

FLORA OF SOUTHERN AFRICA

VOLUME 5

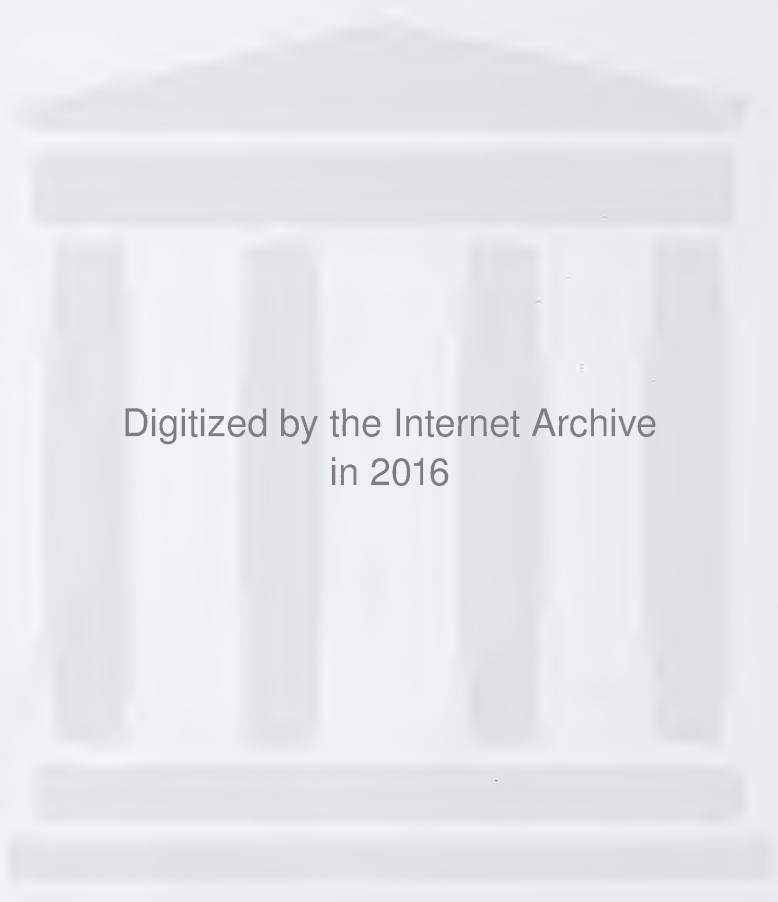
Editors G. Germishuizen & B.A. Momborg



Part 1

Fascicle 2: Asphodelaceae (First part): *Kniphofia*

by L.E. Codd



Digitized by the Internet Archive
in 2016

<https://archive.org/details/floraofsoutherna512unse>

FLORA OF SOUTHERN AFRICA

which deals with the territories of

SOUTH AFRICA, LESOTHO, SWAZILAND, NAMIBIA AND BOTSWANA

VOLUME 5

PART 1

FASCICLE 2: ASPHODELACEAE (FIRST PART): *KNIPHOFIA*

by

L.E. Codd

Scientific editor: G. Germishuizen
Technical editor: B.A. Momberg



Pretoria
2005

Editorial Board

B.J. Huntley South African National Biodiversity Institute, Cape Town, RSA
R.B. Nordenstam Swedish Museum of Natural History, Stockholm, Sweden
W. Greuter Botanischer Garten und Botanisches Museum Berlin-Dahlem, Berlin, Germany

Typesetting and page layout by S.S. Brink, SANBI, Pretoria

Printed by Afriscot Printers, P.O. Box 75353, 0040 Lynnwood Ridge

© published by and obtainable from the
South African National Biodiversity Institute, Private Bag X101, 0001 Pretoria,
South Africa

Tel. (012) 804-3200 Fax (012) 804-3211
<http://www.sanbi.org>

ISBN 1-919976-03-5

CONTENTS

New taxa, new combinations and new statuses published in Volume 5, Part 1, Fascicle 2 (First part)	iv
Introduction	v
Kniphofia <i>Moench</i>	1
Excluded species	85
References	88
Index	93
Appendix:	
Plan of <i>Flora of southern Africa</i>	A-1
<i>FSA</i> contributions in <i>Bothalia</i>	A-3
<i>Flora of southern Africa</i> : alphabetical list of published taxa	A-4

**NEW TAXA, NEW COMBINATIONS AND NEW STATUSES
PUBLISHED IN VOLUME 5, PART 1, FASCICLE 1 (FIRST PART)**

None.

INTRODUCTION

This part is compiled in accordance with the Guide for contributors to the *Flora of southern Africa* (compiled by Leistner, Ross & De Winter and available from the Editor, South African National Biodiversity Institute, Private Bag X101, Pretoria, 0001 South Africa).

The maps show the distribution of the various taxa in the *FSA* region only.

The numbering of the genus is according to De Dalla Torre & Harms in their *Genera siphonogamarum* (1900–1907), as adapted by Germishuizen & Meyer (2003).

Background to this Fascicle

Dr L.E.W. Codd, former Director of the Botanical Research Institute (now the South African National Biodiversity Institute), completed the manuscript of the revision of the genus *Kniphofia* for the *Flora of southern Africa* in the late 1980s, after his major work on the genus (Codd 1968).

The line drawings by Gill Condy in this Fascicle have been added to illustrate taxa that have not appeared in Codd (1968) and that have not been illustrated in the *Flowering Plants of Africa* series. Furthermore, literature references such as Fabian & Germishuizen (1997), Retief & Herman (1997), Goldblatt & Manning (2000), Leistner (2000) and Germishuizen & Meyer (2003) have been added to include the latest work on the genus. *Kniphofia leucocephala* Baijnath (1992) was taken verbatim to complete the revision of the genus. The key has been adapted to include this species.

References

- BAIJNATH, H. 1992. *Kniphofia leucocephala* (Asphodelaceae): a new white-flowered red-hot poker from South Africa. *South African Journal of Botany* 58: 482–485.
- CODD, L.E. 1968. The South African species of *Kniphofia*. *Bothalia* 9: 363–511.
- FABIAN, A. & GERMISHUIZEN, G. 1997. *Wild flowers of northern South Africa*. Fernwood Press, Vlaeberg, Cape Town.
- GERMISHUIZEN, G. & MEYER, N.L. (eds). 2003. Plants of southern Africa: an annotated checklist. *Strelitzia* 14. National Botanical Institute, Pretoria.
- GOLDBLATT, P. & MANNING, J. 2000. Cape plants. A conspectus of the Cape flora of South Africa. *Strelitzia* 9. National Botanical Institute, Pretoria.
- LEISTNER, O.A. (ed.). 2000. Seed plants of southern Africa: families and genera. *Strelitzia* 10. National Botanical Institute, Pretoria.
- RETIEF, E. & HERMAN, P.P.J. 1997. Plants of the northern provinces of South Africa: keys and diagnostic characters. *Strelitzia* 6. National Botanical Institute, Pretoria.



LESLIE EDWARD WOSTALL CODD
16 September 1908–2 March 1999

1024000

KNIPHOFIA

by L.E. CODD[†]

Kniphofia Moench, Methodus: 631 (1794); Kunth: 551 (1843); Baker: 360 (1871); Benth. & Hook.f.: 775 (1883); Baker: 275 (1885); Engl.: 5 (1888); T.Durand & Schinz: 291 (1894); Baker: 275 (1896); Baker: 450 (1898b); A.Berger: 31 (1908); K.Krause: 299 (1930); Codd: 41 (1967); Codd: 363 (1968); Marais: 465 (1974); R.A.Dyer: 928 (1976); J.Taylor: 129 (1985); Gideon.F.Sm. & N.L.Meyer: 585 (2000); Goldblatt & J.C.Manning: 73 (2000); C.Archer: 108 (2003), nom. cons. Type species: *K. alooides* Moench, nom. illeg. = *K. uvaria* (L.) Oken.

Aloe sensu L.: 323 (1753), p.p.; sensu Mill. (1768), p.p.

Aletris sensu Burm.f.: 10 (1768); *Alethris* sensu L.: 367 (1771), p.p.; sensu Aiton: 464 (1789), p.p.; sensu Thunb.: 60 (1794), p.p.

Veltheimia sensu Willd.: 182 (1799), p.p.; sensu Thunb.: 309 (1823), p.p.

Tritoma Ker Gawl.: t. 744 (1804a); W.T.Aiton: 290 (1811). Type species: *T. media* Ker Gawl., nom. illeg. = *K. sarmentosa* (Andrews) Kunth.

Tritomanthe Link: 383 (1821); Schult. in Roem. & Schult.: 631 (1829), nom. superfl.

Tritonium Link: 170 (1829), nom superfl.

Triclissa Salisb.: 75 (1866), nom. superfl.

Notosceptrum Benth. in Benth. & Hook.f.: 775 (1883); Engl.: 5 (1888); T.Durand & Schinz: 295 (1894); Baker: 285 (1896); Baker: 454 (1898b); A.Berger: 69 (1908); K.Krause: 300 (1930); E.Phillips: 185 (1951). Lectotype species prop.: *N. benguelense* (Baker) Benth. [Codd: 509 (1985)].

Plants perennial, herbaceous, solitary or caespitose from a thick, simple or branching rhizome, rarely somewhat caulescent. *Leaves* radical or, in caulescent plants, in a dense rosette at apex of stem, in 4 or 5 ranks or rarely distichous, linear or rarely lanceolate-linear, tapering gradually to apex, usually keeled, margin and keel smooth to minutely serrulate. *Scape* erect, subequal to or overtopping leaves; peduncle narrowly cylindrical, rigid, simple or very rarely branched. *Raceme* dense or lax, centrifugal (opening from base upwards) in S African species, centripetal in a few tropical African species; bracts persistent, longer than short persistent pedicels. *Perianth* spreading or pendulous, rarely ascending, white, yellow, brownish or various shades of red, deciduous; tube campanulate to cylindrical, 1.5–50.0 mm long, glabrous in S African species, occasionally papillose in tropical African species; lobes 6, short, 1.5–5.0 mm long. *Stamens* 6, hypogynous, usually almost as long as or longer than tube at anthesis, rarely included; filaments filiform; anthers versatile, introrse. *Ovary* ovoid to ovoid-triquetrous, 3-locular, with many axile ovules; style filiform, usually finally exerted; stigma apical, minute. *Fruit* capsular, globose to ovoid-triquetrous, dehiscing loculicidally. *Seed* somewhat flattened, acutely 3-angled or winged.

Species about 70, mostly in Africa, with two in Madagascar and one in the southern Arabian Peninsula; 47 species in southern Africa, but absent from Namibia and Botswana.

Allied to *Aloe* L. but the leaves are nearly always radical, herbaceous to fibrous, not succulent or semisucculent. The chromosome number for all species so far examined is $2n = 12$ (De Wet 1960: 295).

[†] Late of the Botanical Research Institute, Private Bag X101, 0001 Pretoria.

The present treatment should be used in conjunction with the revision of Codd (1968), in which the species are freely illustrated.

1a Perianth less than 20 mm long:

- 2a Raceme elongate, 300–800 mm long; perianth 7–12 mm long; flowers ascending . . .
 1. *K. multiflora*
- 2b Raceme less than 300 mm long; flowers spreading or pendulous:
- 3a Perianth 4–10 mm long:
- 4a Flowers yellow-brown to fuscous, drying dark purplish brown:
- 5a Bracts linear-lanceolate, acuminate; perianth 8–9 mm long 4. *K. umbrina*
- 5b Bracts ovate-deltoid to subrotund; perianth 4.0–6.5 mm long:
- 6a Raceme 150–300 mm long; leaves 350–650 mm long 5. *K. typhoides*
- 6b Raceme 40–90 mm long; leaves 150–280 mm long 6. *K. brachystachya*
- 4b Flowers greenish, yellow, cream-coloured or white, not drying purplish brown:
- 7a Bracts broadly ovate, obtuse; leaves 10–15 mm broad, margin minutely denticulate
 3. *K. acraea*
- 7b Bracts ovate-lanceolate, acute; leaves 2.5–7.0 mm broad, margin smooth or almost
 so:
- 8a Perianth 4.0–5.5 mm long, white 7. *K. buchananii*
- 8b Perianth (6–)7–11 mm long:
- 9a Raceme relatively lax, usually secund, 60–280 mm long; flowers greenish to dull
 yellow, occasionally maroon tinged 2. *K. parviflora*
- 9b Raceme dense (rarely lax at base), not secund, 40–80 mm long; flowers white,
 cream-coloured or yellow 8. *K. breviflora*
- 3b Perianth 11–19 mm long:
- 10a Raceme dense:
- 11a Leaves narrow, grass-like, 2–4(–6) mm broad (occasionally less than 6 mm in *K.*
gracilis but then bracts ovate, obtuse):
- 12a Flowers white, cream-coloured or yellow:
- 13a Perianth not more than 11 mm long 8. *K. breviflora*
- 13b Perianth more than 12 mm long:
- 14a Leaf margin scaberulous to finely denticulate or almost smooth 13. *K. fibrosa*
- 14b Leaf margin conspicuously serrulate 12. *K. crassifolia*
- 12b Flowers orange, coral or red:
- 15a Stamens not more than half length of perianth tube at anthesis; perianth lobes
 spreading 11. *K. evansii*
- 15b Stamens reaching throat of perianth at anthesis or slightly exerted; perianth
 lobes not spreading 13. *K. fibrosa*
- 11b Leaves 6–45 mm broad:
- 16a Bracts ovate to ovate-oblong, obtuse 14. *K. gracilis*
- 16b Bracts ovate-lanceolate to lanceolate, acute to acuminate:
- 17a Perianth 15 mm long or longer, somewhat constricted above ovary; leaves
 15–45 mm broad 20. *K. ensifolia*
- 17b Perianth 11–15 mm long, cylindrical; leaves 6–15 mm broad:
- 18a Flowers white or cream-coloured; buds ascending, greenish or tinged with red
 9. *K. albescens*
- 18b Flowers orange-yellow to reddish; buds pendulous, red 10. *K. flammula*
- 10b Raceme lax:
- 19a Bracts ovate to ovate-oblong, obtuse 14. *K. gracilis*

- 19b Bracts lanceolate to linear-lanceolate, acute to acuminate:
- 20a Raceme 100–300 mm long; perianth 19–30 mm long, in various colours (including yellow), not markedly expanding about the middle 17. *K. angustifolia*
- 20b Raceme 30–100 mm long; perianth 14–18 mm long, expanding from \pm middle to throat 18. *K. pauciflora*
- 1b Perianth 20 mm or more in length:
- 21a Raceme lax, particularly in lower part:
- 22a Bracts ovate to ovate-oblong, obtuse:
- 23a Perianth up to 22 mm long 14. *K. gracilis*
- 23b Perianth 24–35 mm long 15. *K. laxiflora*
- 22b Bracts ovate-lanceolate to linear-lanceolate, acute to acuminate:
- 24a Perianth more than 30 mm long 16. *K. ichopensis*
- 24b Perianth up to 30 mm in length:
- 25a Leaves 2–5 mm broad 17. *K. angustifolia*
- 25b Leaves 8–30 mm broad:
- 26a Leaves 0.6–1.5 m long, arcuate-spreading or pendulous from cliff faces; pedicels 5–7 mm long 19. *K. tabularis*
- 26b Leaves 0.3–0.6 m long, erect; pedicels 1–3 mm long 24. *K. sarmentosa*
- 21b Raceme dense, especially in lower part (sometimes \pm lax towards apex):
- 27a Leaves not keeled or V-shaped in cross section:
- 28a Leaves spreading, arcuate, broad and relatively flat, 30–120 mm broad; plants often caulescent 28. *K. northiae*
- 28b Leaves rigid, erect, U-shaped in cross section, markedly ribbed, 8–14 mm broad 29. *K. stricta*
- 27b Leaves keeled or V-shaped in cross section:
- 29a Bracts lanceolate to linear-oblong, apex acute to gradually acuminate:
- 30a Stamens well exerted at anthesis and remaining exerted:
- 31a Plants usually caulescent; perianth 20–24 mm long; leaf bases and bracts usually drying with a purplish tinge 26. *K. caulescens*
- 31b Plants acaulescent or occasionally shortly caulescent (*K. albomontana*); leaf bases and bracts not drying with a purplish tinge; perianth 20–40 mm long:
- 32a Pedicels 5–12 mm long; perianth 24–30 mm long (Western Cape: Uniondale, Knysna and Eastern Cape: Komga) 22. *K. bruceae*
- 32b Pedicels 1–3 (rarely 4) mm long; perianth up to 24 (rarely 25) mm long:
- 33a Plants spring-flowering; flowers whitish when open, often red in bud stage 20a. *K. ensifolia* subsp. *ensifolia*
- 33b Plants autumn-flowering; flowers whitish to yellow or orange-yellow when open, often red in bud stage:
- 34a Leaves semiglaucous, 20–45 mm broad; flowers whitish to lemon yellow when open (eastern Free State) 20b. *K. ensifolia* subsp. *autumnalis*
- 34b Leaves midgreen, 10–20 mm broad, nervose; flowers greenish yellow to orange-yellow when open (Limpopo, Mpumalanga and Swaziland) 21. *K. splendida*
- 30b Stamens included or shortly exerted at anthesis, often withdrawn later (sometimes somewhat exerted in *K. albomontana* but distinguished from the related *K. caulescens* by the leaves exceeding 700 mm in length and perianth usually longer than 24 mm):
- 35a Plants robust with leaves 0.8–2.0 m long; scape (with raceme) 1–2 m tall (commonly cultivated redhot pokers occasionally occurring as garden escapes) 23. *K. praecox*

- 35b Plants of small to medium stature, indigenous; scape (with raceme) usually less than 1 m tall:
- 36a Leaves with margins distinctly serrulate:
- 37a Plants usually shortly caulescent; leaves more than 30 mm broad . . . 27. *K. albomontana*
- 37b Leaves less than 25 mm broad:
- 38a Leaves up to 8 mm broad; raceme concolorous, coral-red 33a. *K. triangularis* subsp. *triangularis*
- 38b Leaves 8–24 mm broad; raceme dull red at apex; flowers usually greenish yellow:
- 39a Leaves glabrous 31. *K. ritualis*
- 39b Leaves pubescent 30. *K. hirsuta*
- 36b Leaves with margins smooth or with a few scattered teeth:
- 40a Perianth 20–25 mm long; perianth lobes not or slightly spreading:
- 41a Leaves grass-like, 2–4 mm broad 13. *K. fibrosa*
- 41b Leaves 6–30 mm broad:
- 42a Leaves 300–600 mm long; scape 250–450 mm tall; raceme lax to medium-dense, up to 300 mm long; Western Cape 24. *K. sarmentosa*
- 42b Leaves 500–900 mm long; scape 500–900 mm tall; raceme dense, rarely more than 120 mm long; Limpopo 25. *K. corralligemma*
- 40b Perianth 25–50 mm long (occasionally shorter in *K. triangularis* but then perianth coral-red with spreading lobes):
- 43a Raceme concolorous, coral-red in colour; perianth lobes spreading:
- 44a Leaves 1.5–3.0 mm broad and margins smooth to sparsely toothed or, if broader, margins sparsely to distinctly serrulate . . . 33a *K. triangularis* subsp. *triangularis*
- 44b Leaves 3–9 mm broad, margins always smooth 33b *K. triangularis* subsp. *obtusiloba*
- 43b Raceme bicolorous; buds brownish red to scarlet; flowers whitish, yellow or orange; perianth lobes not or slightly spreading:
- 45a Leaves fibrous in texture, grass-like, 3–6(–8) mm broad; buds scarlet, flowers orange to red 32. *K. galpinii*
- 45b Leaves soft-textured, 2–25 mm broad:
- 46a Buds brownish red; flowers whitish; leaves 2–5 mm broad with margins smooth or sparsely serrulate 34. *K. thodei*
- 46b Buds red or red-tinged; flowers lemon-yellow to orange-yellow; leaves 6–25 mm broad, margins always smooth:
- 47a Perianth 30–40(–42) mm long; leaves 6–14 mm broad . . 35. *K. porphyrantha*
- 47b Perianth 42–50 mm long; leaves 8–25 mm broad 36. *K. fluviatilis*
- 29b Bracts ovate to oblong or, rarely, lanceolate, apex rounded to acute:
- 48a Flowering July to November:
- 49a Pedicels 2.5–6.0 mm long at flowering stage:
- 50a Leaves 15–30 mm broad, yellow-green, usually recurved-falcate with serrulate margins; scape 250–500 mm tall (Pondoland coastal areas) . . 39. *K. drepanophylla*
- 50b Leaves 6–15 mm broad, dull to glaucous-green, erect, with margins smooth to sparsely denticulate; scape up to 1 m tall (Western to Eastern Cape) . . 44. *K. uvaria*
- 49b Pedicels 1–2 mm long at flowering stage:
- 51a Raceme normally 60–80 mm diam., globose, very dense; plants usually robust with scape 0.8–1.4 m tall; leaves 0.5–1.2 m long; bracts 7–11 mm long, erect and imbricate in bud stage (depauperate plants apt to be confused with *K. littoralis* but bracts not white and fruits small, subglobose): coastal marshes from Eastern Cape to southern KwaZulu-Natal 43. *K. rooperi*

- 51b Raceme 40–60(–65) mm diam., ovoid, rhomboid, globose to oblong; plants of small to medium stature; scape 250–700(–900) mm tall; leaves 150–700(–900) mm long; bracts not imbricate in bud stage:
- 52a Leaf margins smooth or with a few scattered teeth:
 - 53a Buds with lower half various shades of green or brown; upper half white; Richards Bay, northern KwaZulu-Natal 49. *K. leucocephala*
 - 53b Buds dull red or flame red throughout:
 - 54a Buds flame-red; flowers yellow; raceme globose; leaves erect, relatively narrow; occurs in grass among sandstone rocks near the coast, Pondoland to southern KwaZulu-Natal 38. *K. coddiana*
 - 54b Buds dull red; flowers greenish yellow; leaves erect or falcate; occurs on grassy slopes or flats:
 - 55a Bracts whitish, chartaceous, margin entire; pedicels elongating in fruit up to 5 mm; fruits ovoid, 8–10 mm long; sandy coastal flats, KwaZulu-Natal 37. *K. littoralis*
 - 55b Bracts brownish, scarious, margin usually eroso-denticulate; pedicels scarcely elongating in fruit; fruits subglobose-triquetrous, 5–7 mm long; inland areas, Eastern Cape, KwaZulu-Natal 40. *K. baurii*
- 52b Leaf margins serrulate:
 - 56a Leaves usually not more than 500 mm long and 25 mm broad at flowering stage, often distinctly falcate; scape usually overtopping leaves; Eastern Cape, KwaZulu-Natal 40. *K. baurii*
 - 56b Leaves 500–900 × 15–40 mm at flowering stage, usually rigid, erect or sometimes slightly falcate; scape subequal to or shorter than leaves:
 - 57a Raceme ovoid-rhomboid; leaves glaucous-green, tapering rather rapidly to apex; KwaZulu-Natal midlands 41. *K. latifolia*
 - 57b Raceme globose to ovoid-globose; leaves yellow-green, tapering gradually to apex; Mpumalanga 42. *K. rigidifolia*
- 48b Flowering December to June:
 - 58a Leaves not keeled, (30–)40–120 mm broad 28. *K. northiae*
 - 58b Leaves keeled, 4–40 mm broad:
 - 59a Perianth 19–26(–28) mm long; stamens exerted by 6–10 mm:
 - 60a Raceme subglobose, 45–50 mm long; scape 0.4–0.6 m tall 45. *K. citrina*
 - 60b Raceme ovoid, rhomboid to subcylindrical:
 - 61a Raceme ovoid to subcylindrical; scape 1–2 m tall 47. *K. tysonii*
 - 61b Raceme ovoid to rhomboid; scape 450 to 600 mm tall 49. *K. leucocephala*
 - 59b Perianth usually more than 26 mm long; stamens exerted by 5 mm or less at anthesis, often later withdrawn:
 - 62a Pedicels 3–6 mm long at flowering stage 44. *K. uvaria*
 - 62b Pedicels less than 3 mm long at flowering stage:
 - 63a Leaves distinctly tough and fibrous usually arcuate-spreading and often glaucous, 6–15 (rarely–20) mm broad:
 - 64a Raceme narrowly rhomboid, tapering to apex and base, 130–200 mm long; northern KwaZulu-Natal 15. *K. laxiflora*
 - 64b Raceme oblong or ovoid to subglobose, truncate at base, 70–120 mm long; Eastern Cape 44. *K. uvaria*
 - 63b Leaves not markedly tough, usually not glaucous, (12–)15–40 mm broad:
 - 65a Raceme globose; leaves arcuate-spreading; coastal marshes, Eastern Cape to southern KwaZulu-Natal 43. *K. rooperi*



FIGURE 1.—*Kniphofia multiflora*. A, habit, much reduced; B, leaf, showing keel, $\times 1.4$; C, leaf margin, $\times 3.8$; D, apex of inflorescence, $\times 1.8$; E, portion of inflorescence, $\times 1.8$; F, individual flowers and bud, $\times 1.8$; G, l/s flower, $\times 3.8$; H, apex of flower showing perianth lobes, $\times 5.7$; I, base of inflorescence showing fruits, all $\times 0.9$. Artist: Cythna Letty.

65b Raceme oblong to rhomboid, rarely subglobose; leaves erect, later reflexed (kneed) \pm middle, not arcuate; inland, eastern part of Western Cape, Eastern Cape, Free State, KwaZulu-Natal and Swaziland to Mpumalanga

..... 46. *K. linearifolia*

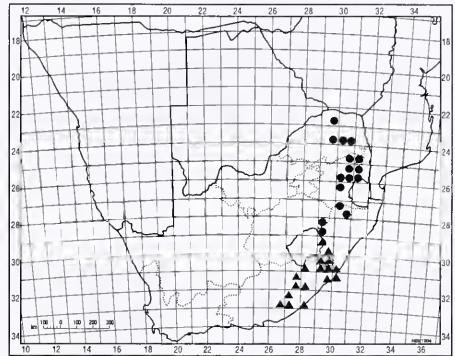
1. ***Kniphofia multiflora*** *J.M.Wood & M.S.Evans* in *Journal of Botany, British and Foreign* 35: 353 (1897); *J.M.Wood*: t. 206 (1900); *J.M.Wood*: 56 (1901); *Hook.f.*: t. 7832 (1902); *A.Berger*: 44 (1908); *Codd*: t. 1445 (1965a); *Codd*: 400 (1968); *A.Fabian & Gernish.*: 42, t. 13c (1997); *Retief & P.P.J.Herman*: 101 (1997). Type: Natal [KwaZulu-Natal], between Van Reenen and Nelson's Kop, *J.M.Wood 5972* (NH, holo.!; K!).

Plants robust, usually many-stemmed. *Leaves* ascending, later bending over \pm middle, 0.8–1.8 m long, 20–40 mm broad, deeply keeled, mid-green; margin and keel serrulate. *Scape* overtopping reflexed leaves, 0.8–2.0 m tall. *Raceme* slender, elongate, tapering gradually towards apex, 300–800 mm long; buds ascending; buds greenish white to orange-yellow tipped with red, becoming whitish to yellow as flowers open. *Bracts* oblong-spathulate, 3.5–5.5 mm long, acute to rounded at apex; margin minutely eroso-denticulate. *Pedicels* 1.5–4.0 mm long at flowering stage, elongating up to 4–5 mm in fruit. *Perianth* shortly subcylindrical, 7–12 mm long; lobes ovate, 1.5 mm long. *Anthers* shortly exserted. *Fruit* ovoid-triquetrous, 5–6 mm long. *Flowering time*: February to April. Figure 1.

Distributed along the Drakensberg escarpment from Van Reenen and Harrismith in the south to northern KwaZulu-Natal, Swaziland and Mpumalanga, reaching its northernmost limit on the Soutpansberg in Limpopo. It grows in mountain marshes, vleis and on streambanks, usually at altitudes of 1 300 to 2 000 m, but in Mpumalanga, it is found in vleis east of the escarpment as low as 800 m. Map 1.

Vouchers: *Bruce 292*; *Codd 6952, 10334*.

Readily distinguished from other South African species by the exceptionally long, narrow raceme. There are two colour forms, separated



MAP 1.—● *Kniphofia multiflora*
▲ *K. parviflora*

geographically. In the south, from Van Reenen to Wakkerstroom, the typical form occurs with greenish white buds and whitish to cream-coloured flowers. From the Carolina and Barberton Districts northwards, the buds are orange-yellow, often tinged with red, and the flowers on opening are pale to deep yellow.

Unlike other species of *Kniphofia* in South Africa, the flowers do not become pendulous with age. Its closest relative is probably *K. reynoldsii* Codd from Malawi which, however, has a shorter perianth tube, up to 10 mm long, with spreading lobes.

2. ***Kniphofia parviflora*** *Kunth*, *Enumeration plantarum* 4: 553 (1843); *Baker*: 361 (1871); *Baker*: 277 (1885); *Baker*: 277 (1896); *A.Berger*: 40 (1908), excluding var. *albiflora* *A.Berger*; *Codd*: 403 (1968). Type: Pondoland, hills between Umzimvubu and Umsikaba Rivers, *Drège 4528* (K, lecto.!; G!).

K. modesta *Baker*: 43 (1889); *Baker*: 277 (1896), p.p., as to type. Type: East Griqualand, [KwaZulu-Natal], near



FIGURE 2.—A–C, *Kniphofia parviflora*, Zietsman 1420: A, leaf base and leaves, $\times 1$; B, inflorescence, $\times 1$; C, floral bract, $\times 2$. Artist: Gillian Condy.

Kokstad, Mount Currie, *Tyson 1418* (K, holo.!; BOL!, G!, GRA!, PRE!).

K. krookii Zahlbr.: 15 (1900). Type: East Griqualand, [KwaZulu-Natal], Mt Insizwa, *Krook sub Penther 547* (W, holo.; BOL!).

Plants usually single-stemmed. *Leaves* narrow, at first ascending and later recurving, 200–750 \times 3–7 mm, keeled; margin smooth or, rarely, sparsely toothed. *Scape* overtopping recurved leaves, 250–800 mm long. *Raceme* elongate-oblong, fairly lax, usually secund, 60–280 mm long; buds ascending, greenish brown to maroon; flowers eventually pendulous, creamy yellow or yellow-green to greenish brown, rarely suffused with dull red, faintly scented. *Bracts* ovate, 4.0–6.5 mm long, usually broadest \pm middle then narrowing abruptly to an acute to acuminate apex; margin entire. *Pedicels* 1–2 mm long, elongating slightly in fruit. *Perianth* cylindrical, 7–10 mm long; lobes ovate, 1 mm long, not spreading. *Stamens* exerted by 1–2 mm at anthesis, later withdrawn. *Fruit* subglobose, 5–6 mm long. *Flowering time*: mainly January to March but occasional specimens may flower as early as August. Figure 2.

Distributed from King William's Town District of Eastern Cape, through the Transkei to the Polela District of southern KwaZulu-Natal. Map 1.

Vouchers: *Acocks 13363, 21984; Codd 9317; Pegler 851*.

K. parviflora is unique in the genus in usually having a second raceme. As the flowers start to open, the inflorescence leans to one side and the flowers turn in that direction. In the bud stage the raceme is narrowly cylindrical and may be confused in the herbarium with *K. breviflora* (No. 8), but *K. parviflora* has longer racemes, greenish yellow to pale greenish brown flowers and broader, more ovate bracts.

The type of *K. modesta* is conspecific with that of *K. parviflora* but Baker (1893b) subsequently misinterpreted his species. The plant figured in *Curtis's Botanical Magazine* t. 7293



FIGURE 3.—A–D, *Kniphofia acraea*. A, rhizome with roots and leaf base, $\times 0.8$; B, inflorescence, $\times 0.8$; C, floral bract, $\times 4$; Dm l/s flower, $\times 3$. Artist: Cythna Letty.

as *K. modesta*, is a form of the variable *K. gracilis* (see No. 14) and it is in this sense that later authors treated the name *K. modesta* until N.E. Brown pointed out the mistake in *The Gardener's Chronicle*, ser. 3, 56: 410 (1914) and renamed the *Curtis's Botanical Magazine* plate, *K. sparsa* N.E.Br.

3. *Kniphofia acraea* Codd in *Bothalia* 9: 142 (1966); Codd: 405 (1968). Type: Cape [Eastern Cape], National Mountain Zebra Park, on top of Bankberg, alt. about 2 250 m, *Liebenberg 7120* (PRE, holo!).

Plants with several stems. *Leaves* 500–700 \times 10–15 mm, V-shaped in cross section, tending to fold along midrib, nerves conspicuous in dried specimens; margin minutely and distantly denticulate, keel smooth. *Scape* subequal to leaves, 500–600 mm tall. *Raceme* dense, ovoid to subcylindrical, 60–120 \times 22–25 mm, tapering to apex in young stage; buds greenish yellow, spreading; flowers yellow, at first spreading, later deflexed. *Bracts* broadly ovate, obtuse, 4–5 mm long, at first erect and overlapping buds, later deflexed; margin minutely erose-denticulate. *Pedicels* 1.5–2.0 mm long. *Perianth* subcampanulate, 8–9 mm long, 2 mm broad at base, increasing up to 2.5–3.0 mm at mouth; lobes broadly ovate, 1.5–2.0 mm long. *Stamens* exerted by 2–3 mm at anthesis. *Fruit* not seen. *Flowering time*: March. Figure 3.

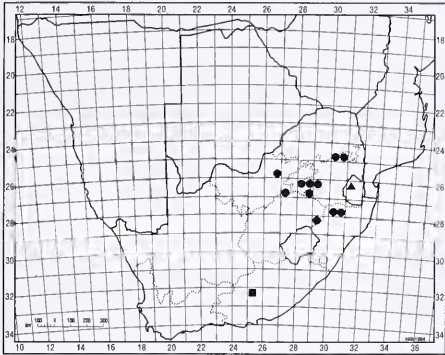
Known only from the type gathering in March 1964 (three specimens) at the top of the Bankberg, Cradock District, Eastern Cape, in small seepage areas among rocks. A living plant was cultivated in Pretoria for a few years. Map 2.

It somewhat resembles *K. breviflora* (No. 8) but has broader leaves and broader, obtuse bracts. Its true relationship is not clear.

4. *Kniphofia umbrina* Codd in *Bothalia* 9: 141 (1966); Codd: 406 (1968). Type: Swaziland, 6.5 km south of Forbes Reef, *Bruce 272* (PRE, holo!).



FIGURE 4.—A–C, *Kniphofia umbrina*, Kemp 1280: A, leaf, $\times 1$; B, inflorescence, $\times 1$; C, floral bract, $\times 2$. Artist: Gillian Condy. D–G, *K. brachystachya*, Roux 1463: D, rhizome with roots and leaf base, $\times 0.8$; E, leaf section showing keel, $\times 0.8$; F, inflorescence, $\times 0.8$; G, floral bract, $\times 1.6$. Artist: Gillian Condy.



MAP 2.—● *Kniphofia typhoides*
▲ *K. umbrina*
■ *K. acraea*

Plants with several stems. *Leaves* somewhat flaccid, at first erect, later reflexed, 450–700 × 10–20 mm, V-shaped in cross section, mid-green; margin and keel smooth. *Scape* overtopping leaves, 700–900 mm tall. *Raceme* sub-cylindrical, very dense, 70–150 × 15–20 mm; buds purplish brown; flowers reddish brown to burnt amber, drying blackish, slightly scented. *Bracts* linear-lanceolate, acuminate, 9–11 mm long; margin entire. *Pedicels* 0.5 mm long. *Perianth* cylindrical, 8–9 mm long, *Stamens* exerted by up to 2 mm at anthesis. *Fruit* ovoid-triangular, 5–6 mm long. *Flowering time*: February to early March. Figure 4A–C.

Known from only a small area south of Forbes Reef in Swaziland at an altitude of about 1 500 m where it grows on grassy slopes. Map 2.

Vouchers: *Codd* 9521; *Compton* 27552, 31290.

With its brown, slightly scented flowers and bullrush-like raceme, it shows an obvious relationship to the next species, *K. typhoides*, but differs in several characters: the leaves are not distichously arranged nor glaucous and are V-shaped in cross section; the perianth is longer and more pendulous; and the bracts are longer and acuminate, not rounded, as in *K. typhoides*.

In view of its restricted distribution and the pressure of agricultural activities, the species must be regarded as being very vulnerable. The authorities are aware of the position and a 1985 survey revealed the presence of about 4 500 plants, about half of which were transplanted to the nearby Malolotja National Park. Their subsequent fate is not known.

5. *Kniphofia typhoides* *Codd* in The Flowering Plants of Africa 36: t. 1424 (1964d); *Codd*: 407 (1968); *Retief & P.P.J.Herman*: 102 (1997). Type: Natal [KwaZulu-Natal], 'Klip River County', *Mrs K. Saunders sub J.M. Wood* 3895 (K, holo.!; BM!, NR!).

Notosceptrum natalense *Baker*: 285 (1896); *Baker*: t. 2523 (1897b); *A.Berger*: 71 (1908); non *Kniphofia natalensis* *Baker*.

Plants with one to several stems from a short, thickened rhizome. *Leaves* more or less distichous, glaucous, ascending, 350–650 × 8–25 mm, shallowly channelled above, keeled, tending to be spirally twisted, firm and semifleshy in texture; margin smooth. *Scape* overtopping leaves, 500–750 mm tall. *Raceme* cylindrical, very dense, 150–300 × 15–25 mm, rounded at apex; buds erect, dark brown; flowers ascending to spreading, brown to purplish brown, faintly scented. *Bracts* obovate or subrotund to ovate, 4–6 mm long, rounded at apex; margin entire to minutely eroso-denticulate. *Pedicels* up to 0.5 mm long. *Perianth* subcampanulate or shortly cylindrical, 4.5–6.5 mm long; lobes ovate to rounded, 1.5 mm long, not spreading. *Stamens* exerted by 3–4 mm at anthesis. *Fruit* ovoid, more or less triquetrous, 5–6 mm long. *Flowering time*: February to March. Figure 5.

Recorded from the northern districts of KwaZulu-Natal, the eastern part of the North-West, Gauteng, Mpumalanga and northeastern Free State, at altitudes of 1 300–1 800 m. It is almost invariably found on black clay soil, and shows a preference for low-lying places. The type locality is given by *Baker* as Klip River County, but on the sheet in NH the locality is given as 'near Newcastle', which fits in better with the known distribution. Map 2.



FIGURE 5.—*Kniphofia typhoides*. A, habit, much reduced; B, leaf, $\times 0.9$; C, inflorescence, $\times 0.9$; D, floral bract, $\times 4.7$; E, l/s flower, $\times 4.7$; F, ovary, $\times 7.5$; G, fruit, $\times 2.8$. Artist: Adele Walters.

