenya, Tanzania \_\_\_\_\_ **C. sigensis**
14. Achenes with style to 33 mm long; sepals 10 mm long. Ethiopia \_\_\_\_\_ **C. burgensis**
12. Leaves 5- or more foliolate with leaflets broadly ovate and frequently deeply lobed, irregularly or infrequently toothed.
15. Flowers yellowish-green, coastal Mozambique and Tanzania \_\_\_\_\_ **C. viridiflora**
15. Flowers white to cream or greenish.
16. Leaves mostly once-pinnate, 5–9-foliolate, leaflets broadly ovate, irregularly lobed and toothed; tropical woodland and savanna, Angola to n.e. South Africa and Zimbabwe, northward to Ethiopia, and from there westward to Senegal, 220–2340 m \_\_\_\_\_ **C. hirsuta**
16. Leaves mostly twice-pinnate, leaflets narrow, deeply lobed and infrequently toothed; temperate to subtropical grassland, South Africa to Zimbabwe, Botswana & Namibia; 400–2200 m \_\_\_\_\_ **C. brachiata**

## TAXONOMIC SYNOPSIS AND COMMENTARY

Note: Three species of African *Clematis*, *C. chrysoarpa*, *C. uhehensis* and *C. villosa*, were formerly segregated in the genus *Clematopsis*, and not originally included in this survey. The recent paper by Brummitt (2000) provides a thorough treatment of those species, while providing the rationale for including them in *Clematis*. I am in full agreement with that decision, and include the species in this synopsis, but refer the reader to Brummitt's paper for more detail and discussion.

- 1. *Clematis brachiata*** Thunb., Prod. pl. cap. 94. 1800. TYPE: not cited, but photos of authentic material from Uppsala have been seen.

*Clematis oweniae* Harv. in Harv. & Sond., Fl. cap. 1:2. 1860.

*Clematis stewartiae* Burt Davy, Man. Flowering Pl. Ferns Transvaal. 1:37, 111. 1926.

*Clematis thunbergii* Steud., Nom., ed 2, 1:380. 1841, Harv. in Harv. & Sond., Fl. Cap 1:2. 1860.

*Clematis triloba* Thunb., Prod. pl. cap. 94. 1800 (non B. Heyne ex Roth, Nov. pl. sp. 251. 1851). TYPE: not cited.

The first species of *Clematis* described from sub-Saharan Africa, *C. brachiata* is similar to *C. hirsuta*, as both are widespread, variable species of open, disturbed habitats, and both produce numerous small white flowers. Exell and Milne-Redhead (1960), along with Thulin (1993), considered that *C. brachiata* and *C. hirsuta* would probably have to be combined, although earlier, Exell (1937) recognized *C. hirsuta* in Angola and *C. brachiata* in South Africa. White (1962) considered *C. hirsuta* and *C. inciso-dentata* as synonyms of *C. brachiata*. The two species can, however, be generally separated by the simply pinnate leaves of *C. hirsuta* compared with the doubly- (or more) compound leaves of *C. brachiata*. The geographic separation, with *C. brachiata* confined primarily to the subtropical grasslands of eastern South Africa and *C. hirsuta* occurring primarily in tropical savannas and woodlands, also suggests ecological differences.

Confusion between *C. hirsuta* and *C. brachiata* may have arisen in part because of a discrepancy between Thunberg's diagnosis of the latter species and his own specimens at the Uppsala Herbarium. Thunberg actually described two species from South Africa. One (*C. brachiata*) supposedly had simply pinnate leaves, and the other (*C. triloba*) had doubly compound leaves. Thunberg did not designate types, but authentic specimens have been found at Uppsala, one for each species, and apparently annotated by Thunberg. In contradiction to his diagnoses, both specimens have doubly compound leaves, as do the great majority of South African specimens. The specimen annotated as *C. triloba* has larger flowers (sepals 10 mm long vs 5 mm long) than the specimen annotated as *C. brachiata*. Both flower size and the dissection of the leaf are quite variable, and the differences between these two specimens of Thunberg become insignificant when a large number of specimens are examined. Because of its simply pinnate leaves, *C. hirsuta* may have been equated with Thunberg's diagnosis of *C. brachiata* by some authors. For them the species with doubly-compound leaves was *C. triloba* or one of the later names discussed below.

There was some additional confusion concerning the name *C. triloba* Thunb. It was apparently assumed by some later authors that this name was anteceded by *C. triloba* Roth ex B. Heyne, which however was not published until 1821. The name *C. thunbergii* was published by Steudel in 1841, apparently as a new name for *C. triloba*, so the latter name has been little used. In 1860, Harvey published *C. oweniae* for some South African specimens with doubly-compound leaves, apparently unaware of *C. triloba*. Some authors have attempted to distinguish *C. oweniae* from *C. brachiata* on the basis of anther shape, with the former species possessing short ovoid anthers and the latter elongate anthers. These differences do not hold up when a broad range of specimens is examined. The same applies to the species *C. stewartiae*.

Johnson (1997) and Grey-Wilson (2000) recognized three South African species, *C. brachiata*, *C. triloba*, and *C. oweniae*. Grey-Wilson distinguished *C. oweniae* from *C. triloba* by its smaller flowers (sepals 10–12 mm long vs. 12–18

mm long). He also says that the latter has "deliciously scented" flowers, but does not mention scent for *C. oweniae*. Flowers of *C. brachiata* are simply described as "fragrant," and he appears to have misinterpreted *C. brachiata* as similar in foliage to *C. simensis*. Once again, variation in leaf form and flower size in South African *Clematis* are such that these kinds of lines are hard to draw without extensive field studies. Particular morphological combinations may indeed prove to be consistent within populations occupying specialized habitats or geographical areas. The issue of fragrance also needs to be examined more rigorously and consistently.