Vouchers: *Bruce 259, 260, 293; Codd 7693, 8509.*

Kniphofia typhoides is characterized by the ascending, glaucous, strap-shaped leaves arranged in a more or less distichous manner, and the dense bullrush-like racemes of small brown flowers carried well above the leaves.

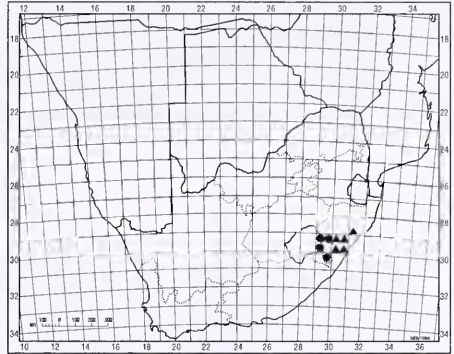
Notes on the relationships of *K. typhoides* are given under the preceding and following species, *K. umbrina* and *K. brachystachya* respectively. The three form a closely related group with small, closely placed, brown or yellow-brown, slightly scented flowers.

6. *Kniphofia brachystachya* (Zahlbr.) Codd in *The Flowering Plants of Africa* 36: sub t. 1424 (1964d); Codd: 409 (1968). Type: East Griqualand, [KwaZulu-Natal], Mt Insizwa, *Krook sub Penther 536* (W, holo.); neotype: Cape [Eastern Cape], Umzimkulu Dist., Ensi-keni, *Haygarth sub J.M. Wood 12062* (PRE!).

Notosceptrum brachystachyum Zahlbr.: 15, t. 3 (1900); A. Berger: 71 (1908).

Plants with stems solitary or in small clusters. *Leaves* erect or somewhat falcate, rigid, 150–280 × 4–12 mm, shallowly keeled. *Scape* overtopping leaves, 250–650 mm tall. *Raceme* cylindrical, dense, 40–90 × 10–15 mm; buds erect, brownish; flowers erect to spreading, dull yellow to brownish, drying purplish brown, slightly scented. *Bracts* ovate to ovate-deltoid, acute, 4–5 mm long; margin eroso-denticulate. *Pedicels* up to 0.5 mm long. *Perianth* campanulate to subtrubinate, 4–5 mm long; lobes ovate, 1.0–1.5 mm long, not spreading. *Stamens* exerted by 2 mm at anthesis. *Fruit* globose, mature fruits not seen. *Flowering time*: November to January. Figure 4D–G.

Recorded from the mountains of East Griqualand, KwaZulu-Natal and the foothills of the Drakensberg in the midlands of KwaZulu-Natal, in mountain grassland at altitudes of 1 300–2 200 m. Map 3.



MAP 3.—● *Kniphofia brachystachya*
▲ *K. buchananii*

Vouchers: *Killick 1867; J.M. Wood 63919; Schlechter 6462.*

Related to the former species, *K. typhoides*, but smaller in stature with shorter and narrower leaves and somewhat smaller flowers, 4–5 mm long. The bracts are ovate, acute, whereas in *K. typhoides* they are rounded at the apex. The only other species with such small flowers is *K. buchananii* (No. 7), but in this species the flowers are white, the bracts are lanceolate, acuminate, and the leaves are grass-like, 400–600 × 2.5–4.0 mm.

There is a specimen in PRE, *Nicholson s.n.*, reputed to come from Karkloof, KwaZulu-Natal, which is somewhat intermediate between *K. brachystachya* and *K. buchananii* but unfortunately lacks notes on flower colour. It may represent an undescribed entity but is placed as a form of *K. brachystachya* until more material is forthcoming.

7. *Kniphofia buchananii* Baker in *Journal of Botany*, London 23: 276 (1885); Baker: 276 (1896); A. Berger: 39 (1908), p.p. excluding *Cooper 1029, 3294*; Engl. & Drude: 313 (1908); Codd: t. 1446A (1965b). Codd: 411 (1968). Type: Natal [KwaZulu-Natal], without locality, *Rev. J. Buchanan s.n.* (K, holo!).

K. buchananii var. *flavescens* A. Berger: 40 (1908), p.p., as to J.M. Wood 1972.

Plants usually single-stemmed. *Leaves* narrow, grass-like, at first ascending, later recurving, 400–600 × 2.5–4.0 mm, keeled, triangular in cross section; margin smooth. *Scape* overtopping recurved leaves, 400–850 mm tall. *Raceme* oblong to cylindrical, 35–90 × 10–14 mm, dense at apex, often laxer below; buds erect, greenish cream or tinged with red; flowers ascending to deflexed, white. *Bracts* ovate-lanceolate to lanceolate, acute to acuminate, 4.0–5.5 mm long; margin entire or minutely eroso-denticulate. *Pedicels* 0.5–1.0 mm long, elongating to 2 mm in fruit. *Perianth* subcampanulate to oblong, 4.0–5.5 mm long; lobes broadly ovate, 1 mm long, not spreading. *Stamens* exerted by 1.0–1.5 mm at anthesis. *Fruit* globose to ovoid, 2.5 mm long. *Flowering time*: mainly February to March, with an occasional record as early as October and as late as April. Figure 6.

Found in the KwaZulu-Natal midlands and semicoastal grassland at medium altitudes of 300–1 300 m, on grassy slopes, often among dolerite rocks. Map 3.

Vouchers: J.M. Wood 1972, 4572, 4798; Schlechter 6723.

Its nearest relative is *K. breviflora* (No. 8) from which it is distinguished mainly on perianth length which, in *K. breviflora*, is 7–11 mm. There are, however, occasional intermediates which suggest that *K. buchananii* might be better placed as a subspecies of *K. breviflora*. *K. breviflora* occurs more inland and at higher elevations than *K. buchananii*. For this reason *K. parviflora* var. *albiflora* A. Berger, based on J.M. Wood 4826 from Glencoe with flowers 6–7 mm long, is placed in synonymy under *K. breviflora* (see also notes on flower colour and typification under the latter species).

8. *Kniphofia breviflora* Harv. ex Baker in Journal of the Linnean Society, Botany 11: 361 (1871); Baker: 277 (1896); Baker: t. 7570 (1897c); A. Berger: 40 (1908); Codd: 413 (1968).

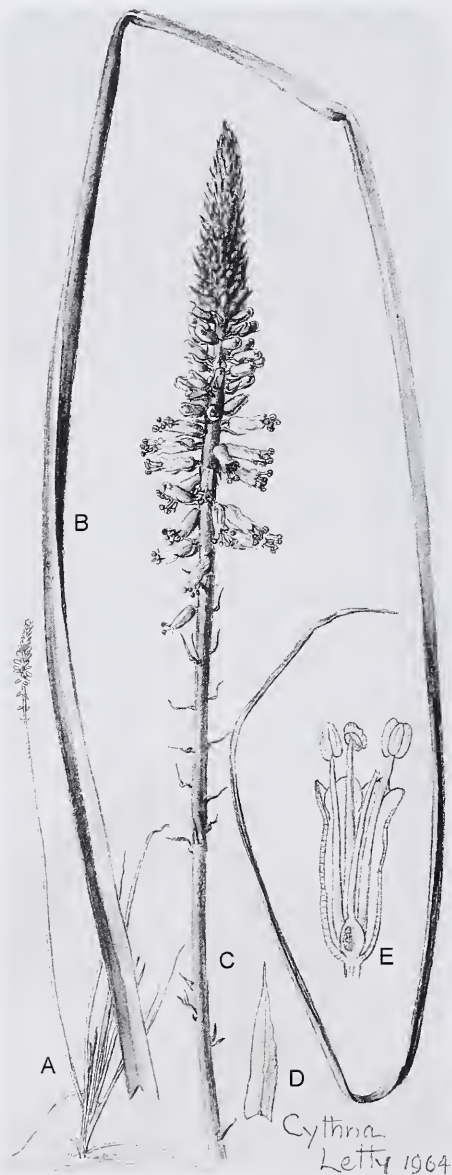


FIGURE 6.—*Kniphofia buchananii*. A, habit, much reduced; B, leaf, × 0.9; C, inflorescence, × 0.9; D, floral bract, × 4; E, l/s flower, × 6.2. Artist: Cythna Letty.

Lectotype: 'Orange Free State', Drakensberg, *Cooper 1029*, the specimen mounted on the same sheet as *Cooper 3924* (K!). (See discussion below).

K. schlechteri Schinz: 10 (1900). Type: Natal [KwaZulu-Natal], Van Reenen's Pass, *Schlechter 6940* (Z, holo!; BM!, BOL!, G!, GRA!, K!, PRE!).

K. concinna Baker: 784 (1901a). *K. breviflora* var. *concinna* (Baker) A. Berger: 40 (1908). Type: Natal [KwaZulu-Natal], near Newcastle, *Rehmann 7024* (Z, holo!).

K. fibrosa sensu J.M. Wood: t. 322 (1903b).

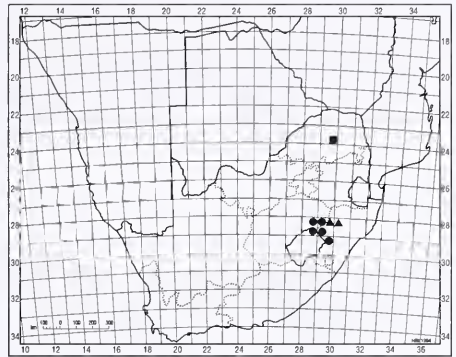
K. buchananii var. *flavescens* A. Berger: 40 (1908), p.p., excl. *J.M. Wood 1972*. Type: based on *K. breviflora* Baker.

K. parviflora var. *albiflora* A. Berger: 40 (1908). Type: Natal [KwaZulu-Natal], near Glencoe, *J.M. Wood 4826* (K, holo!; NH!).

Plants usually single-stemmed. *Leaves* narrow, grass-like, at first ascending, later recurving \pm middle, 400–700 \times 2.5–6.0 mm, triangular in cross section; margin and keel smooth. *Scape* overtopping recurved leaves, 400–800 mm tall. *Raceme* ovoid to oblong, usually dense at apex, medium-lax below, 50–80 \times 20–24 mm; buds erect to spreading, yellow-green, often tinged with red; flowers whitish to yellow. *Bracts* ovate-lanceolate to lanceolate, acute to acuminate, 4.5–7.5 mm long; margin usually entire. *Pedicels* 1–2 mm long at flowering stage and in fruit. *Perianth* subcylindrical, (6–)7–11 mm long, in occasional specimens broadest above middle then narrowing to throat; lobes broadly ovate, 2.0–2.5 mm long, not spreading. *Stamens* exerted by 1.0–1.5 mm at anthesis, later withdrawn. *Fruit* globose to ovoid, 4.5–5.0 mm long. *Flowering time*: January to March but has been collected in flower as early as October. Figure 7.

Recorded from the foothills and slopes of the Drakensberg from Underberg to Newcastle in KwaZulu-Natal and extending into the Free State in the Harrismith District, in dense mountain grassland on hillsides or in vleis. Map 4.

Vouchers: *Codd 10522, 10530; Killick & Marais 2157; J.M. Wood 5606, 8922*.



MAP 4.—● *Kniphofia breviflora*
▲ *K. flammula*
■ *K. crassifolia*

K. breviflora is based on *Cooper 1029* from the 'Orange Free State', of which two specimens, mounted on different sheets, are in Kew Herbarium. One of these specimens is mounted on the same sheet as *Cooper 3924* and has an inflorescence with a few apical flowers attached, 7.0–7.5 mm long. The other specimen is on a sheet by itself and has an inflorescence devoid of flowers, but with three loose flowers, measuring \pm 5 mm long, in a capsule. These loose flowers resemble *K. buchananii*. The specimen on the sheet with *Cooper 3924* has been selected as the lectotype because it agrees with Baker's (1897c) concept of the species as indicated in the illustration written up by him in *Curtis's Botanical Magazine* t. 7570, and by his treatment in *Flora capensis* 6: 277 (Baker 1896) where he cites, in addition to *Cooper 1029, Cooper 3924* and *J.M. Wood 5606*. During the latter part of 1861, Cooper travelled through the eastern Free State into KwaZulu-Natal and so could have collected both *K. breviflora* and *K. buchananii*. The latter species does not occur in the Free State.

There are two colour forms in *K. breviflora* associated with geographical distribution. Plants in the Free State and the adjoining high Drakensberg area (Oliviershoek and Van Reenen's Pass) have yellow flowers, whereas those occurring at lower altitudes towards Underberg



FIGURE 7.—*Kniphofia breviflora*, Condly 153. A, rhizome with roots, $\times 0.8$; B, leaf tip, $\times 0.8$; C, leaf section showing keel, $\times 0.8$; D, inflorescence, $\times 0.8$; E, floral bract, $\times 1.7$; F, fructescence, $\times 0.8$. Artist: Gillian Condly.

and Estcourt have white flowers. At intermediate altitudes, plants with pale yellow flowers have been recorded.

The close affinity between *K. breviflora* and *K. buchananii* has been discussed under the latter species above. They are separated mainly on the basis of the shorter perianth of *K. buchananii*. At the other end of the scale, *K. breviflora* is related to the following species, *K. albescens*, which forms more robust plants with leaves 8–15 mm broad, and longer perianth, 11–15 mm and bracts 7–9 mm long. The latter species also has a more northerly distribution, extending into Mpumalanga but, where the two overlap in northern KwaZulu-Natal, it is sometimes difficult to distinguish between them with certainty.

9. ***Kniphofia albescens*** Codd in The Flowering Plants of Africa 34: t. 1325 (1960a); Codd: 417 (1968); Retief & P.P.J. Herman: 101 (1997). Type: Natal [KwaZulu-Natal], mountains north of Utrecht, *Codd 3243* (PRE, holo.!).

Plants usually several- to many-stemmed. *Leaves* 0.6–1.0 m long, 8–15 mm broad, keeled, dull green to glaucous, tough and fibrous in texture; margin and keel smooth or sometimes distantly and minutely scabrid. *Scape* overtopping recurved leaves, 400–750 mm tall. *Raceme* long-ovoid or subcylindrical, tapering to base and apex, dense, 60–100 × 27–35 mm, elongating up to 300 mm in fruit; buds greenish white or tinged with pink, erect; flowers becoming white or cream-coloured, spreading at anthesis, later pendulous. *Bracts* lanceolate to linear-lanceolate, acuminate, 7–9 mm long, erect in bud stage; margin smooth to minutely denticulate. *Pedicels* 1 mm long. *Perianth* cylindrical, 11–15 mm long; lobes ovate, 2 mm long, slightly spreading. *Stamens* exerted by 2.0–2.5 mm at anthesis, eventually exerted by 5–6 mm. *Fruit* ovoid-triangular, 7–8 mm long. *Flowering time*: mid-January to early March. Figure 8.

Distributed mainly from the Utrecht District in KwaZulu-Natal to the Piet Retief and Ermelo Districts in Mpumalanga with one record from

Mount aux Sources. It occurs in dense grassland on mountain slopes, and on flats and in marshy places, at altitudes of 1 500 to 2 000 m. Map 5.

Vouchers: *Bruce 275, 277, 289; Codd 2532, 6953, 6956, 10267.*

For differences between this species and the related *K. breviflora*, see notes after the latter species (No. 8). In perianth length, *K. albescens* approaches *K. fibrosa* (No. 12) and *K. crassifolia* (No. 13), but these two species are much less robust, with narrow grass-like leaves and serrulate margins.

10. ***Kniphofia flammula*** Codd in The Flowering Plants of Africa 34: t. 1326 (1960b); Codd: 418 (1968). Type: Natal [KwaZulu-Natal], 5.5 km NW of Glencoe, *Codd 6779* (PRE, holo.!).

Plants usually several-stemmed. *Leaves* dull green to semi-glaucous, at first erect then recurving or bending ± at middle, 600–900 × 6–12 mm, narrowly keeled; margin and keel smooth. *Scape* subequal to leaves, 500–850 mm tall. *Raceme* ovoid to shortly rhomboid, 30–70 × 20–35 mm, dense; buds pendulous, flame-scarlet; flowers at first spreading, later pendulous, orange-yellow to salmon-orange. *Bracts* ovate-lanceolate, lanceolate or linear-lanceolate, acuminate, 6.5–7.5 mm long. *Pedicels* 0.5–1.0 mm at flowering stage, elongating up to 2 mm in fruit. *Perianth* subcylindrical, 13–15 mm long; lobes ovate, 1.5 mm long, not spreading. *Stamens* exerted by 3–4 mm at anthesis, later withdrawn. *Fruit* subglobose to ovoid, 6–7 mm long. *Flowering time*: mid-November to the end of January. Figure 9.

Recorded from a restricted area near Glencoe in the Dundee District, KwaZulu-Natal, where it grows with dense, tall grasses and sedges in and at the margins of vleis at an altitude of ± 1 500 m. Map 4.

Vouchers: *Codd 8247; Killick 2219; J.M. Wood 5188.*



FIGURE 8.—*Kniphofia albescens*. A, habit, much reduced; B, portion of outer leaf, $\times 0.9$; C, c/s leaf, $\times 1.8$; D, E, inflorescence, $\times 0.9$; F, floral bracts, $\times 4.6$; G, flower, $\times 4.6$; H, l/s flower, $\times 4.6$. Artist: Cythna Letty.

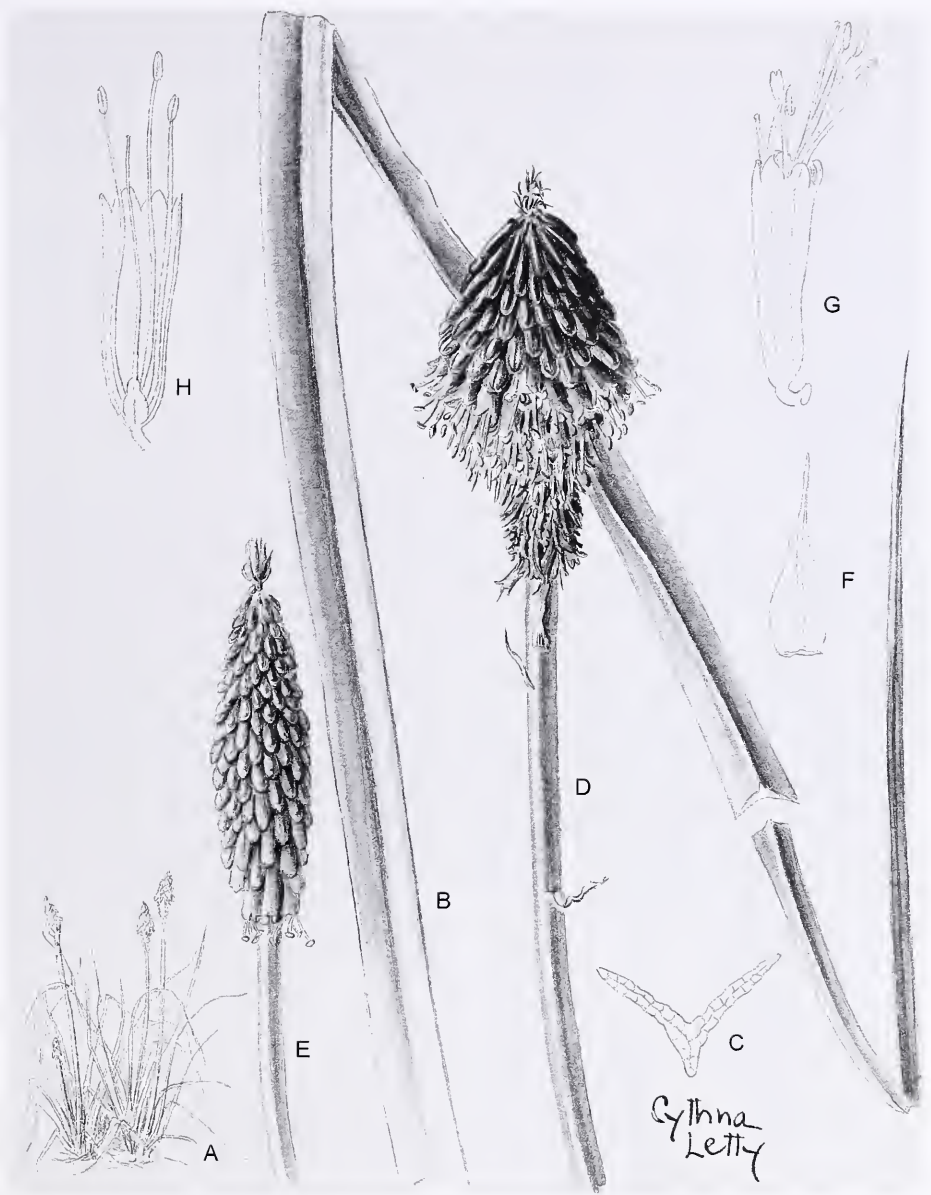


FIGURE 9.—*Kniphofia flammula*. A, habit, much reduced, B, portion of leaf, $\times 0.9$; C, c/s leaf, $\times 2.7$; D, E, inflorescence, $\times 0.9$; F, floral bract, $\times 4.6$; G, flower, $\times 2.7$; H, l/s flower, $\times 2.7$. Artist: Cythna Letty.

If the pressed material is scrappy or the collector's notes incomplete, specimens might be confused with *K. albescens* or *K. breviflora*. From the latter it differs in the longer perianth and from both in the buds being distinctly pendulous and scarlet in colour, and the bracts not as long-acuminate.

11. *Kniphofia evansii* Baker in *Flora capensis* 6: 278 (1896); A. Berger: 42 (1908); Codd: 419 (1968). Type: Natal [KwaZulu-Natal], Drakensberg, Tiger Valley, *Evans* 353 (K, holo.!: NH!).

Plants single- to several-stemmed. *Leaves* grass-like, fibrous, ascending, 600–750 × 2–3 mm, keeled; margin and keel smooth. *Scape* subequal to or shorter than leaves, 550–650 mm tall. *Raceme* long-ovoid to subcylindrical, tapering to apex, dense, 50–100 × 25–35 mm; buds ascending; flowers spreading to pendulous, ± concolorous, yellow-orange to coral-scarlet, becoming dark purple on withering. *Bracts* ovate-lanceolate to lanceolate, long acuminate, 4–6 mm long; margin entire. *Pedicels* 1 mm long, elongating up to 2 mm in fruit. *Perianth* subcylindrical, 13–16 mm long; lobes ovate, 2.5 mm long, distinctly spreading. *Stamens* remaining in basal half of perianth tube at and after anthesis. *Style* 1.5–2.5 mm long at anthesis. *Fruit* subglobose, 5–6 mm long. *Flowering time*: January to early February. Figure 10.

Known at present from only a small area on the upper slopes of the Drakensberg in the Bergville District, KwaZulu-Natal, where it grows among hygrophilous grasses and herbs on streambanks and moist ledges at altitudes of 1 900–2 300 m. Map 5.

Vouchers: *Killick* 1642, 1653; *Killick & Vahrmeijer* 3552.

The concolorous raceme of orange to coral-scarlet flowers with spreading lobes indicates a close relationship to *K. triangularis* (No. 32), from

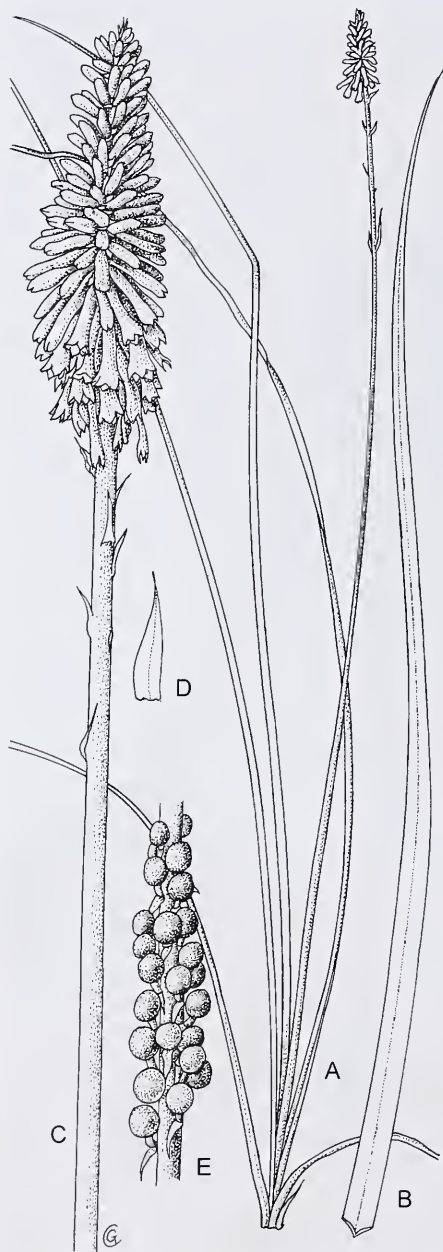
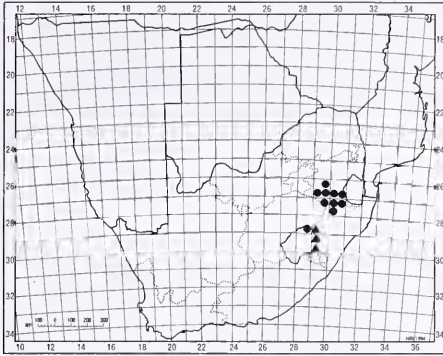


FIGURE 10.—*Kniphofia evansii*, *Killick* 1640: A, habit, ×0.4; B, leaf tip, ×0.8; C, inflorescence, ×0.8; D, floral bract, ×1.7; E, fructescence, ×0.8. Artist: Gillian Condy.



MAP 5.—● *Kniphofia albescens*
▲ *K. evansii*

which it may readily be separated by the shorter perianth and by a character which is unique in the genus: the stamens remain included in the lower half or third of the perianth and the style does not exceed 2.5 mm in length, so that the stigma is placed below the anthers at anthesis.

An odd specimen, *Trauseld* 741 from Giant's Castle Game Reserve, apparently combines characters of *K. evansii* and *K. porphyrantha* (No. 35) and may be a natural hybrid between the two. In perianth length, which is 30–32 mm, and general appearance, the specimen resembles *K. porphyrantha* but the coral-red perianth colour and the fact that the stamens extend to only half the length of the perianth tube suggest hybridization with *K. evansii*, but the situation requires further investigation. Mr Trauseld subsequently informed me that there were five plants of this kind flowering within 30 or 40 m of one another.

12. *Kniphofia crassifolia* Baker in Bulletin de l'Herbier Boissier, ser. 2. 1: 784 (1901a); A. Berger: 41 (1908); Codd: 424 (1968); Retief & P.P.J. Herman: 101 (1997). Type: Transvaal [Limpopo], Houtbosch, *Rehmann* 5796 (Z, holo.!).

Plants probably single-stemmed. *Leaves* grass-like, 400–500 × 3–6 mm, keeled; margin con-

spicuously serrulate. *Scape* ± 300 mm tall. *Raceme* subglobose to oblong, dense, ± 50 mm long; flowers probably whitish or pale yellow. *Bracts* lanceolate, acuminate, 5–7 mm long; margin entire. *Pedicels* 1.0–1.5 mm long. *Perianth* cylindrical, 15–18 mm long; lobes ovate, 1.5–2.0 mm long, slightly spreading. *Stamens* exerted by 3 mm at anthesis. *Fruit* not seen. Figure 11.

Known only from the type gathering in the Houtbosch area of Limpopo in 1880, probably during the month of January. Map 4.

Related to the following species, *K. fibrosa*, but differs in the characteristic serrulation of the leaf margin. Although a search has been made in the type area, no further material has been forthcoming.

13. *Kniphofia fibrosa* Baker in Flora capensis 6: 533 (1897a); A. Berger: 41 (1908); Codd: 422 (1968). Type: Natal [KwaZulu-Natal], Mahwaqua [Mahwaqa] Mountain (near Bulwer). *Evans* 649 (K, holo.!, NH!).

Plants usually single-stemmed. *Leaves* grass-like, at first erect then bending over ± at middle, 350–600 × 3–4 mm, keeled; margin scaberulous to finely denticulate towards apex, often smooth towards base. *Scape* overtopping recurved leaves, 300–600 mm tall. *Raceme* subglobose to oblong, dense, 25–70 × 25–35 mm; buds spreading, greenish white to reddish; flowers spreading to pendulous, creamy yellow in the typical form, yellow, coral or orange in hybrids (see notes below). *Bracts* ovate-lanceolate, acuminate, 5–7 mm long; margin entire to minutely denticulate towards apex. *Perianth* cylindrical (12–)15–20(–24 in hybrids) mm long; lobes broadly ovate, 1 mm long, not spreading. *Stamens* exerted by up to 3 mm at anthesis. *Fruit* ovoid-triangular, 3–4 mm long. *Flowering time*: February and March. Figure 12A–E.

Recorded from the KwaZulu-Natal midlands and foothills of the Drakensberg, with a few scattered records from Eastern Cape, some of which are based on scrappy specimens and



FIGURE 11.—*Kniphofia crassifolia*. Photograph of type.



FIGURE 12.—A–E, *Kniphofia fibrosa*: A, rhizome with roots and leaf base, $\times 0.8$; B, leaf section showing keel, $\times 4$; C, inflorescence, $\times 0.8$; D, floral bract, $\times 1.6$; E, fructescence, $\times 0.8$. A–D, *Rennie 1632A, 1634*; E, *Galpin 11347*. Artist: Gillian Condy. F–J, *K. angustifolia*: F, rhizome with roots and leaf base, $\times 0.8$; G, leaf section showing keel, $\times 3.2$; H, inflorescence, $\times 0.8$; I, floral bract, $\times 3.2$; J, fructescence, $\times 0.8$. F, G, I, J, *Killick 1466*; H, *Condly 160*. Artist: Gillian Condy.

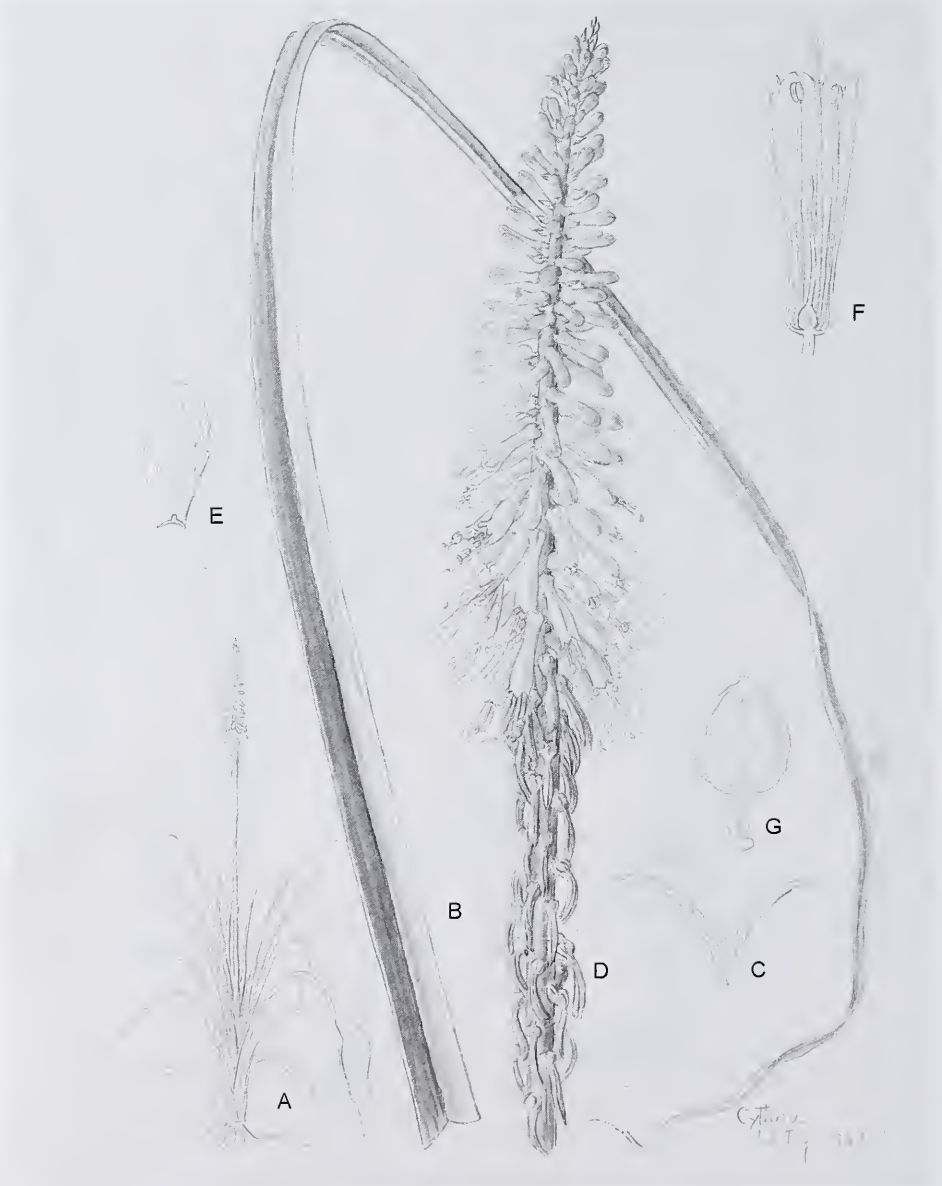
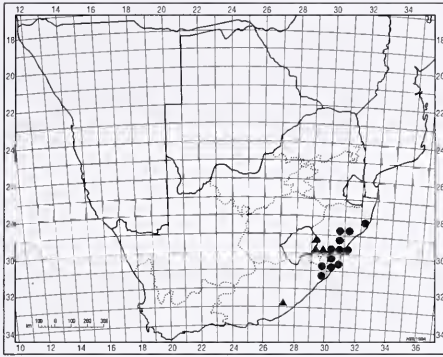


FIGURE 13.—*Kniphofia gracilis*. A, habit, much reduced; B, leaf, $\times 0.9$; C, c/s keeled leaf, $\times 2.6$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 1.4$; F, l/s flower, $\times 2.6$; G, fruit, $\times 3.5$. Artist: Cythna Letty.



MAP. 6.—● *Kniphofia gracilis*
▲ *K. fibrosa*

therefore require confirmation; found in mountain grassland. Map 6.

Vouchers: *Hilliard & Burt* 8014, 15152; *Rennie* 5, 345, 1635.

Hybrid swarms, presumed to be derived from *K. fibrosa* and *K. triangularis* (No. 33), have been recorded around Bushman's Nek by Hilliard & Burt, and on Mahwaqa Mountain by Mrs Rennie, where both putative parents are found. In *K. triangularis* the raceme is concolorous, coral-red to orange-red in colour and the perianth varies from 25–35 mm in length with spreading lobes. The hybrids vary in perianth length from 20–30 mm and in colour from yellow to coral, with combinations of coral or orange buds and pink to yellow flowers. Examples of these hybrids are: *Hilliard & Burt* 7963: perianth 22–24 mm, coral; 8017: perianth 27 mm, buds coral-pink, flowers pale yellow; 8972: perianth 25 mm, buds red, flowers yellow; 12562: perianth 27–28 mm, buds coral, flowers orange-yellow.

Occasional specimens have also been collected with medium to lax racemes, which suggest that *K. angustifolia* (No. 17) may have contributed to the range of variation recorded.

14. *Kniphofia gracilis* Harv. ex Baker in *Journal of the Linnean Society, Botany* 11: 362 (1871); Baker: 278 (1896); A.Berger: 41 (1908);

Codd: 424 (1968). Type: 'Zululand' [KwaZulu-Natal], *Gerrard & McKen s.n.* (K, holo.!).

K. modesta sensu Baker: t. 7293 (1893b); Baker: 277 (1896), p.p., as to t. 7293 (1893b) and *J.M. Wood* 4409; sensu Mallett: 83 (1906); sensu A.Berger: 42 (1908).

K. woodii W.Watson: 292 (12 Oct. 1895). *K. modesta* var. *woodii* (W.Watson) A.Berger: 42 (1908), excl. syn. *K. natalensis* var. *condensata* Baker. Type: a specimen which flowered at Kew, 23 Sept. 1895, annotated by N.E. Brown (K, holo.!).

K. natalensis var. *condensata* sensu Baker: 533 (1897a), p.p. as to syn. *K. woodii*.

K. modesta var. *Intescens* A.Berger: 43 (1908). Type: Natal [KwaZulu-Natal], Manderston, *J.M. Wood* 5463 (K, holo.!, NH!).

K. wyliei N.E.Br.: 129 (1910). Type: 'Zululand' [KwaZulu-Natal], *Wylie sub J.M. Wood* 8996 (locality given as Entumeni on NH sheet) (K, holo.!, NH!).

K. sparsa N.E.Br.: 410 (1914). Type: Curtis's Botanical Magazine t. 7293 (Baker 1893b).

Plants several-stemmed. *Leaves* recurving ± at middle, 0.4–1.2 m long, 4–14 mm broad, channelled above, keeled below; margin smooth to sparsely serrulate, often only towards apex. *Scape* overtopping recurved leaves, 0.25–1.0 m tall. *Raceme* oblong to narrowly cylindrical, usually tapering towards apex, 90–350 × 28–38 mm, dense or lax; buds ascending, whitish tinged with pink, to yellow or orange; flowers at first spreading, later deflexed, whitish, cream-coloured or yellow. *Bracts* broadly ovate to oblong, 4.0–6.5 mm long, obtuse to rounded, rarely acute; margin minutely serrulate. *Pedicels* 1.5–2.0 mm long. *Perianth* subcylindrical to narrowly funnel-shaped, (11–)13–20 mm long, widening gradually to throat, or ± abruptly about middle; lobes ovate, 2.0–2.5 mm long, often somewhat spreading. *Stamens* exerted by 0–2 mm at anthesis. *Fruit* ovoid-triquetrous, 5.75 × 4.5 mm, stipitate. *Flowering time*: December to April. Figure 13.

Distributed from the Mt Ayliff District in the former Transkei, Eastern Cape, to the Hlabisa District in northern KwaZulu-Natal, on grassy slopes from near sea level to the midlands up to about 1 500 m altitude. Map 6.

Vouchers: *Bayliss* 2710; *Codd* 6955, 10191; *Strey* 7377.



FIGURE 14.—*Kniphofia laxiflora*. A, habit, much reduced; B, leaf tip, $\times 0.8$; C₁, leaf section showing keel, $\times 2.4$; C₂, leaf margin, $\times 2.4$; D, inflorescence, $\times 0.8$; E, floral bract, $\times 1.6$; F, fructescence, $\times 0.8$. B-E, *Condy 156*; F, *Codd 6955*. Artist: Gillian Condy.

There is considerable variation in the length and density of the raceme and in the length of the perianth. The perianth is usually cream-coloured to yellow, though specimens with white flowers [e.g. *Curtis's Botanical Magazine*: t. 7293 (Baker 1893b) and *J.M. Wood 4409* from 'Botha's'] may be found. The perianth is usually somewhat constricted above the ovary, expanding about the middle, producing a narrowly funnel-shaped appearance, but this is not always apparent in herbarium specimens. At present a broad view is taken of the species, but further field studies may indicate that it can be subdivided into meaningful groups with separate status.

In southern KwaZulu-Natal, specimens have been collected with flowers up to 20 mm long, which approach the lower limit of *K. laxiflora* (No. 15) in which the flowers vary from (22–) 24–35 mm, and in colour from yellow to shades of pink, coral, orange and red. The type of *K. natalensis* var. *condensata*, cultivated at Kew ex Hort. Leichtlin, has flowers about 22 mm long and is included in synonymy under *K. laxiflora*.

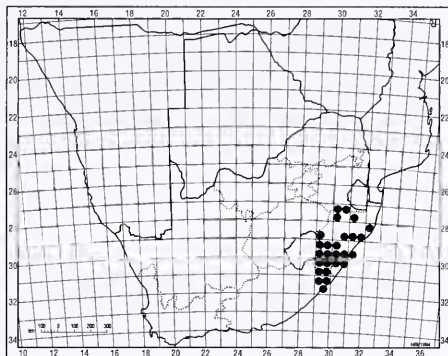
The somewhat lengthy synonymy is discussed in Codd (1968) and is partly due to misuse of the name *K. modesta* by Baker (1893b). He was followed by Berger (1908) who correctly cited the type of *K. modesta* Baker under *K. parviflora*, but upheld the name *K. modesta*, based on the *Curtis's Botanical Magazine* plate, for the specimens of *K. gracilis* with elongate, lax racemes.

15. *Kniphofia laxiflora* Kunth, Enumeratio plantarum 4: 552 (1843); Baker: 281 (1896); A.Berger: 50 (1908); Codd: 428 (1968); Retief & P.P.J.Herman: 101 (1997). Type: Transkei [Eastern Cape], between Umtentu and Umsikaba Rivers, *Drège 4527* (K, lecto.!).

K. natalensis Baker: 278 (1885); Baker: 281 (1896), p.p., excl. var. *angustifolia* Baker; J.M.Wood: t. 305 (1903a); A.Berger: 50 (1908). Type: Natal [KwaZulu-Natal], Inanda, *J.M. Wood 636* (K, holo.!; BM).

K. decaphebia Baker: 6 (1892a); Baker: 282 (1896); A.Berger: 57 (1908). Type: Transkei [Eastern Cape], *Bachmann 281* (B, holo.).

K. natalensis var. *condensata* Baker: 281 (1896). Type: plant cultivated at Kew ex Hort. Leichtlin (K, holo.!).



MAP. 7.—● *Kniphofia laxiflora*

K. natalensis var. *robustior* A.Berger: 52 (1908). Type: Natal [KwaZulu-Natal], Tugela River, *J.M. Wood 3872* (K, holo.!).

Plants one- to many-stemmed. *Leaves* recurving about the middle, 0.5–1.2 m long, 6–10 (rarely–15) mm broad, channelled above, keeled below; margin smooth or serrulate. *Scapae* overtopping recurved leaves, 400–900 mm tall. *Raceme* oblong-ovoid and fairly dense to markedly elongate and lax, tapering to apex, 100–450 × 45–55 mm, ± concolorous; flowers eventually deflexed, varying greatly in colour from pale yellow or yellow-green to salmon-pink, orange, coral-red or red-orange; buds usually more strongly pigmented. *Bracts* broadly ovate to ovate-oblong, 6–9 mm long, obtuse or rounded at apex; margin minutely eroso-serrulate. *Pedicels* 1.5–2.0 mm long. *Perianth* subcylindrical, (22–) 24–35 mm long, often somewhat curved, slightly to markedly constricted above ovary; lobes ovate to oblong, 2.0–2.5 mm long, often spreading. *Stamens* scarcely exerted at anthesis. *Fruit* ovoid-triquetrous, up to 10 mm long. *Flowering time*: February to May. Figure 14.

A variable species found on grassy slopes from near sea level at Port St Johns, through Pondoland, KwaZulu-Natal coastal districts and midlands, with a somewhat odd form occurring among dolerite rocks in the northern KwaZulu-Natal Drakensberg at altitudes of about 1 600 m and just entering Mpumalanga. Map 7.

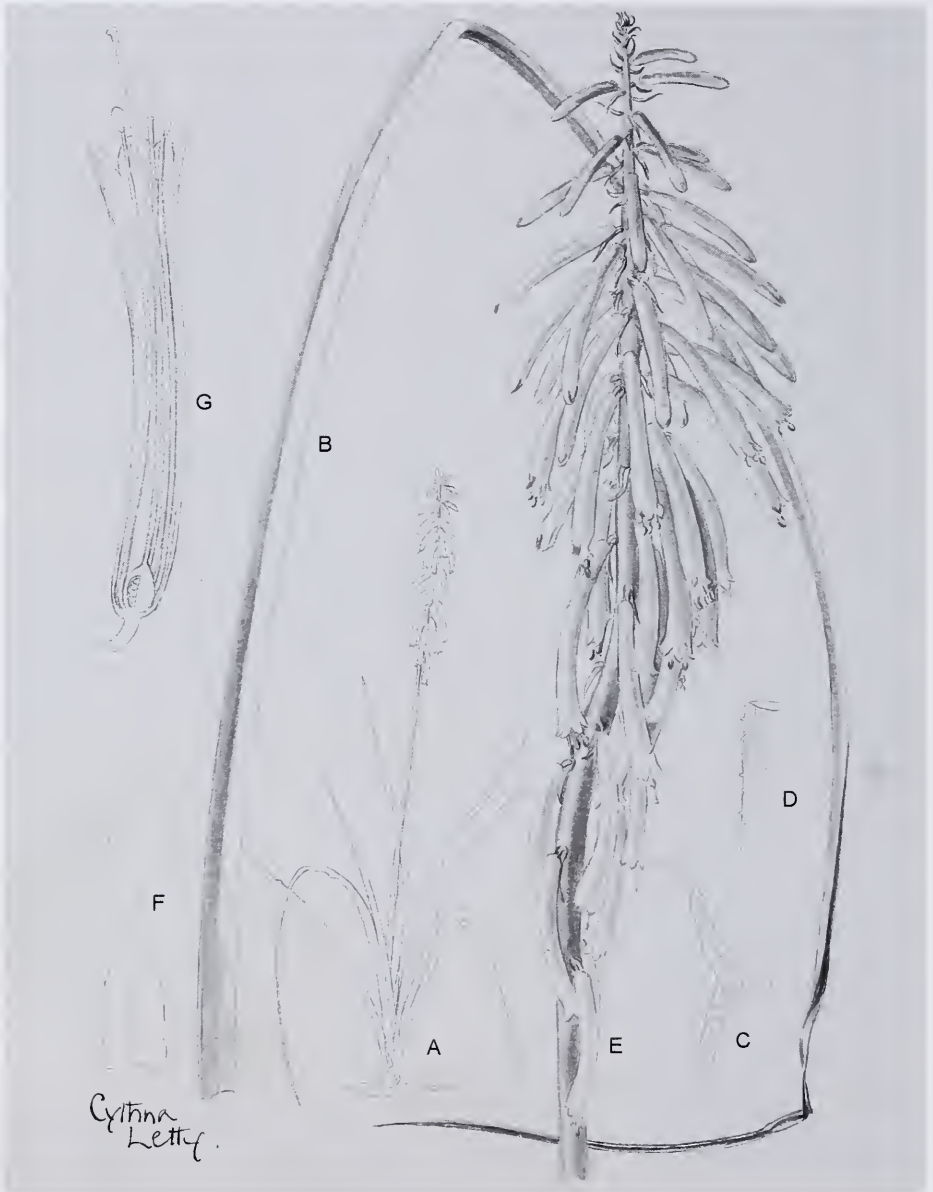


FIGURE 15.—*Kniphofia ichopen sis*. A, habit, much reduced; B, leaf, $\times 0.8$; C, c/s leaf, $\times 5$; D, leaf margin, $\times 8.5$; E, inflorescence, $\times 0.8$; F, floral bract, $\times 4$; G, l/s flower, $\times 2$. Artist: Cythna Letty.

Vouchers: Form A (typical): *Bruce* 595; *Codd* 9305, 9307; *Strey* 10839. Form B: *Acocks* 11217, 11218, 11219; *Moll* 3474; *Strey* 9230, 10891. Form C: *Bruce* 279, 288, 290; *Codd* 6955.

Three forms are recognized, occupying somewhat distinct geographical areas, but it has not been possible to separate them satisfactorily in the herbarium so they have not been given formal taxonomic status.

Form A. In the typical form the plants are one- to few-stemmed; the racemes are relatively short, 80–200 mm long, fairly dense about the middle, tapering and more lax towards the apex; flower colour varies mainly from orange-red to yellow. Its distribution is more extensive than the other two, from Port St Johns, through Pondoland and along the coastal areas of KwaZulu-Natal to Lake St Lucia in the north. In the northern part of the range, for example in the Mtunzini and Hlabisa Districts, only the yellow flower colour has been recorded, and the plants tend to flower later (April–May) than is the case further south (February–April).

Form B. This form is found mainly in the KwaZulu-Natal midlands and extends from East Griqualand to the Estcourt District. It overlaps with Form A between Pietermaritzburg and Durban. The plants occur on grassy slopes or among rocks and are usually many-stemmed; the racemes are distinctly lax and elongate, 180–450 mm long, tapering gradually to the apex; there is a wide range of flower colours from pale yellow or yellow-green to orange, salmon-pink, coral-red or orange-red, the colour varying among adjacent plants. The groups of graceful inflorescences in various shades of colour make this one of the most attractive members of the genus. *Flowering time:* February–March.

Form C. This form has a disjunct distribution on the Drakensberg north and northeast of Utrecht, extending into Mpumalanga on the lower northern slopes of the range and is always found among dolerite rocks. The plants are many-stemmed with very fibrous, subglau-

cous, arcuate-spreading leaves; the racemes are relatively dense, 120–180 mm long, rhomboid in shape, tapering to the apex and base and the flower colour is generally yellow-green with the buds often tinged with dull red. Not many gatherings are known and further investigation may reveal that this form is worthy of separate taxonomic status. In the herbarium it may be confused with *K. linearifolia* (No. 46), but the leaves are narrower and more fibrous, and the raceme more tapering to the apex and base. In the field the two would never be confused.

K. laxiflora may be distinguished from other lax-flowered species, such as *K. ichopensis* (No. 16) and *K. tabularis* (No. 19), by its broader bracts which are rounded or obtuse at the apex. A few specimens have, however, been seen with bracts of intermediate shape, which may be hybrids.

In southern KwaZulu-Natal, *K. laxiflora* tends to grade into the former species, *K. gracilis*, and occasional specimens with the perianth about 22 mm long may be difficult to place with certainty.

16. ***Kniphofia ichopensis*** *Baker ex Schinz* in Bulletin de l'Herbier Boissier, sér. 2, 2: 1016 (1902). Type: Natal [KwaZulu-Natal], Ixopo, *Schlechter* 6662 (K, holo.!; BOL!, GRA!, PRE!, Z!).

Plants one- to few-stemmed. *Leaves:* see varieties. *Scape* 0.5–0.9 m tall, overtopping leaves. *Raceme* lax, oblong-cylindrical, 100–300 × 60–70 mm; buds dull yellow, often tinged with red; flowers eventually deflexed, varying in colour from cream-coloured to yellow-green, or rarely, salmon-pink. *Bracts* lanceolate to linear-lanceolate, acute to acuminate, 7–11 mm long; margin entire. *Pedicels* 2.0–3.5 mm long. *Perianth* subcylindrical, often slightly arcuate, 30–42 mm long; lobes ovate, 4 mm long, not spreading. *Stamens* included or slightly exerted at anthesis, later withdrawn. *Fruit* subglobose to ovoid, about 6 mm long. Figure 15.

Key to varieties

- Leaves soft, keeled, 500–800 × 5–10 mm
 16a. var. *ichopensis*
- Leaves needle-like, up to 200 × 0.5–1.0
 mm 16b. var. *aciformis*

16a. var. *ichopensis* Codd: 231 (1986).

K. ichopensis Baker ex Schinz in Bulletin de l'Herbier Boissier, sér. 2, 2: 1016 (1902); A.Berger: 52, t. 20E (1908); Codd: t. 1292 (1959d); Codd: 433 (1968).

K. schlechteri Baker: 784 (1901a), nom. illeg. non Schinz (1900). Type: Natal, [KwaZulu-Natal], Ixopo, *Schlechter* 6662 (K, holo.!: BOL., GRA!, PRE!, Z!).

Leaves more or less distichous, soft, erect or curving over near apex, 500–800 × 5–10 mm, keeled below; margin and keel smooth or remotely and minutely denticulate towards apex. *Flowering time*: December to March.

Occurs mainly in the KwaZulu-Natal midlands from Pietermaritzburg and Greytown to the foothills of the Drakensberg in the Estcourt District, at altitudes of 1 000 to 2 200 m, in grassy vleis and marshy places. Map 8.

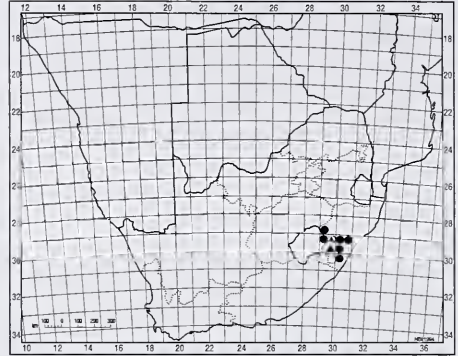
Vouchers: *Codd* 10651; *Killick & Vahrmeijer* 3648; *J.M. Wood* 7154.

16b. var. *aciformis* Codd in Bothalia 16: 231 (1986). Type: Natal [KwaZulu-Natal], Kamberg Nature Reserve, *F.B. Wright* 2 (PRE, holo.!).

Leaves in dense tufts, needle-like, up to 200 × 0.5–1.0 mm. *Flowering time*: November.

Found in moist mountain grassland; known from only two gatherings in addition to the type: *Rennie* 675 (in NU) from Mahwaqa [Mahwaqa] Mtn near Bulwer, KwaZulu-Natal, and *F.B. Wright* 1961 (in NU) from the same locality as the type. Map 8.

The leaves of var. *aciformis* are very distinct from typical *K. ichopensis* and no intermediates have been seen. Further investigation may



MAP 8.—● *Kniphofia ichopensis* var. *ichopensis*
 ▲ *K. ichopensis* var. *aciformis*

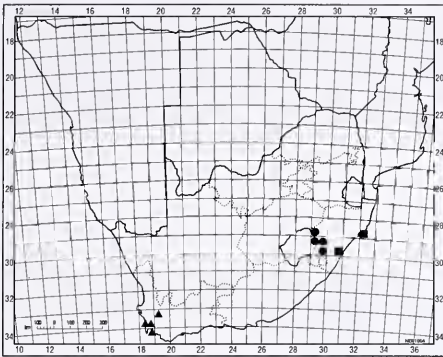
reveal that it is worthy of separate species rank. The floral characters are not distinguishable from var. *ichopensis*.

17. *Kniphofia angustifolia* (Baker) Codd in Bothalia 16: 231 (1986). Type: Natal [KwaZulu-Natal], Thabamhlope Mtn. *M.S. Evans* 411 (K, holo.!: NH!, PRE!).

K. natalensis var. *angustifolia* Baker: 281 (1896).

K. rufa sensu Codd: 434 (1968).

Plants one- to several-stemmed. *Leaves* soft, erect at first, later arcuate, 400–700 × 2–5 mm, ± triangular in cross section with a narrow channel above, slightly keeled below; margin and keel smooth or remotely denticulate towards apex. *Scape* 400–650 mm tall, overtopping arcuate leaves. *Raceme* usually lax, rarely subdense, oblong-cylindrical, 80–250 × 5–6 mm; buds cream-coloured or dull yellow to orange-red; flowers pendulous, often somewhat arcuate, varying in colour from white to cream, yellow or coral-red. *Bracts* lanceolate to linear-lanceolate, acute to acuminate, 6–10 mm long. *Pedicels* 2–3 mm long. *Perianth* subcylindrical, often slightly arcuate, 19–30 mm long; lobes ovate, 2.5 mm long, not or scarcely spreading. *Stamens* included or slightly exserted at anthesis, later withdrawn. *Fruit* subglobose to ovoid, ± 6 mm long. *Flower-*



MAP. 9.—● *Kniphofia angustifolia*
▲ *K. tabularis*
■ *K. pauciflora*

ing time: end of November to early April with a peak from January to March. Figure 12F–J.

Found beside mountain streams, on grassy slopes and marshy places in mountain grassland, chiefly along the eastern slopes of the Drakensberg from Polela to Estcourt Districts, at altitudes of 1 500 to 2 500 m. Map 9.

Vouchers: Hilliard & Burt 18117; Killick 1405, 1431, 1442; Smuts 1064.

It is characterized by its narrow, grass-like leaves and slender racemes which are medium-lax to very lax, with flowers about 19–30 mm long, varying in colour from white to yellow or coral-red. There is some indication that colour may be associated, to some extent, with perianth length. The typical form has white to yellow flowers 19–25 mm long, whereas specimens with reddish flowers may be up to 30 or even 32 mm long. The variation may occur within a small area and the situation resembles the hybrid swarms reported under *K. fibrosa* (No. 13). Here again it is assumed that the longer perianth and reddish colours are contributed by *K. triangularis* (No. 32), which has dense, concolorous racemes, orange-red to coral-red in colour, with flowers 24–35 m long.

Specimens with flowers about 30 mm long may be confused with *K. ichopensis* var. *ichopensis* (above), but the two can usually be separated on the basis of leaf width which, in *K. angustifolia*, does not exceed 5 mm.

This species was dealt with in Codd (1968) under the name *K. rufa* Baker. The latter name was based on a plant grown by Max Leichtlin in his nursery at Baden Baden and forwarded to Kew in June 1899, where it was figured for *Curtis's Botanical Magazine* t. 7706 (Baker 1900). The type specimen in K has a medium-lax inflorescence with flowers about 24 mm long and leaves up to 8 mm broad. It is not exactly matched by any specimens collected in the wild state and the name is therefore considered to be of doubtful application (see Excluded species).

18. *Kniphofia pauciflora* Baker in *Journal of Botany*, London 23: 280 (1885); Baker: 65, t. 10 (1892b); Baker: t. 7269 (1892c); Baker: 279 (1896); Mallett: 101, t. 43 (1906); A. Berger: 41 (1908); Codd: 438 (1968); Codd: t. 1995 (1989). Syntypes Natal [KwaZulu-Natal], *Sanderson 416* (K!); Clairmont Flats, *J.M. Wood 1096* (BOL!, K!, NH!).

K. pedicellata Baker: 998 (1904). Type: Natal [KwaZulu-Natal], Clairmont, *Schlechter 3160* (Z!).

Plants with short stolons forming small groups of stems. *Leaves* soft, erect, 200–350 × 28 mm, keeled, shallowly channelled above; margin and keel smooth. *Scope* overtopping or subequal to leaves, 300–500 mm tall. *Raceme* ovoid, lax to medium-dense, few-flowered, 30–100 × 30–35 mm; buds ascending, deep yellow; flowers finally deflexed, yellow to pale yellow. *Pedicels* 3–4 mm long. *Bracts* narrowly lanceolate, acuminate, 4–6 mm long; margin entire. *Perianth* narrowly funnel-shaped, 14–18 mm long; lobes ovate, obtuse, 3 mm long, spreading. *Stamens* exerted by 2–3 mm at anthesis, later withdrawn. *Fruit* small, subglobose. *Flowering time*: September to November. Figure 16.



FIGURE 16.—*Kniphofia pauciflora*, *Bajjnath* PRE58798. A, leaf base, $\times 0.9$; B, c/s leaf, $\times 1.8$; C, inflorescence, $\times 0.9$; D, flower, $\times 1.8$. Artist: Gilliam Condry.

Known from only two restricted areas in KwaZulu-Natal: the Durban-Pinetown area, and Richards Bay, in marshy grassland. Map 9.

Vouchers: *J.M. Wood 7293; Reyburni sub PRE37003; Strey 9916.*

It may be separated from the previous species, *K. angustifolia* by the slightly broader leaves and narrowly funnel-shaped perianth. Its nearest affinity is probably *K. pallidiflora* Baker of Madagascar, which has more distinctly funnel-shaped flowers and longer pedicels. The Richards Bay specimens tend to have denser racemes and red-tinged flowers.

The species seems to be doomed to extinction as a result of urban development around Durban and at Richards Bay.

19. **Kniphofia tabularis** Marloth in Transactions of the South African Philosophical Society 18: 49 (1907); A. Berger: 329 (1908); Marloth: 102, t. 24c (1915); Codd: 439 (1968); Codd: t. 1661 (1973); Goldblatt & J.C. Manning: 73 (2000). Type: Cape [Western Cape], Table Mt, *Marloth 4366* (PRE, holo.!, BOL!).

Plants many-stemmed. *Leaves* soft, arcuate-spreading or pendulous from cliff faces, 0.6–1.5 m long, 6–20 mm broad, channelled above and keeled below, the outer shorter and sheathing at base; margin and keel smooth. *Scape* arcuate-erect, 0.6–1.2 m tall, occasionally branched near apex. *Raceme* lax, oblong to cylindrical, 100–250 × 55–70 mm; buds ascending; flowers spreading, eventually deflexed, red or scarlet to pale orange, blackish at tips of lobes. *Pedicels* 5–7 mm long, elongating to 10 mm in fruit. *Bracts* linear-lanceolate, long-acuminate to aristate, 7–11 mm long; margin entire. *Perianth* subcylindrical, 24–30 mm long; lobes ovate, 3 mm long, not spreading. *Stamens* in throat or slightly exerted at anthesis. *Fruit* subglobose to ovoid, 7 mm long. *Flowering time*: December and January. Figure 17.

Grows on and at the base of moist cliffs on the southern aspect of Table Mountain and in similar situations on mountains in neighbour-

ing districts at altitudes of 800–1 800 m. Map 9.

Vouchers: *Boucher 2721; Bruce 245; Esterhuysen 18341.*

A distinct species with long, spreading to pendulous leaves, lax racemes and long pedicels. An odd feature is that the peduncle is occasionally sparsely branched towards the apex.

20. **Kniphofia ensifolia** Baker in Journal of Botany, London 23: 278 (1885). Type: Transvaal [North-West], Matebe River near Zeerust, *Holub 1530* (K, holo.!).

Plants many-stemmed. *Leaves* erect, bending over towards apex, glaucous to semiglaucous, 0.5–1.2 m long, 15–45 mm broad, V-shaped in cross section; margin and keel usually conspicuously serrulate, rarely smooth or almost so. *Scape* 0.6–1.8 m tall. *Raceme* very dense, cylindrical, 90–200 × 35–40 mm, tapering slightly towards apex; buds spreading, greenish white, red-tinged, or dull to flame-red; flowers spreading to pendulous, greenish white to cream-coloured, or sometimes yellow (in subsp. *autumnalis*), with a green line down each perianth lobe. *Pedicels* 2–3 mm long, increasing to 5 mm long in fruit. *Bracts* lanceolate to linear-lanceolate, acuminate, 7–10 mm long; margin smooth or rarely minutely eroso-serrulate. *Perianth* narrowly funnel-shaped, 15–21 mm long; lobes ovate, 2.5 mm long, not spreading. *Stamens* exerted by 6–8 mm at anthesis. *Fruit* subglobose, ± 6 mm long. *Flowering time*: October to December. Figure 18.

A robust species with an inland distribution west of the Drakensberg escarpment. Two subspecies are recognized, based mainly on the flowering season.

- Flowering time October–December; flowers on opening white to greenish white 20a. subsp. *ensifolia*
- Flowering time February–March; flowers on opening whitish to yellow (eastern Free State) 20b. subsp. *autumnalis*



FIGURE 17.—*Kniphofia tabularis*. A, thizome with roots and leaf base, $\times 0.5$; B, inflorescence, $\times 1$; C, fructescence, $\times 1$.
A, C, Jackson s.n. (NBG); B, Manning 566. Artist: Gillian Condy.

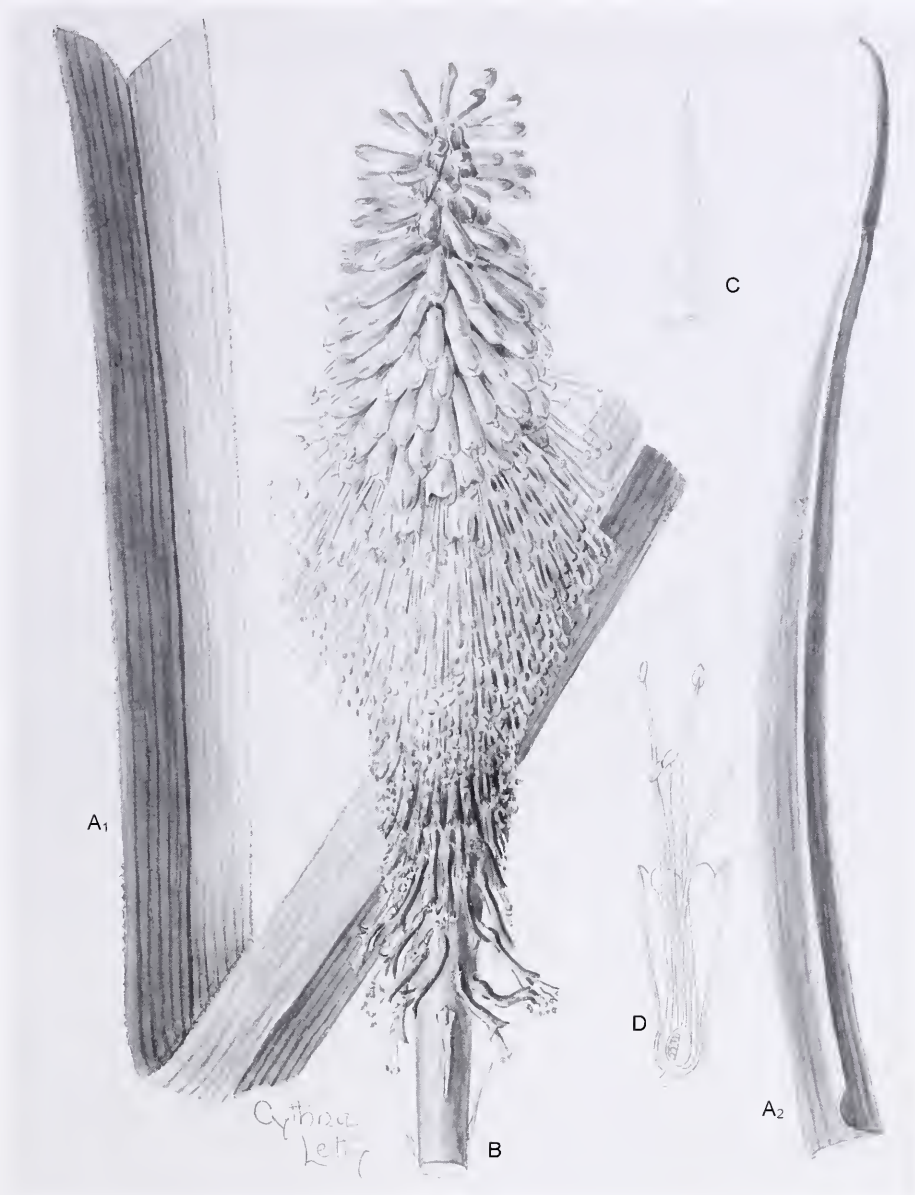


FIGURE 18.—*Kniphofia ensifolia*. A₁, A₂, leaf and leaf tip, $\times 1$; B, inflorescence, $\times 1$; C, floral bract, $\times 2.8$. D, 1/s flower, $\times 2.3$. Artist: Cynthia Letty.

20a. subsp. *ensifolia*. *Codd*: 440 (1968); Fabian & Germish.: 44, t. 14a, b (1997); Retief & P.P.J.Herman: 101 (1997).

K. ensifolia Baker in *Journal of Botany*, London 23: 278 (1885); Baker: 280 (1896); A.Berger: 45 (1908); Letty: 33, t. 19.2 (1962). Type: Transvaal [North-West], Matebe River near Zeerust, *Holub 1530* (K, holo.!).

K. tuckii Baker: 68 (1893a); Baker: 278 (1896); Baker: t. 7644 (1899); Bean: 232 (1900); Mallett: 101 (1906); A.Berger: 56 (1908). Type: Cape [Northern Cape], Colesberg, ex Hort. Lechtlin, *Tuck s.n.* (K, holo.!).

K. foliosa sensu Baker: 279 (1896), non Hochst.

K. pumila sensu Baker: 279 (1896), non (Aiton) Kunth.

K. rivularis A.Berger: 55, t. 21D, E (1908); R.A.Dyer: t. 866 (1942). Type: Transvaal [Gauteng], Modderfontein, *Conrath 643* (W, holo.♀; K!).

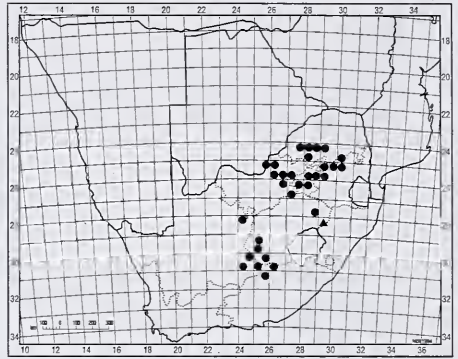
K. ensifolia var. *albiflora* E.A.Bruce: 231 (1951). Type: Transvaal [Mpumalanga], 21 km W of Witbank, *Codd & De Winter 3156* (PRE, holo.!).

In the typical subspecies, the open flowers are white to greenish white and the buds may or may not be pigmented with red to dull red. The plants are locally common in marshy places and on streambanks, usually on black clay soil, from the relatively dry areas of Northern Cape and western Free State, across the North-West, Gauteng to the Lydenburg District in Mpumalanga and northwards to the Waterberg District in Limpopo. Map 10.

Vouchers: *Bruce 221, 229, 462; Codd 5767; Van Wyk 1763.*

There has been confusion in the past between typical *K. ensifolia* and the two Ethiopian species, *K. pumila* and *K. foliosa* (see *Codd 1963: 145*).

The form which occurs around Colesberg and in the western Free State tends to have relatively short, glaucous leaves, and the buds are strongly red-pigmented. Further north the leaves are longer, less markedly glaucous and the buds are less pigmented. In var. *albiflora* the buds lack red pigmentation but do not differ in any other way from typical *K. ensifolia*.



MAP. 10.—● *Kniphofia ensifolia* subsp. *ensifolia*
▲ *K. ensifolia* subsp. *autumnalis*

K. rivularis is described as having smooth-margined leaves. Such specimens are found in *K. ensifolia* but are rare.

20b. subsp. *autumnalis* *Codd* in *Bothalia* 9: 443 (1968). Type: O.F.S. [Free State], Harrismith District, Farm Rensburgskop, *Jacobsz s.n.* (PRE, holo.!).

Differs from subsp. *ensifolia* in the flowering time which is during February and March; the raceme is usually more colourful with red buds and yellow flowers, though specimens with greenish buds and whitish flowers are known.

Recorded only from the Harrismith District in eastern Free State where it occurs on black clay soil on streambanks and low-lying areas in grassland. Map 10.

Vouchers: *Codd 10520, 10523.*

Subsp. *ensifolia* is absent from the eastern Free State but *K. linearifolia* (No. 46) occurs here and occasional specimens are found which appear to be hybrids between this species and subsp. *autumnalis*.

21. *Kniphofia splendida* *E.A.Bruce* in *The Flowering Plants of Africa* 30: t. 1183 (1955a); Letty: 33, t. 20 (1962); *Codd*: 443

(1968); Retief & P.P.J.Herman: 102 (1997)
Type: Transvaal [Mpumalanga], Magoebas-
kloof (cultivated in Pretoria), *Groeneveld* in
PRE28420 (PRE, holo.!).

Plants many-stemmed. *Leaves* fairly rigid,
distinctly nervose when dry, at first erect, later
recurved, 0.3–2.0 m long, 10–20(–30) mm
broad, keeled below, channelled above, mid-
green; margin and keel finely and somewhat
irregularly serrulate, rarely almost smooth.
Scape 1.2–2.5 m long, overtopping recurved
leaves. *Raceme* very dense, subcylindrical,
100–220 × 50–60 mm, usually tapering towards
apex, buds orange to reddish orange; flowers
spreading to pendulous, lemon-yellow to
orange-yellow. *Pedicels* 1.5–4.0 mm long.
Bracts ovate-lanceolate to lanceolate, 5–9 mm
long; margin slightly to distinctly serrulate.
Perianth narrowly funnel-shaped, 19–25 mm
long, slightly constricted and 1.5–2.0 mm diam.
at the base, expanding about the middle to 4–6
mm and ± 5–7 mm near throat. *Stamens* well
exserted by 5–10 mm at anthesis. *Fruit* subglo-
bose, 5.0–6.5 mm long. *Flowering time*:
February to March. Figure 19.

Distributed from Swaziland along the east-
ern Mpumalanga escarpment to the Soutpans-
berg and extending to the mountains of eastern
Zimbabwe and Malawi, growing among rocks
or in tall grassland, often adjacent to forest.
Map 11.

Vouchers: *Bruce* 273; *Compton* 29258;
Scheepers 925.

Its nearest affinity is probably with the fol-
lowing species, *K. bruceae*, from which it dif-
fers in its shorter perianth and pedicels and
somewhat narrower leaves. The flowers are
usually orange-yellow with red-tipped buds, but
around Sabie, in Mpumalanga, the flowers lack
red pigment and are greenish yellow.

22. *Kniphofia bruceae* (Codd) Codd in
Bothalia 17: 185 (1987). Type: Cape [Eastern

Cape], Bedford Farm, near Komga (cultivated
in Pretoria). *Bruce* 604 (PRE, holo.!).

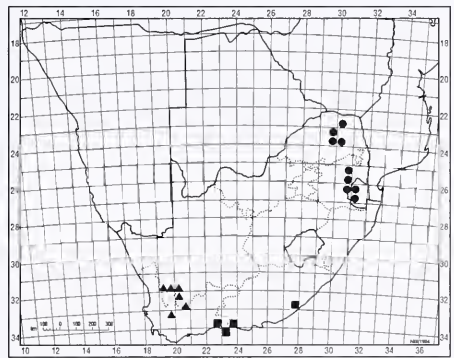
K. praecox subsp. *bruceae* Codd: 449 (1968).

K. uvaria sensu Jacq.: t. 4 (1800).

Plants several- to many-stemmed. *Leaves*
somewhat spreading, nervose when dry, 0.9–1.5
m long, 20–30 mm broad, keeled below, chan-
nelled above; margin and keel sparsely to dis-
tinctly serrulate. *Scape* 1.0–1.8 m tall, overtop-
ping leaves. *Raceme* dense, subcylindrical, taper-
ing somewhat to apex. 150–300 × 60–70 mm;
buds orange to reddish orange; flowers spreading
to pendulous, yellow. *Pedicels* 5–8 mm long,
elongating to 10 mm in fruit. *Bracts* linear-lance-
olate, 8–12 mm long; margin finely eroso-denticu-
late. *Perianth* narrowly funnel-shaped, 24–30
mm long, ± 2 mm diam. near base, expanding
about 10 mm above base to 5–7 mm near throat.
Stamens exserted by 8–15 mm at anthesis. *Fruit*
subglobose, 5–7 mm long. Figure 20.

Found in grassy valleys and low-lying places
at altitudes of 100–300 m in three disjunct
areas: (a) Komga-King Williams Town; (b)
Plettenberg Bay-Knysna; and (c) Willowmore
District. Map 11.

Vouchers: *Flanagan* 2323; *Marais* 577; *Mogg*
sub *PRE37078*.



MAP. 11.—● *Kniphofia splendida*
▲ *K. sarmentosa*
■ *K. bruceae*

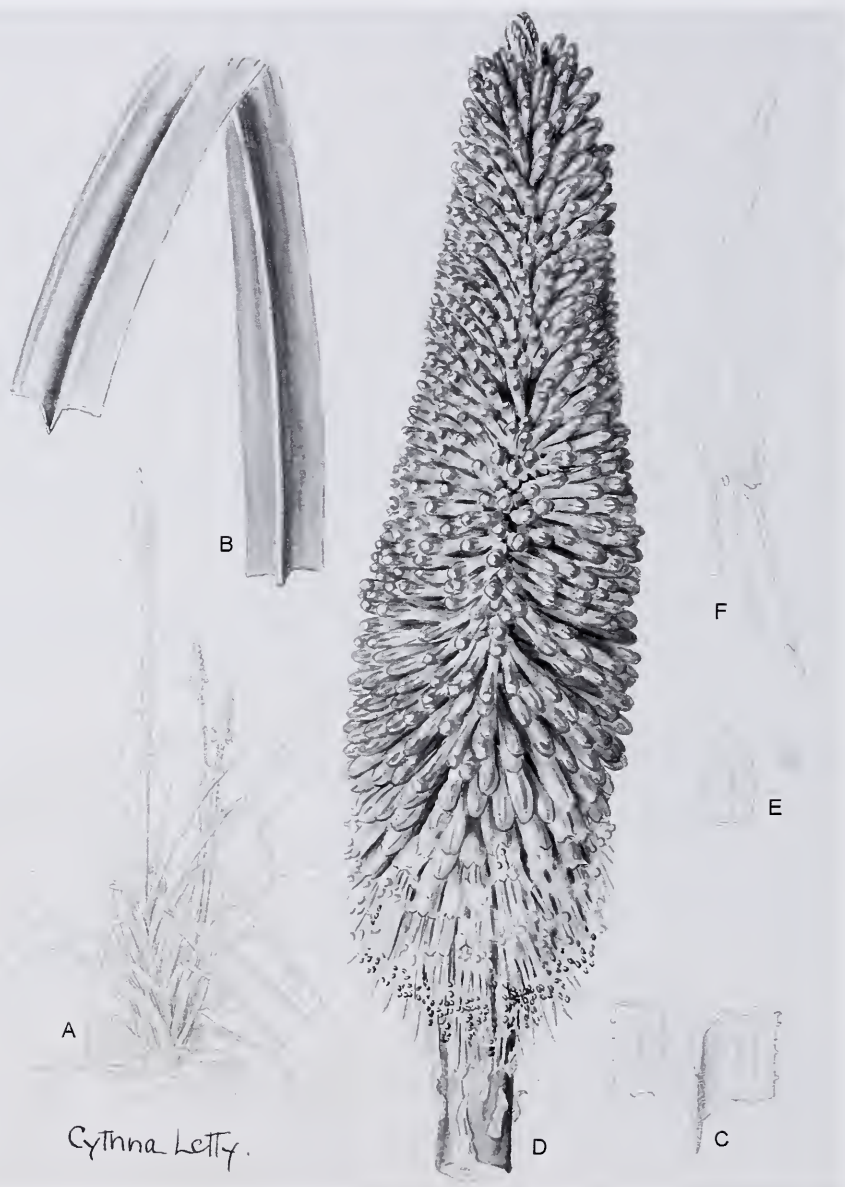


FIGURE 19.—*Kniphofia splendida*. A, habit, much reduced; B, leaf portion, $\times 0.9$; C, leaf section, $\times 1.8$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 2.7$; F, flower, $\times 2.7$. Artist: Cynthia Letty.