Hybridization between *Clematis brachiata* and *Clematis villosa* subsp. *stanleyi*, both of which are common in the Johannesburg area, has been noted in the literature (Letty 1962) and on some herbarium specimens. One specimen that is clearly intermediate in character between these two species is Mogg 36528. This underscores the close relationship between the species formerly segregated into *Clematopsis* and other African species, as well as the possibility that many unusual specimens in Africa could be the result of hybridization.

**2. *Clematis burgensis*** Engl., Bot. Jahrb. Syst. 45:272. 1910.

A distinct species according to Demel (1987), native to Ethiopia. Three of the specimens cited under *C. simensis* (Ash 1294, J. de Wilde 6224, Westphal & Westphal-Stevels 3062) have smooth leaflet margins as indicated for this species, but lack flowers so the other traits could not be verified. I was unable to draw any conclusions about this species from the MO material.

**3. *Clematis chrysoarpa*** Welw. ex Oliv., Fl. trop. Afr. 1:5. 1865. *Clematis villosa* subsp. *chrysoarpa* (Welw. ex Oliv.) Kuntze, *Clematopsis chrysoarpa* (Welw. ex Oliv.) Hutch. (see Brummitt, 2000).

**a. *Clematis chrysoarpa* subsp. *chrysoarpa***

Brummitt (2000) places the following species in synonymy here: *Clematis chrysoarpoides* DeWilde., *Clematopsis speciosa* Hutch. (*Clematis angolana* M. Johnson, 1997, Slåktet Klematis: 145, *nom. nov.*: replaced synonym: *Clematopsis speciosa* Hutch.)

**b. *Clematis chrysoarpa* subsp. *bijuga*** Brummitt, Kew Bull. 55:97-108. 2000.

Brummitt (2000) placed the following species in synonymy here: *Clematopsis lineariloba* Hutch. & Summerh., *Clematopsis oliveri* forma *lineariloba* (Hutch. & Summerh.) Staner & Leonard. (*Clematis africolineariloba* W.T. Wang, Acta Phytotax. Sin. 39:336. 2001, replaced synonym: *Clematopsis lineariloba* Hutchinson & Summerhayes).

**4. *Clematis grandiflora*** DC, Syst. nat. 1:151. 1818. TYPE: not indicated.

*Clematis pseudograndiflora* Kuntze, Verh. Bot. Vereins Prov. Brandenburg 26:128. 1885. TYPE: ANGOLA: Welwitsch 1218, 1219.

*Clematis kakoulimensis* Schnell, Bull. Soc. Bot. France 96:223. 1949. TYPE: GUINEA: Mt. Kakoulima, 2000 ft, Schnell 2461 (HOLOTYPE: n.v.)

*Clematis chlorantha* Lindl., Edward's Bot. Reg. 16, t. 1234. 1829. Belongs here according to Oliver (1868) and Johnson (1997).

A very distinctive species with very large, campanulate flowers. Leaves are 5-pinnate, with leaflets ovate, rarely lobed, and finely toothed, much like those of *C. simensis*. Material referred to as *C. kakoulimensis* and *C. pseudograndiflora* have somewhat smaller flowers, with sepals 18–20 mm long, and about 50 carpels per flower, but otherwise similar to the large-flowered specimens. They appear to represent extremes in the range of variation. A remarkable photograph of this species appears in Johnson (1997), showing large, pendant, yellowish flowers, reminiscent of Asian species in the section *Connatae*.

5. ***Clematis dolichopoda*** Brenan, Kew Bull. 1949:71. 1949. *Clematis hirsuta* var. *dolichopoda* (Brenan) Staner & J. Leonard, Bull. Soc. Roy. Bot. Belgique 82:36, 1950 and Flore du Congo Belge 2:187. 1951.

*Clematis longipes* Engl., Bot. Jahrb. Syst. 45:273. 1910. Illegitimate name, cf. *Clematis longipes* Freyn, 1890, from Madagascar.

Poorly represented in the MO collections, this species appears to be similar to *C. longicauda*, but with smaller flowers. The foliage has the same distinctive indumentum of golden hairs ("rusty ferruginous"). Sepals are 13–20 mm long, variously described as white, golden-white, or yellowish, the latter perhaps due to the heavy external covering of golden hairs. Leaflets are essentially heart-shaped, with irregular teeth, or in some material from Burundi, the leaflets are narrow-elongate. It is possible that the latter material represents hybrids with *C. welwitschii*. The species occurs mostly in high mountains, up to 3500 m, but as low as 1000 m in some Burundi material. One specimen, Williams 35, is placed here questionably. It is a fruiting specimen, but the large number of fruiting heads in the inflorescence suggests that the flowers are much smaller than in the other specimens. The hairs are much sparser on the leaves, though still golden in color.

6. ***Clematis hirsuta*** Guill. & Perr. in Guill., A. Rich. & Perr., Fl. Seneg. tent. 1:1. 1831. TYPE: not cited, collected by Perrottet in 1829 at Cape Verde, Senegal near Kounoun and Rufisk.

*Clematis incisodentata* A. Rich., Tent. fl. abyss. 1:2, fig 1. 1847. TYPE: not specified, but collected by A. Petit in Shoa Province, Ethiopia, between 1838 and 1843; = *C. hirsuta* fide Demel (1987) and Johnson (1997).

*Clematis wightiana* auct non Wall.

*Clematis grata* (non Wall.) sensu Oliv., Fl. trop. Afr. 1:7. 1868.

*Clematis glaucescens* Fresen., Beitr. Fl. Abyssin., in Mus. Senckenb. 2: 268. 1837. TYPE: Not cited; = *C. hirsuta* fide Demel (1987) and Johnson (1997).

*Clematis djalonenis* A. Cheval., Bull. Mus. Hist. Nat. (Paris), ser. 2. 4:1010. 1932. TYPE: FRENCH GUINEA: Fouta-Djalon, 1300 m, Chevalier 34545 (n.v.) (= *C. hirsuta* fide Hutch. & Dalziel).



*Clematis chariensis* A. Cheval., Bull. Mus. Hist. Nat. (Paris), ser. 2. 4:1012. 1932. TYPE: CENTRAL AFRICAN REPUBLIC: Haut-Chari, between Dekoua and Nana, *Chevalier 6192*; said to be a cousin of *C. hirsuta* by Chevalier, described as a low-growing scrambler adapted to frequent bush fires, sprouting annually from the rootstock.

*Clematis petersiana* Klotzsch in Peters, Naturw. Reise Mossambique 6(1):170. 1861. From the ambiguous description, this species appears to be indistinguishable from ordinary *C. hirsuta*. It is from the upland, interior province of Tete, and so not likely to be equated with *C. viridiflora*.

In the conservative treatment presented here, this is a widespread, variable species found throughout the tropical savannas and open woodlands of central Africa. Its distribution correlates roughly with that of *Acacia sieberana* in mid-elevation plains and plateaus in what is called the Sudano-Zambezian region (Brenan 1978). The correlated distribution of the two species includes disjunct populations of each in central Angola. The two other widespread species with numerous white flowers appear to be geographically and/or altitudinally separated: *C. simensis* at generally higher elevations, and *C. brachiata* further south in the warm-temperate to subtropical grasslands of South Africa. A fourth species that appears to be in this complex, *C. viridiflora* is a lowland species found along the coast of Mozambique and possibly Tanzania. There are morphological differences as well, but definitely gray areas between these species, both geographically and morphologically. *Clematis hirsuta* is distinguished from *C. simensis* by its lobed, irregularly toothed leaflets, as opposed to the unlobed, finely dentate leaflets of the latter, and from *C. brachiata* by its simply pinnate leaves, as opposed to the doubly compound leaves of *C. brachiata*. *C. viridiflora* is hard to distinguish from herbarium material, but its flowers are somewhat larger, with the sepals said to be thinner and more yellowish.

*Clematis* species with numerous, small, white flowers are found throughout the world, including the *C. virginiana/catesbyana/ligustifolia* group in North America, *C. dioica* and its relatives in tropical America, *C. grata/wightiana* and similar species in Asia, *C. vitalba* in Europe, and other species in New Guinea, Australia and New Zealand. All of these species are abundant, variable and widespread, occupying open, disturbed habitats, and can generally be described as "weedy." Species with larger, fewer, and often more colorful and/or fragrant flowers, on the other hand, tend to be less common and more restricted in both their distribution and habitat preferences. This pattern holds for Africa as well.

The species placed in synonymy here were based on one or a few variant specimens and appear to fall within the range of variation in the widespread species, although they do warrant further study. The vestiture of the leaves in *C. hirsuta* is variable. Some, as the name implies, are rather densely hirsute, while others are nearly glabrous. The greatest concentration of heavily hirsute specimens is in the Ethiopia/Uganda region. Some populations in Ethiopia have significantly larger flowers with rather attenuate sepals, as opposed to the more

obtuse sepals in other specimens, suggesting some degree of subspecific differentiation. This appears to have been the basis for recognizing both *C. glaucescens* and *C. inciso-dentata*, neither of which were recognized by Demel Tekatay (1987) in his thorough study of *Clematis* in Ethiopia. The present study also suggests that there are numerous intermediate specimens, making such a distinction difficult. Grey-Wilson (2000) recognized *C. djalonensis* from southwest Mali and northern Guinea, on the basis of its smaller flowers that are more rounded in bud and said to be more fragrant, and with shorter pedicels. This again appears to fall within the range of variation for *C. hirsuta*, but needs to be investigated further. The photograph of *C. hirsuta* in Grey-Wilson appears to be misidentified. The flowers appear to be much larger than those of the many specimens examined in this study, and the leaves appear to be more deeply divided. The plant looks more like *C. welwitschii*.

One difficulty in verifying the proper application of the name *C. hirsuta* is the lack of authentic type material. The type should be at Paris, but it cannot be found, and the Missouri collection contains no specimens from Senegal at all. The protologue for that species indicates that the foliage is ternate to biternate, and densely villous. No dimensions were given for the flowers, which were said only to be in clusters of 1-3. Biternate leaves are rare in the species as currently understood, suggesting the possibility that the population at Cape Verde (near sea-level) is distinct at some level from the more widespread form. In his flora of Senegal, Berhaut (1967) describes the leaves as having two pairs of leaflets, and the white flowers produced in large panicles, which is consistent with *C. hirsuta* elsewhere in its range. It is not known whether Berhaut had material from the Cape Verde area, however. If the species still exists there, it needs to be studied in order to resolve any further doubts.

**7. *Clematis longicauda*** Steud. ex A. Rich., Tent. fl. abyss. 1:2. 1847. TYPE: ETHIOPIA:  
*Schimper 1284* (n.v.).

This taxon has large flowers similar to those of *C. grandiflora*. The 3-foliolate leaves differ conspicuously in the broader, lobed leaflets and the fine reddish-gold pubescence. It is found at higher elevations (1350-2100 m), and only in Ethiopia. Johnson (1997) and Grey-Wilson (2000) both misinterpret this very distinctive species as a synonym of *C. hirsuta*.

**8. *Clematis simensis*** Fresen., Beitr. Fl. Abyssin., in Mus. Senckenb. 2:267. 1837.  
TYPE: *Ruppell* (n.v.).

*Clematis altissima* Hutch. belongs here according to Hutchinson and Dalziel (1954) and Johnson (1997).

This is a distinctive species occurring throughout central and eastern Africa, generally at higher elevations than *C. hirsuta*, with which it overlaps geographically. Leaves are typically 5-foliolate, with the leaflets finely toothed and

unlobed. Flowers tend to be numerous in elongate inflorescences, well exserted above the foliage. One specimen from Kenya, *Taylor 1455*, has unusually large flowers, representing perhaps a taxonomic variant or hybrid with a large-flowered species.