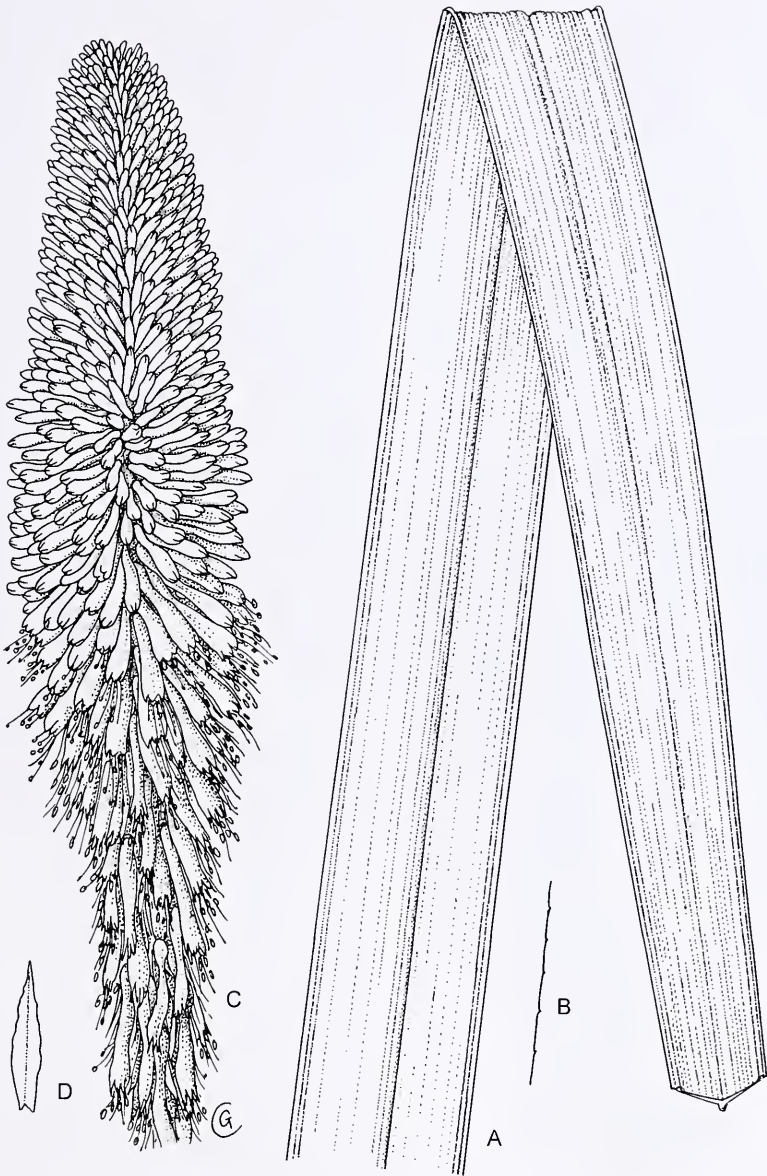


FIGURE 20.—*Kniphofia bruceae*, Bruce 604. A, leaf portion showing keel, $\times 1$; B, leaf margin showing serrations, $\times 4$; C, inflorescence, $\times 0.5$; D, floral bract, $\times 2$. Artist: Gillian Condy.

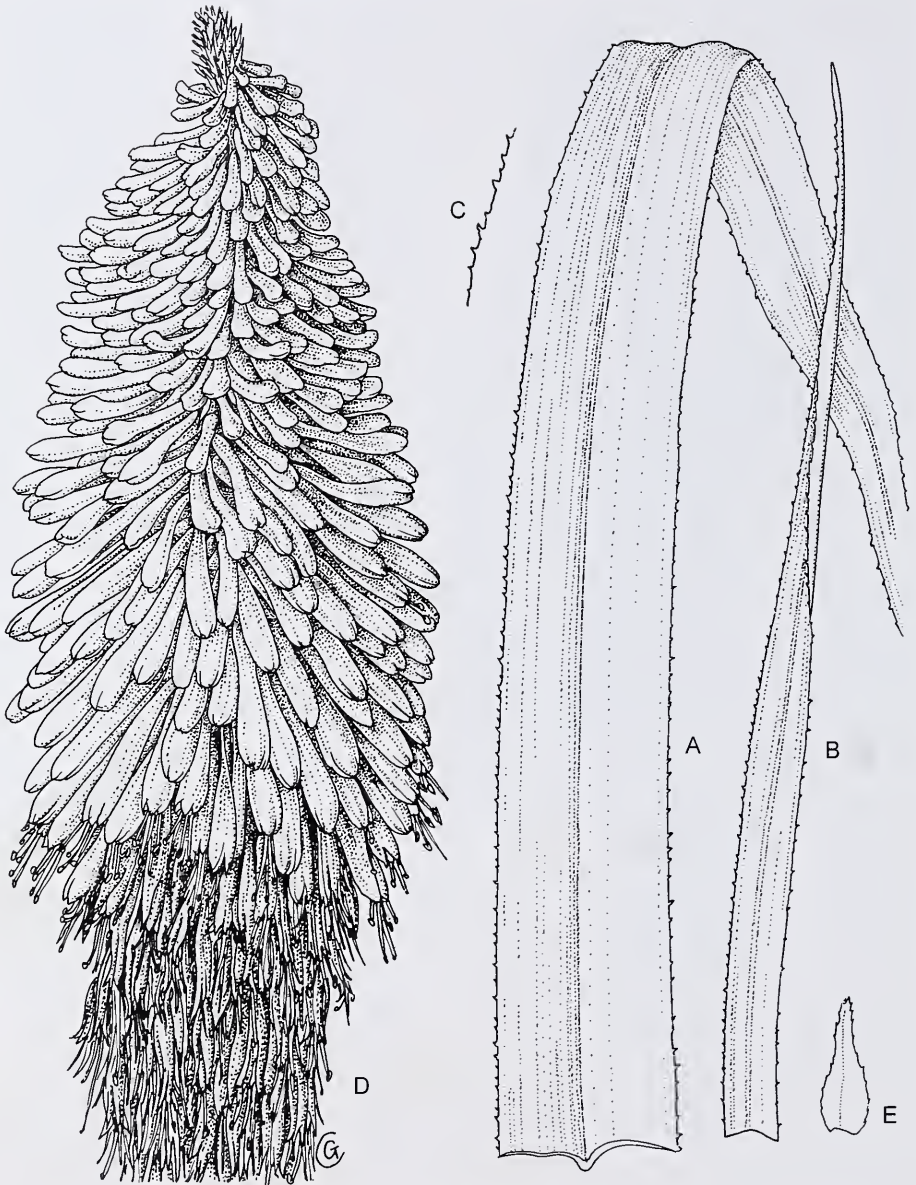


FIGURE 21.—*Kniphofia praecox*, Dyer 00026. A, portion of leaf showing keel, $\times 1$; B, leaf tip, $\times 1$; C, leaf margin, $\times 1.5$; D, inflorescence, $\times 0.8$; E, floral bract, $\times 2$. Artist: Gillian Condy.

Its affinity with *K. splendida* (No. 21) is discussed above. It is considered that the following species, *K. praecox*, is probably derived from the hybridization of *K. bruceae* with a species such as *K. uvaria* (No. 44) or *K. linearifolia* (No. 46) in the early 1800s. Its presence in Europe at this early stage is evidenced by the illustration in Jacquin's *Fragmenta* t. 4 (1800 or 1801).

23. *Kniphofia praecox* Baker in Saunders, *Refugium Botanicum*: t. 169 (1870); Codd: 447 (1968), p.p., excl. *Mogg s.n.*, *Codd 9922*, *Marais 577*, *Van Breda & Admiraal 2174*; Codd: 185 (1987); Goldblatt & J.C.Manning: 73 (2000). Type: ex Hort. Saunders (K, holo.!).

K. uvaria var. *maxima* Baker: t. 6533 (1881); A.Berger: 61 (1908). *K. alooides* var. *maxima* (Baker) Baker: 283 (1896). Type: Hortus kewensis, Oct 1879 ex Max Leichtlin (K, holo.!).

K. alooides sensu Baker: 283 (1896), p.p., as to syn. *K. praecox* and probably *K. alooides* var. *nobilis* (Guillon) Baker and var. *serotina* Baker (see discussion).

K. longicollis sensu Baker: t. 7623 (1898a), non Baker (1895c).

K. uvaria var. *praecox* (Baker) A.Berger: 62 (1908), and probably var. *nobilis* (Guillon) A.Berger and var. *serotina* (Baker) A.Berger.

Plants many-stemmed. *Leaves* erect to \pm spreading, 0.9–2.0 m long, 20–40 mm broad, deeply keeled below, channelled above; margin and keel serrulate to obscurely serrulate, rarely almost smooth. *Scape* 1.2–2.0 m tall, overtopping recurved leaves. *Raceme* dense to very dense, subcylindrical, 200–300 mm long, tapering somewhat towards apex; buds scarlet; flowers spreading to pendulous, orange to yellow, often brown-tipped when dry. *Pedicels* 4–6 mm long. *Bracts* lanceolate, 8–10 mm long, tapering gradually to small rounded apex; margin finely eroso-denticulate. *Perianth* subcylindrical, widening slightly about the middle, 30–36 mm long. *Stamens* exerted by 5–6 mm at anthesis. *Fruit* subglobose, erect, 5–7 mm long. Figure 21.

As indicated in Codd (1968: 448), a robust hybrid *Kniphofia* cropped up in European gardens in the early 1800s which, judging by the

long, narrow bracts, was derived from *K. bruceae* (No. 22) crossed with one of the showy species such as *K. uvaria* (No. 44) or *K. linearifolia* (No. 46), both of which have shorter, ovate bracts. It is apparent that the hybrid produced several derivatives which became widely accepted in cultivation under epithets such as *uvaria* and *aloides*, while the original *K. uvaria* was lost or was regarded as inferior and less desirable from the horticultural viewpoint. The bract shape is virtually the only character which can be used to separate herbarium specimens of these hybrids from *K. linearifolia*, from which it follows that many illustrations which have been published over the years cannot be satisfactorily identified in the absence of a voucher specimen or a description or drawing of the bracts.

From specimens preserved at Kew it may be concluded that the plant described as *K. praecox* was one of these hybrid derivatives. It was grown in the garden of Mr W.W. Saunders of Reigate and said to have been introduced from the Cape by Thomas Cooper. However, it is considered that an error had crept into the garden records between Cooper's visit to South Africa in 1859–1862 and the subsequent preparation of the *Refugium botanicum* t. 169 (Baker 1870). No specimen collected in the wild state by Cooper matching the type of *K. praecox* has been seen, though he did collect *K. linearifolia* (No. 3599 in K, Z).

Baker's (1896: 283) description of *K. praecox* was somewhat tentative and he subsequently did not uphold the species, stating that it 'on one occasion flowered in summer, and at other times in autumn'. Two forms of redhot poker are commonly grown in South Africa, a summer-flowering form and a winter-flowering form. The summer-flowering form comes nearest to typical *K. praecox* and has occasionally been found as a garden escape.

Vouchers: *Bruce 148a*; *Codd 9965*; *R.A.Dyer sub PRE37071*.

The name *K. alooides* var. *serotina* Hort. ex Baker: 283 (1896) may apply to the late-flower-



FIGURE 22.—*Kniphofia sarmetosa*. A, leaf, $\times 0.9$; B, c/s leaf, $\times 1.8$; C, inflorescence, $\times 0.9$; D, floral bract, $\times 3.6$; E, flower, $\times 2.7$. Artist: Cynthia Letty.

ing form of *K. praecox* but no material has been traced and so its identity is uncertain.

Another epithet, *nobilis*, requires scrutiny. A robust *Kniphofia* described as *Tritoma nobilis* Guillon in *Revue horticole*: 24 (1882) and Carrière in *Revue horticole*: 252 (1885) is a name of doubtful application because there is no reference to bract shape and no type specimen has been traced. However, there are specimens in K with this epithet, dated 1883 and 1884, which are hybrids resembling *K. praecox*. They were probably what Baker had in mind when he published the name *K. alooides* var. *nobilis* (Guillon) Baker in *Flora capensis* 6: 283 (1896) which, nomenclaturally, is linked to Guillon's epithet, and therefore of uncertain application.

The type of *K. uvaria* var. *maxima*, a plant grown in Kew Gardens in Oct. 1879, originally from Max Leichtlin's nursery at Baden Baden, is also a segregate from this hybrid pool. Baker describes the bracts as 'lanceolate, a quarter to half an inch long'. He also attached the epithet to *Cooper* 3599, collected in the Free State, which has oblong-ovate, rounded bracts, and is a form of *K. linearifolia*.

24. ***Kniphofia sarmentosa* (Andrews) Kunth**, *Enumeratio plantarum* 4: 552 (1843); Baker: 362 (1871); Baker: 279 (1885); Baker: 282 (1896); A.Berger: 62 (1908), p.p., excl. *Reumann* 4769; Codd: t. 1327 (1960c); Codd: 453 (1968); Goldblatt & J.C.Manning: 73 (2000). Type: the illustration in Andrews's, *The botanists repository*, vol. 1: t. 54 (1797).

Aletris sarmentosa Andrews: t. 54 (1797). *Veltheimia sarmentosa* (Andrews) Willd.: 380 (1809). Type: as above.

Veltheimia media Donn: 131 (1800). *Tritoma media* (Donn) Ker Gawl.: t. 744 (1804a); Redouté: t. 161 (1807); W.T.Aiton: 290 (1811). *Tritomanthe media* (Donn) Link: 333 (1821); Schult.: 630 (1829). *Veltheimia repens* Ker Gawl.: 18 (1801). All nom. illeg. Type as for *K. sarmentosa*.

Plants with short rhizomes forming small groups of stems. *Leaves* erect to recurved, glaucous, soft and flaccid in texture, 300–650 × 8–30 mm, V-shaped in cross section; margin

and keel smooth. *Scape* stout, 300–600 mm tall, overtopping recurved leaves. *Raceme* conical, ovoid or subcylindrical, tapering to apex, at first dense but often elongating and becoming laxer, 80–300 × 50–65 mm; buds at first erect, soon spreading, coral to coral-scarlet with a greyish bloom; flowers pendulous, salmon to creamy buff. *Bracts* long, erect in bud stage and covering buds, later deflexed, lanceolate to oblong-lanceolate, acuminate, 11–15 mm long; margin entire. *Pedicels* 1–3 mm long. *Perianth* subcylindrical, 20–35 mm long, widening gradually above the middle; lobes ovate, 2 mm long, not spreading. *Stamens* exerted by 2–5 mm at anthesis, later withdrawn. *Fruit* ovoid-triangular, 7–8 mm long. *Flowering time*: June to October. Figure 22.

Found beside mountain streams in the Sutherland and Calvinia Districts of Northern Cape, and the Worcester and Caledon Districts of Western Cape. Map 11.

Vouchers: *Comins* 1101; *Hall* 3261; *Hardy* 47; *Marloth* 9609.

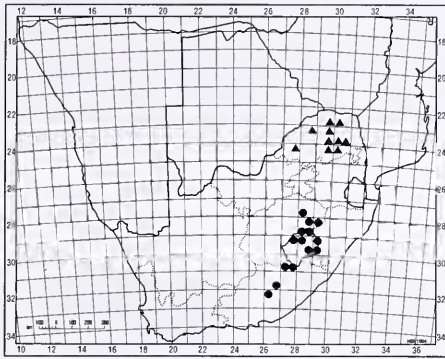
A fairly clear-cut species showing affinity to the Limpopo species, *K. coralligemma* (below), from which it differs in its longer bracts, somewhat shorter, broader and more glaucous leaves, shorter peduncles and in the flowering time.

25. ***Kniphofia coralligemma* E.A.Bruce** in *The Flowering Plants of Africa* 30: t. 1186 (1955d); Letty: 36, t. 20,2 (1962); Codd: 453 (1968); Retief & P.P.J.Herman: 101 (1997). Type: Transvaal [Limpopo], Waterberg District, Kransberg, *Codd & Erens* 2090 (PRE, holo!).

Plants solitary to several-stemmed. *Leaves* at first erect, later bending over about the middle, 0.55–1.1 m long, 10–20 mm broad, soft in texture, channelled above and keeled below, midgreen to slightly glaucous; margin distantly serrulate towards apex, generally smooth in lower part and on keel. *Scape* 0.6–1.2 m tall, overtopping recurved leaves. *Raceme* ovoid, cylindrical, usually tapering slightly towards



FIGURE 23.—*Kniphofia coralligemma*. A, habit, much reduced; B, portion of outer leaf just above base, slightly enlarged; C, leaf margin with serrations, slightly enlarged; D, inflorescence, $\times 0.9$; E, floral bract, $\times 5.3$; F, flower, $\times 1.8$. Artist: Cynthia Letty.



MAP. 12.—● *Kniphofia caulescens*
▲ *K. coralligemma*

apex, 80–150 × 40–50 mm, dense, or sometimes rather lax at apex; buds at first ascending, later spreading, coral to pale orange or orange-scarlet; flowers varying in colour according to locality (see notes) from cream-coloured or ivory, to creamy yellow or orange-yellow. *Pedicels* 2–5 mm long. *Bracts* at first erect, later deflexed, oblong-lanceolate to narrowly lanceolate, acute to acuminate, 7–12(–16) mm long, minutely serrulate to entire. *Perianth* subcylindrical, 22–25 mm long; lobes about 3 mm long, slightly spreading. *Stamens* exerted by about 2 mm at anthesis, later withdrawn. *Fruit* ovoid-triangular, 5 mm long. *Flowering time*: February to April. Figure 23.

Found in marshy places, forest margins and grassy, south-facing slopes at altitudes of 1 700–2 000 m in three mountainous areas of Limpopo: (a) Kransberg (Waterberg); (b) Blouberg; and (c) Soutpansberg, Wolkberg and Haenertsburg, Map 12.

Vouchers: *Codd & Erens* 3966; *Meeuse* 9856, 10235; *Van Wyk* 2701.

Flower colour varies according to the three localities indicated above: (a) in the typical form, known from only a small area on the western extremity of the Waterberg (Kransberg), the buds are coral-pink shading to creamy white

or ivory as the flowers mature; (b) on the highest point of the Blouberg, the plants tend to be smaller with orange-yellow buds, becoming pale yellow in open flowers; (c) in the Soutpansberg to Wolkberg area, the plants tend to be more robust than the typical form, with orange-scarlet buds changing to orange-yellow towards the base of the raceme, bearing a superficial resemblance to *K. linearifolia* (No. 46), but differing in the narrower leaves and lanceolate-acuminate bracts.

26. *Kniphofia caulescens* Baker ex *Hook.f.* in Curtis's Botanical Magazine t. 5946 (1872); Baker: 281 (1885); Baker: 284 (1896); Mallett: 82 (1906); A. Berger: 65 (1908); Codd: 455 (1968). Type: Curtis's Botanical Magazine t. 5946, ex Hort. W.W. Saunders, Reigate, collected by Thomas Cooper on the Stormberg.

Tritoma caulescens (Baker) Carrière: 132, t. 28 (1887).

K. tysonii sensu E. Phillips: 294 (1917), as to *Dieterlen* 642.

Plants caulescent, several-stemmed, often gregarious; stems simple or sparsely branched up to 600 mm tall, crowned with large rosette of leaves. *Leaves* erect or bending over towards apex, glaucous, outer leaves 450–700 × 25–50 mm (inner leaves much smaller), V-shaped in cross section, drying with a purplish tinge towards chartaceous base; margin and keel distinctly and finely serrulate. *Scape* 300–600 mm long, overtopping or subequal to leaves. *Raceme* oblong to subcylindrical, 90–300 × 5–6 mm, very dense; buds coral-pink to flame-coloured; flowers pale greenish yellow to creamy yellow. *Pedicels* 3–5 mm long. *Bracts* linear-oblong to linear, acute to acuminate, 7–11 mm long, chartaceous, drying with purplish tinge; margin entire to finely denticulate towards apex. *Perianth* subcylindrical, 22–24 × 1.5 mm above ovary, widening to 3.5 mm near the middle; lobes 2 mm long, not or slightly spreading. *Stamens* markedly exerted by 8–13 mm at anthesis. *Fruit* ovoid-triangular, erect, 5 mm long. *Flowering time*: January to March, though flowering specimens have been collected in KwaZulu-Natal in late November and December. Figure 24.



FIGURE 24.—*Kniphofia caulescens*. A, habit, much reduced; B, portion of leaf and leaf tip, $\times 1$; C, leaf margin, $\times 4$; D, inflorescence, $\times 1$; E, floral bract, $\times 2$; F, fructescence, $\times 1$. A–E, Bruce 344; F, Galpin s.n. Artist: Gillian Condy.

Occurs in high mountain areas at altitudes of 1 800–2 800 m on peaty soil overlying rock formations, marshy places and seepage areas in mountain grassland, in northern Eastern Cape, eastern Free State, Lesotho and the adjoining crest of the Drakensberg in KwaZulu-Natal. Map 12.

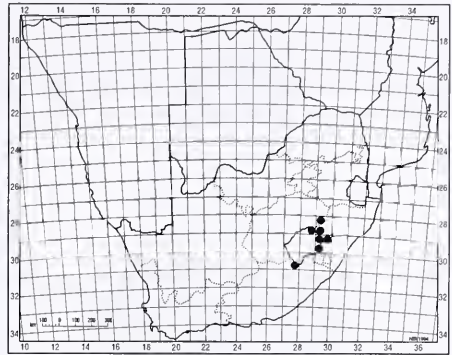
Vouchers: *Dieterlen 642; Galpin 1929, 13667; Hilliard & Burt 16443.*

One of the few caulescent species and the stem may be simple or branched, each branch ending in a dense rosette of glaucous leaves. The plants tend to be gregarious and a colony in full flower is an impressive sight. In the herbarium, the leaf bases and bracts tend to dry with a purplish tinge, a character not noted in any other species. Allied to the next species, *K. albomontana*, but has shorter and less fibrous leaves, shorter perianth with longer-exserted stamens.

27. *Kniphofia albomontana* Baijnath in South African Journal of Botany 53: 307 (1987). Type: Natal [KwaZulu-Natal]: Thabamhlope, Farm Marshlands about 10 km from Thabamhlope Police Station, 21.2.1986, *Baijnath 1876* (UDW, holo.; K, MO, PRE!).

Plants caulescent, 1–4-stemmed; stems up to 250 mm tall. *Leaves* recurved, stiff in texture, 0.6–1.0 m long, 22–45 mm broad, V-shaped in cross section; margin and keel finely serrulate. *Scape* 0.8–1.2 m tall, overtopping leaves. *Raceme* ovoid, 110–220 × 50–70 mm, dense; buds purplish orange; flowers pale yellow-green, sometimes tinged with orange. *Bracts* lanceolate to narrowly lanceolate, subacute to slightly obtuse, 18–22 mm long; margin minutely eroso-denticulate in upper half. *Pedicels* 2 mm long, increasing to 5–7 mm long in fruit. *Perianth* narrowly funnel-shaped, 30–35 mm long; lobes ovate, 2–3 mm long, not spreading. *Stamens* exserted by up to 5 mm at anthesis. *Fruit* ovoid, 11–13 mm long. Figure 25.

Found in seepage areas in mountain grassland along the Drakensberg and adjoining foothills at 1 800–2 500 m from Sani Pass to



MAP. 13.—● *Kniphofia albomontana*

Thabamhlope in KwaZulu-Natal, the Harri-smith District in the Free State and the Herschel District in Eastern Cape. Map 13.

Vouchers: *Jacobsz 279; Killick & Vahrmeijer 3771; Marais 1469.*

Allied to the next species, *K. northiae*, but distinguished by the narrower leaves which are V-shaped in cross section.

28. *Kniphofia northiae* Baker in Journal of Botany, London 27: 43 (1889); Baker: 67 (1891); Baker: t. 7412 (1895); Baker: 284 (1896); Mallett: 100, t. 42 (1906); A. Berger: 65 (1908); Codd: 464 (1968). Type: a drawing by Miss North of a plant from 'the mountains north of Grahamstown' (in K).

Plants solitary, caulescent; stems simple, or rarely, branching from base, up to 1.7 m tall. *Leaves* in a rosette at apex of stem, recurved, stiff in texture, 0.5–1.5 m long, 35–120 mm broad, shallowly crescentiform in cross section, not keeled; margin strongly serrulate. *Scape* overtopping recurved leaves, stout, 200–300 mm tall. *Raceme* cylindrical to ovoid, very dense, 100–200 × 50–60 mm; buds pinkish red opening to whitish flowers (typical) or orange-red opening to yellow flowers (Eastern Cape [Transkei]). *Bracts* oblong-lanceolate to linear-oblong, 7–12



FIGURE 25.—*Kniphofia albomontana*. A, habit, much reduced; B, portions of leaf, $\times 0.8$; C, leaf margin, $\times 1.6$; D, inflorescence, $\times 0.8$; E, floral bract, $\times 1.6$; F, fructescence, $\times 0.8$. D, E, *Killick & Vahmeijer 3771*; F, *M.L. Jacobs 279*. Artist: Gillian Condy.

mm long, acute to obtuse at apex; margin entire or minutely eroso-denticulate near apex. *Pedicels* 2.5–3.0 mm long, elongating to 7–10 mm in fruit. *Perianth* subcylindrical, 22–32 mm long; lobes ovate, 2 mm long, not spreading. *Stamens* exerted by 10–13 mm at anthesis. *Fruit* subglobose, obscurely triquetrous, erect, 8 mm long. *Flowering time*: December to February, but at the two last-mentioned localities, flowering has been recorded in September and October. Figure 26.

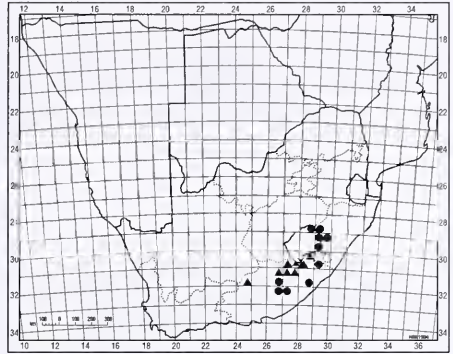
Occurs in mountain areas at altitudes of 1 500–2 800 m in grass or on sparsely wooded stony slopes in Eastern Cape, KwaZulu-Natal midlands and Drakensberg region, and eastern Lesotho, with outliers at lower altitudes in Eastern Cape [Transkei] and near Pietermaritzburg. Map 14.

Vouchers: *Bowker* sub PRE37132; *Galpin* 6866; *Trauseld* 498.

May be separated from all other species by the broad, shallowly channelled, arched leaves which lack a distinct keel. In the following species, *K. stricta*, the leaves are not keeled, but they are rigid, erect and only 8–14 mm broad.

29. ***Kniphofia stricta*** Codd in The Flowering Plants of Africa 34: t. 1328 (1960d); Codd: 461 (1968). Type: Cape [Eastern Cape], Graaff-Reinet Dist., near New Bethesda, *Kitching* 54 (PRE, holo.!).

Plants several-stemmed. *Leaves* erect to ascending, rigid, strongly nerved, 300–700 × 8–14 mm, U-shaped in cross section (not keeled), channelled above; margin serrulate; nerves prominent on lower surface, often with scattered papillae on nerves. *Scape* subequal to leaves, 300–600 mm tall. *Raceme* subcylindrical to ovoid, dense, 80–140 × 50–60 mm; buds orange or pale orange-red to coral, becoming yellow to greenish yellow as flowers open. *Bracts* ovate to ovate-lanceolate, 7–10 mm long; apex rounded to acute; margin eroso-denticulate. *Pedicels* 1.5–3.0 mm long, elongating to 6 mm long in fruit. *Perianth* subcylindrical, 27–33 mm long; lobes ovate, 3 mm long, slightly spreading. *Stamens* exerted by 0–8



MAP. 14.—● *Kniphofia northiae*
▲ *K. stricta*

mm at anthesis. *Fruit* subglobose, 7–9 mm long. *Flowering time*: mid-January to early March. Figure 27.

Occurs in the mountains of Eastern Cape and the adjoining area of southwestern Lesotho, on grassy slopes, often among dolerite rocks, at altitudes of 1 700–2 500 m. Map 14.

Vouchers: *Bayliss* 3939; *Bruce* 563, 567; *Galpin* 14083; *Van Wvk* 6715.

The leaves of *K. stricta* are U-shaped in cross section, rigid, erect and strongly nervose, often with the margins tending to be involute. When herbarium specimens are prepared, the leaves become flattened and the characteristic shape is not always apparent. Along the nerves there are often minute papillae, making the leaf surface scabrid to the touch, which may lead to confusion with the following species, *K. hirsuta*, in which the leaves are hispid and V-shaped in cross section.

30. ***Kniphofia hirsuta*** Codd in Bothalia 9: 140 (1966); Codd: 460 (1968). Type: Lesotho, Berea Dist., Mamalapi, *Jacot Guillarmod* & *Marais* 1307 (PRE, holo.!).

Plants solitary or few-stemmed. *Leaves* erect, soft in texture, dull green, 400–600 × 15–25 mm,

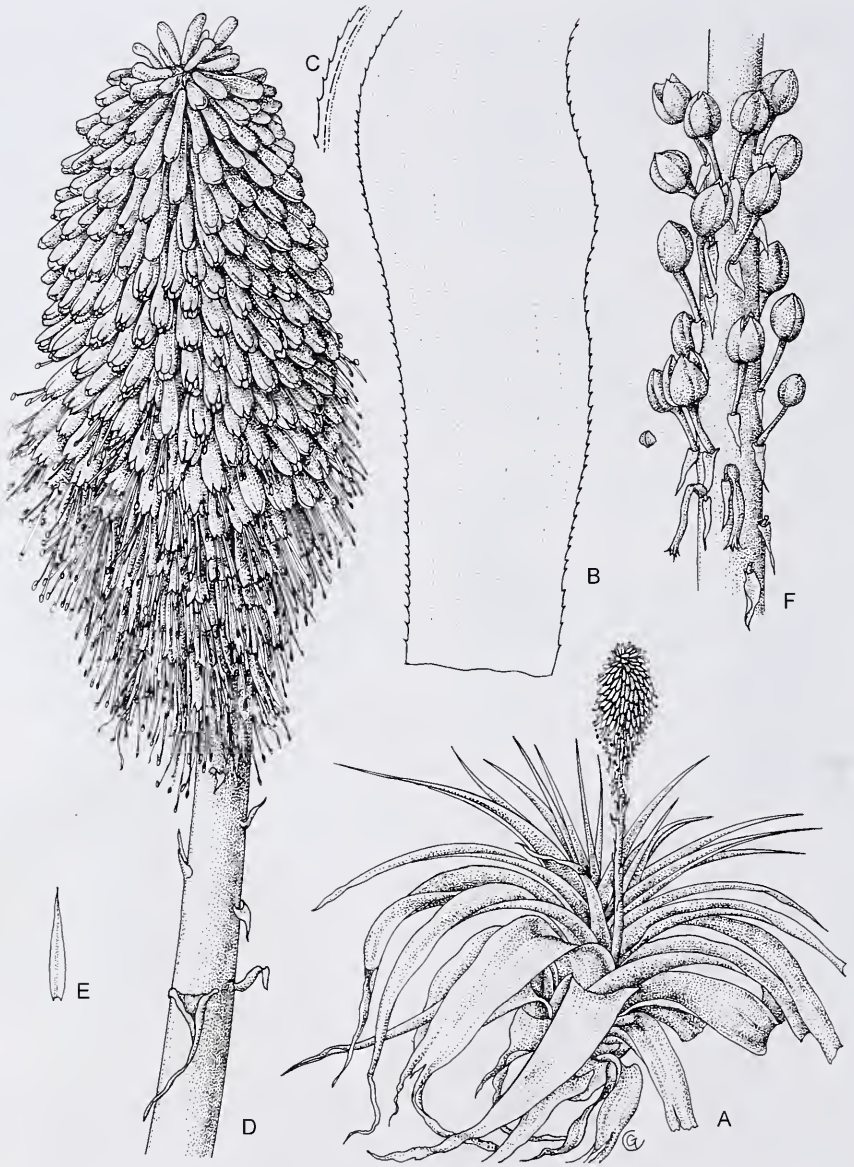


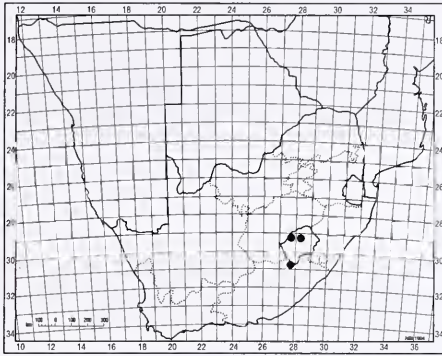
FIGURE 26.—*Kniphofia northiae*. A, habit, much reduced; B, portion of leaf, $\times 0.8$; C, leaf margin, $\times 1.6$; D, inflorescence, $\times 0.8$; E, floral bract, $\times 1.6$; F, fructescence, $\times 0.8$. A, *Marais 1074*; D, E, *Bowker, Killick & Marais 2175*; F, *Galpin 6866*. Artist: Gillian Condy.



FIGURE 27.—*Kniphofia stricta*. A, habit, much reduced; B, base and apex of leaf, $\times 0.9$; C, leaf margin, $\times 4.6$; D, c/s leaf, $\times 1.9$; E, inflorescence, $\times 0.9$; F, floral bract, $\times 4.6$; G, 1/8 flower, $\times 2.3$. Artist: Cynthia Letty.



FIGURE 28.—*Kniphofia hirsuta*. A, habit, much reduced; B, leaf base, $\times 1$; C, portion of leaf showing deep keel and hirsute venation, $\times 2$; D, inflorescence, $\times 1$; E, floral bract, $\times 2$; F, fructescence, $\times 1$. A, D, *Marais 1308*; B, C, *Schmitz 8480*; E, F, *Hilliard & Burt 16444*. Artist: Gillian Condy.



MAP. 15.—● *Kniphofia hirsuta*

deeply keeled, hirsute along nerves on both surfaces; margin conspicuously and regularly serrulate. *Scape* equal to or longer than leaves, 450–600 mm long. *Raceme* shortly rhomboid-cylindrical to ovoid, dense, 80–120 × 40–45 mm; buds orange or dull coral to salmon-pink tipped with green; flowers pendulous, dull greenish yellow. *Bracts* linear-lanceolate, acuminate, 10–14 mm long; margin minutely denticulate to subtire. *Pedicels* 2–4 mm long. *Perianth* subcylindrical, 22–27 mm long; lobes ovate, 2.5 mm long, not spreading. *Stamens* not or scarcely exerted at anthesis. *Fruit* subglobose, 7–9 mm long. *Flowering time*: December and January. Figure 28.

Found in the mountains of Lesotho on grassy slopes and streambanks at altitudes of 2 400–2 800 m. Map 15.

Vouchers: *Jacot Guillarmod 1238*; *Schmitz 8480*.

K. hirsuta resembles the following species, *K. ritualis*, in raceme, bract and perianth characters but is unique in the genus in having pubescent leaves. The only other species which approaches it in this respect is *K. stricta* (No. 29) which usually has scabrid papillae on the nerves.

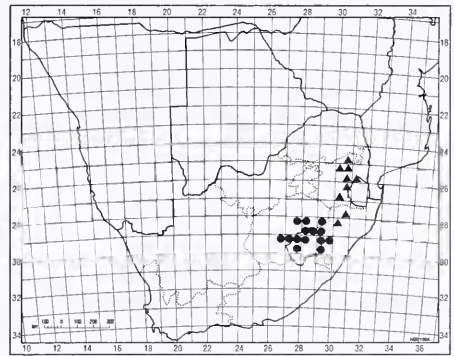
31. *Kniphofia ritualis* Codd in *Bothalia* 9: 139 (1966); Codd: 458 (1968), excl. Trans-

vaal [Limpopo] specimens. Type: Lesotho, Berea Dist., Bitsolebe area, *Marais 1327* (PRE, holo.).

K. sarmentosa sensu E. Phillips: 294 (1917), as to *Dieterlen 174, 174a*.

Plants solitary or few-stemmed. *Leaves* at first erect later bending at the middle or semi-spreading, soft in texture, semiglaucous, 400–900 × 12–24 mm, deeply keeled; margin conspicuously and regularly serrulate. *Scape* subequal to or shorter than leaves, 400–800 mm long. *Raceme* rhomboid-cylindrical to ovoid, dense in lower half, often laxer towards apex, 90–140 × 40–50 mm; buds coral or salmon to dull orange-red; flowers pendulous, greenish yellow. *Bracts* lanceolate to linear-lanceolate, acute to acuminate, 10–12 mm long; margin usually minutely denticulate. *Pedicels* 1–2 mm long at flowering, increasing to 5 mm at fruiting stage. *Perianth* subcylindrical, 25–30 mm long; lobes ovate, 3.0–3.5 mm long, not spreading. *Stamens* not or scarcely exerted at anthesis. *Fruit* subglobose, 7–8 mm long. *Flowering time*: January to March. Figure 29.

Common in Lesotho and the adjoining areas of the eastern Free State, extending to the Bergville District in KwaZulu-Natal, mainly on sandstone formation, in shallow soil in rock crevices, in dry watercourses and on grassy slopes, at altitudes of 1 800–2 800 m. Map 16.



MAP. 16.—● *Kniphofia ritualis*
▲ *K. galpinii*.

Vouchers: Bruce 361, 393; Killick 1857; Schmitz 9146, 9171.

K. ritualis has conspicuously long, narrow bracts like those of *K. sarmentosa* (No. 24) but is distinguished from the latter by its markedly serrulate leaves and longer perianth, which is 25–30 mm long, as against 20–25 mm in *K. sarmentosa*.

Its affinity with the previous species, *K. hirsuta*, is discussed above.

32. ***Kniphofia galpinii* Baker** in *Flora capensis* 6: 281 (1896); A. Berger; 56 (1908); E. Phillips: t. 783 (1940); Letty: 36, t. 20,3 (1962); Codd: 466 (1968); A. Fabian & Germish.: 44, t. 14f (1997); Retief & P.J. Herman: 101 (1997). Type: Transvaal [Mpumalanga], near Barberton, *Galpin 1208* (K, holo.; BOL!, PRE!).

Plants solitary or few-stemmed. *Leaves* grass-like, recurved, 400–650(–1000) × 3–6(–8) mm, markedly fibrous, triangular in cross section; margin entire or minutely denticulate towards apex. *Scape* overtopping recurved leaves, 300–600 mm tall. *Raceme* subglobose to ovoid, dense, 50–80 × 40 mm; buds flame-red to orange-red; flowers pendulous, yellow to orange. *Bracts* linear-lanceolate, 9–13 mm long, acuminate; margin entire to minutely denticulate towards apex. *Pedicels* 1.5–3.0 mm long, elongating to 4 mm in fruit. *Perianth* subcylindrical, 27–35 mm long; lobes ovate, 2 mm long, not spreading. *Stamens* not or scarcely exerted at anthesis, later withdrawn. *Fruit* not seen. Figure 30.

Grows in dense grass on hillsides and grassy vleis at altitudes of 1 000–2 000 m in Mpumalanga and northern Swaziland. A few specimens collected in the Helpmekaar District of Kwa-Zulu-Natal are included here, though further investigation may indicate that they are worthy of separate status. Map 16.

Vouchers: Bruce 314, 316; Codd 4878; Galpin 13717.

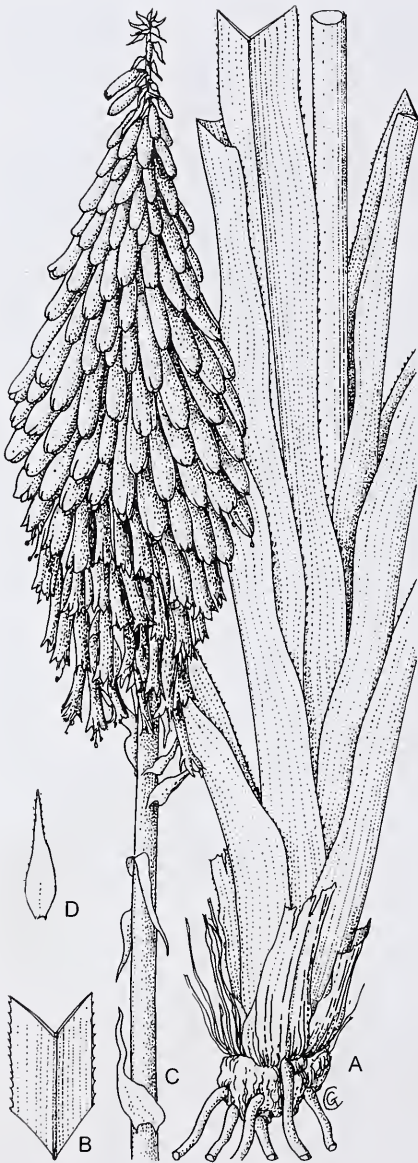


FIGURE 29.—*Kniphofia ritualis*, Schmitz 9146: A, leaf base, × 0.5; B, portion of leaf showing deep keel, × 1; C, inflorescence, × 1; D, floral bract, × 2. Artist: Gillian Condy.



FIGURE 30.—*Kniphofia galpinii*: A, leaf base, $\times 1$, B, inflorescence, $\times 1$. Artist: Cythna Letty.

The narrow, grass-like leaves of this species are similar to some forms of *K. triangularis* (No. 33) but are, in general, more nervous and fibrous. The floral characters of the two are also similar, though in *K. galpinii* the perianth lobes are not spreading and the raceme is bicolorous, with flame-red buds grading down to yellowish flowers. In *K. triangularis* the raceme is more or less concolorous, coral-red to orange-red in colour, and the perianth lobes are spreading.

Occasional depauperate specimens of *K. linearifolia* may be confused with *K. galpinii*, but the former normally has larger racemes, broader, and more flaccid leaves, and ovate bracts.

33. ***Kniphofia triangularis* Kunth**, Enumeratio plantarum 4: 551 (1843). Type: 'Aliwal District', Wittebergen, *Drège* 3524 (K, lecto.!: G!).

Plants solitary or several-stemmed. *Leaves* erect, bending over about the middle, or arcuate, 280–600 \times 1.5–8.0 mm, triangular in cross section or \pm flat with narrow channel above, keeled below; margin entire to serrulate. *Scape* subequal to leaves, 300–600 mm long. *Raceme* subcylindrical to ovoid, dense, 40–80 \times 40–50 mm; buds and flowers pendulous, \pm concolorous, coral-red, orange-red or salmon-red to yellow-orange. *Bracts* ovate-lanceolate to lanceolate, acute to acuminate, 6–8 mm long; margin entire or nearly so. *Pedicels* 1–2 mm long, elongating to 3 mm in fruit. *Perianth* subcylindrical, 24–35 mm long; lobes ovate, 1.5–2.0 mm long, usually spreading. *Stamens* shortly exerted at anthesis, later withdrawn. *Fruit* ovoid, obscurely triquetrous, 6–8 mm long, erect.

Two subspecies are recognized. For key to subspecies, see key to species.

33a. subsp. ***triangularis***. Codd: 469 (1968).

K. triangularis Kunth: 551 (1843); Baker: 362 (1871); Baker 278 (1885); Baker: 280 (1896); A. Berger: 53 (1908); E. A. Bruce: t. 1184 (1955b). Type: 'Aliwal District', Wittebergen, *Drège* 3524 (K, lecto.!: G!).



FIGURE 31.—*Kniphofia triangularis* subsp. *triangularis*. A, leafy base of plant, $\times 0.9$; B, portion of leaf near apex showing serrulations, $\times 9$; C, c/s leaf, $\times 9$; D, flowering peduncle, $\times 0.9$; E, floral bract, $\times 2.7$; F, l/s flower, $\times 2.3$. Artist: Cynthia Letty.

K. macowanii Baker: 3 (1874); Hook.f.: t. 6167 (1875); Baker: 278 (1885); Baker: 280 (1896); Mallett: 83, t. 38 (1906); A.Berger: 54, t. 21c (1908). *Tritoma macowanii* (Baker) Carrière: 390 (1879). Type: Cape [Western Cape], Somerset East Dist., Boschberg, *Macowan 1536* (K, holo.!; BOL!, G!, GRA!, PRE!, SAM!, Z!).

K. nelsonii Mast.: 554, t. 83 (1892); Baker: 280 (1896); Mallett: 82, t. 37 (1906); A.Berger: 53 (1908); E.Phillips: 294 (1917). Type: O.F.S. [Free State], *Nelson s.n.* (K, holo.!).

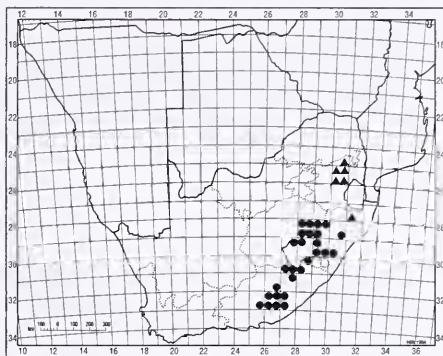
Included in subsp. *triangularis* are plants with leaves very narrow and grass-like, 1.5–3.0 mm in diameter, with smooth margins (typical) and those with leaves 2.5–6.0(–8) mm broad and margins sparsely to distinctly serrulate, which were separated as *K. macowanii* (see notes below). *Flowering time*: January to April. Figure 31.

Found in mountain grassland, often in peaty soil, on grassy slopes, streambanks and moist places among sandstone rocks at altitudes of 1 000 to 2 000 m in Eastern Cape, eastern Free State, Lesotho and the southern and central Drakensberg area of KwaZulu-Natal. Map 17.

Vouchers: *Acocks 22175*; *Dieterlen 474*; *Flanagan 1841*; *Hilliard & Burt 12161*; *Scheepers 1816*.

Plants occurring in Eastern Cape tend to have broader (2.5–6.0 mm) leaves which have distinctly serrulate margins. This form was described as *K. macowanii* Baker but there are intermediates linking it with typical *K. triangularis*, which occurs in eastern Free State and Lesotho, and which has narrow, grass-like leaves (1.5–3.0 mm broad) with smooth margins. Plants occurring in the Drakensberg area of KwaZulu-Natal have narrow (1.5–4.0 mm) leaves with the margins smooth to sparsely serrulate. In the last-mentioned area, hybridization apparently occurs between subsp. *triangularis* and two species with narrow, grass-like leaves: *K. fibrosa* (No. 13) and *K. angustifolia* (No. 17).

In the herbarium, *K. thodei* (No. 34), with its narrow leaves and sparsely toothed to entire margins, may be confused with some forms of *K. triangularis*. However, the inflorescence of



MAP. 17.—● *Kniphofia triangularis* subsp. *triangularis*
▲ *K. triangularis* subsp. *obtusiloba*

K. thodei is bicolorous, the buds being dull brownish red and the flowers whitish, and the perianth lobes are not spreading so that it is clearly closer to *K. porphyrantha* in its affinity than to *K. triangularis*.

33b. subsp. *obtusiloba* (A.Berger) Codd in Bothalia 9: 472 (1968); Retief & P.P.J.Herman: 102 (1997). Type: Transvaal [Mpumalanga], Lydenburg Dist., *Wilms 1559* (B, holo.!.; BM!, K!).

K. obtusiloba A.Berger: 54, t. 21 (1908); Letty: 33 (1962); Codd: t. 1422 (1964b).

Leaves soft in texture, (2.5–)4.0–10.0 mm broad; margins smooth. *Raceme* concolorous, orange-red to yellow-orange, tending to dry a purplish brown colour. *Flowering time*: mid-January to end of April. Figure 32.

Occurs among quartzite rocks in mountain grassland at altitudes of 1 300 to 2 300 m in Mpumalanga, with one record from the Ngotshe District, KwaZulu-Natal. Map 17.

Vouchers: *Bruce 477, 514, 516*; *Codd 8274, 10306*.

In subsp. *obtusiloba* the leaves are consistently smooth-margined and herbarium specimens



FIGURE 32.—*Kniphofia triangularis* subsp. *obtusiloba*. A, habit, much reduced; B, base of plant and leaves, $\times 0.9$; C, c/s leaf, $\times 4.4$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 1.8$; F, l/s flower, $\times 1.8$; G, fruit, $\times 0.9$. Artist: Cythna Letty.

are apt to be confused with *K. porphyrantha* (No. 35) which, however, has a bicolorous raceme, with red buds and yellow flowers. On Mariepskop, specimens with narrow leaves are found which resemble *K. galpinii* (No. 32) but the latter has a bicolorous raceme, red at the apex and yellow below, and the leaves are more markedly fibrous in texture than in subsp. *obtusiloba*.

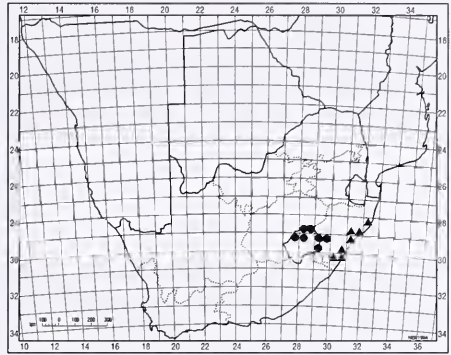
34. ***Kniphofia thodei* Baker** in *Flora capensis* 6: 533 (1897); A.Berger: 57 (1908); Codd: t. 1446B (1965c); Codd: 472 (1968). Type: O.F.S. [Free State], Caledon Range, Moperi's Peak, *Thode* 62 (BOL, holo.!; K!, NH!, PRE!, STE!).

Plants usually single-stemmed. *Leaves* at first erect, later recurved or bent downwards, 250–500 × 2–5 mm, pale glaucous-green, soft in texture, broadly triangular in cross section, narrowly channelled above, keeled below; margin smooth to finely serrulate, especially towards apex. *Scape* overtopping leaves, 300–500 mm long. *Raceme* subglobose to ovoid, dense, 40–60 × 40–50 mm; buds dull red to reddish brown, often tipped with white; flowers pendulous, white or tinged with reddish brown towards base. *Bracts* lanceolate, long-acuminate, 6–7 mm long; margin entire. *Pedicels* 1.5–2.0 mm long. *Perianth* subcylindrical, somewhat curved, 20–35 mm long; lobes broadly ovate, 1.5 mm long, not spreading. *Stamens* reaching throat of perianth at anthesis, later withdrawn. *Fruit* not seen. *Flowering time*: January, but extends from November to March. Figure 33.

Found in moist places in mountain grassland at altitudes of 2 500–2 800 m in Lesotho and northeastern Free State and at altitudes of 1 600–2 000 m in the Estcourt District, Kwa-Zulu-Natal. Map 18.

Vouchers: *Jacot Guillarmod* 4011; *Killick & Marais* 2155, 2163.

Herbarium specimens of *K. thodei* without notes on flower colour may be confused with either *K. porphyrantha* (No. 35) or *K. triangu-*



MAP. 18.—● *Kniphofia thodei*
▲ *K. littoralis*

laris (No. 33). Fresh specimens may be recognized by the unusual colour combination in the raceme, with buds dull red to brownish red often tipped with white, and open flowers whitish in colour. In *K. porphyrantha* the raceme is lemon-yellow tinged with red at the apex and the leaves are yellow-green with smooth margins. *K. triangularis* has concolorous coral-red to orange-red racemes and the leaves are usually longer and more fibrous in texture than in *K. thodei*.

35. ***Kniphofia porphyrantha* Baker** in *Journal of Botany*, London 12: 4 (1874); Baker: 279 (1885); Baker: 281 (1896); A.Berger: 59 (1908); Codd: t. 1291 (1959c); Letty: 32, t. 19, 1 (1962); Codd: 474 (1968); Retief & P.P.J.Herman: 101 (1997). Type: O.F.S. [Free State], *Cooper* 3208 (K, lecto.!).

K. conrathii Baker: 998 (1904); A.Berger: 59 (1908). Type: Transvaal [Gauteng], Modderfontein, *Conrath* 644 (K, holo.!; Z!).

Plants usually many-stemmed. *Leaves* at first erect, later reflexed, 300–450 × 6–14 mm, yellow-green, flaccid, shallowly channelled above, keeled below; margin and keel smooth. *Scape* overtopping leaves, 400–600 mm long. *Raceme* subglobose to shortly cylindrical, dense, 40–80 × ± 50 mm; buds spreading, orange-flame, tipped with yellow, flowers pendulous, lemon-yellow. *Pedicels* 1.5 mm

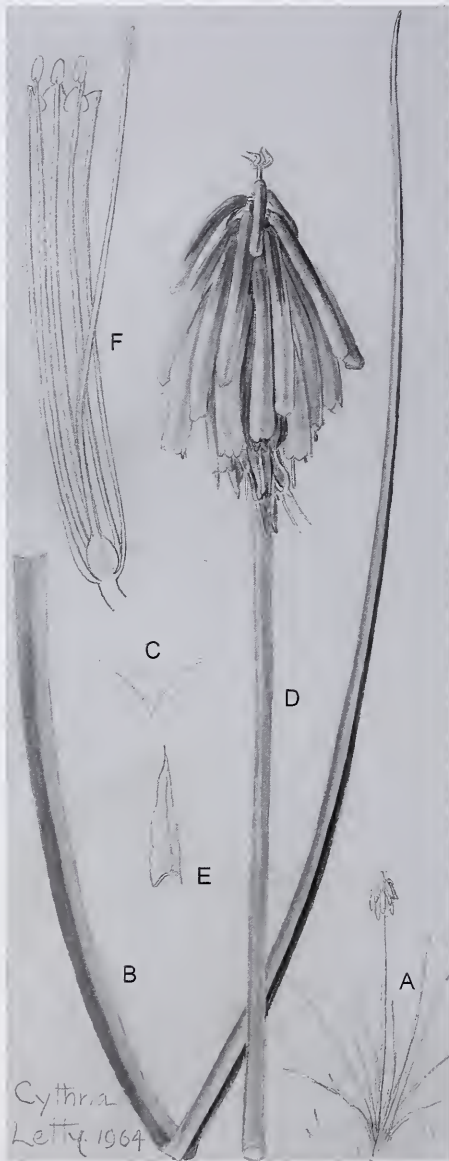
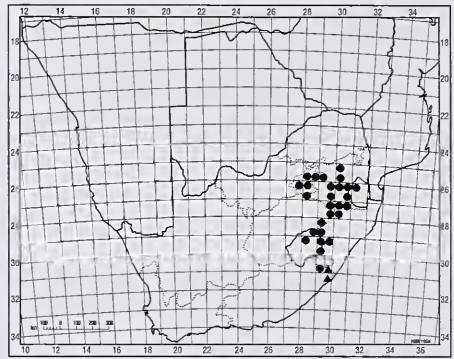


FIGURE 33.—*Kniphofia thodei*. A, habit, much reduced; B, leaf, $\times 0.9$; C, c/s leaf, $\times 2.7$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 2.7$; F, 1/s flower, $\times 2.7$. Artist: Cythna Letty.



MAP. 19.—● *Kniphofia porphyrantha*
▲ *K. drepanophylla*

long. Bracts ovate-lanceolate, 6–9 mm long, acute to acuminate, usually smooth, occasionally minutely toothed towards apex. Perianth narrowly sub-cylindrical, 30–42 mm long, somewhat arcuate; lobes ovate, 2.5 mm long, not or slightly spreading. Stamens exerted by 1–3 mm at anthesis, finally withdrawn. Fruit erect, subglobose, obscurely triquetrous, 8–10 mm long. Flowering time: October to December in Gauteng and Mpumalanga, but extends to January and February in KwaZulu-Natal and eastern Free State. Figure 34.

Widespread in grassy vleis and mountain grassland at altitudes of 1 500–2 300 m in eastern Free State, northwestern KwaZulu-Natal, Gauteng and Mpumalanga, extending into the western part of Swaziland. Map 19.

Vouchers: Codd 3188, 3434, 7592; Galpin 9613; Killick 1265.

K. porphyrantha is relatively small in stature with small racemes, pale to lemon-yellow in colour, tinged with red at the apex; the leaves are flaccid, yellow-green in colour with smooth margins. In the herbarium it is not always easy to distinguish it from certain other species with acute to acuminate bracts but, with fresh material, the above characters provide a basis for separating *K. porphyrantha* from the following: (a) *K. triangularis* subsp. *obtusiloba* (No. 33b), which has concolorous, coral-

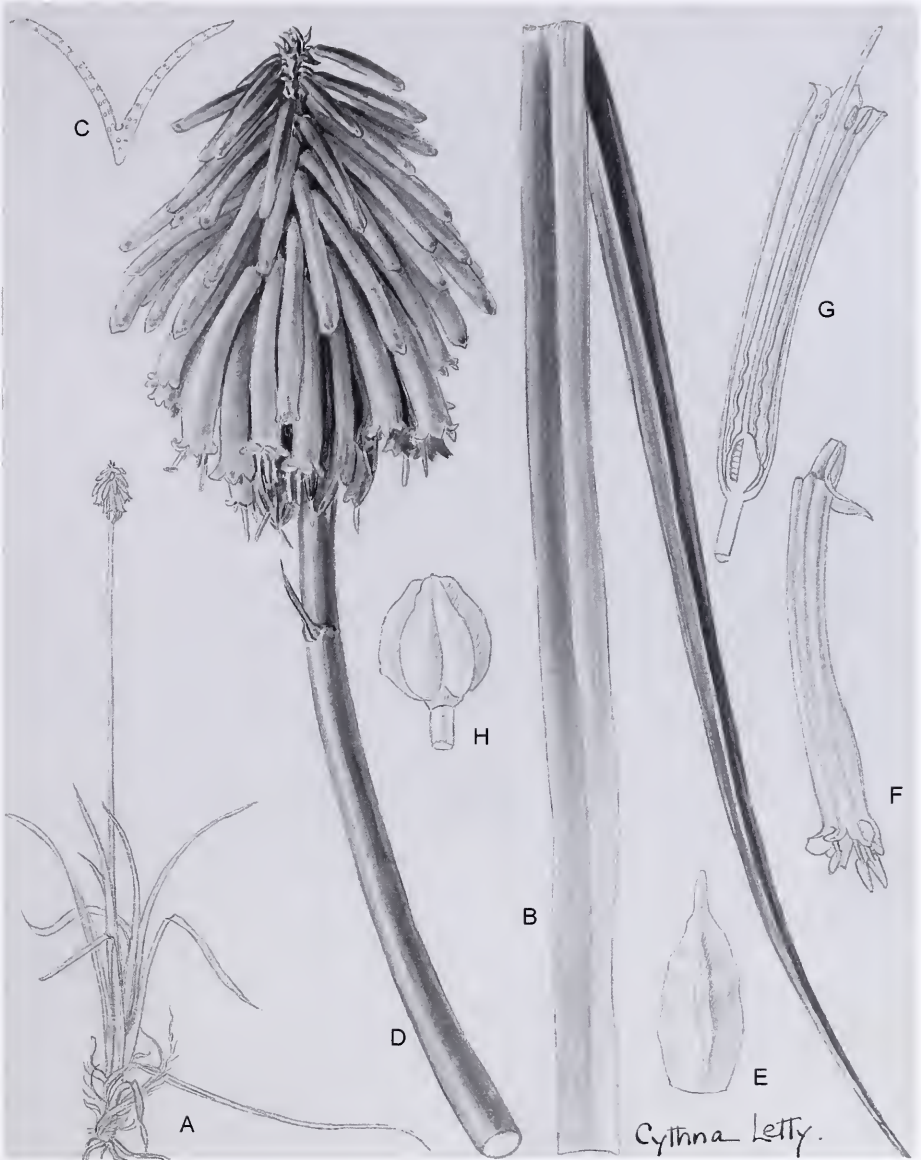


FIGURE 34.—*Kniphofia porphyrantha*. A, habit, much reduced; B, leaf, $\times 0.9$; C, c/s leaf, $\times 2.3$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 4.5$; F, flower with basal bract and exerted stamens, $\times 1.8$; G, l/s flower showing contraction of filaments and included stamens, $\times 1.8$; H, capsule, $\times 2.3$. Artist: Cythna Letty.



FIGURE 35.—*Kniphofia fluviatilis*. A, habit, much reduced and habitat; B, portions of leaf, $\times 0.9$; C, 1/5 leaf, $\times 0.9$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 4.7$; F, 1/5 flower, $\times 1$; G, immature fruit. Artist: Cynthia Letty.

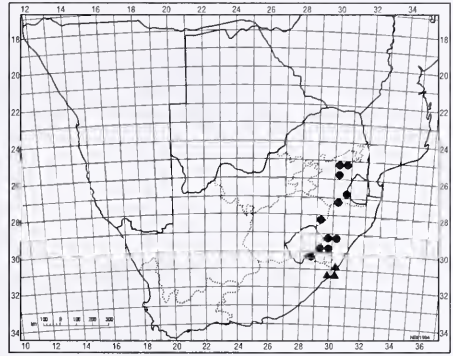
red to orange-red racemes and spreading perianth lobes; (b) *K. galpinii* (No. 32), with its predominantly scarlet racemes and narrower, grass-like leaves; (c) *K. thodei* (No. 34) with the unusual brownish red and white coloration of its racemes and the usually denticulate leaves; and (d) *K. fluviatilis* (No. 36), which resembles *K. porphyrantha* in the colour of the raceme but has longer flowers (42–50 mm) and the leaves tend to be broader, more glaucous and are V-shaped in cross section.

36. ***Kniphofia fluviatilis* Codd** in The Flowering Plants of Africa 36: t. 1421 (1964a); Codd; 476 (1968); A.Fabian & Germish.: 44, t. 14d (1997); Retief & P.P.J.Herman: 101 (1997). Type: Transvaal [Mpumalanga], 4 km northeast of Dullstroom, *Codd 7625* (PRE, holo.!).

Plants several-stemmed. *Leaves* erect, firm in texture, tapering rapidly, 350–700 × 8–25 mm, dull to glaucous-green, V-shaped in cross section with a rather thick keel; margin and keel smooth. *Scape* moderately stout, usually overtopping leaves, 450–650 mm long. *Raceme* ovoid to subglobose, often pyramidal at apex, dense, 20 × 60–80 mm; buds deflexed, flame to orange-red; flowers pendulous, apricot-yellow to greenish yellow. *Bracts* ovate-lanceolate to lanceolate, acute to long-acuminate, 7–13 mm long; margin entire. *Pedicels* 1.5–2.0 mm long, elongating to 2.5–3.0 mm at fruiting stage. *Perianth* subcylindrical, often somewhat arcuate, 42–50 mm long; lobes ovate, 2 mm long, not spreading. *Stamens* just included or slightly exerted at anthesis, finally withdrawn. *Fruit* erect globose to ovoid, 8–10 mm long. *Flowering time*: November and December, but flowering specimens have been collected as late as February. Figure 35.

On banks of streams in mountain grassland, usually growing partly in running water, at altitudes of 1 200–2 200 m, in Mpumalanga and the foothills of the Drakensberg range in KwaZulu-Natal and East Griqualand. Map 20.

Vouchers: *Codd 6655*; *Codd & De Winter 3234*; *Killick & Marais 2088, 2156*.



MAP. 20.—● *Kniphofia fluviatilis*
▲ *K. coddiana*

Closely related to *K. porphyrantha* (No. 35) and the differences are discussed under that species. In addition, *K. fluviatilis* almost invariably grows on the banks of mountain streams, usually partly in the water, whereas *K. porphyrantha* inhabits grassy vleis and moist hillsides. The two species are rarely found together at the same locality, although their general distribution overlaps to some extent.

37. ***Kniphofia littoralis* Codd** in Bothalia 9: 478 (1968). Type: Natal [KwaZulu-Natal], near Park Rynie, *Codd 9764* (PRE, holo.!).

Plants several-stemmed. *Leaves* erect (when growing in dense grass) to strongly recurved (when in an exposed place or after grass has been burnt in winter), soft in texture, 150–700 × 10–25 mm, dull to glaucous-green, V-shaped in cross section, usually folded along midrib (especially in dried specimens with recurved leaves); margin and keel smooth or minutely serrulate towards apex. *Scape* overtopping spreading leaves, 250–650 mm long. *Raceme* globose to shortly cylindrical, dense, 50–90 × 50–55 mm; buds spreading to pendulous, red to dull red; flowers pendulous, pale yellow-green. *Bracts* ovate to ovate-oblong, 5–8 mm long, acute to obtuse, white, chartaceous; margin entire. *Pedicels* 1–2 mm, elongating in fruit up

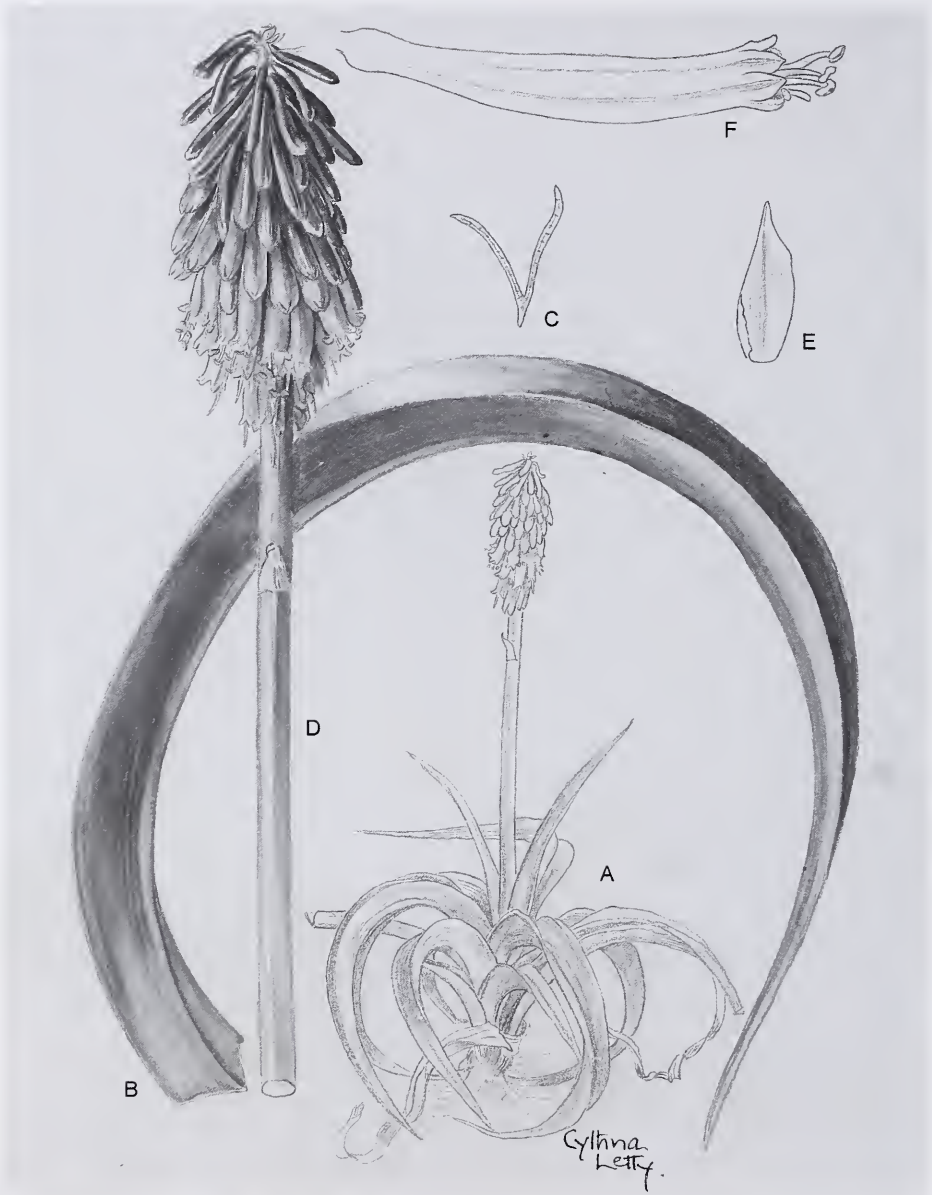


FIGURE 36.—*Kniphofia littoralis*. A, habit, much reduced; B, leaf, $\times 0.9$; C, c/s leaf, $\times 1.9$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 3.8$; F, flower, $\times 2.6$. Artist: Cythna Letty.

to 5 mm. *Perianth* subcylindrical, slightly arcuate, 28–34 mm long; lobes broadly ovate, 2 mm long, not spreading. *Stamens* reaching throat or slightly exserted at anthesis, later exserted by 3–5 mm. *Fruit* ovoid, erect, 12–15 × 8–10 mm, acute at apex. *Flowering time*: August to October. Figure 36.

Found in moist, grassy, low-lying places near the KwaZulu-Natal coast from just above sea level to about 200 m altitude, from the Port Shepstone District in the south to the Hlabisa District in the north. Map 18.

Vouchers: *Bruce 155, 423; Codd 9699.*

The large, ovoid fruits, 12–15 × 8–10 mm, carried erect on stout, arcuate pedicels up to 5 mm long, distinguish *K. littoralis* from related species. In the absence of fruits there may sometimes be difficulty in separating it in the herbarium from *K. drepanophylla* (No. 39), *K. baurii* (No. 40) and from depauperate specimens of *K. rooperi* (No. 43).

K. drepanophylla and *K. baurii* normally have markedly serrulate leaves and broader, more rounded bracts than *K. littoralis* and are not known to occur along the coast of KwaZulu-Natal. *K. rooperi* is a robust species with leaves up to 40 mm broad and scape up to 1.5 m tall, occurring in coastal marshes in Eastern Cape [Transkei], reaching the Port Shepstone District in KwaZulu-Natal. Along the drier edges of the marshes, the plants may be smaller, with narrower leaves, and such depauperate specimens may be confused with *K. littoralis* if fruits are lacking. However, the bracts of *K. littoralis* are usually white and papery, acute to obtuse and not erect in bud, whereas in *K. rooperi* they are usually discoloured and brownish, rounded at the apex and erect and imbricate in the bud stage; *K. littoralis* also has slightly longer pedicels and the flowers do not form such a dense raceme as in *K. rooperi*.

38. ***Kniphofia coddiana*** Cufod. in *Annalen des Naturhistorischen Museums in Wien* 75: 40 (1971). Type: Transkei [Eastern Cape], Mkambati, *Codd 9720* (PRE, holo.!).

K. elegans Codd: 480 (1968), nom. illeg., non Engl.

Plants one- to several-stemmed. *Leaves* erect or later bending over about the middle, soft-textured, 300–600 × 8–15 mm, dull glaucous-green, V-shaped in cross section; margin and keel smooth or sparsely toothed towards apex. *Scape* overtopping or subequal to leaves, 400–650 mm tall. *Raceme* globose, dense, 50–70 × 50–60 mm; buds spreading, flame-red; flowers pendulous, yellow to orange-yellow. *Bracts* broadly ovate to subrotund, 6–8 mm long, obtuse to rounded, chartaceous; margin almost entire to minutely eroso-denticulate. *Pedicels* 1–2 mm long. *Perianth* subcylindrical, somewhat arcuate, 28–32 mm long; lobes broadly ovate, 2 mm long, not spreading. *Stamens* reaching throat or just exserted at anthesis, finally withdrawn. *Fruit* globose, 6–8 mm long. *Flowering time*: August to October. Figure 37.

Grows in grass among sandstone rocks at altitudes of 70–300 m in Eastern Cape [Transkei] and the southern part of the Port Shepstone District in KwaZulu-Natal. Map 20.

Vouchers: *Codd 9713, 9737; Marais 952, 970.*

A spring-flowering species related to *K. littoralis* (No. 35), but the globose racemes are flame-red at the apex, grading down to yellow flowers and the smaller, globose fruits are borne on short, spreading pedicels. Unlike *K. littoralis*, it grows among sandstone rocks.

39. ***Kniphofia drepanophylla*** Baker in *Botanische Jahrbücher* 15, Beibl. 35: 5 (1892a); Baker: 282 (1896); A. Berger: 48 (1908); Codd: t. 1447 (1965d); Codd: 481 (1968). Type: Transkei [Eastern Cape], Pondoland, *Bachmann 281* (K, holo.!: B).

Plants few- to several-stemmed. *Leaves* falcate, flaccid, yellow-green, 150–300 mm at flowering stage, eventually elongating to 600 mm, 15–30 mm broad, V-shaped in cross section, tending to fold along midrib; margin and keel finely serrulate. *Scape* overtopping recurved leaves, 250–500 mm tall. *Raceme* subglobose, 50–70 × 50–60 mm, often lax at apex,



FIGURE 37.—*Kniphofia coddiana*, Codd 9713. A, habit, much reduced; B, leaf base, $\times 1$; C, c/s leaf, $\times 1$; D, inflorescence, $\times 1$; E, floral bract, $\times 2$; F, fructescence, $\times 1$. Artist: Gillian Condy.

denser below; buds spreading, greenish yellow, often suffused with dull red; flowers pendulous, lemon-yellow. *Bracts* broadly oblong, rounded to obtuse, 5–6 mm long, scariose; margin subentire to somewhat eroded. *Pedicels* 3.5–5.0 mm long. *Perianth* subcylindrical, 35–40 mm long; lobes broadly ovate, 3 mm long, spreading. *Stamens* exerted by up to 5 mm at anthesis, later withdrawn. *Fruit* ovoid-triangular, 7–9 mm long. *Flowering time*: mainly August to October. Figure 38.

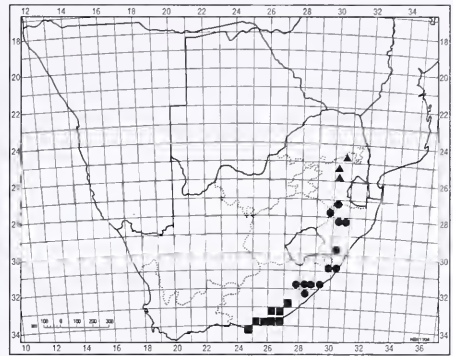
Grows in marshy places at altitudes of 50–200 m near the coast in Pondoland, where it is locally common. Map 19.

Vouchers: *Codd* 9717, 9738; *Marais* 953; *Story* 4233.

In the herbarium it may be confused with the following species, *K. baurii*, which has somewhat narrower, glaucous leaves, slightly shorter, more greenish flowers and a more inland distribution. A specimen from Weza, altitude 1 160 m (*Killick & Marais* 2014) is somewhat intermediate between the two species.

40. ***Kniphofia baurii*** Baker in *Flora capensis* 6: 281 (1896); A. Berger: 48 (1908); Codd: t. 1423 (1964c); Codd: 482 (1968); Retief & P.P.J. Herman: 101 (1997). Type: Transkei [Eastern Cape], Tembuland, Baziya, *Baur* 755 (K, holotype!).

Plants several- to many-stemmed. *Leaves* erect to somewhat falcate or occasionally recurved, soft in texture, glaucous, 200–500 × 12–25 mm, V-shaped in cross section; margin and keel markedly to sparsely serrulate or almost smooth. *Scapes* overtopping leaves, 250–600 mm tall. *Raceme* globose to oblong, sometimes broader than long, dense, 40–100 × 40–60 mm; buds spreading, dull red to greenish tinged with dull red; flowers eventually pendulous, greenish to greenish yellow. *Bracts* ovate to ovate-oblong, obtuse to rounded, 4.5–10.0 mm long; margin eroso-denticulate, especially towards apex. *Pedicels* 1–2 mm long. *Perianth* subcylindrical, 28–38 mm long; lobes ovate, 2.5 mm long, slight-



MAP. 21.—● *Kniphofia baurii*
▲ *K. rigidifolia*
■ *K. citrina*

ly spreading. *Stamens* exerted by up to 2 mm at anthesis, later withdrawn. *Fruit* subglobose-triangular, about 7 mm long. *Flowering time*: mid-September to early November. Figure 39.

Found on moist, grassy slopes or depressions and on streambanks at 600–1 300 m altitude in two disjunct areas: (a) Eastern Cape [Transkei], from the Engcobo District eastwards into southern KwaZulu-Natal; and (b) northern KwaZulu-Natal, from Dundee District northwards to the foothills of the Drakensberg, with one record from Wakkerstroom District in Mpumalanga. Map 21.

Vouchers: (a) Typical form: *Marais* 1003, 1021, 1028, 1032; (b) northern KwaZulu-Natal form: *Codd* 5609, 6161, 6788, 6789.

Its affinity with the previous species, *K. drepanophylla*, is discussed under that species. Plants of the northern KwaZulu-Natal form tend to be more robust and form larger groups of stems with somewhat softer leaves and less markedly serrulate margins than typical *K. baurii*. In essential characters they agree with the typical form and are not given separate status.