**9. *Clematis sigensis*** Engl., Bot. Jahrb. Syst. 45:271. 1910.

A distinct species according to Beentje (1989), found in Kenya and Tanzania; no matching specimens at MO.

**10. *Clematis uhehensis*** Engl., Bot. Jahrb. Syst. 28:387. 1900. *Clematopsis scabiosifolia* subsp. *uhenensis* (Engl.) Brummitt, *Clematopsis villosa* subsp. *uhehensis* (Engl.) J. Raynal & Brummitt (see Brummitt, 2000).

Brummitt (2000) includes the following names in synonymy here: ?*Clematis villosa* var. *teuszii* Kuntze, *Clematopsis teuszii* (Kuntze) Hutch.; *Clematis homblei* De Wild., *Clematopsis homblei* (De Wild) Staner & J. Leonard, *Clematopsis katangensis* Hutch., *Clematis katangensis* (Hutch.) M. Johnson, *Clematopsis simplicifolia* Hutch & Summerh., *Clematopsis grandifolia* Staner & J. Leonard, *Clematis grandifolia* (Staner & J. Leonard) M. Johnson.

**11. *Clematis villosa*** DC., Syst. nat. 1:154. 1818.

**a. *Clematis villosa* subsp. *villosa***

Brummitt (2000) placed the following species in synonymy here: *Clematis scabiosifolia* DC., *Clematis villosa* var. *scabiosifolia* (DC.) Hiern., *Clematopsis scabiosifolia* (DC.) Hutch., *Clematis villosa* subsp. *argentea* Kuntze, *Clematis argentea* (Kuntze) Prantl, *Clematopsis argentea* (Kuntze) Hutch., ?*Clematis mechowiana* Kuntze, ? *Clematis villosa* var. *angolensis*, *Clematis stuhlmannii* Hieron. ex Engl., *Clematopsis stuhlmannii* (Hieron. ex Engl.) Hutch., *Clematis villosa* forma *obtusiloba* Hiern, *Clematis villosa* forma *stenophylla* Hiern, *Clematis sapinii* De Wild, *Clematopsis sapinii* (De Wild.) Staner & J. Leonard.

**b. *Clematis villosa* subsp. *stanleyi*** (Hook.) Kuntze, Verh. Bot. Vereins Prov. Brandenburg 26:172. 1885. *Clematis stanleyi* Hook., *Clematopsis scabiosifolia* subsp. *stanleyi* (Hook.) Brummitt, *Clematopsis stanleyi* (Hook.) Hutch. (see Brummitt, 2000).

Brummitt (2000) places the following species in synonymy here: *Clematis villosa* var. *tomentosa* (Kuntze) T. Durand & Schinz.

This is a very distinctive subspecies, with finely dissected leaves.

**c. *Clematis villosa* subsp. *kirkii*** (Oliv.) Brummitt, Kew Bull. 55:97-108. 2000. *Clematis kirkii* Oliv., *Clematis villosa* var. *kirkii* (Oliv.) Kuntze, *Clematopsis kirkii* (Oliv.) Hutch., *Clematopsis scabiosifolia* subsp. *kirkii* (Oliv.) Brummitt (see Brummitt 2000).

Brummitt (2000) places the following species in synonymy here: *Clematis villosa* var. *pubescens* Kuntze; *Clematis stanleyi* var. *pubescens* (Kuntze) T. Durand & Schinz; *Clematis goetzei* Engl.; *Clematis busseana* Engl.; *Clematis lugnignu* De Wild.

**d. *Clematis villosa* subsp. *oliveri*** (Hutch.) Brummitt, Kew Bull. 55:97-108. 2000.  
*Clematopsis scabiosifolia* subsp. *oliveri* (Hutch.) Brummitt.

Brummitt (2000) included the following species in synonymy here: *Clematopsis nigerica* Hutch.

**12. *Clematis viridiflora*** Bertol., Misc. bot. 19:7, pl. 3. 1830.

The number of specimens available for this species at MO are few, but it appears to be a distinct species ecologically as well as morphologically. The name suggests that the flowers are greenish. This is confirmed on one specimen (*Lemos & Balsinhas* 37) who describe the flower color as "amarelo-esverdeadas." Exell and Milne-Redhead (1960), describe the sepals as "thin and membranous" as opposed to the thicker sepals of *C. brachiata*, which they equate with *C. hirsuta*. Ecologically, it appears to be a coastal species, apparently growing on dunes—a most unusual habitat for African *Clematis*, although in North America there are populations of *C. catesbyana* in a similar habitat (Essig 1990). A photograph of a cultivated plant attributed to this species in Grey-Wilson (2000) shows a plant with yellowish flowers. If accurately identified, it confirms a distinctly different species, and also strengthens the argument of a relationship with section *Meclatis*. One specimen from Zanzibar Island is tentatively placed here, though it has smaller flowers, reported to be white, and leaflets less lobed than the material from Mozambique. It may be represent *C. zanzibarensis* Bojer ex Loud., who found it similar to *C. vitalba* and *C. grata*, the latter a name widely misapplied to *C. hirsuta*. It has to be remembered also that Zanzibar has been a center of trade for centuries and that exotic species may have been brought in.

**13. *Clematis welwitschii*** Hiern ex Kuntze, Verh. Bot. Vereins Prov. Brandenburg 26:171. 1885. TYPE: *Welwitsch* 1217 (photo seen, MO- Angola); see also Exell & Mendonca (1937).

*Clematis antunesii* Engl., Bot. Jahrb. Syst. 45:274. 1910. TYPE: ANGOLA: *Antunes* A56 (BD, n.v.), belongs here according to Exell and Mendonca (1937).

*Clematis commutata* Kuntze, Verh. Bot. Vereins Prov. Brandenburg 26:128. 1885. TYPE: ANGOLA: *Welwitsch* 1215a (MO-photo seen).

*Clematis prostrata* Hutch., Botanist southern Africa. 484. 1946. TYPE: *Hutchinson* 3504 (n.v.); appears to belong here from the description, placed here by Exell & Milne-Redhead, 1960.

*Clematis thalicrifolia* Engl., Bot. Jahrb. Syst. 45:270. 1910. Zaire, Zambia, Tanzania; close to *C. welwitschii* fide Exell & Milne-Redhead (1960), distinguished by larger, solitary flowers.

This taxon includes specimens with medium-large flowers (sepals 1.5-2 cm long) with spreading sepals. Flowers are reported to be white to cream-colored, but sometimes with a pink tinge on the outside. Foliage is extremely variable in this species. Leaves are pinnately to doubly pinnately compound, with leaflets coarsely toothed, deeply lobed, elongate, and sometimes very finely dissected. The types of both *C. welwitschii* and *C. commutata* were collected in Angola, and both names have been applied to specimens with moderately large flowers

in a broad area from Angola, Zaire and Cameroon to Tanzania. Differences between them, primarily leaf shape and number of flowers, blur considerably when a large number of specimens are examined, and they appear at this point to be just forms of one variable species. Johnson (1997) and Grey-Wilson (2000) both recognize *C. commutata* and *C. thalictrifolia* as separate species, but the distinctions are not clear or convincing, and the ranges overlap. The Missouri collections did not contain any specimens with flowers as large as those reported for *C. thalictrifolia*. They are said to be up to 50 mm across, which put them in the range of *C. grandiflora* or one of the species of section *Pseudanemone*, such as *C. villosa*. This potential species is certainly worth investigating. A number of the specimens cited below have broad, cordate leaves and/or somewhat smaller flowers, strongly suggesting hybridization with a species such as *C. hirsuta*. These include *Exell & Mendonca 1076* from Angola, *Lacroix 3020*, *Tawakali & Kaunda 190*, and *Pawek's 6255, 12644, and 13658* from Malawi.

#### ERRONEOUS AND UNRESOLVED NAMES IN AFRICAN CLEMATIS

The following names are either erroneous, invalid or require further research to determine their status. (note: IPNI = International Plant Name Index at [www.ipni.org](http://www.ipni.org))

- Clematis capensis* Poir. Encyc. Suppl. 2, 298. (= *Anemone capensis* according to IPNI).
- Clematopsis costata* Weim., Bot. Not. 1936:28. Zimbabwe/Zambia.
- Clematis friesiorum* Ulbr., Notizbl. Bot. Gart. Berlin-Dahlem, 10:914. 1930. Kenya. (= *C. hirsuta* fide Johnson 1997)
- Clematis intermedia* Chiov., Ann. Bot. (Roma) 9:51. 1911. hybr. Ethiopia; said to be a natural hybrid between *C. simensis* and "C. thunbergii" (*C. hirsuta*?).
- Clematis iringaensis* Engl., Bot. Jahrb. Syst. 28:388. 1900. Zambia and Tanzania; resembles *C. welwitschi*, but flower buds covered with "yellow" indumentum, possibly as in *C. dolichopoda*.
- Clematis kassneri* Engl., Bot. Jahrb. Syst. 45:274. 1910; Zaire. (= *C. welwitschii* fide Grey-Wilson (2000).
- Clematis keilii* Engl., Bot. Jahrb. Syst. 45:273. 1910; Burundi. (= *C. welwitschii* fide Grey-Wilson (2000; but said by Engler to be "ferrugineo-pilosus" and similar to *C. longipes*, i.e. *C. dolichopoda*).
- Clematis kerrii* Steud., Nom. ed. 2. 1:379. 1840. South Africa.
- Clematis kissenyensis* Engl. in Wiss. Ergebn. Deutsch. Zentr. Afr.-Exped. 1907-8, 2:207. 1911. Tropical East Africa. (= *C. simensis* fide Johnson 1997)
- Clematis massoniana* DC., Syst. nat. 1:135. 1818. (= *C. brachiata* fide IPNI). Ethiopia? South Africa.
- Clematopsis pulchra* Weim., Bot. Not. 1936:27.
- Clematis schinziana* Engl. & Gilg ex Engl., Pflanzenw. Ost.-Afrikas 3:1. 1895. (Engl. & Drude, Veg. Erde 9:172. 1915, in obs.). Namibia.
- Clematis spathulifolia* (Kuntze) Prantl, Bot. Jahrb. Syst. 9:258. 1888, in obs. Zaire (cannot be determined fide Brummitt 2000).
- Clematis stolzii* Engl., Bot. Jahrb. Syst. 45:272 (1910), Malawi. (= *C. simensis* fide Johnson 1997, but has few, rather large flowers; could be a form of *C. welwitschii* or a hybrid).
- Clematis tenuifolia* Poir., Encyc. Suppl. 2, p. 298. 1786. (= *Anemone tenuifolia* fide IPNI).
- Clematis teusczii* (Kuntze) Engl., Pflanzenw. Ost.-Afrikas 3:1. 1895. (Engl. & Drude, Veg. Erde 9:170. 1915, in obs. (= *C. villosa* var. *teusczii* fide IPNI). Angola.

*Clematis tibestica* Quezel, Bull. Soc. Hist. Nat. Afrique N. 48:86. 1957. Tibesti Mountains of Sudan (treated as a separate species by Johnson (1997) and Grey-Wilson (2000), who also indicated its close affinity with *C. simensis*).

*Clematis zanzebarica* Sweet, Hort. brit. ed. 2, 1. 1832. = *C. zanzibarensis* Loudon, fide IPNI (= *C. viridiflora*?).

*Clematis zanzibarensis* Bojer ex Loudon, Hort. brit., ed 2, 228. 1832. (= *C. viridiflora*?, similar to *C. vitalba* or *C. grata* fide Exell & Mendonca 1937).