In *Bothalia* 9: 484 (Codd 1968), a group of late-flowering (January to April) specimens from Eastern Cape [Transkei] and East Griqualand, with greenish flowers and dull red buds,



FIGURE 38.—*Kniphofia drepanophylla*. A, habit, much reduced; B, C, leaves, $\times 0.9$; D, leaf margin, $\times 2.8$; E, c/s leaf, $\times 0.9$; F, inflorescence, $\times 0.9$; G, bract, $\times 2.8$; H, l/s flower, $\times 1.8$. Artist: Cythna Letty.

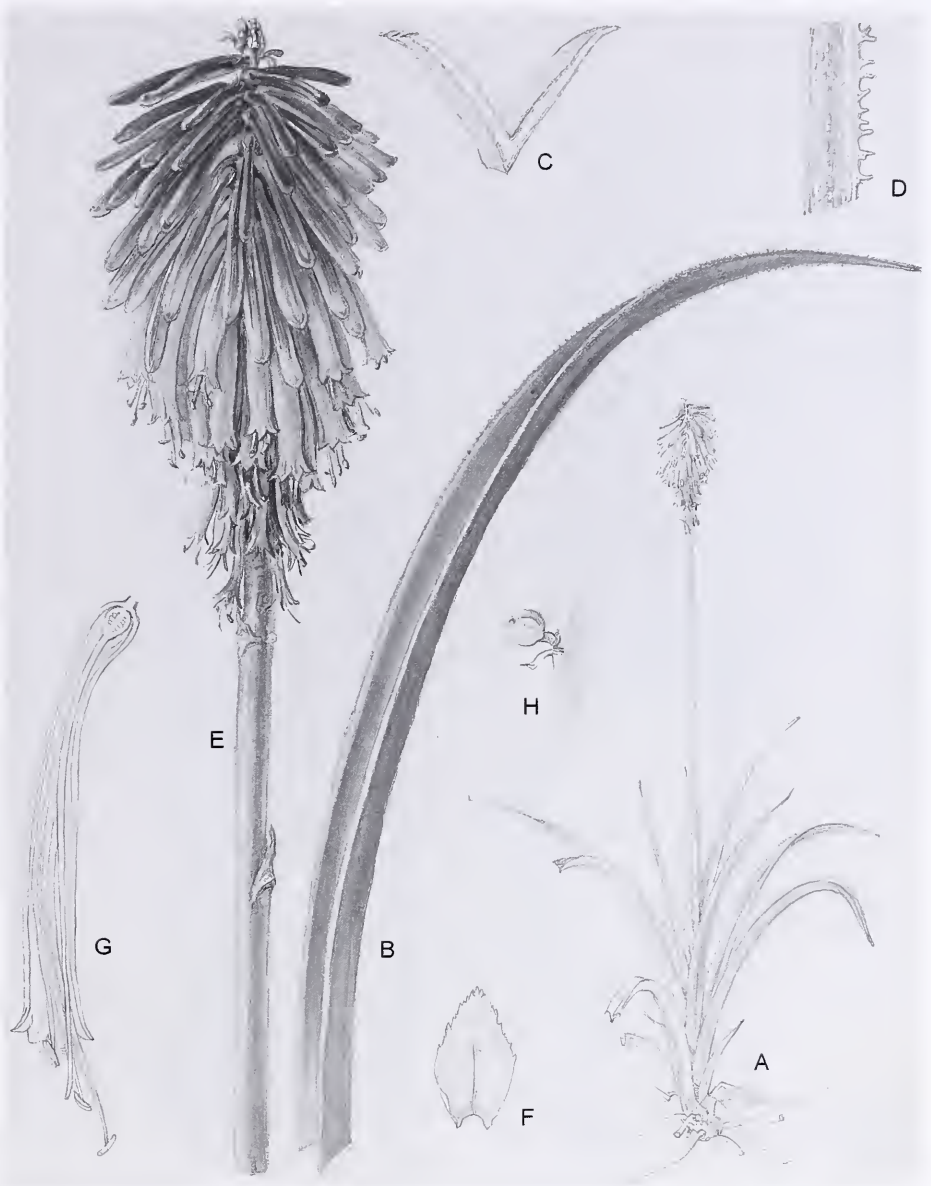


FIGURE 39.—*Kniphofia baurii*. A, habit, much reduced; B, part of leaf, $\times 0.9$; C, c/s leaf, $\times 1.8$; D, leaf margin, $\times 9$; E, inflorescence, $\times 0.9$; F, floral bract, $\times 4.5$; G, 1/s flower, $\times 2.7$; H, fruit, $\times 0.9$. Artist: Mary Elizabeth Connell.



FIGURE 40.—*Kniphofia latifolia*, Condly 151. A, habit, much reduced; B, part of leaf, $\times 0.8$; C, leaf margin; D, inflorescence, $\times 0.8$; E, floral bract, $\times 1.6$; F, fructescence, $\times 0.8$. Artist: Gillian Condly.

was included in *K. baurii*. It is now considered that these probably belong in the widespread summer and autumn-flowering species, *K. linearifolia* (No. 46), which exhibits various flower colours, including greenish flowers with dull red buds, as in *K. baurii*.

41. ***Kniphofia latifolia* Codd** in *Bothalia* 9: 484 (1968). Type: Natal [KwaZulu-Natal], near New Hanover, *Codd 6791* (PRE, holo!).

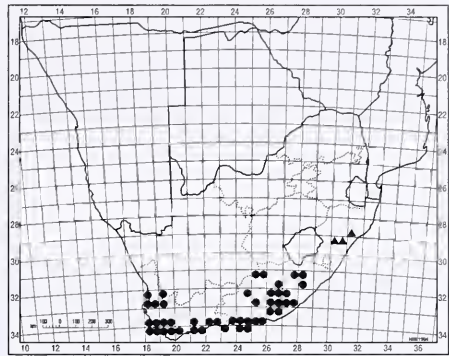
Plants several-stemmed. *Leaves* broad, erect, ensiform, 600–900 × 20–40 mm, midgreen, V-shaped in cross section, tapering rapidly to apex; margin and keel finely and regularly serrulate. *Scape* shorter than leaves at flowering stage, 400–800 mm tall, eventually elongating to 1 m. *Raceme* narrowly ovoid, conical to tapering at apex, dense, 70–110 × 45–50 mm; buds pendulous, red to dull blood-red; flowers pendulous, imbricate, greenish to yellow-green. *Bracts* broadly oblong, obtuse to rounded, 7–9 mm long; margin very minutely serrulate to almost entire. *Pedicels* 1 mm long, elongating in fruit to 3 mm. *Perianth* subcylindrical, 30–35 mm long; lobes ovate, 3 mm long, not spreading. *Stamens* exerted by 4–6 mm at anthesis, usually remaining exerted by 2–3 mm. *Fruit* erect, broadly ovoid, 5 mm long. *Flowering time*: October and November. Figure 40.

Found on grassy slopes and river banks, usually in moist depressions with grass and sedge, in a restricted area of the KwaZulu-Natal midlands, at altitudes of 800–1 100 m. Map 22.

Vouchers: *Bruce 460*; *Killick & Marais 2113*.

Related to the previous species, *K. baurii*, but differs in the broader leaves which overtop the scape at the flowering stage, and the tapering raceme. The tapering raceme and the broader, rounded bracts distinguish *K. latifolia* from the next species, *K. rigidifolia*, which is restricted to Mpumalanga.

42. ***Kniphofia rigidifolia* E.A.Bruce** in *The Flowering Plants of Africa* 30: t. 1185 (1955c); Letty: 32 (1962); Codd: 487 (1968);



MAP. 22.—● *Kniphofia uvaria*
▲ *K. latifolia*

A.Fabian & Germish.: 44, t. 14e (1997); Retief & P.P.J.Herman: 102 (1997). Type: Transvaal [Mpumalanga], 11 km S of Dullstroom, *Codd 3224* (PRE, holo!).

Plants several-stemmed. *Leaves* erect, firm in texture, yellow-green, 500–800 × (15–)20–35 mm, V-shaped in cross section; margin and keel finely serrulate. *Scape* subequal to leaves or slightly longer, 500–900 mm tall. *Raceme* subglobose to broadly ovoid, very dense, 50–80 × 50–60 mm; buds spreading, flame or orange-red to coral-red; flowers pendulous, yellow-green to greenish. *Bracts* oblong-ovate to oblong-lanceolate, subacute to obtuse, 5–7 mm long; margin finely erose-denticulate to almost entire. *Pedicels* 1 mm long at flowering, increasing to 3 mm long at fruiting stage. *Perianth* subcylindrical, 30–40 mm long; lobes broadly ovate, 2.5 mm long, slightly spreading. *Stamens* in throat or slightly exerted at anthesis, later withdrawn. *Fruit* subglobose to broadly ovoid, 7 mm long. *Flowering time*: mid-October to the end of November. Figure 41.

Grows in dense grass among dolerite rocks and on fertile soil beside streams in Mpumalanga at altitudes of 1 500–2 100 m. Map 21.

Vouchers: *Codd 6166, 6654, 6661*.

A spring-flowering species with globose racemes reminiscent of the following species,

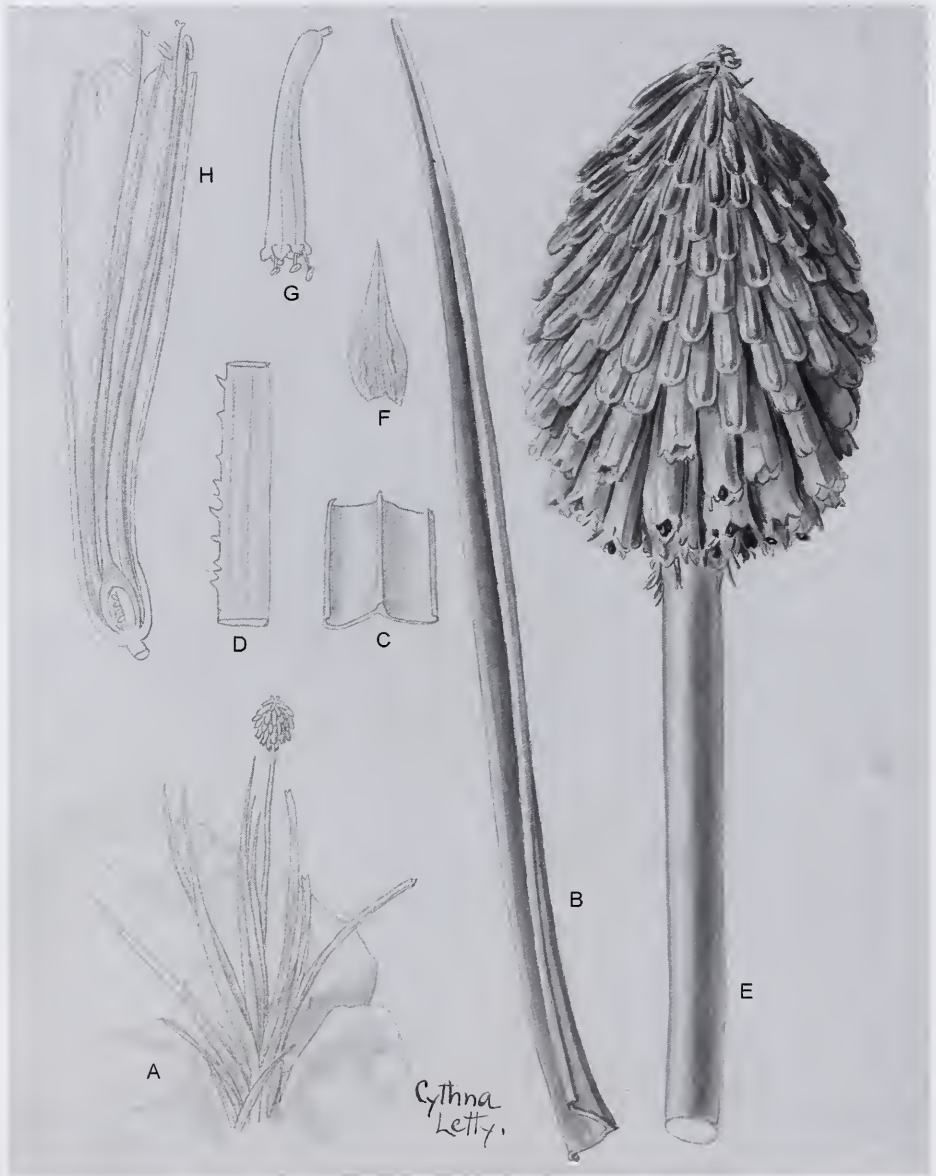


FIGURE 41.—*Kniphofia rigidifolia*. A, habit, much reduced; B, apical portion of leaf, $\times 0.9$; C, basal portion of leaf showing keel, $\times 0.9$; D, leaf margin, $\times 4.6$; E, inflorescence, $\times 0.9$; F, floral bract, $\times 3$; G, perianth, $\times 0.9$; H, l/s perianth, $\times 2.3$. Artist: Cythna Letty.

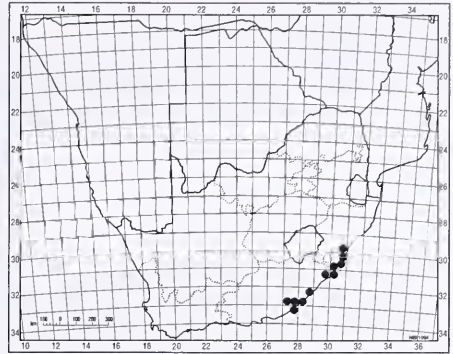
K. rooperi, but *K. rigidifolia* has erect, not spreading, yellow-green leaves and the buds are not erect and covered by the imbricate bracts as in *K. rooperi*. The two species are completely separated geographically.

43. **Kniphofia rooperi** (*T.Moore*) *Lem.*, *Le Jardin fleuriste*: t. 362 (1854); Baker: 363 (1871); Baker: 280 (1885), excl. Hook.f. in *Curtis's Botanical Magazine* t. 6116 (1874); Baker: 283 (1896), excl. Hook.f. in *Curtis's Botanical Magazine* t. 6116 (1874); A.Berger: 62 (1908), as to type only; Codd: t. 1290 (1959b); Codd: 488 (1968). Type: the specimen ex Herb. T. Moore on which the plate in *Garden Companion and Florist's Guide* 1: 113 (1852) is based (*K.* holo.!).

Tritoma rooperi T.Moore: 113 (1852).

K. longicollis Baker: 682 (1893c); Baker: 284 (1896); A.Berger: 60 (1908). Type: 'Natal, Hort. Leichtlin, May 30, 1893' (*K.* holo.!).

Plants many-stemmed. *Leaves* usually in four ranks, arcuate-spreading to strongly recurved, dull green, 0.5–1.1 m long, 15–35(–40) mm broad, deeply keeled and broadly V-shaped in cross section; margin and keel distinctly to sparsely serrulate, rarely almost smooth. *Scape* overtopping spreading leaves, stout, 0.6–1.4 m tall. *Raceme* very dense, globose when in full flower, 80–110 × 50–80 mm; apex conical in young stage with buds erect and enclosed in overlapping imbricate bracts; variable in colour with buds brilliant flame-red to orange-yellow or greenish, and open flowers orange-red to yellow-green. *Bracts* oblong to obovate, obtuse to rounded, 7–11 mm long, usually brownish, minutely serrulate to almost entire. *Pedicels* 1 mm long, elongating to 3–4 mm in fruiting stage. *Perianth* subcylindrical, 35–42 mm long; lobes ovate, 2.5 mm long, slightly spreading at anthesis. *Stamens* slightly exerted at anthesis, later withdrawn. *Fruit* ovoid-triangular, erect, 8–10 mm long. *Flowering time*: winter and early spring, from June to September, but flowering specimens have been recorded, especially in cultivation, as early as March and as late as November. Figure 42.



MAP. 23.—● *Kniphofia rooperi*

Found in marshy places near the coast from the East London District in Eastern Cape [Tran-skei], to several km north of Port Shepstone in KwaZulu-Natal. Map 23.

Vouchers: *Bruce* 417, 425, 603; *Dyer* 5335; *Pegler* 838; *Strey* 8849; *Van Wyk* 6133.

K. rooperi can usually be recognized by the large globose racemes which appear mainly during winter and spring, carried well above the arcuate-spreading leaves which are broad, dull green and are normally arranged in 4 or 5 ranks. Flower colour may vary in wild populations from dull greenish yellow to brilliant scarlet. It reaches its maximum development of over 1.5 m in height in boggy, peaty marshes near the coast. It is noticeable that the most robust plants are to be found in the wettest, central part of the marsh and tend to become progressively smaller toward the drier edges. These small, depauperate plants may be confused with *K. littoralis* (No. 37) and *K. drepanophylla* (No. 39) and differences are discussed under those headings.

It is considered that the type of *K. longicollis* Baker is probably a small specimen of *K. rooperi*; although the bracts are not an exact match of *K. rooperi*, they come nearer to that species than to *K. littoralis*. The plant illustrated in *Curtis's Botanical Magazine* t. 7623 (Baker 1898a) as *K. longicollis* is not that species

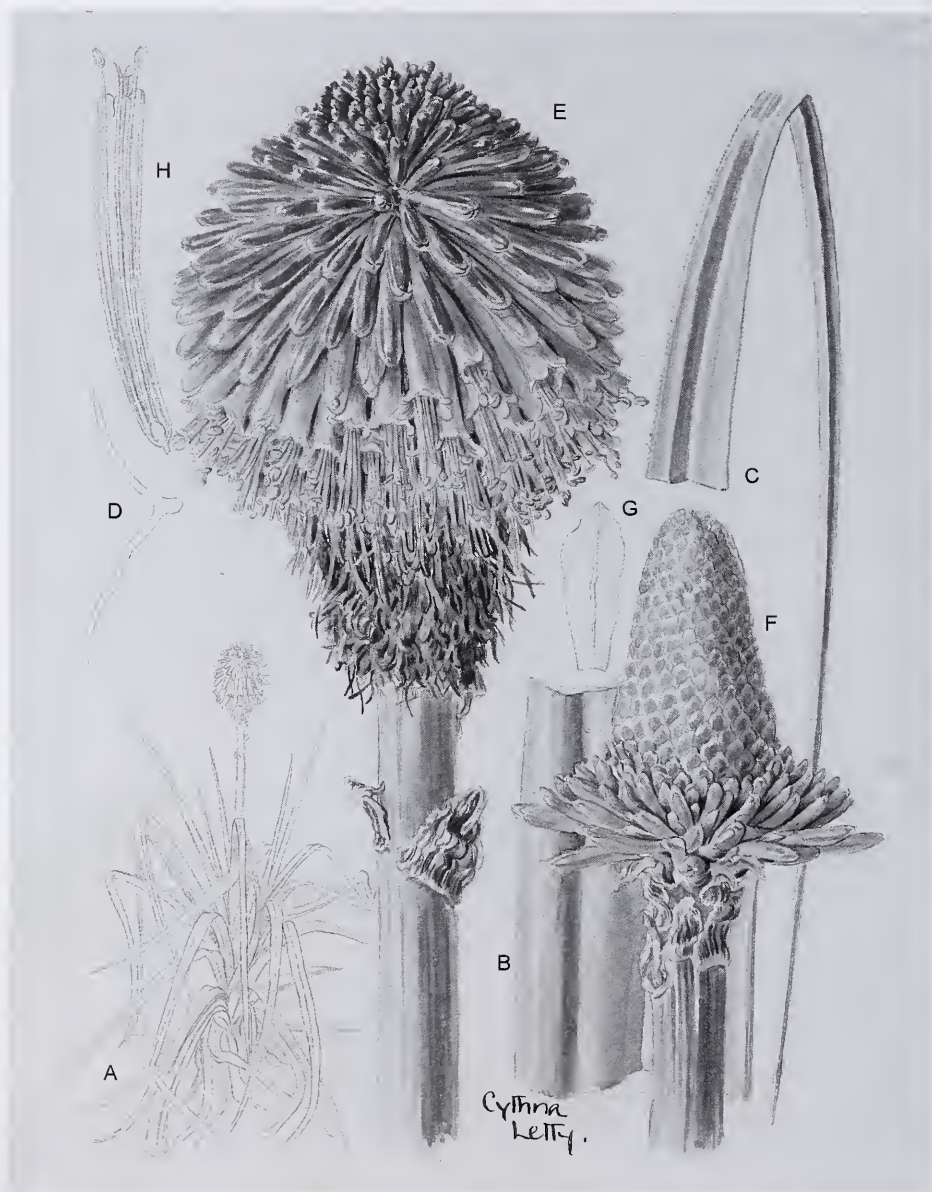


FIGURE 42.—*Kniphofia rooperi*. A, habit, much reduced; B, C, leaf, $\times 0.9$; D, c/s leaf, $\times 0.9$. E, F, inflorescence: E, $\times 0.9$; F, bud stage, $\times 0.9$. G, floral bract, $\times 2.8$; H, l/s flower, $\times 1.6$. Artist: Cynthia Letty.

but is probably a form of *K. praecox* (No. 23). It is also doubtful if the plant figured as *K. rooperi* in *Curtis's Botanical Magazine* t. 6116 (Hooker 1874) is correctly named. The raceme is too elongate for *K. rooperi* and it appears to be a form of *K. linearifolia* (No. 46).

Several specimens have been collected between Komga and Knysna, and inland in the King William's Town and Stutterheim Districts, which appear to be intermediate between *K. rooperi* and *K. uvaria* (No. 44). There are also specimens from the Albany, Port Elizabeth and Humansdorp Districts with medium-sized, globose racemes which may link *K. rooperi* with *K. citrina* (No. 45). The taxonomy of this complex is discussed under *K. uvaria*.

44. *Kniphofia uvaria* (L.) Oken, Allgemeine Naturgeschichte für alle Stände 3, 1: 566 (1841); Hook.: t. 4816 (1854), p.p. excl. tab. and descr.; A. Berger: 61 (1908), p.p., excl. spec. cited; Adamson: 170 (1950); Codd: t. 1289 (1959a); Codd: 492 (1968); Goldblatt & J.C. Manning: 73 (2000). Lectotype (Codd 1968: 493); the specimen in Herb. Hort. Cliff. (BM, lecto!).

Aloe uvaria L.: 323 (1753); L.: 4 (1759); Kniph.: t. 805 (1762); Burm.f.: 10 (1768); Mill.: No. 23 (1768); J.Hill: 333 (1769); Knorr: t. A.13 (1770); Buc'hoz: 1 (1775). *Aletris uvaria* (L.) L.: 368 (1771); Aiton: 464 (1789); Thunb.: 60 (1794); L.: 359 (1797). *Aloe longifolia* Lam.: 90 (1783); nom. illeg. *K. alooides* Moench: 631 (1794); Heynh.: 335 (1840); Kunth: 551 (1843); Baker: 364 (1871); Baker: 279 (1885); Baker: 283 (1896), p.p.; nom. illeg. *Veltheimia uvaria* (L.) Willd.: 182 (1799); Pers.: 377 (1805); Thunb.: 309 (1823); Willd.: 291, t. 17 (1827). *Tritoma uvaria* (L.) Ker Gawl.: t. 758 (1804b); W.T. Aiton: 290 (1811). *Tritomanthe uvaria* (L.) Link: 383 (1821). *Tritonium uvaria* (L.) Link: 170 (1829). *K. odorata* Heynh.: 335 (1840), nom. illeg. *Triclistia uvaria* (L.) Salisb.: 75 (1866).

Tritoma burchellii Herb. ex Lindl.: t. 1745 (1836); Herb. ex Sweet: 517 (1830), nom. nud.; Nees & Sinning: 19, t. 7 (1831). *K. burchellii* (Lindl.) Kunth: 552 (1843); Heynh.: 335 (1840); Baker: 363 (1871); Baker: 280 (1885); Baker: 284 (1896); A. Berger: 63 (1908). Type: Hort. Kew, originally from the Cape, *Burchell s.n.* (K, holo!).

K. baclmannii Baker: 784 (1901a); A. Berger: 58 (1908). Type: Cape (Western Cape), Malmesbury Dist., *Baclmann 1229* (B, holo, 1; Z!).

K. occidentalis A. Berger: 57 (1908). Type: Cape Peninsula, Smithwinkel Bay near Simonstown, *Schlechter 817* (Z, holo!).

Plants several- to many-stemmed. *Leaves* erect to arcuate-spreading, dull green to glaucous, 350–800 × 6–18 mm, keeled, V-shaped in cross section, usually tough and often drying with a hard, fibrous texture; margin and keel smooth to sparsely serrulate towards apex. *Scapae* overtopping or subequal to leaves, up to 1 m tall. *Raceme* oblong to globose, dense to subdense, sometimes lax at apex, 45–110 × 50–80 mm; buds spreading, brilliant scarlet to greenish tinged with red; flowers eventually pendulous, orange-yellow to greenish yellow. *Bracts* broadly ovate to oblong-ovate, rounded or obtuse to subacute, 3–9 mm long; margin almost entire to eroso-denticulate. *Pedicels* (1.5–)3.0–5.0 mm long, elongating to 3–8 mm long in the fruiting stage. *Perianth* subcylindrical, 28–40 mm long; lobes ovate, 2 mm long, slightly spreading. *Stamens* included or just exerted at anthesis, finally exerted by 3–5 mm. *Fruit* ovoid-triangular, 7–14 mm long. *Flowering time*: in Eastern Cape in autumn from January to May, but in Western Cape it may occur at almost any time from September to June, depending largely on veld fires, with two peaks, namely, October–December, and April–May. Figure 43.

Plants now included in this species are distributed from the Cape Peninsula, where the typical form occurs, northwards to Khamiesberg, eastwards to Humansdorp and Albany Districts and, inland, to Queenstown and along the foothills of the Drakeneberg from Dordrecht to Ugie. The typical form is found in seepage areas, marshy places and beside streams in the fynbos of Western Cape from near sea level to 1 200 m altitude; and forms occur in moist grassland in Eastern Cape (see notes below), from about 200 m altitude in the Knysna and Humansdorp Districts to over 2 000 m on the Stormberg range. Map 22.

Vouchers: (a) typical form: *Esterhuysen 20798*; *Galpin 12832*; *Marloth 5896, 11099*; (b) Malmesbury form: *Bruce 227*; *Esterhuysen 18170*; *Van Breda 3*; (c) Humansdorp form: *Comins 1010*; *Lewis sub SAM68235*; *Thode A1052*; (d) Eastern Cape mountain form: *Erens 2187*; *Galpin 1810*; *Marais 878, 880*.

Four forms are recognized, each with a fairly distinct distribution area, though there is

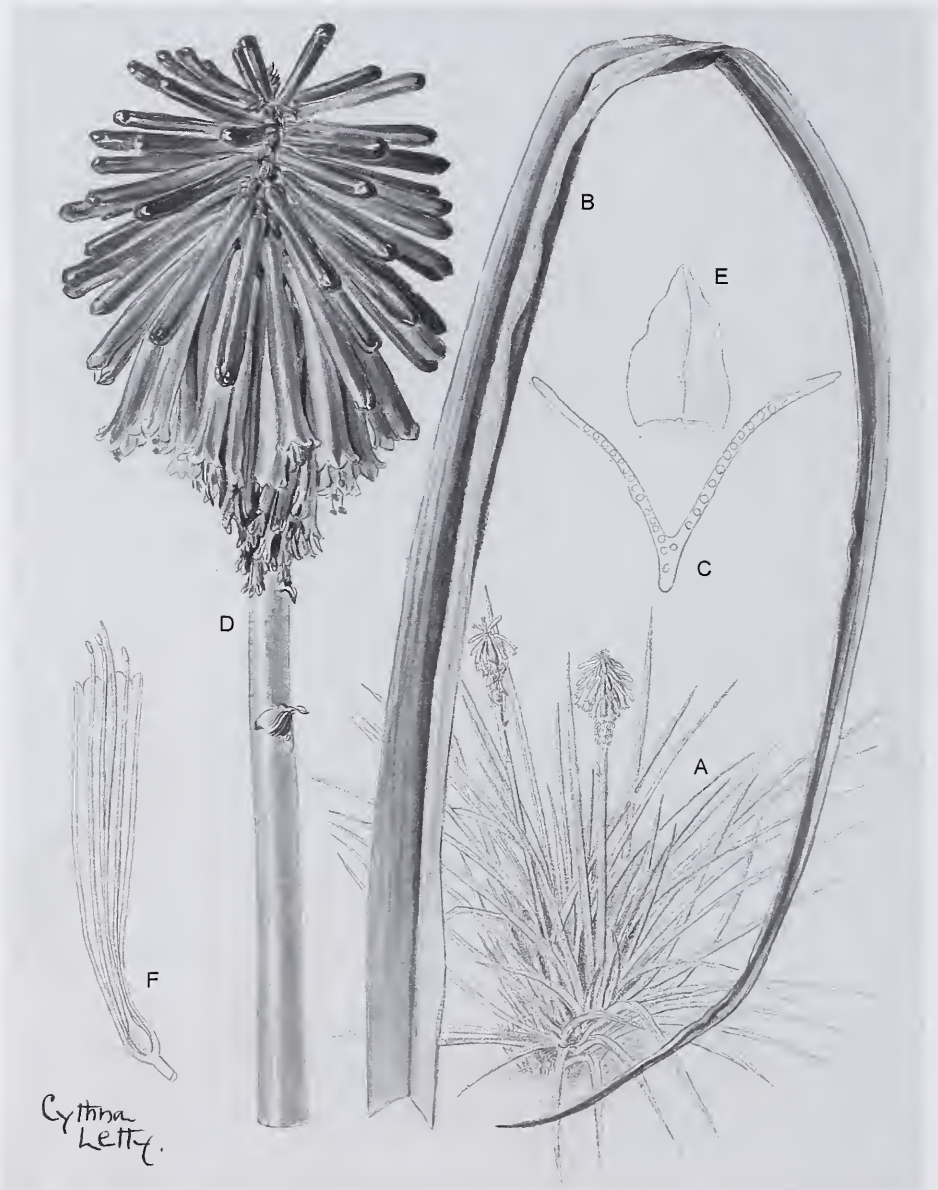


FIGURE 43.—*Kniphofia uvaria*. A, habit, much reduced; B, leaf, $\times 0.9$; C, c/s leaf, $\times 4.6$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 4.6$; F, l/s flower, $\times 1.8$. Artist: Cythna Letty.

some overlapping. There is also a good deal of intergradation between the forms and they have not been accorded formal taxonomic status.

(a) Typical *K. uvaria* occurs on the Peninsula and in surrounding districts. The leaves are erect to somewhat arcuate, dull green and relatively soft. The racemes are medium-sized, ovoid to oblong and brightly coloured, with the buds scarlet grading down to orange-yellow flowers. The pedicels are fairly conspicuous (2–4 mm long). The types of *K. burchellii* and *K. occidentalis* belong in this group.

(b) From Malmesbury District northwards the plants have somewhat longer and laxer racemes, but still brightly coloured, with conspicuous pedicels (3–5 mm). The leaves are similar to the typical form but the fruits tend to be larger (12–14 mm long). The type of *K. bachmannii* represents this form.

(c) From Humansdorp to Alexandria Districts plants of medium to small stature have been recorded, with leaves often narrower than usual, erect to arcuate or recurved and fairly tough in texture. The racemes are oblong to globose, varying a good deal in colour from brilliant red to greenish yellow, and the pedicels tend to be shorter (2–3 mm long). Some specimens show a trend towards the small globose racemes of *K. citrina* (No. 45), and the distinction between this species and *K. uvaria* becomes somewhat arbitrary. One such intermediate specimen (*Paterson 669*) was listed without description as *K. patersoniae* by Schönland: 38 (1919).

(d) Further inland and northeastward from about Stutterheim to Hogsback, Queenstown and Dordrecht, and along the southern foothills of the Drakensberg, usually on rocky sandstone formations, a form of medium stature occurs with arcuate, often glaucous, tough leaves. The racemes are ovoid to subglobose, fairly large, somewhat reminiscent of *K. rooperi* (No. 43) and, like that species, may vary from brilliant red to greenish yellow tinged with dull red, or sometimes pure yellow. The bracts are oblong-ovate, longer than in the typical *K. uvaria*, and the pedicels are

shorter (1.5–2.5 mm). Morphologically, this form occupies a position between typical *K. uvaria* and *K. rooperi* but is separated from both geographically. Herbarium specimens may also be confused with *K. linearifolia* (No. 46) but can usually be separated from the latter by the hard, fibrous and somewhat narrower leaves, and the more ovoid-globose racemes.

The '*K. uvaria* complex' includes, in addition, several entities which are treated here as separate species, namely: *K. citrina*, *K. rooperi*, *K. linearifolia* and *K. tysonii*. With the exception of *K. tysonii*, there is some overlapping in distribution and intergradation of characters between these 'species' and *K. uvaria* in Eastern Cape, especially in the Albany-King William's Town region. For this reason, opinions may differ as to the rank which should be accorded to these groups, and subspecies status may be considered more appropriate; however, there appear to be more disadvantages than advantages in such a classification. Each group has a relatively constant raceme shape and perianth length, as well as a fairly well-defined geographical distribution. *K. tysonii*, with its cylindrical raceme and short flowers with well-exserted stamens, shows no intergradation with *K. uvaria*, but it does grade into *K. linearifolia*. In fact, *K. linearifolia* appears to be the 'parent' form with the most extensive distribution area.

Bayliss 3917 from Bouwershoekberge, east of Graaff-Reinet, is unusual in having narrow (4–8 mm), erect, very fibrous leaves, large globose to oblong racemes (perianth 38–42 mm long), conspicuous pedicels (3 mm long) and ovoid fruits 10 mm long. Further investigation may reveal that it is worthy of separate status.

45. *Kniphofia citrina* Baker in The Gardeners' Chronicle, ser. 3, 14: 552 (1893d); Baker: 278 (1896); Mallett: 82 (1906); A. Berger: 57 (1908); Codd: t. 1448 (1965e); Codd: 497 (1968); Goldblatt & J.C. Manning: 73 (2000). Type: 'from mountains north of Grahamstown', ex Hort. Leichtlin (K, holo.!).

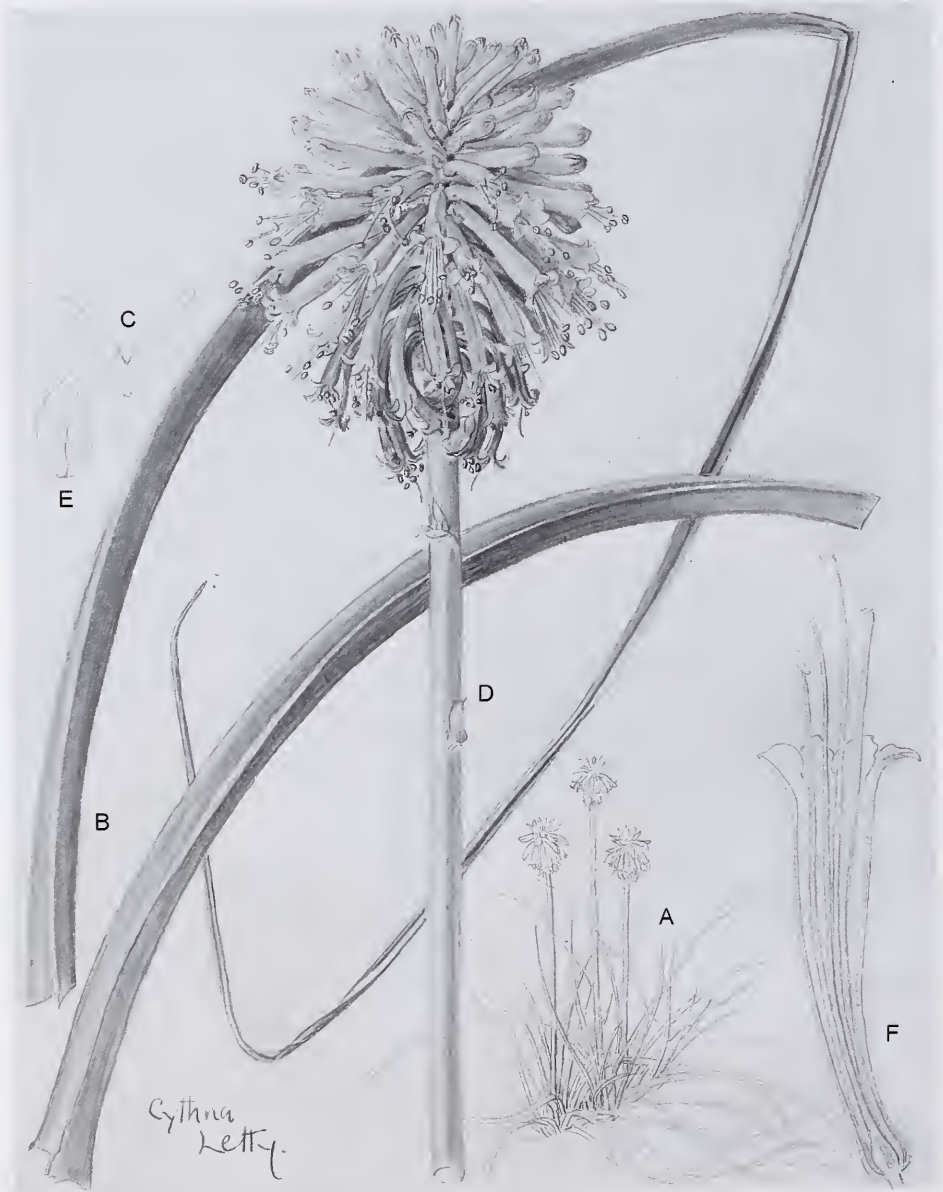


FIGURE 44.—*Kniphofia citrina*. A, habit much reduced; B, portions of leaf, $\times 0.9$; C, c/s leaf, $\times 2.8$; D, inflorescence, $\times 0.9$; E, floral bract, $\times 2.8$; F, 1/2 flower, $\times 2.8$. Artist: Cythna Letty.

K. linearifolia sensu E. Phillips: t. 340 (1929).

Plants several-stemmed. *Leaves* suberect to arcuate, 400–700 × 6–10(–12) mm, somewhat glaucous, strongly nerved, keeled and tending to fold along midrib; margin smooth to minutely and sparsely denticulate. *Scape* usually overtopping leaves, 400–600 mm long. *Raceme* globose to subglobose, dense, 45–60 × 50–55 mm; buds red, red-tipped or yellow; flowers spreading to pendulous, yellow to yellow-green. *Bracts* ovate-oblong, 4.5–5.0 mm long, subacute to obtuse; margin finely eroso-denticulate. *Pedicels* 1.5–2.5 mm long. *Perianth* subcylindrical, (20–)22–27 mm long; lobes broadly ovate, 2.5 mm long, spreading. *Stamens* exerted by 4–6 mm at anthesis and remaining exerted. *Fruit* globose-triquetrous, about 8 mm long. *Flowering time*: March to May. Figure 44.

Found in dense grass from the Humansdorp to Bathurst Districts and, inland, to the Albany and King William's Town Districts, from near sea level to 600 m altitude. Map 21.

Vouchers: *Comins 1018, 2032*.

As mentioned under the previous species, the affinity of *K. citrina* is with the *K. uvaria* complex, a variable group showing several evolutionary trends. One of these trends has been towards reduction in stature, size of inflorescence and length of perianth, combined with shorter and narrower leaves. Its distribution overlaps with *K. uvaria* and intermediate specimens are found, suggesting that separate species rank for *K. citrina* is scarcely justified.

46. ***Kniphofia linearifolia* Baker** in *Botanische Jahrbücher* 15, Beibl. 35: 5 (1892a); Baker: 282 (1896); A. Berger: 58 (1908); Codd: 498 (1968); Marais: 475 (1974); A. Fabian & Germish.: 44, t. 14c (1997); Retief & P. P. J. Herman: 101 (1997). Type: Transkei [Eastern Cape], Pondoland, *Bachmann 279* (B, holo.); neotype: Transkei [Eastern Cape], Idutywa, *Codd 9262* (PRE, neo!).

Tritoma uvaria sensu Redouté: t. 291 (1810).

K. uvaria sensu Hook.: t. 4816 (1854); sensu A. Berger: 61 (1908), p.p.

K. alooides sensu Van Houtte: 187, t. 1393 (1861); sensu Baker: 283 (1896), p.p.

K. rooperi sensu Hook. f.: t. 6116 (1874); sensu A. Berger 62 (1908), p.p., as to Curtis's Botanical Magazine t. 6116 and *Schlechter 6518*; sensu J. M. Wood: t. 540 (1912).

K. longiflora Baker: 134 (1901b); A. Berger: 60 (1908). Type: 'Natal, probably', Hort. Kew, Nov. 1898 'from seeds communicated by Mrs Watkins, Euston Square, London' (K, holo!).

K. linearifolia var. *montana* A. Berger: 58 (1908). Syntypes: East Griqualand [KwaZulu-Natal], Insizwa Mtn, *Krook 548* (W †); Transkei [Eastern Cape], Umtata, *Krook 368* (W †).

K. linearifolia var. *kuitzei* A. Berger: 58 (1908). Type: Natal [KwaZulu-Natal], near Colenso, *Kuitze s.n.* (K!, Z!).

K. rhodesiana Rendle: 214 (1911). Type: Gazaland [Zimbabwe], Nyahodi River, *Swynmerton 723* (BM, holo!).

K. praecox sensu Letty: t. 18 (1962).

Plants several- to many-stemmed. *Leaves* at first erect, later folding back ('kneed') with maturity, 0.6–1.4 m long, 12–28 mm broad, strongly keeled, fairly rigid to flaccid in texture, yellow-green to dull green, rarely subglaucous; margin serrulate to sparsely toothed or occasionally smooth. *Scape* overtopping reflexed leaves, 0.8–1.5 m tall. *Raceme* ovoid or oblong to rhomboid, dense, 60–160 × 55–65 mm, usually tapering towards apex; buds pinkish red to green, tinged with dull red; flowers pendulous, yellow-orange to yellow-green or greenish. *Bracts* broadly ovate to ovate-oblong, 4–10 mm long, rounded to obtuse or sometimes subacute; margin usually finely serrulate. *Pedicels* very short, 1.0–1.5 mm long. *Perianth* subcylindrical, 25–35 mm long; lobes broadly ovate, 2–3 mm long, sometimes spreading. *Stamens* exerted by 4–5 mm at anthesis, later almost or completely withdrawn. *Fruit* ovoid-triquetrous, about 8 mm long. *Flowering time*: January to March but in Mpumalanga (e.g. Mariepskop) flowering may extend to April. Figure 45.

Found on streambanks, in marshy places and in mountain grassland at altitudes of 300–2 000 m in the eastern parts of Western Cape with an out-



FIGURE 45.—*Kniphofia linearifolia*. A, habit, much reduced; B, portions of leaf, $\times 0.8$; C, inflorescence, $\times 0.8$. D, E, flower: D, $1/5$, $\times 1.6$; E, showing basal bract, $\times 1.2$. Artist: Cythna Letty.

lier near Worcester, Northern Cape, Eastern Cape [Transkei], eastern Free State, KwaZulu-Natal, the mountainous parts of Swaziland and Mpumalanga, extending into Zimbabwe. Map 24.

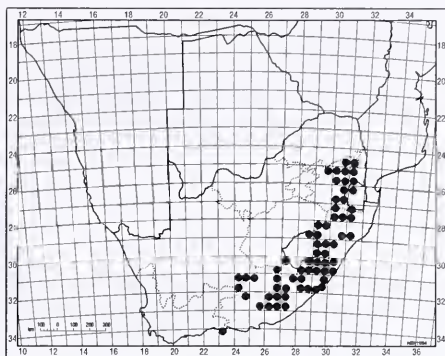
Vouchers: *Bruce* 309; *Codd* 9265, 9280; *Galpin* 1230, 9287, 13607.

K. linearifolia is the most widespread species in South Africa, forming robust plants with large showy racemes which are ovoid, rhomboid or oblong in shape. Although the racemes are usually brightly coloured with pinkish red buds grading down to yellow flowers, a colour form is found in KwaZulu-Natal (*Bruce* 406; *Codd & Dyer* 6252, 6289) in which the buds are green, often tinged with dull red, and the flowers are greenish yellow; the leaves of such plants are dull green to subglaucous (in contrast to the yellow-green colour of typical *K. linearifolia*) and, if the plants are small in stature, they are not easily distinguishable from *K. baurii* (No. 40) which, however, normally flowers in spring and early summer.

K. linearifolia, *K. rooperi* (No. 43) and *K. uvaria* (No. 44) are closely related and intermediate specimens occur where their distribution areas overlap. The distinguishing characters are discussed under *K. uvaria*. There are also intermediate specimens linking *K. linearifolia* and *K. tysonii* (No. 47), but the latter can usually be separated by the more elongate racemes with shorter flowers and well-exserted stamens.

The racemes of *K. praecox* (No. 23) may superficially resemble those of *K. linearifolia* in shape and colour but may be distinguished by the lanceolate, subacute bracts and the slightly longer pedicels. As mentioned under that species, illustrations of these robust redhot poker cannot be identified with certainty in the absence of a type specimen unless a drawing or description of the bracts is provided. For this reason one can ignore such semihorticultural, though validly published, names as *Veltheimia speciosa* Roth (1821), and *T. nobilis* Guillon (1882) and Carrière (1885).

The racemes of *K. linearifolia* tend to be more conical at the apex than those of *K. uvaria*



MAP. 24.—● *Kniphofia linearifolia*

and *K. praecox* and, judging by Redouté's plate 291 in *Les Liliacées* (1810), it must have been introduced to Europe by the early part of the 19th century. It apparently was not, at that stage, distinguished from *K. uvaria*, and the plants with larger and more showy inflorescences (including the hybrid progenitors of *K. praecox*) soon replaced true *K. uvaria* in European gardens. The situation is demonstrated in the text to *Curtis's Botanical Magazine* t. 4816 under the name '*K. uvaria*' where Hooker (1854) says: 'the figure, indeed, of Mr Gawler (i.e. *Curtis's Botanical Magazine* t. 758, 1804, which illustrates true *K. uvaria*), is so indifferent, that we can well excuse its not being easily recognized and have no hesitation in offering a better one.'

Reasons for taking up the name *K. linearifolia* for this species are discussed in Codd (1968: 503).

47. *Kniphofia tysonii* Baker in *Journal of Botany*, London 27: 43 (1889). Type: East Griqualand [KwaZulu-Natal], Zuurberg, *Tyson* 1709 (K. hol.!, BOL!, SAM!).

Plants several- to many-stemmed. *Leaves* at first erect, later folding over about the middle, 0.8–1.5 m long, 12–40 mm broad, yellow-green to dull green or subglaucous (see subspecies), strongly keeled, relatively flaccid in texture; margin serrulate to smooth. *Scape* overtopping reflexed leaves, 1–2 m

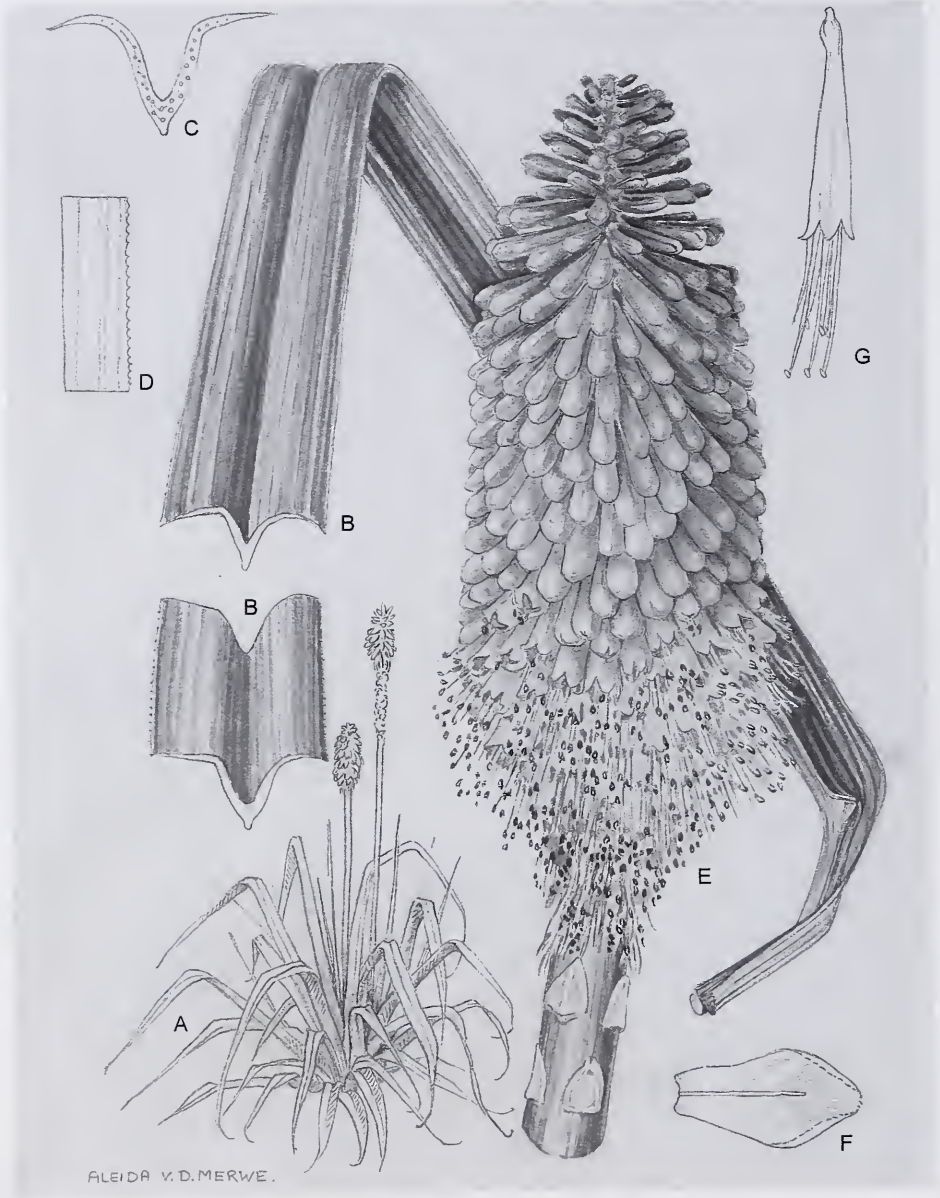


FIGURE 46.—*Kniphofia tysonii* subsp. *tysonii*, Codd 8572. A, habit, much reduced; B, portions of leaf, $\times 1$; C, c/s leaf, $\times 1$; D, leaf margin, $\times 1$; E, inflorescence, $\times 1$; F, floral bract, $\times 3$; G, flower, $\times 1.75$. Artist: Aleida van der Merwe.

tall. *Raceme* oblong to subcylindrical, dense, 70–150 × 45–55 mm; buds orange-red to pinkish red or dull blood-red; flowers spreading to pendulous, yellow to greenish yellow (see subspecies). *Bracts* oblong-ovate to oblong, obtuse to rounded, 4–8 mm long; margin finely serrulate. *Pedicels* almost obsolete, about 1 mm long. *Perianth* subcylindrical, 20–28 mm long; lobes broadly ovate, 2.5 mm long, scarcely spreading. *Stamens* exerted by 6–9 mm at anthesis and remaining exerted. *Fruit* subglobose-triquetrous, 4–5 mm long.

Two subspecies are recognized.

Leaves relatively broad (up to 35 mm), usually serrulate; buds usually spreading, orange-red to pinkish red; flowers spreading to pendulous, yellow to yellow-green

. 47a. subsp. *tysonii*

Leaves 12–20 mm broad, usually smooth or almost so; buds pendulous, imbricate, dull blood-red; flowers pendulous, greenish

. 47b. subsp. *lebomboensis*

47a. subsp. **tysonii**. Codd: 506 (1968).

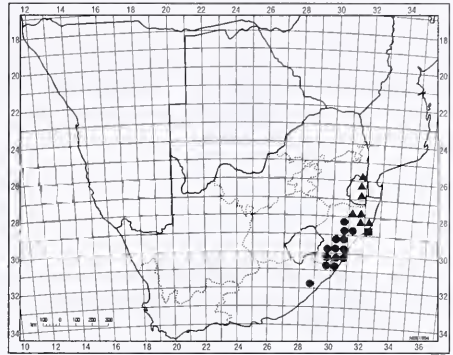
K. tysonii Baker in Journal of Botany, London 27: 43 (1889); Baker: 279 (1896); A. Berger: 56 (1908). Type: East Griqualand [KwaZulu-Natal], Zuurberg, *Tyson 1709* (K, holo.!; BOLI, SAM!).

Characterized by the broader (15–35 mm), yellow-green to midgreen leaves; buds spreading, orange-red to pinkish red, flowers yellow to yellow-green. *Flowering time*: January to March. Figure 46.

Recorded from Eastern Cape [Transkei] and KwaZulu-Natal as far north as Nkandla and Nqutu Districts, in dense tall grass on hillsides and at forest margins, from near sea level in the Port Shepstone District to over 1 300 m in the KwaZulu-Natal midlands. Map 25.

Vouchers: *Codd 8572, 9364; Dyer 5325; Hilliard & Burt 16736*.

Related to *K. linearifolia* (No. 46) but the raceme is more oblong to subcylindrical, and



MAP. 25.—● *Kniphofia tysonii* subsp. *tysonii*
▲ *K. tysonii* subsp. *lebomboensis*
■ *K. leucocephala*

the flowers are shorter with well-exserted stamens. However, intermediate specimens are encountered which may be difficult to allocate with certainty. Typical subsp. *tysonii* occurs in Eastern Cape [Transkei] to southern and central KwaZulu-Natal. It has relatively broad, yellow-green leaves and the buds tend to be orange-red in contrast to the pinkish red of *K. linearifolia* and the dull blood-red, imbricate buds of subsp. *lebomboensis*. Further north, in the districts of Melmoth, Nkandla and Nqutu, specimens are found with pinkish red buds resembling those of *K. linearifolia*.

47b. subsp. **lebomboensis** Codd in Bothalia 9: 506 (1968). Type: Swaziland, near Stegi, *Bruce 306* (PRE, holo.!).

Characterized by the narrower (12–20 mm) leaves which are distinctly flaccid and midgreen to glaucous with smooth or almost smooth margins; the raceme tapers to the apex with imbricate buds, dull blood-red in colour, and the flowers become greenish as they open. *Flowering time*: March, but the flowering period extends from February to early April. Figure 47.

Found in the Nongoma and Hlabisa Districts of KwaZulu-Natal and on the Lebombo Range in Swaziland, in moist, grassy places or seepage



FIGURE 47.—*Kniphofia tysonii* subsp. *lebomboensis* Erens & Dyer 2025, from near Stegi, Swaziland.

areas on hillsides, at altitudes of 500 to 800 m. Map 25.

Vouchers: *Codd 7010*; *Dyer & Erens 2025*; *Ward 2189*.

Although some specimens are difficult to separate from subsp. *tysonii* in the herbarium, the distributions of the two do not overlap and it appears as if subsp. *lebomboensis* was derived independently from *K. linearifolia* rather than from subsp. *tysonii*. A few specimens intermediate with *K. linearifolia* have been found at higher altitudes than the typical subsp. *lebomboensis* in the Ngotshe District of northern KwaZulu-Natal (*Bruce 300*; *Codd 7012, 7022*).

48. **Kniphofia leucocephala** *Baijnath*¹ in South African Journal of Botany 58: 482 (1992). Type: Natal [KwaZulu-Natal]: Zululand, 12 km east of KwaMbonambi, Langepan plantation, 1990-12-14, *Baijnath 2502* (UDW, holo.; K, MO, PRE).

Plants shortly stoloniferous, forming tight tufts ± 50 mm in diameter, with 4-7 aerial groups of leaves. *Roots* yellow, originating from around base of growing point, up to 150 mm long, ± 5 mm wide, tapering towards tips. *Leaves* 3-6 at each growing point, in general upright, 470-630 \times 4-7 mm, gradually tapering to a point at apex, channelled above and keeled below, V-shaped in cross section at midway, with angles of V greater than 90°, soft, green to glaucous green, margins with fine bead-like outgrowths in upper third, smooth on lower part and on keel; up to 4 dried leaves present at each growing point; basal leaf remains sometimes present as filiform fibres up to 60 mm long. *Scape* upright, usually overtopping or subequal to leaves, 450-600 \times 3-5 mm, pinkish or brownish green with usually a single, sterile bract below inflorescence and a coma of white bracts at apex. *Inflorescence* ovoid to rhomboid at mid-flowering stage, 45-50 \times 38-46 mm; buds bases and lower half yellowish green, whitish green, green, greenish orange, reddish brown, yellowish brown, pinkish brown, pinkish

white, pinkish purple or greenish brown; upper half in general white, in very young stage buds directed upwards, with maturity directed almost at right angles to axis and finally directed to base during pre-anthesis, anthesis and post anthesis periods, mature flowers white. *Bracts* ovate, somewhat boat-shaped, 5.0-6.5 \times 3.5-4.5 mm, white, translucent, with central brown nerve terminating about one-third before apex, each margin with 3 or 4 large teeth with acute apices, apex acute or slightly obtuse. *Pedicels* 2.0-2.5 \times ± 0.5 mm, increasing up to 3.5-4.0 \times 1.0-1.5 mm at fruiting. *Perianth* funnel-shaped, slightly curved, 20-23 mm long, ± 2 mm wide from base to \pm midway, then broadening to ± 7 mm at mouth; lobes spreading almost at right angles to tube, $\pm 3 \times 3.5$ mm, outer lobe tapering gradually to obtuse apex, inner lobe with apex rounded or emarginate. *Stamens* of two lengths, longer series opposite inner perianth lobes, exerted by 7.5-10.0 mm, shorter series opposite outer perianth lobes, exerted by 3.5-5.0 mm; filament ± 0.35 mm diam.; anthers $\pm 1.5 \times 0.7$ mm; in senescent flowers all filaments withdrawn with anthers located at mouth of perianth tube. *Ovary* ovoid, 2.5-3.0 \times 1.5-2.0 mm; style 27-32 \times 0.4 mm at stigma receptivity exerted by 8-10 mm, tapering very gradually toward apex; stigma small, papillate. *Capsule* broadly ovoid, 6-7 \times 5-6 mm, directed upwards, dehiscence loculicidal; seeds 4-7 per capsule, brownish black, deltid, margin rarely with narrow wing. Figure 48.

Recorded from the Richards Bay area of north-eastern KwaZulu-Natal. It is almost invariably found on black, sandy clay soil, and shows a preference for moist, low-lying places. Map 25.

Flowering time: December, but known to flower earlier in September.

Vouchers: *Baijnath 2502*; *Strey 9916*; *Venter 5986*.

EXCLUDED SPECIES

Certain species names are excluded from the *Flora of southern Africa* treatment for the reasons given after each name listed below.

¹Closely related to 18. *K. pauciflora*.



FIGURE 48.—*Kniphofia leucocephala*, Condy 155. A, leaf base, $\times 0.9$; B, portion of leaf showing keel, $\times 1.8$; C, inflorescence, $\times 0.9$; D, floral bract, $\times 1.8$; E, fructescence, $\times 0.9$. Artist: Gillian Condy.

Kniphofia carinata C.H.Wright in Curtis's Botanical Magazine t. 8545 (1914). Type: Hort. Kew. (K, holo.!). Although said to be a South African species, grown at Kew from seed reputedly sent by Miss Ayliff of Grahamstown in 1892, it is not matched by any South African material and is considered to be a synonym of the Ethiopian species, *K. leichtlinii* Baker ex Hook.f. (Codd 1963: 149).

K. infundibularis Baker in Journal of Botany, London 23: 277 (1885); Baker: 277 (1896); A.Berger: 44 (1908). Type: Hort. Kew about 1780, from the herbarium of Bishop Goodenough (K, holo.!). This is a synonym of the Ethiopian species, *K. pumila*, listed below. It was based on a specimen collected at Kew about the same time that *K. pumila* was described by Aiton. Due to a later misinterpretation of *K. pumila* by subsequent authors, the species was redescribed by Baker.

K. primulina Baker in Flora capensis 6: 533 (1897a). Based on a plant from 'Natal, Hort. Leichtlin, flowered in the Temperate House at Kew, January 1897'. No corresponding specimen with this date, or annotated by Baker as *K. primulina*, has been found in K. The description mentions smooth-margined leaves; dense oblong raceme, 3–4 inches long; pedicels very short; bracts small, ovate; flowers all pale yellow; perianth an inch long. Although Baker aligns it to *K. natalensis* Baker (which is a synonym of *K. laxiflora* Kunth) the description differs a good deal from the latter complex and there appears little possibility of establishing the identity of *K. primulina* with certainty.

It may be noted that the name *K. primulina* was linked, possibly wrongly, by N.E. Brown with the plant illustrated in Curtis's Botanical Magazine t. 7623 (Baker 1898a) as '*K. longicollis*'. This plate is certainly not *K. longicollis* Baker, nor does it match the description of *K. primulina*: the leaf margins are serrulate, the raceme is about 150 mm (6 inches) long, the bracts are oblong, acute, and the perianth is 30 mm (1¼ inches) long.

There is a specimen in K which is a good match of the Curtis's Botanical Magazine plate,

annotated entirely by N.E. Brown in two notes. The first note, dated Feb. 15, 1897 states: 'Type of Bot. Mag. t. 7623. Hort. W.E. Gumbleton, Queens-town, Ireland. Flowers pale yellow etc.' The second note, dated Dec. 1898 states: 'This is *K. primulina* Baker in Fl. Cap. vol. 6, p. 533 (June 1897) etc.' This specimen appears to be an odd colour segregate from the hybrid complex which includes *K. praecox* (No. 23). However, considering the discrepancies in origin and description, it is doubtful if this specimen can be accepted as representing *K. primulina*.

K. pumila (Aiton) Kunth, Enumeratio plantarum 4: 552 (1843). Type: a specimen in BM labelled 'Hort. Kew 1781, *Aletris pumila*' (BM, holo.!). Although Aiton stated that this was introduced from the Cape in 1774 by Francis Masson, it is an Ethiopian species, of which *Veltheimia abyssinica* Redouté is a synonym (see Codd 1963: 145) for full synonymy. Masson did, in fact, send a *Kniphofia* to Kew, represented by a specimen in BM labelled 'ex Hort. Kew 1786'. It is *K. ensifolia* and it is apparent that subsequent authors based their concept of *K. pumila* on this specimen, with the result that *K. pumila* was redescribed as *K. infundibularis* (see above).

K. rufa Baker in Curtis's Botanical Magazine t. 7706 (1900). Type: ex Hort. Max Leichtlin, Baden Baden (K, holo.!). As stated in Codd 1986: 232, the type of *K. rufa* is a plant of doubtful background and is not exactly matched by any plant collected in the wild state. The floral characters are not unlike some specimens now placed as *K. angustifolia* (No. 17) but the leaves are broader (8 mm) as against 2–5 mm recorded for the latter species. The name *K. rufa* was taken up with some hesitation in Codd 1968: 434 but this was not a satisfactory decision and it is considered that the name should rather be excluded as being of doubtful application. Regarding the origin of the type plant, Max Leichtlin reports in a letter to Kew, which is filed with the type specimen: 'The *Kniphofia* came with original seeds of *K. nelsonii* and seeing some difference in leafage I kept it separate'. It is, therefore, probably of hybrid origin.

K. saundersii (Carrière) G.Nicholson, The century supplement to the illustrated dictionary of gardening: 459 (1901). See *Tritoma saundersii* Carrière, below.

Notosceptrum alooides Benth. in Benth. & Hook.f., *Genera plantarum* 3: 775 (1883). This proves to be a species of *Aloe* and the combination *A. alooides* (Bolus) Druten appears in Archibald *et al.* (1956).

Tritoma. Under *K. praecox* (No. 23) and *K. linearifolia* (No. 46), reference is made to certain semihorticultural names applied to various robust redhot pokers that have been introduced to gardens from time to time. In the absence of a drawing or description of the bracts, or a preserved type specimen, it is not possible to ascertain if such a name applies to a member of the hybrid pool from which *K. praecox* was derived, or whether it is a member of the *K. uvaria*-*K. linearifolia* complex. The following names, taken up mainly from *Index kewensis*, may, therefore, be excluded: *T. glauca* hort. *, *T. recurva* hort., *T. recurvata* hort. (1863), *T. grandis* hort. (1865), *T. saundersii* Carrière (1882), *T. nobilis* Guillon (1882) and Carrière (1885).

Veltheimia speciosa Roth, *Novae plantarum species praesertim Indiae orientalis* 190 (1821). Although it is stated in the protologue to be related to *K. uvaria*, no type specimen has been traced and the description is inadequate for it to be identified with certainty.

REFERENCES

- ADAMSON, R.S. 1950. *Kniphofia*. In R.S. Adamson & T.M. Salter, *Flora of the Cape Peninsula*: 170. Juta, Cape Town.
- AITON, W. 1789. *Hortus kewensis* 1: 464. Nicol, London.
- AITON, W.T. 1811. *Hortus kewensis*, edn 2, 2: 290. Longman, Hurst, Rees, Orme & Brown, London.
- ANDREWS, H. 1797. *Alettris sarmentosa*. *The botanists repository*, vol. 1: t. 54. London.
- ARCHER, C. 2003. *Kniphofia*. In G. Germishuizen & N.L. Meyer, *Plants of southern Africa: an annotated checklist. Strelitzia* 14: 1008–1010. National Botanical Institute, Pretoria.
- ARCHIBALD, E.E.A., CODD, L.E., DYER, R.A., MEEUSE, A.D.J. & VAN DRUTEN, D. 1956. New and interesting records of South African flowering plants. *Bothalia* 6: 535–547.
- BAIJNATH, H. 1987. *Kniphofia albomontana* (Asphodelaceae): a new caulescent species from South Africa. *South African Journal of Botany* 53: 307–310.
- BAIJNATH, H. 1992. *Kniphofia leucocephala* (Asphodelaceae): a new white-flowered red-hot poker from South Africa. *South African Journal of Botany* 58: 482–485.
- BAKER, J.G. 1870. *Kniphofia praecox* Baker. Saunders, *Refugium botanicum* 3: t. 169. Van Voorst, London.
- BAKER, J.G. 1871. *Kniphofia*. *Journal of the Linnean Society, Botany* 11: 360–364.
- BAKER, J.G. 1874. *Kniphofia*. *Journal of Botany, London* 12: 3, 4.
- BAKER, J.G. 1881. *Kniphofia uvaria* var. *maxima*. *Curtis's Botanical Magazine*, ser. 3, 56: t. 6533.
- BAKER, J.G. 1885. A synopsis of the Cape species of *Kniphofia*. *Journal of Botany, London* 23: 275–281.
- BAKER, J.G. 1889. New petaloid monocotyledons from Cape Colony. *Journal of Botany, London* 27: 42, 43.
- BAKER, J.G. 1891. *Kniphofia northiae*. *The Gardeners' Chronicle*, ser. 3, 10: 67.
- BAKER, J.G. 1892a. Liliaceae novae Africae australis herbarii regii Berolinensis. *Botanische Jahrbücher* 15, Beibl. 35: 5–8.
- BAKER, J.G. 1892b. *Kniphofia pauciflora*. *The Gardeners' Chronicle*, ser. 3, 12: 65, t. 10.
- BAKER, J.G. 1892c. *Kniphofia pauciflora*. *Curtis's Botanical Magazine*, ser. 3, 48: t. 7269.
- BAKER, J.G. 1893a. *Kniphofia tuckii*. *The Gardeners' Chronicle*, ser. 3, 13: 68.
- BAKER, J.G. 1893b. *Kniphofia modesta*. *Curtis's Botanical Magazine*, ser. 3, 49: t. 7293.
- BAKER, J.G. 1893c. *Kniphofia longicollis*. *The Gardeners' Chronicle*, ser. 3, 13: 682.
- BAKER, J.G. 1893d. *Kniphofia citrina*. *The Gardeners' Chronicle*, ser. 3, 14: 552.
- BAKER, J.G. 1895. *Kniphofia northiae*. *Curtis's Botanical Magazine*, ser. 3, 51: t. 7412.
- BAKER, J.G. 1896. *Kniphofia*. In W.T. Thistleton-Dyer. *Flora capensis* 6: 275–285. Reeve, London.
- BAKER, J.G. 1897a. *Kniphofia*. In W.T. Thistleton-Dyer. *Flora capensis* 6, suppl.: 533, 534. Reeve, London.
- BAKER, J.G. 1897b. *Notosceptrum natalense*. *Hooker's icones plantarum*: t. 2523.
- BAKER, J.G. 1897c. *Kniphofia breviflora*. *Curtis's Botanical Magazine*, ser. 3, 53: t. 7570.
- BAKER, J.G. 1898a. *Kniphofia longicollis*. *Curtis's Botanical Magazine*, ser. 3, 54: t. 7623.
- BAKER, J.G. 1898b. *Kniphofia*. In W.T. Thistleton-Dyer. *Flora of tropical Africa* 7: 450–454.
- BAKER, J.G. 1899. *Kniphofia tuckii*. *Curtis's Botanical Magazine*, ser. 3, 55: t. 7644.
- BAKER, J.G. 1900. *Kniphofia rufa*. *Curtis's Botanical Magazine*, ser. 3, 56: t. 7706.
- BAKER, J.G. 1901a. Liliaceae. *Bulletin de l'Herbier Boissier* ser. 2, 1: 780–788.
- BAKER, J.G. 1901b. *Kniphofia longiflora*. *Kew Bulletin* 1901: 134.

* of gardeners, not formally published.

- BAKER, J.G. 1904. Liliaceae. *Bulletin de l'Herbier Boissier*, ser. 2, 4: 996–1002.
- BEAN, W.J. 1900. *Kniphofia tuckii*. *The Garden* 58: 232.
- BENTHAM, G. 1883. *Kniphofia* and *Notosceptrum*. In G. Bentham & J.D. Hooker, *Genera plantarum* 3: 775.
- BERGER, A. 1908. Liliaceae–Asphodeloideae–Aloineae. *Das Pflanzenreich* Heft 33: IV.38.III.II: 1–347. Engelmann, Leipzig.
- BROWN, N.E. 1910. *Kniphofia wyliei*. *Kew Bulletin* 1910: 129.
- BROWN, N.E. 1914. Notes upon the genus *Kniphofia*. *The Gardeners' Chronicle*, ser. 3, 56: 409–411.
- BRUCE, E.A. 1951. *Kniphofia ensifolia* var. *albiflora*. *Bothalia* 6: 231.
- BRUCE, E.A. 1955a. *Kniphofia splendida*. *The Flowering Plants of Africa* 30: t. 1183.
- BRUCE, E.A. 1955b. *Kniphofia triangularis*. *The Flowering Plants of Africa* 30: t. 1184.
- BRUCE, E.A. 1955c. *Kniphofia rigidifolia*. *The Flowering Plants of Africa* 30: t. 1185.
- BRUCE, E.A. 1955d. *Kniphofia coralligemma*. *The Flowering Plants of Africa* 30: t. 1186.
- BUCHHOZ, P.J. 1775. *Histoire universelle du règne végétal* 7: t. 1 Paris.
- BURMAN, N.L. 1768. *Prodromus florum capensis*: 10. In *Flora indica*. Leiden and Amsterdam.
- CARRIÈRE, E.A. 1879. *Tritoma macowanii*. *Revue horticole*: 390. Paris.
- CARRIÈRE, E.A. 1882. *Tritoma saundersii*. *Revue horticole*. Paris.
- CARRIÈRE, E.A. 1885. *Tritoma nobilis*. *Revue horticole*: 252. Paris.
- CARRIÈRE, E.A. 1887. *Tritoma caulescens*. *Revue horticole*: 132, t. 28. Paris.
- CODD, L.E. 1959a. *Kniphofia invaria*. *The Flowering Plants of Africa* 33: t. 1289.
- CODD, L.E. 1959b. *Kniphofia rooperi*. *The Flowering Plants of Africa* 33: t. 1290.
- CODD, L.E. 1959c. *Kniphofia porphyrantha*. *The Flowering Plants of Africa* 33: t. 1291.
- CODD, L.E. 1959d. *Kniphofia ichopensis*. *The Flowering Plants of Africa* 33: t. 1292.
- CODD, L.E. 1960a. *Kniphofia abscens*. *The Flowering Plants of Africa* 34: t. 1325.
- CODD, L.E. 1960b. *Kniphofia stamula*. *The Flowering Plants of Africa* 34: t. 1326.
- CODD, L.E. 1960c. *Kniphofia sarmentosa*. *The Flowering Plants of Africa* 34: t. 1327.
- CODD, L.E. 1960d. *Kniphofia stricta*. *The Flowering Plants of Africa* 34: t. 1328.
- CODD, L.E. 1963. The identity of *Kniphofia puntila* (Aiton) Kunth and *K. carinata* C.H. Wright. *Journal of South African Botany* 29: 145–150.
- CODD, L.E. 1964a. *Kniphofia fluviatilis*. *The Flowering Plants of Africa* 36: t. 1421.
- CODD, L.E. 1964b. *Kniphofia obtusiloba*. *The Flowering Plants of Africa* 36: t. 1422.
- CODD, L.E. 1964c. *Kniphofia baurii*. *The Flowering Plants of Africa* 36: t. 1423.
- CODD, L.E. 1964d. *Kniphofia typhoides*. *The Flowering Plants of Africa* 36: t. 1424.
- CODD, L.E. 1965a. *Kniphofia multiflora*. *The Flowering Plants of Africa* 37: t. 1445.
- CODD, L.E. 1965b. *Kniphofia buchananii*. *The Flowering Plants of Africa* 37: t. 1446A.
- CODD, L.E. 1965c. *Kniphofia thodei*. *The Flowering Plants of Africa* 37: t. 1446B.
- CODD, L.E. 1965d. *Kniphofia drepanophylla*. *The Flowering Plants of Africa* 37: t. 1447.
- CODD, L.E. 1965e. *Kniphofia citrina*. *The Flowering Plants of Africa* 37: t. 1448.
- CODD, L.E. 1966. New species of *Kniphofia*. *Bothalia* 9: 139–142.
- CODD, L.E. 1967. The status of the genus *Notosceptrum* Benth. (Liliaceae). *Botaniska Notiser* 120: 41–45.
- CODD, L.E. 1968. The South African species of *Kniphofia*. *Bothalia* 9: 363–511.
- CODD, L.E. 1973. *Kniphofia tabularis*. *The Flowering Plants of Africa* 37: t. 1661.
- CODD, L.E. 1985. A new lectotypification proposed for the genus *Notosceptrum* Benth. (Liliaceae). *Taxon* 34: 509.
- CODD, L.E. 1986. Notes on *Kniphofia*. *Bothalia* 16: 231, 232.
- CODD, L.E. 1987. Notes on *Kniphofia*. *Bothalia* 17: 185.
- CODD, L.E. 1989. *Kniphofia pauciflora*. *The Flowering Plants of Africa* 50: t. 1995.
- CUFODONTIS, G. 1971. Bemerkungen über die Gattung *Kniphofia* und Beschreibung einer neuen Art aus Äthiopien. *Annalen des Naturhistorischen Museums in Wien* 75: 39–41.
- DE WET, J.M.J. 1960. Chromosome morphology in *Kniphofia*. *Bothalia* 7: 295–297.
- DONN, J. 1800. *Hortus cantabrigiensis*, edn 2: 131. Cambridge.
- DURAND, T.A. & SCHINZ, H. 1894. *Conspectus florum africae* 5: 291–295. Brussels.
- DYER, R.A. 1942. *Kniphofia rivularis*. *The Flowering Plants of South Africa* 22: t. 866.
- DYER, R.A. 1976. *The genera of southern African flowering plants* 2: 928. Pretoria.
- ENGLER, H.G.A. 1888. Asphodeloideae–Aloineae–Kniphofinae. *Die natürlichen Pflanzenfamilien* 2, 5: 42. Leipzig.
- ENGLER, H.G.A. & DRUDE, C.G.O. 1908. *Die Vegetation der Erde* 9.2. Engelmann, Leipzig.
- FABIAN, A. & GERMISHUIZEN, G. 1997. *Wild flowers of northern South Africa*. Fernwood Press, Vlaeberg, Cape Town.
- GOLDBLATT, P. & MANNING, J. 2000. *Kniphofia*. Cape plants. A conspectus of the Cape flora of South Africa. *Strelitzia* 9: 73. National Botanical Institute, Cape Town & Missouri Botanical Garden.
- GUILLON, P.A. 1882. *Tritoma nobilis*. *Revue horticole*: 24. Paris.
- HEYNHOLD, G. 1840. *Nomenclator botanicus hortensis* 2: 335. Dresden & Leipzig.
- HILL, J. 1769. *Hortus kewensis*, edn 2: 333. London.
- HOOKE, J.D. 1854. *Kniphofia invaria*. *Curtis's Botanical Magazine*, ser. 3, 10: t. 4816.
- HOOKE, J.D. 1872. *Kniphofia caulescens*. *Curtis's Botanical Magazine*, ser. 3, 28: t. 5946.