## APPENDIX

### Abbreviated listing of specimens examined (all from MO)

***Clematis brachiata* Thunb.—Botswana:** Skarpe 284. **Namibia:** Leistner et al. 194; Muller & Tilson 917; Seydal 2150; 4123, 4291. **South Africa:** Allardice 1572; Arnold 205; Balsinhas 2857, 3416; Bayliss 1188, 1331, 4674; Booij 32; Borle 508, 1110; Brink 596, 628; Buitendag 812; Burt-Davy 15148; Codd 9648; Dahlstrand 2387, 2542, 3515, 3588; Davidse 6776; Drege s.n. (6 specimens with meager label data); Ecklon s.n. (3 specimens with meager label data); Edwards 175; Edwards & Vahrmeyer 4281; Germishuizen 225, 3168, 3924; Gibbs et al. 234; Goldblatt 1688; Halliwell 5126; Hilliard & Burt 9836; Joffe 232; Kemp 864; Krause 1234; Leendertz 50; Liebenberg 7564, 8820; Madley-Wood 4733, s.n. (1900); McLean 331, 534, 829; Mogg 19347, 21053, 25264, 25832; Morley 377; Pillans 10910; Phillipson 551; Raymond s.n. (1972); Reardon 17; Retief & Germishuizen 286; Rodin 3685, 3874; Scheepers 1398, 1485; Sidey 683, 2432; Stinton 83; Strey 2542, 9745, 86411181, 11263; Vahrmeyer 2425; van Hoepen 1648; Welman 729, 801; Wild 5781; Zambatis 1182. **Swaziland:** Kemp. **Zimbabwe:** Davies 388; Ngoni 372; Norrgrann 103a.

***Clematis chrysocarpa* subsp. *chrysocarpa* Welw. ex Oliv.—Angola:** Exell & Mendonca 794, 1360, 2547; Homble 828bis (photo, BR); Welwitsch 1222 (photo, BM). **Zaire:** Symoens 6060

***Clematis chrysocarpa* subsp. *bijuga* Brummitt—Malawi:** Brummitt et al. 15601; Chapman & Chapman 7510; Lacroix 4257; Pawek 6256, 8044, 8415, 8894, 10797; Phillips 799, 1310; Reekmans 5527. **Mozambique:** Jansen & Boane 7882; Pereira et al. 1827. **Tanzania:** Bidgood & Congdon 147; Kayombo & Kayombo 166; Gereau & Kayombo 4363; Richards 15564; Stolz 2385 (type of *C. lineariloba* Hutch. & Summerhayes)

***Clematis dolichopoda* Brenan—Tanzania:** Williams 35; Verdcourt 275; Schlieben 3991. **Burundi:** Reekmans 2298, 2365, 8476.

***Clematis grandiflora* DC—Angola:** Gossweiler 10311, Welwitsch 1218 (photo, BM, type of *C. pseudograndiflora*), 1219. **Cameroon:** Bates 1257, Guile 10, Latilo & Daramola FHI 28900, de Wilde & de Wilde-Duyffes 1157. **Côte d'Ivoire:** Hepper & Maley s.n. (1984). **Ghana:** Vigne 2681. **Guinea:** Adam 3857, 7562. **Liberia:** Konnel 621. **Nigeria:** Dalziel s.n. (1912). **Sierra Leone:** Adam 22116, 22315, 22409, 22974. **Zaire:** Liben 3192.

***Clematis hirsuta* Guill. & Perr—Angola:** Giess et al. 6612; Gossweiler 10285, 11379. **Botswana:** Smith 616, 3520. **Burundi:** Lewalle 4674; Reekmans 595, 3444, 5132, 5133, 5138, 6271, 8029, 8983, 9145, 10258, 10420. **Cameroon:** Thomas 3105; Baldwin 13852; de Wilde & de Wilde-Duyffes 4332, 4117; Latilo & Dasabika 28773; Leeuwenberg 7561, 10497. **Central African Republic:** Fay 5562, 6084. **Côte d'Ivoire:** Gautier-Beguín 460. **Ethiopia:** Ash 652, 1279, 1343; de Wilde & de Wilde-Duyffes 8693, 9277; J. de Wilde 5773, 5866, 6225, 7350; Mengeshu s.n. (1958); Nievergelt & Nievergelt 1227; Pappi 4642, 507; Pichi-Sermolli 2372; Schimper 212, 1481; Westphal & Westphal-Stevens 2476, 2876, 2951. **Fernando Po:** Guinea 1876. **Guinea:** Adam 2630, 7174, 7190. **Kenya:** Agnew et al. 10283; Mwangangi 77; Faden et al. 74/655; Harmsen & Agnew 6540; Paolo 541; Perdue & Kibuwa 8155; Williams 315. **Malawi:** Banda & Thera 2612; Brass 17112, 17119; Chapman & Chapman 7496; Kwatha & Balaka 139; LaCroix 4562; Pawek 5547, 5548, 7162, 11354; Phillips 1438, 2678, 2823; Salubeni 1536, 2799, 3156; Salubeni & Tawakali 4960, 5000;