- HOOKER, J.D. 1874. *Kniphofia rooperi*. *Curtis's Botanical Magazine*, ser. 3, 30: t. 6116.
- HOOKER, J.D. 1875. *Kniphofia macowanii*. *Curtis's Botanical Magazine*, ser. 3, 31: t. 6167.
- HOOKER, J.D. 1902. *Kniphofia multiflora*. *Curtis's Botanical Magazine*, ser. 3, 58: t. 7832.
- JACQUIN, N.J. VON. 1800. *Fragmenta botanica*: t. 4. Schmidt, Vienna.
- KER GAWLER, J.B. 1801. *Recensio plantarum*: 18. London.
- KER GAWLER, J.B. 1804a. *Tritoma media*. *Curtis's Botanical Magazine*, ser. 1, 19: t. 744.
- KER GAWLER, J.B. 1804b. *Tritoma uvaria*. *Curtis's Botanical Magazine*, ser. 1, 19: t. 758.
- KNIPHOF, J.H. 1762. *Botanica in originale* 9: t. 805. Trampe, Halle.
- KNORR, G.W. 1770. *Thesaurus rei herbariae*: t. A.13. Nuremberg.
- KRAUSE, K. 1930. Liliaceae. *Die natürlichen Pflanzenfamilien*, edn 2, 15a: 227–386.
- KUNTH, C.S. 1843. *Kniphofia* Moench. *Enumeratio plantarum*, vol. 4: 550–553. Cotta, Stuttgart & Tübingen.
- LAMARCK, J.B.A.P.M. DE. 1783. *Encyclopedie méthodique, Botanique* 1: 90. Pancouke, Paris.
- LEMAIRE, C.A. 1854. *Le Jardin fleuriste*: t. 362. Paris.
- LETTY, C.L. 1962. *Wild flowers of the Transvaal*: 17–52. Hortors, Johannesburg.
- LINDLEY, J. 1836. *Tritoma burchellii*. *Edwards's Botanical Register*: t. 1745.
- LINK, J.H.F. 1821. *Enumeratio plantarum hortii regii berlinensis altera* 1: 383. Reimer, Berlin.
- LINK, J.H.F. 1829. *Tritomium*. *Handbuch* 1: 170. Josephy, Berlin.
- LINNAEUS, C. 1753. *Species plantarum*, edn 1: 323. Salvius, Stockholm.
- LINNAEUS, C. 1759. *Flora capensis*: 4. Uppsala.
- LINNAEUS, C. 1771. *Mantissa plantarum altera*. Cramer, Weinheim.
- LINNAEUS, C. 1797. *Systema naturae*, edn 10: 359. Stockholm.
- MALLET, G.B. 1906. Kniphofias and their culture. *The Gardeners' Chronicle*, ser. 3, 39: 81–83, 100–101.
- MARAIS, W. 1974. A revision of the tropical species of *Kniphofia* (Liliaceae). *Kew Bulletin* 28: 465–483.
- MARLOTH, H.W.R. 1907. *Kniphofia tabularis*. *Transactions of the South African Philosophical Society* 18: 49, 50.
- MARLOTH, H.W.R. 1915. *Flora of South Africa* 4: 102, t. 24c. Cape Town & London.
- MASTERS, M.T. 1892. *Kniphofia nelsonii*. *The Gardeners' Chronicle*, ser. 3, 11: 554, t. 83.
- MILLER, P. 1768. *The gardeners dictionary*, edn 8, Aloe: No. 23. Rivington, London.
- MOENCH, C. 1794. *Methodus*: 631. Nova libraria academiae, Marburg.
- MOORE, T. 1852. *Garden Companion and Florists' Guide* 1: 113. London.
- NEES VON ESENBECK, T.F.L. & SINNING, W. 1831. *Sammlung schönblühender Gewächse*: 19, t. 7. Düsseldorf.
- NICHOLSON, G. 1901. *The century supplement to the illustrated dictionary of gardening*. Upcott Gill, London.
- OKEN, L. 1841. *Allgemeine Naturgeschichte für alle Stände* 3, 1: 566. Stuttgart.
- PERSOON, C.H. 1805. *Synopsis plantarum*, vol. 1: 377. Cramer, Paris.
- PHILLIPS, E.P. 1917. A contribution to the flora of the Leribe Plateau and environs. *Annals of the South African Museum* 16: 294.
- PHILLIPS, E.P. 1929. *Kniphofia linearifolia*. *The Flowering Plants of South Africa* 9: t. 340.
- PHILLIPS, E.P. 1940. *Kniphofia galpinii*. *The Flowering Plants of South Africa* 20: t. 783.
- PHILLIPS, E.P. 1951. The genera of South African flowering plants. *Memoirs of the Botanical Survey of South Africa* No. 25, edn 2: 185.
- REDOUTÉ, P.J. 1807. *Tritoma media*. *Les Liliacées* 3: t. 161. Paris.
- REDOUTÉ, P.J. 1810. *Tritoma uvaria*. *Les Liliacées* 5: t. 291. Paris.
- RENDLE, A.B. 1911. *Kniphofia rhodesiana*. *Journal of the Linnean Society, Botany* 40: 214, 215.
- RETIEF, E. & HERMAN, P.P.J. 1997. Plants of the northern provinces of South Africa: keys and diagnostic characters. *Strelitzia* 6. National Botanical Institute, Pretoria.
- ROTH, A.W. 1821. *Novae plantarum species praesertim Indiae orientalis*: 190. Halberstadt.
- SALISBURY, R.A. 1866. *The genera of plants: a fragment containing part of Lirioideae*: 75. Van Voorst, London.
- SCHINZ, H. 1900. *Kniphofia schlechteri*. *Mémoires de l'Herbier Boissier* 20: 10.
- SCHINZ, H. 1902. *Berichtigung*. *Bulletin de l'Herbier Boissier*, sér. 2, 2: 1016.
- SCHÖNLAND, S. 1919. Phanerogamic flora of the divisions of Uitenhage and Port Elizabeth. *Memoirs of the Botanical Survey of South Africa* No. 1: 38.
- SCHULTES, J.A. 1829. *Tritomanthe*. In J.J. Roemer & J.A. Schultes, *Systema vegetabilium* 7, 1: 629–631. Stuttgart.
- SMITH, G.F. & MEYER, N.L. 2000. Asphodelaceae. In O.A. Leistner, *Seed plants of southern Africa: families and genera*. *Strelitzia* 10: 582–586. National Botanical Institute, Pretoria.
- SWEET, R. 1830. *Hortus britannicus*, edn 2: 517. London.
- TAYLOR, JANE. 1985. *Kniphofia*—a survey. *The Plantsman* 7: 129–160.
- THUNBERG, C.P. 1794. *Prodronus plantarum capensium* 1: 60. Edman, Uppsala.
- THUNBERG, C.P. 1823. *Flora capensis*, edn Schultes: 309. Cotta, Stuttgart.
- VAN HOUTTE, L.B. 1861. *Flore des serres* 13: 187, t. 1393. Ghent.
- WATSON, W. 1895. *Kniphofia woodii*. *The Garden* 48: 292.
- WILLDENOW, C.L. 1799. *Species plantarum*, vol. 2, edn 4: 182. Nauk, Berlin.
- WILLDENOW, C.L. 1809. *Enumeratio plantarum hortii regii botanici berlinensis*: 380. Berlin.
- WILLDENOW, C.L. 1827. *Annalen der Blumisterei* 2: 291, t. 17.
- WOOD, J.M. 1900. *Kniphofia nulliflora*. *Natal plants* 3: t. 206. Bennet & Davis, Durban.

- WOOD, J.M. 1901. *Kniphofia multiflora*. *The Gardeners' Chronicle*, ser. 3, 29: 56.
- WOOD, J.M. 1903a. *Kniphofia natalensis*. *Natal plants* 4,1: t. 305. Bennet & Davis, Durban.
- WOOD, J.M. 1903b. *Kniphofia fibrosa*. *Natal plants* 4,1: t. 322. Bennet & Davis, Durban.
- WOOD, J.M. 1912. *Kniphofia rooperi*. *Natal plants* 6: t. 540. Natal Government and Durban Botanical Society, Durban.
- WOOD, J.M. & EVANS, M.S. 1897. *Kniphofia multiflora*. *Journal of Botany, British and Foreign* 35: 353.
- WRIGHT, C.H. 1914. *Kniphofia carinata*. *Curtis's Botanical Magazine*, ser. 4, 10: t. 8545.
- ZAHLEBRUCKNER, A. 1900. *Notosceptrum brachystachyum*. *Annalen des Kaiserlich-königlich Naturhistorischen Hofmuseums in Wien* 15: 15, t. 3.

INDEX†

- ALETHRIS* sensu L., 1
uvaria (L.) L., 75
- ALETRIS* sensu Burm.f., 1
pumila Aiton*, 87
sarmentosa Andrews, 43
uvaria (L.) L., 75
- ALOE L., 1
aloooides (*Bolus*) *Drueten*, 72
longifolia Lam., 75
uvaria L., 75
- KNIPHOFIA Moench, 1
acraea *Codd*, 9
albescens *Codd*, 17
albomontana *Baijnath*, 47
aloooides Moench, 75
 var. *maxima* (Baker) Baker, 41
 var. *nobilis* (Guillon) Baker, 41
 var. *serotina* Baker, 41
aloooides sensu Baker, 41
aloooides sensu Van Houtte, 79
angustifolia (Baker) *Codd*, 30
bachmannii Baker, 75
baurii Baker, 67
brachystachya (*Zahlbr.*) *Codd*, 13
breviflora *Harv. ex Baker*, 14
 var. *concinna* (Baker) A.Berger, 15
bruceae (*Codd*) *Codd*, 37
buchananii Baker, 13
 var. *flavescens* A.Berger, 14, 15
burchellii (Lindl.) Kunth, 75
carinata C.H.Wright*, 87
caulescens Baker *ex Hook.f.*, 45
citrina Baker, 77
coddiana *Cufod.*, 65
concima Baker, 15
conrathii Baker, 59
coralligemma E.A.Bruce, 43
crassifolia Baker, 21
decaphebia Baker, 27
drepanophylla Baker, 65
elegans *Codd*, 65
ensifolia Baker, 33, 36
 subsp. *autumnalis* *Codd*, 36
 subsp. *ensifolia*, 36
 var. *albiflora* E.A.Bruce, 36
evansii Baker, 20
fibrosa Baker, 21
fibrosa sensu J.M.Wood, 15
flammula *Codd*, 17
fluviatilis *Codd*, 63
foliosa sensu Baker, 36
galpini Baker, 54
gracilis *Harv. ex Baker*, 25
hirsuta *Codd*, 49
ichopensis Baker *ex Schinz.*, 29, 30
 var. *aciformis* *Codd*, 30
 var. *ichopensis*, 30
infundibularis Baker*, 87
krookii *Zahlbr.*, 8
latifolia *Codd*, 71
laxiflora *Kunth*, 17
leucocephala *Baijnath*, 85
linearifolia Baker, 79
 var. *kuntzei* A.Berger, 79
 var. *montana* A.Berger, 79
linearifolia sensu E.Phillips, 79
littoralis *Codd*, 63
longicollis Baker, 41, 73
longiflora Baker, 79
macowanii Baker, 57
modesta Baker, 7
 var. *lutescens* A.Berger, 25
 var. *woodii* (W.Watson) A.Berger, 25
modesta sensu Baker, 7, 25
multiflora J.M.Wood & M.S.Evans, 7
natalensis Baker, 27
 var. *angustifolia* Baker, 27, 30
 var. *condensata* Baker, 25, 27
 var. *robustior* A.Berger, 27
nelsonii Mast., 57
northiae Baker, 47
obtusiloba A.Berger, 57
occidentalis A.Berger, 75
odorata Heynh., 75
pallidiflora Baker*, 33
parviflora *Kunth*, 7
 var. *albiflora* A.Berger, 15
patersoniae Schönland, 77
pauciflora Baker, 31
pedicellata Baker, 31

† Synonyms are in italics.

* excluded names.

- porphyrantha* Baker,
praecox Baker, 41
 subsp. *bruceae* Codd, 37
praecox sensu Letty, 79
primulina Baker*, 87
pumila (Aiton) Kunth*, 87
pumila sensu Baker, 36
rhodesiana Rendle, 79
rigidifolia E.A.Bruce, 71
ritualis Codd, 53
rivularis A.Berger, 36
rooperi sensu Hook.f., 79
rooperi (T.Moore) Lem., 73
rufa Baker*, 87
rufa sensu Codd, 30
sarmentosa (Andrews) Kunth, 43
sarmentosa sensu E.Phillips, 53
saundersii (Carrière) G.Nicholson*, 88
schlechteri Baker, 30
schlechteri Schinz, 15
sparsa N.E.Br., 25
splendida E.A.Bruce, 36
stricta Codd, 49
tabularis Marloth, 33
thodei Baker, 59
triangularis Kunth, 55
 subsp. *obtusiloba* (A.Berger) Codd, 57
 subsp. *triangularis*, 55
tuckii Baker, 36
typhoides Codd, 11
tysonii Baker, 81, 83
 subsp. *lebomboensis* Codd, 83
 subsp. *tysonii*, 83
tysonii sensu E.Phillips, 45
umbrina Codd, 9
uvaria (L.) Oken, 75
 var. *maxima* Baker, 41
 var. *nobilis* (Guillon) A.Berger, 41
 var. *praecox* (Baker) A.Berger, 41
 var. *serotina* (Baker) A.Berger, 41
 uvaria sensu Hook., 79
 uvaria sensu Jacq., 37
 woodii W.Watson, 25
 wyliei N.E.Br., 25
- NOTOSCEPTRUM** Benth., 1
 aloooides Benth.*, 88
 benguellense (Baker) Benth., 1
 brachystachyum Zahlbr., 13
 natalense Baker, 11
- TRICLISSA** Salisb., 1
 uvaria (L.) Salisb., 75
- TRITOMA** Ker Gawl., 1, 88
 burchellii Herb. ex Lindl., 75
 caulescens (Baker) Carrière, 45
 glauca hort.*, 88
 grandis hort.*, 88
 macowanii (Baker) Carrière, 57
 media (Donn) Ker Gawl., 43
 nobilis Guillon*, 88
 recurva hort.*, 88
 recurvata hort.*, 88
 rooperi T.Moore, 73
 saundersii Carrière*, 88
 uvaria (L.) Ker Gawl., 75
 uvaria sensu Redouté, 79
- TRITOMANTHE** Link, 1
 media (Donn) Link, 43
 uvaria (L.) Link, 75
- TRITOMIUM** Link, 1
 uvaria (L.) Link, 75
- VELTHEIMIA** sensu Willd., 1
 abyssinica Redouté*, 87
 media Donn, 43
 repens Ker Gawl., 43
 sarmentosa (Andrews) Willd., 43
 speciosa Roth*, 88
 uvaria (L.) Willd., 75

APPENDIX

PLAN OF *FLORA OF SOUTHERN AFRICA*

Cryptogam volumes will in future not be numbered, but will be known by the name of the group they cover. The number assigned to the volume on Charophyta therefore becomes redundant. Occasional contributions to the *Flora* are published in *Bothalia* under the title *FSA contributions*.

Exotic families are marked with an asterisk.

Published volumes and parts are shown in bold.

INTRODUCTORY VOLUMES

The genera of southern African flowering plants, Vols 1 (1975) and 2 (1976). Replaced by Seed plants of southern Africa: families and genera, published as *Strelitzia* 10 (2000).

Vol. 1: Dicotyledons (1975)

Vol. 2: Monocotyledons (1976)

Botanical exploration of southern Africa (1981)

CRYPTOGAM VOLUMES

Charophyta (as Vol. 9 in 1978)

Bryophyta: Part 1: Musci: **Fascicle 1: Sphagnaceae, Andreaeaceae, Fissidentaceae, Nanobryaceae, Archidiaceae, Ditrichaceae, Seligeriaceae, Dicranaceae, Calymperaceae, Encalyptaceae, Pottiaceae, Bryobartramiaceae, Grimmiaceae (1981)**

Fascicle 2: Gigaspermaceae, Ephemeraceae, Funariaceae, Splachnaceae, Bryaceae, Mniaceae, Eustichiaceae, Rhizogoniaceae, Aulacomniaceae, Bartramiaceae (1987)

Fascicle 3: Erpodiaceae, Rhachithecaceae, Ptychomitriaceae, Orthotrichaceae, Rhabdowesiaceae, Racopilaceae, Fontinalaceae, Wardiaceae, Hedwigiaceae, Cryphaeaceae, Leucodontaceae, Prionodontaceae, Trachypodaceae, Pterobryaceae, Meteoriaceae, Leptodontaceae, Neckeraceae, Thamnobryaceae, Hookeriaceae (1998)

Fascicle 4: Fabroniaceae, Leskeaceae, Thuidiaceae, Rigodiaceae, Amblystegiaceae, Brachytheciaceae, Entodontaceae, Plagiotheciaceae, Catagoniaceae, Sematophyllaceae, Hypnaceae, Hylocomiaceae, Polytrichaceae

Hepatophyta: Part 1: Marchantiopsida: **Fascicle 1: Targioniaceae, Lunulariaceae, Aytoniaceae, Cleveaceae, Exormothecaceae, Marchantiaceae, Oxymitriaceae, Ricciaceae (1999)**

Anthocerotophyta

Pteridophyta (1986)

FLOWERING PLANTS VOLUMES

Vol. 1: Stangeriaceae, Zamiaceae, Podocarpaceae, Pinaceae*, Cupressaceae, Welwitschiaceae, Typhaceae, Zosteraceae, Potamogetonaceae, Ruppiaceae, Zannichelliaceae, Najadaceae, Aponogetonaceae, Juncaginaceae, Alismataceae, Hydrocharitaceae (1966)

Vol. 2: Poaceae

Vol. 3: Cyperaceae, Arecaceae, Araceae, Lemnaceae, Flagellariaceae

Vol. 4: Part 1: Restionaceae

Part 2: Xyridaceae, Eriocaulaceae, Commelinaceae, Pontederiaceae, Juncaceae (1985)

Vol. 5: Part 1: Fascicle 1: **Aloaceae (First part): *Aloe* (2000)**

Fascicle 2: Asphodelaceae (First part): *Kniphofia* (2005)

Colchicaceae, Eriospermaceae, Asphodelaceae (*Chortolirion*, 1995 in *Bothalia* 25: 31–33; *Poellnitzia*, 1995 in *Bothalia* 25: 35, 36)

Part 2: **Alliaceae, Liliaceae*, Hyacinthaceae, Agavaceae (1996 in *Bothalia* 26: 31–35)**

Part 3: Dracaenaceae, Asparagaceae, Luzuriagaceae, Smilacaceae (1992)

- Vol. 6: Haemodoraceae, Amaryllidaceae, Hypoxidaceae, Tecophilaeaceae, Velloziaceae, Dioscoreaceae
- Vol. 7: Iridaceae: Part 1: Nivenioideae, Iridoideae
Part 2: Ixiodeae: Fascicle 1: **Ixieae (First part): Ixinae, Tritoniinae (1999)**
Fascicle 2: **Stringodeae, Romulea (1983)**
- Vol. 8: Musaceae, Strelitziaceae, **Zingiberaceae (1998 in *Bothalia* 28: 35–39)**, Cannaceae*, Burmanniaceae, Orchidaceae (*Holothrix*, 1996 in *Bothalia* 26: 125–140)
- Vol. 9: **Part: Urticaceae (2001)**
Casuarinaceae* (2000 in *Bothalia* 30: 143–146), **Piperaceae (2000 in *Bothalia* 30: 25–30)**, Salicaceae, Myricaceae, Fagaceae*, **Ulmaceae (1999 in *Bothalia* 29: 239–247)**, Moraceae, **Cannabaceae* (1999 in *Bothalia* 29: 249–252)**, Proteaceae
- Vol. 10: Part 1: **Loranthaceae, Viscaceae (1979)**, Santalaceae, Grubbiaceae, Opiliaceae, Olacaceae, Balanophoraceae, Aristolochiaceae, Rafflesiaceae, Hydnoraceae, Polygonaceae, Chenopodiaceae, Amaranthaceae, Nyctaginaceae
- Vol. 11: Phytolaccaceae, Aizoaceae, Mesembryanthemaceae
- Vol. 12: Portulacaceae, Basellaceae, Caryophyllaceae, Illecebraceae, Cabombaceae, Nymphaeaceae, **Ceratophyllaceae (1997 in *Bothalia* 27: 125–128)**, Ranunculaceae, Menispermaceae, Annonaceae, Trimeniaceae, Lauraceae, Hernandiaceae, Papaveraceae, Fumariaceae
- Vol. 13: Brassicaceae, Capparaceae, Resedaceae, Moringaceae, Droseraceae, Roridulaceae, Podostemaceae, Hydrostachyaceae (1970)**
- Vol. 14: Crassulaceae (1985)**
- Vol. 15: Vahliaaceae, Montiniaceae, Escalloniaceae, Pittosporaceae, Cunoniaceae, Myrothamnaceae, Bruniaceae, Hamamelidaceae, Rosaceae, Connaraceae
- Vol. 16: Fabaceae: **Part 1: Mimosoideae (1975)**
Part 2: Caesalpiinoideae (1977)
Part 3: Papilionoideae: Fascicle 1: Swartzieae–Robinieae
Fascicle 2: Indigoferaeae
Fascicle 3: Desmodieae, Phaseoleae
Fascicle 4: Psoraleae–Galegeae
Fascicle 5: Loteae–Liparicaceae
Fascicle 6: Crotalarieae (*Aspalathus*) (1988)
Fascicle 7: Crotalarieae (*Bolusia–Lebeckia*)
Fascicle 8: Crotalarieae (*Lotononis–Wiborgia*)
Fascicle 9: Crotalarieae (*Pearsonia–Argyrobolium*), Genisteae (*Cytisus–Ulex*)
- Vol. 17: Geraniaceae, Oxalidaceae
- Vol. 18: Part 1: Linaceae, Erythroxylaceae, Zygophyllaceae, Balanitaceae
Part 2: Rutaceae
Part 3: Simaroubaceae, Burseraceae, Ptaeroxylaceae, Meliaceae (Aitoniaceae), Malpighiaceae (1986)
- Vol. 19: Part 1: Polygalaceae, Dichapetalaceae
Part 2: Euphorbiaceae, Callitrichaceae, **Buxaceae (1996 in *Bothalia* 26: 37–40)**
Part 3: Anacardiaceae: **Fascicle 1: *Rhus* (1993)**
Fascicle 2: remaining genera
Aquifoliaceae (1994 in *Bothalia* 24: 163–166)
- Vol. 20: Celastraceae, Icacinaceae, Sapindaceae, Melianthaceae, Greyiaceae, Balsaminaceae, Rhamnaceae, Vitaceae
- Vol. 21: **Part 1: Tiliaceae (1984)**
Malvaceae, Bombacaceae, Sterculiaceae
- Vol. 22: Ochnaceae, Clusiaceae, Elatinaceae, Frankeniaceae, Tamaricaceae, Canellaceae, Violaceae, Flacourtiaceae, Turnercaceae, Passifloraceae, Achariaceae, Loasaceae, Begoniaceae, Cactaceae (1976)**
- Vol. 23: Geissolomataceae, Penaeaceae, Oliniaceae, Thymelaeaceae, Lythraceae, Lecythidaceae
- Vol. 24: Rhizophoraceae, Combretaceae, Myrtaceae, Melastomataceae, **Onagraceae (1997 in *Bothalia* 27: 149–165)**, **Trapaceae (1998 in *Bothalia* 28: 11–14)**, Haloragaceae, Gunneraceae, Araliaceae, Apiaceae, Cornaceae
- Vol. 25: Ericaceae

- Vol. 26: Myrsinaceae, Primulaceae, Plumbaginaceae, Sapotaceae, Ebenaceae, Oleaceae, Salvadoraceae, Loganiaceae, Gentianaceae, Apocynaceae (1963)**
- Vol. 27: Part 1: Periploaceae, Asclepiadaceae (*Microloma–Xysmalobium*)
 Part 2: Asclepiadaceae (*Schizoglossum–Woodia*)
 Part 3: Asclepiadaceae (*Asclepias–Anisotoma*)
Part 4: Asclepiadaceae (*Brachystelma, Ceropegia, Riocreuxia*) (1980)
 Asclepiadaceae (remaining genera)
- Vol. 28: Part 1: **Convolvulaceae (2000)**
 Part 2: Hydrophyllaceae, Boraginaceae
 Part 3: Stilbaceae, Verbenaceae (*Vitex*, 1996 in *Bothalia* 26: 141–151)
Part 4: Lamiaceae (1985)
 Part 5: Solanaceae, Retziaceae
- Vol. 29: Scrophulariaceae
- Vol. 30: Part 1: Bignoniaceae, Pedaliaceae, Martyniaceae, Orobanchaceae
 Part 2: Gesneriaceae, Lentibulariaceae
Part 3: Acanthaceae: Fascicle 1: Justiciinae (1995)
 Acanthaceae (remaining genera), Myoporaceae
- Vol. 31: Part 1: Fascicle 1: **Plantaginaceae (1998 in *Bothalia* 28: 151–157)**, Rubiaceae (Rubioidae—First part)
Fascicle 2: Rubiaceae (Rubioidae—Second part): Paedericaceae, Anthospermaceae, Rubieae (1986)
 Fascicle 3: Ixoroideae, Chinchonoideae
 Part 2: Valerianaceae, Dipsacaceae, Cucurbitaceae
- Vol. 32: Campanulaceae, **Sphenocleaceae (2000 in *Bothalia* 30: 31–33)**, Lobeliaceae, Goodeniaceae
- Vol. 33: Asteraceae: Part 1: Lactuceae, Mutisieae, ‘Tarchonantheae’
 Part 2: Vernoniaceae, Cardueae
 Part 3: Arctotideae
 Part 4: Anthemideae: **Fascicle 1: Erioccephalus, Lasiospermum (2001)**
 Part 5: Astereae
 Part 6: Calenduleae
 Part 7: Inuleae: Fascicle 1: Inulinae
 Fascicle 2: **Gnaphaliinae (First part) (1983)**
 Part 8: Heliantheae, Eupatorieae
 Part 9: Senecioneae

FSA CONTRIBUTIONS IN BOTHALIA

- FSA* contributions 1: Aquifoliaceae. S. ANDREWS. 1994. *Bothalia* 24: 163–166.
- FSA* contributions 2: Asphodelaceae/Aloaceae, 1029010 *Chortolirion*. G.F. SMITH. 1995. *Bothalia* 25: 31–33.
- FSA* contributions 3: Asphodelaceae/Aloaceae, 1028010 *Poellnitzia*. G.F. SMITH. 1995. *Bothalia* 25: 35, 36.
- FSA* contributions 4: Agavaceae. G.F. SMITH & M. MÖSSMER. 1996. *Bothalia* 26: 31–35.
- FSA* contributions 5: Buxaceae. H.F. GLEN. 1996. *Bothalia* 26: 37–40.
- FSA* contributions 6: Orchidaceae: *Holothrix*. K.L. IMMELMAN. 1996. *Bothalia* 26: 125–140.
- FSA* contributions 7: Verbenaceae: *Vitex*. C.L. BREDENKAMP & D.J. BOTHA. 1996. *Bothalia* 26: 141–151.
- FSA* contributions 8: Ceratophyllaceae. C.M. WILMOT-DEAR. 1997. *Bothalia* 27: 125–128.
- FSA* contributions 9: Onagraceae. P. GOLDBLATT & P.H. RAVEN. 1997. *Bothalia* 27: 149–165.
- FSA* contributions 10: Trapaceae. B. VERDCOURT. 1998. *Bothalia* 28: 11–14.
- FSA* contributions 11: Zingiberaceae. R.M. SMITH. 1998. *Bothalia* 28: 35–39.
- FSA* contributions 12: Plantaginaceae. H.F. GLEN. 1998. *Bothalia* 28: 151–157.
- FSA* contributions 13: Ulmaceae. C.M. WILMOT-DEAR. 1999. *Bothalia* 29: 239–247.
- FSA* contributions 14: Cannabaceae. C.M. WILMOT-DEAR. 1999. *Bothalia* 29: 249–252.
- FSA* contributions 15: Piperaceae. K.L. IMMELMAN. 2000. *Bothalia* 30: 25–30.
- FSA* contributions 16: Sphenocleaceae. W.G. WELMAN. 2000. *Bothalia* 30: 31–33.
- FSA* contributions 17: Casuarinaceae. C.M. WILMOT-DEAR. 2000. *Bothalia* 30: 143–146.

FLORA OF SOUTHERN AFRICA

ALPHABETICAL LIST OF PUBLISHED TAXA

* exotic families

- Acanthaceae: Justiciinae, Vol. 30, Part 3, Fasc.1 (1995)
- Achariaceae, Vol. 22 (1976)
- Agavaceae (*Bothalia* 26, 1996)
- Alismataceae, Vol. 1 (1966)
- Aloaceae (first part): *Aloe*, Vol. 5, Part 1, Fasc. 1 (2000)
- Aloe*, Aloaceae (first part), Vol. 5, Part 1, Fasc. 1 (2000)
- Anacardiaceae: *Rhus*, Vol. 19, Part 3, Fasc. 1 (1993)
- Andreaeaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Anthemideae, Asteraceae, Vol. 33, Part 4, Fasc. 1 (2001)
- Anthospermeae, Rubiaceae: Rubioideae (second part), Vol. 31, Part 1, Fasc. 2 (1986)
- Apocynaceae, Vol. 26 (1963)
- Aponogetonaceae, Vol. 1 (1966)
- Aquifoliaceae (*Bothalia* 24, 1994)
- Archidiaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Asclepiadaceae: *Brachystelma-Riocreuxia*, Vol. 27, Part 4 (1980)
- Aspalathus*, Fabaceae: Papilionoideae, Vol. 16, Part 3, Fasc. 6 (1988)
- Asparagaceae, Vol. 5 (1992)
- Asphodelaceae: *Chortolirion*, *Poellnitzia* (*Bothalia* 25, 1995)
- Asphodelaceae: *Kniphofia*, Vol. 5, Part 1, Fasc. 2 (2005)
- Asteraceae: Anthemideae: *Eriocephalus*, *Lasiospernum*, Vol. 33, Part 4, Fasc. 1 (2001)
- Asteraceae: Inuleae: Gnaphaliinae (first part), Vol. 33, Part 7, Fasc. 2 (1983)
- Aulacomniaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Aytoniaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Bartramiaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Begoniaceae, Vol. 22 (1976)
- Brachystelma*, Asclepiadaceae, Vol. 27, Part 4 (1980)
- Brassicaceae, Vol. 13 (1970)
- Bryaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Bryobartramiaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Bryophyta (three fascicles published 1981, 1987, 1998: see plan of *FSA*)
- Burseraceae, Vol. 18 (1986)
- Buxaceae (*Bothalia* 26, 1996)
- Cactaceae, Vol. 22 (1976)
- Caesalpinioideae, Fabaceae, Vol. 16, Part 2 (1977)
- Calymperaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Canellaceae, Vol. 22 (1976)
- Cannabaceae (*Bothalia* 29, 1999)
- Capparaceae, Vol. 13 (1970)
- Casuarinaceae (*Bothalia* 30, 2000)
- Ceratophyllaceae (*Bothalia* 27, 1997)
- Ceropegia*, Asclepiadaceae, Vol. 27, Part 4 (1980)
- Charophyta, Cryptogams 'Vol. 9' (1978)
- Chortolirion*, Asphodelaceae (*Bothalia* 25, 1995)
- Cleveaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Clusiaceae, Vol. 22 (1976)
- Commelinaceae, Vol. 4 (1985)
- Convolvulaceae, Vol. 28, Part 1 (2000)
- Crassulaceae, Vol. 14 (1985)
- Crotalariaeae, *Aspalathus*, Fabaceae: Papilionoideae, Vol. 16, Part 3, Fasc.6 (1988)
- Cryphaeaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Cupressaceae, Vol. 1 (1966)
- Dicranaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Ditrichaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Dracaenaceae, Vol. 5 (1992)
- Droseraceae, Vol. 13 (1970)
- Ebenaceae, Vol. 26 (1963)
- Elatinaceae, Vol. 22 (1976)
- Encalyptaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Ephemeraceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Eriocaulaceae, Vol. 4 (1985)
- Eriocephalus*, Asteraceae: Anthemideae, Vol. 33, Part 4, Fasc. 1 (2001)
- Erpodiaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Eustichiaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Exornothecaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Fabaceae: Caesalpinioideae, Vol. 16, Part 2 (1977)
- Fabaceae: Mimosoideae, Vol. 16, Part 1 (1975)
- Fabaceae: Papilionoideae, Crotalariaeae, *Aspalathus*, Vol. 16, Part 3, Fasc. 6 (1988)
- Fissidentaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Flacourtiaceae, Vol. 22 (1976)
- Fontinalaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Frankeniaceae, Vol. 22 (1976)
- Funariaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Gentianaceae, Vol. 26 (1963)
- Gigaspermaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Gnaphaliinae (first part), Asteraceae: Inuleae, Vol. 33, Part 7, Fasc. 2 (1983)
- Grimmiaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Hedwigiaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Hepatophyta, Part 1, Fasc. 1 (1999)
- Holothrix*, Orchidaceae (*Bothalia* 26, 1996)
- Hookeriaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Hydrocharitaceae, Vol. 1 (1966)
- Hydrostachyaceae, Vol. 13 (1970)
- Inuleae, Asteraceae: Gnaphaliinae (first part), Vol. 33, Part 7, Fasc. 2 (1983)
- Iridaceae: Ixiaceae (first part): Ixiinae, Tritoniinae, Vol. 7, Part 2, Fasc. 1 (1999)

- Iridaceae: *Syringodea*, *Romulea*, Vol. 7, Part 2, Fasc. 2 (1983)
- Ixiaceae (first part), Iridaceae: Ixiinae, Trionoiiinae, Vol. 7, Part 2, Fasc. 1 (1999)
- Ixiinae, Iridaceae: Ixiaceae (first part), Vol. 7, Part 2, Fasc. 1 (1999)
- Juncaceae, Vol. 4 (1985)
- Juncaginaceae, Vol. 1 (1966)
- Justiciinae, Acanthaceae, Vol. 30, Part 3, Fasc. 1 (1995)
- Kniphofia*, Asphodelaceae, Vol. 5, Part 1, Fasc. 2
- Lamiaceae, Vol. 28 (1985)
- Lasiospermum*, Asteraceae: Anthemideae, Vol. 33, Part 4, Fasc. 1 (2001)
- Leptodontaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Leucodontaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Loasaceae, Vol. 22 (1976)
- Loganiaceae, Vol. 26 (1963)
- Loranthaceae, Vol. 10 (1979)
- Lunulariaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Luzuriagaceae, Vol. 5 (1992)
- Malpighiaceae, Vol. 18 (1986)
- Marchantiaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Marchantiales, Hepatophyta, Part 1, Fasc. 1 (1999)
- Marchantiidae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Marchantiopsida, Hepatophyta, Part 1 (1999)
- Meliaceae, Vol. 18 (1986)
- Meteoriaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Mimosoideae, Fabaceae, Vol. 16, Part 1 (1975)
- Mniaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Moringaceae, Vol. 13 (1970)
- Myrsinaceae, Vol. 26 (1963)
- Nanobryaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Najadaceae, Vol. 1 (1966)
- Neckeraceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Ochnaceae, Vol. 22 (1976)
- Oleaceae, Vol. 26 (1963)
- Onagraceae (*Bothalia* 27, 1997)
- Orchidaceae: *Holothrix* (*Bothalia* 26, 1996)
- Orthotrichaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Oxymitracae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Paederiae, Rubiaceae: Rubioideae (second part), Vol. 31, Part 1, Fasc. 2 (1986)
- Passifloraceae, Vol. 22 (1976)
- Pinaceae*, Vol. 1 (1966)
- Piperaceae (*Bothalia* 30, 2000)
- Plantaginaceae (*Bothalia* 28, 1998)
- Plumbaginaceae, Vol. 26 (1963)
- Podocarpaceae, Vol. 1 (1966)
- Podostemaceae, Vol. 13 (1970)
- Poelhinzia*, Asphodelaceae (*Bothalia* 25, 1995)
- Pontederiaceae, Vol. 4 (1985)
- Potamogetonaceae, Vol. 1 (1966)
- Pottiaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Primulaceae, Vol. 26 (1963)
- Prionodontaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Ptaeroxylaceae, Vol. 18 (1986)
- Pteridophyta (1986) (for list of families, see p. v of Pteridophyta volume)
- Pterobryaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Ptychomitriaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Racopilaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Resedaceae, Vol. 13 (1970)
- Rhabdoweisiaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Rhachithecaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Rhizogoniaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Rhus*, Anacardiaceae, Vol. 19, Part 3, Fasc. 1 (1993)
- Ricciaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Riocrexia*, Asclepiadaceae, Vol. 27, Part 4 (1980)
- Romulea*, Iridaceae, Vol. 7, Part 2, Fasc. 2 (1983)
- Roridulaceae, Vol. 13 (1970)
- Rubiaceae: Rubioideae (second part): Paederiae, Anthospermeae, Rubieae, Vol. 31, Part 1, Fasc. 2 (1986)
- Rubieae, Rubiaceae: Rubioideae (second part), Vol. 31, Part 1, Fasc. 2 (1986)
- Rubioideae (second part), Rubiaceae, Vol. 31, Part 1, Fasc. 2 (1986)
- Ruppiaceae, Vol. 1 (1966)
- Salvadoraceae, Vol. 26 (1963)
- Sapotaceae, Vol. 26 (1963)
- Seligeriaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Simaroubaceae, Vol. 18 (1986)
- Smilacaceae, Vol. 5 (1992)
- Sphagnaceae, Bryophyta, Part 1, Fasc. 1 (1981)
- Sphenocleaceae (*Bothalia* 30, 2000)
- Splachnaceae, Bryophyta, Part 1, Fasc. 2 (1987)
- Stangeriaceae, Vol. 1 (1966)
- Syringodea*, Iridaceae, Vol. 7, Part 2, Fasc. 2 (1983)
- Tamaricaceae, Vol. 22 (1976)
- Targioniaceae, Hepatophyta, Part 1, Fasc. 1 (1999)
- Thamnobryaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Tiliaceae, Vol. 21 (1984)
- Trachypodaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Trapaceae (*Bothalia* 28, 1998)
- Tritoniinae, Iridaceae: Ixiaceae (first part), Vol. 7, Part 2, Fasc. 1 (1999)
- Turneraceae, Vol. 22 (1976)
- Typhaceae, Vol. 1 (1966)
- Ulmaceae (*Bothalia* 29, 1999)
- Urticaceae, Vol. 9, Part: Urticaceae (2001)
- Verbenaceae: *Vitex* (*Bothalia* 26, 1996)
- Violaceae, Vol. 22 (1976)
- Visaceae, Vol. 10 (1979)
- Vitex*, Verbenaceae (*Bothalia* 26, 1996)
- Wardiaceae, Bryophyta, Part 1, Fasc. 3 (1998)
- Welwitschiaceae, Vol. 1 (1966)
- Xyridaceae, Vol. 4 (1985)
- Zamiaceae, Vol. 1 (1966)
- Zannichelliaceae, Vol. 1 (1966)
- Zosteraceae, Vol. 1 (1966)