Stolz 206; LaCroix 4562; Willan 65. **Mozambique:** de Konig 7436; Jansen et al. 301. **Nigeria:** Olorunfemi et al. OBB94, OBB501; Guile 13. **Rwanda:** Bouxin & Radoux 2216. **Sierra Leone:** Adam 22214, 22768, 22223, 23259, 22944; Morton SL2804. **Somalia:** Pichi-Sermolli 138. **South Africa:** Cooper 191; Galpin 14413, 14418; Hemm 596; Stalmans 441. **Swaziland:** Kemp 734, 847. **Tanzania:** Flock 423; Frame 149; Gereau & Mziray 1678; Gereau et al. 4600; Grant s.n. (1928); Greenway & Kanuri 15164; Jefford et al. 243; Kayombo 555; Lovett 2182; Lovett & Congdon 1852; Lovett & Kayambo 3458; Mathias et al. A86; Newbould & Harley 4220; Paget-Wilkes 4; Richards 27090; Sanane 220; Schlieben 4393; Tanner 627, 4922; Williams 690. **Togo:** Bretelet 7229; Ern et al. 776; Robertson 72; Schafer 7628. **Uganda:** Brown 63; Dummer 177; Elliot 6567, 7818; Katende 2601, 2219; Loveridge 190, 421; Ross 889; Rwaburindore 326, 998, 1474, 2035, 2676; Taylor 2214, 2275, 2550, 3283. **Zaire:** Bamps 3003; Callens s.n. (July 1958), s.n. (Aug 1958); de Craene 231; Evrard 6350; Jean Lebrun 5352, 8241, 9132; Jean Louis 20, 709, 4509; Michel 2922; Michel & Reed 92; Robyns 2296; Toussaint 2417. **Zambia:** Angus 208, 1279, 1610; Bainbridge 782, 786; Best 328, 327; Chase 8605; Davies 1166; Kabisa 22; Mshasha 66; Richards 9421, 9553, 15136, 15148, 15195, 22233; White 3222. **Zimbabwe:** Bayliss 10087, 10488; Biegel 3126; Chase 4887; Davies 388, 1166; Kabisa 22; Mshasha 66; Muller 2475, 3403, 3087; Noel 2436; Nyarini 168; Plowes 1622; Rushworth 689; Siniou 2194; West 2161; Wild 5781.

**Clematis longicauda** Steud. ex A. Rich.—**Ethiopia:** Ash 2767, de Wilde & de Wilde-Duyffes 9384, 10133, 10434; J. DeWilde 6118, 6720; Meyer 7718; Pichi-Sermolli 2352; Schimper 1284.

**Clematis simensis** Fresen.—**Burundi:** Reekmans 7905, 10671. **Cameroon:** Thomas 2637. **Ethiopia:** Ash 35, 679, 1294; J. de Wilde 3062, 4077, 6224; de Wilde & de Wilde-Duyffes 8238, 8374, 8966, 8984, 10145; Pichi-Sermolli 135, 138; Schimper 1512; Westphal & Westphal-Stevens 1019, 2350, 3062. **Kenya:** Agnew 7707, 9438; D'Arcy 7364; Greenway & Kanuri 13838, 14895; Maas Geesteranus 6049; Maberley & McCall 12; Robertson 1567; Taylor 125361455. **Malawi:** Brass 16106, 16860, 16836; Chapman & Chapman 7807; LaCroix 3103; Pawek 7014, 9711, 10000; Phillips 1704, 2825. **Nigeria:** Sanford 5494. **Rwanda:** Fossey B/7. **Tanzania:** Gereau & Abdallah 1745; Iwarsson et al. 1065; Jefford et al. 1745; Mathias & Taylor A86; Mwanambi 16316; Richards 16802. **Uganda:** Katende 3305; Robertson 1567. **Zaire:** Louis 4817.

**Clematis uhchensis** Engl.—**Malawi:** Pawek 7910; Phillips 136, 337, 452, 1360. **Mozambique:** Sousa 1641. **Tanzania:** Brummitt et al. 18141; Gereau et al. 2833; Goetze 579 (photo, B); Magogo 255; Stolz 2514; Suleman & Fundi 16. **Zaire:** Bamps & Malaisse 8407; Kassner 3347 (photo, BM); Shantz 554 (photo, K).

**Clematis villosa** subsp. *stanleyi* (Hook.) Kuntze—**Angola:** Exell & Mendonca s.n. (1961); Rodin 9349; Young 1385. **Namibia:** Seydel 2067. **South Africa:** Bayliss 3145, 4664; Bourell et al. 2571; Burke 1853; Joffe 192; Liebenberg 8815; Mogg 18811, 21054; Rand 1282; Scheepers 1486; Sidey 1456; J. Thode 1348; Welman 592. **Zimbabwe:** Chubb 108; Cross 353; Plowes 1647; Gonde 386; Leach 8200; Miller 2087, 2189; G. West 2538. **Zimbabwe or Zambia:** Monro s.n.; Mshasha 162; Opperman s.n. (1969). **Zambia:** Grant 4518; Harder et al. 4018; Nawa et al. 123; F. White 1918.

**Clematis villosa** subsp. *kirkii* (Oliv.) Brummitt—**Angola:** Exell & Mendonca 120, 1702, 1741, 160. **Malawi:** Banda 1509; Brass 17453; Chapman & Chapman 7326; Grosvenor & Renz 933; Patel et al. 1484; Pawek 5463, 6634, 8253; Phillips 768A, 1181, 1449, 3671; Salubeni et al. 2518. **Mozambique:** Correia 215; Gomes & Sousa 1662; Torre & Paiva 379. **Tanzania:** Bally & Carter 16461; Gribb et al. 11247; Kayombo & Kayombo 212; Lovett 1482; Lovett et al. 1899; Muumba DSM 3029; Paget-Wilkes 785; Prins-Lambert 392; Stolz 146; Thulin & Mhoro 3125. **Zaire:** Brookes et al. 191; Robyns 1587. **Zambia:** Lusaka Natural History Club 228; Richards 22153. **Zimbabwe:** Bayliss 10659; Chase 7926; Davies 47; Gote 198; Rhodin 4368; Rutherford-Smith 482; West 2541.

**Clematis villosa** subsp. *oliveri* (Hutch.) Brummitt—**Burundi:** Reekmans 2756, 3824, 5337, 5527, 6754. **Cameroon:** DeWilde & de Wilde-Duyffes 2344; Leeuwenberg 7619, 7668; Thomas 6072. **Nigeria:** Ekwuno et al. 291; Sanford 5162, 6176; Wit et al. 1998. **Ruanda:** Michel 3250. **Tanzania:** Gereau & Kayombo 4773; Haarer 2251; Lovett & Congdon 2912; Mwanoka & Kayombo 662; Ndama & Mabira 2251; Shabani 973. **Zaire:** Grant 4501a; Lebrun 9519a; Malaisse 11214; Michel & Reed 2, 232. **Zambia:** Harder et al. 2610.

**Clematis villosa** DC subsp. **villosa**—**Angola**: Exell & Mendonca 1924, 2503, 2967. **Burundi**: Reekmans 1756. **Tanzania**: Gobbo et al. 723; Haarer 2252; Paget-Wilkes 383.

**Clematis viridiflora** Bertol.—**Mozambique**: Correia & Marques 2189; Edwards & Vahrmeyer 4281; Lemos & Balsinhas 37; deKoning & Hiemstra 9022. **Tanzania (Zanzibar)**: Haji DSM 4026.

**Clematis welwitschii** Hiern ex Kuntze—**Angola**: Carisso & Mendonca, 575; Exell & Mendonca 358, 382, 396, 1076; Welwitsch 1215a (photo of type of *C. commutata* at BM); Welwitsch 1217 (photo of type of *C. welwitschii* at BM). **Cameroon**: Breteler et al. 2448. **Malawi**: Chapman & Chapman 9008; LeCroix 3020, Tawakali & Kaunda 190; Lovett & Congdon 2885; Pawek 6255, 7151, 8405, 12644, 12686, 13658, 14352. **Mozambique**: Edwards & Vahrmeyer 4281. **Tanzania**: Bidgood & Congdon 150; Gereau & Kayombo 4228; Mwangoka & Kayombo 872; Mwasumbi 16172; Richards 20438. **Zaire**: Quarre 5383. **Zambia**: Lumba Natural History Club 38; Schmidt et al. 1333; Vesey-Fitzgerald 1172; White 2643. **Zimbabwe**: Bayliss 10086; Leech & Brunton 9841; Rodin 4369.

**Clematis welwitschii** Hiern ex Kuntze—**Angola**: Carisso & Mendonca, 575; Exell & Mendonca 358, 382, 396, 1076; Welwitsch 1215a (photo of type of *C. commutata* at BM); Welwitsch 1217 (photo of type of *C. welwitschii* at BM). **Cameroon**: Breteler et al. 2448. **Malawi**: Chapman & Chapman 9008; LeCroix 3020, Tawakali & Kaunda 190; Lovett & Congdon 2885; Pawek 6255, 7151, 8405, 12644, 12686, 13658, 14352. **Mozambique**: Edwards & Vahrmeyer 4281. **Tanzania**: Bidgood & Congdon 150; Gereau & Kayombo 4228; Mwangoka & Kayombo 872; Mwasumbi 16172; Richards 20438. **Zaire**: Quarre 5383. **Zambia**: Lumba Natural History Club 38; Schmidt et al. 1333; Vesey-Fitzgerald 1172; White 2643. **Zimbabwe**: Bayliss 10086; Leech & Brunton 9841; Rodin 4369.

#### ACKNOWLEDGMENTS

I am grateful to the staff of the Missouri Botanical Garden for making their collection of African *Clematis* available to me for this study, and to Richard Brummitt of the Royal Botanic Gardens, Kew, and Gretchen Walters of the Missouri Botanical Garden, for comments on earlier versions of the manuscript.

#### REFERENCES

- BEENTJE, H.J. 1989. The reinstatement of *Clematis sigensis* Engl. (Ranunculaceae). *Utafiti* 2(1):16.
- BERHAUT, J. 1967. Flore du Senegal. 2<sup>nd</sup>. Ed. ClairAfrique. Dakar.
- BRENAN, J.P.M. 1978. Some aspects of the phytogeography of Tropical Africa. *Ann. Missouri Bot. Gard.* 65:437–478.
- BRUMMITT, R.K. 2000. Inclusion of *Clematopsis* Hutch. in *Clematis* L. (Ranunculaceae). *Kew Bull.* 55:97–108.
- CROSBY, M.R. 1978. Systematic studies in Africa: the twenty-fourth Systematics Symposium. *Ann. Missouri Bot. Gard.* 65:367–368.
- DURAND, T. 1895. *Conspectus florae Africae*. Jardin botanique de l'état, Bruxelles. Pp.1–8.
- ESSIG, F.B. 1990. The *Clematis virginiana* (Ranunculaceae) complex in the southeastern United States. *Sida* 14:49–68.
- EXELL, A.W. and MENDONCA 1937. *Conspectus florae Angolensis*. Lisboa, Portugal. 1:1–4.
- EXELL, A.W. and E. MILNE-REDHEAD. 1960. *Clematis*. In: A.W. Exell and H. Wild, eds. *Flora Zambesiaca*. Pp. 89–93.
- GREY-WILSON, C. 2000. *Clematis*, the genus. Timber Press. Portland, OR.



- JOHNSON, M. 1997. Slæktet Klematis. Magnus Johnsons Plantskola AB. Soedertaelje. Sweden.
- HUTCHINSON, J. and J.M. DALZIEL. 1954. Flora of West Tropical Africa. London, Crown Agents for Oversea Governments and Administrations. Pp. 64–65.
- LETTY, C. 1962. Wild flowers of the Transvaal. Trustees of the Wild Flowers of the Transvaal Book Fund. P. 140.
- OLIVER, D. 1868. Flora of Tropical Africa. London, L. Reeve and Co. 1:7.
- TAMURA, M. 1967. Morphology, ecology and phylogeny of the Ranunculaceae VII. Sci. Rep. Osaka Univ. 16:21–43.
- TEKATAY, D. 1987. Revision of the genus *Clematis* L. in Ethiopia. Belmontia 19(108):1–42.
- THULIN, M. 1993. Flora of Somalia. Royal Botanic Gardens, Kew. 1:22.
- WHITE, F. 1962. The forest flora of northern Rhodesia. Oxford University Press. Pp. 46–47.