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Systematics of The Southern African species of Carex L. (cyperaceae)

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APPENDICES

1. SPECIMEN AND PHYTOGEOGRAPHICAL DATA

KEY TO ABBREVIATIONS:

acuti. = C. acutiformis Ehrh.
aeth. = C. aethiopica Schkuhr
aust. = C. austro-africana (Kuekenth.) Raymond
burch. = C. burchelliana Boeck.
clav. = C. clavata Thunb.
cogn. = C. cognata Kunth
div. = C. divisa Huds.
eckl. = C. ecklonii Nees
glom. = C. glomerabilis Krecz.
mono. = C. monotropa Nelmes
moss. = C. mossii Nelmes
spic. = C. spicato-paniculata C.B. Cl.
spic. x zul. = C. spicato-paniculata C.B. Cl. x C. zuluensis C.B. Cl.
sp. nov. = C. sp. nov.
subi. = C. subinflata Nelmes
sylv. = C. sylvatica Huds.
zul. = C. zuluensis C.B. Cl.

1.1. LIST OF SPECIMENS SEEN

Vouchers are marked with the following symbols:
Anatomy: asterisk (*).
SEM of leaf lamina surface: plus (+).
SEM of perigynium and nutlet: dollar ($).
SEM of acetolyzed nutlet: numero (#).

Abbott, A. *452* (NH), zul.
Acocks, J.P.H. *581* (S), clav.; *776* (S), glom.; *1051* (S), clav.; *1210A* (S), aeth., *2503* (PRE), burch.; *2528* (S), clav.; *3726* (S), eckl.; *9099* (PRE), acuti.; *9280* (BM, PRE), glom.; *9281* (BM, PRE), aust.; *9282* (BM, PRE), moss.; *9291* (BM, PRE), zul.; *9362* (PRE), zul.; *9915* (NH, PRE), glom.; *9976* (NH, PRE), subi.; *10691* (PRE), acuti.; *10784*$ (PRE), sylv.; *11443* (BM, PRE), zul.; *11508* (BM, PRE), spic.; *15730* (PRE), zul.; *15896* (BM, PRE), div.; *16190* (PRE), glom.; *16303* (PRE), glom.; *18588* (PRE), div.; *18638#$* (PRE), sp. nov.; *18659#$* (PRE), glom.; *19564* (PRE), div.; *21620* (PRE),

clav.; *21978* (PRE, S), burch.

Adamson, R.S. *5230* (BOL), aeth.; *5232$* (PRE), aeth.

Alexander; see Prior

Anderson, H.M. *201* (PRE), spic.

Arnold, T.H. *304* (MO, PRE), spic.; *332* (PRE), spic.; *382* (PRE), spic.; *554* (PRE), clav.; *576* (PRE), glom.; *641* (PRE), clav.; *656* (PRE), aeth.; *764* (NU, PRE), moss.; *1328* (PRE), moss.

Bachmann, F. *2159* (Z), div.

Balsinhas, A.A. *3139* (MO, PRE), spic.

Barker, N.P. *734* (PRE), clav.

Barker, W.F. *2717* (NBG), eckl.

Baur, L.R. *443* (K), moss.; *823* (GRA), glom.; *1136* (K), glom.; *1156* (BOL, K), zul.

Bayer, F. *s.n. anno* 5.06.1946 (NU), spic.

Bayer & MacCleag *100* (PRE), zul.

Bayliss, R.D.A. *5434* (MO), subi.

Beeton, H.W. *54* (PRE), cogn.

Beverly & Hoener *690* (NU), cogn.

Bews, J.W. *472* (NU), zul.; *473* (NU), zul.

Blenkiron, M.E. *s.n. sub Young 1392* (J), aust.

Blom, J.J. *44* (PRE), aust.

Bohnen, P. *4853* (PRE, STE), clav.; *7743* (PRE, STE), clav.

Bolus, F. *163* (BOL, PRE), glom.

Bolus, H. *3848* (BOL, GRA, K), aeth.; *7939* (K, NU, PRE), aeth.; *10361* (BOL), glom.

Bolus, L. *s.n. sub BOL 43705* (BOL), aeth.

Bond, P. *162* (NBG, NU), clav.

Bos, J.J. *1171* (PRE), zul.; *7208* (STE), aeth.

Boucher, C. *680* (PRE, STE), clav.

Braun, K.P. *421* (PRE), aust.; *430* (PRE), spic.

Bredenkamp, C. *8* (PRE), glom.

Bredenkamp, G.J. *287* (PRE), glom.; *354* (PRE), aust.

Britten, L.L. *519* (PRE), glom.; *975* (GRA), zul.; *2659* (GRA, PRE), glom.

Brown, R. *s.n. anno* 10-11.1801 (BM), clav.
Browning, J. *245* (NU, PRE), acuti.; *255* (NU, PRE), aust.; *256* (NU, PRE), cogn.
Bruyns-Haylett, J.P. *143* (NU), spic.
Buchanan, J. *97* (K), glom.; *135* (BOL), moss.; *138* (BOL), subi.; *159* (K), clav.; *167* (K), subi.; *350* (K), spic.; *353* (NH), spic.; *355* (K), spic.
Buitendag, E.L. *531* (PRE, STE), spic.
Burchell, W.J. *275* (K), clav.; *1831* (K), burch.; *1911* (K), burch.; *3904* (K), clav.; *4137* (K), clav.; *6554* (K), glom.
Burgers, C.J. *2930* (STE), clav.
Buthelezi, C.N. *369* (NH), zul.

Caporn, A. *s.n. sub BOL 49715* (BOL), clav.
Codd, L.E.W. *401* (PRE), spic.; *3189* (BM, PRE), acuti.
Codd & Dyer *9082* (BM, PRE), spic.
Coetzee, B.J. *275* (PRE), acuti.; *841* (PRE), aust.; *1454* (PRE), moss.
Coetzee, J.A. *389* (NBG), cogn.; *397* (NBG), mono.; *546* (PRE), glom.; *573$* (PRE), mono.
Coleman, T.A. *707* (PRE), glom.; *919* (PRE), aust.
Compton, R.H. *4451* (BOL), aeth.; *7688* (BOL), eckl.; *8073* (NBG), aeth.; *14290* (NBG), aeth.; *14292* (NBG), glom.; *16585* (NBG), eckl.; *17517* (NBG), clav.; *17720* (NBG), zul.; *17726* (NBG), zul.; *17859* (NBG, NU), aeth.; *19238* (NBG), zul.; *21262* (NBG), glom.; *21549* (NBG), subi.; *22750* (NBG), spic.; *23626* (NBG), clav.; *25425* (NBG, PRE), zul.; *25599* (NBG, NU, PRE), spic.; *26349* (NBG, PRE), zul.; *26553* (NBG, PRE), spic.; *26846* (NBG, NU, PRE), spic.; *27400* (NBG, PRE), zul.; *30266* (NBG, PRE), cogn.; *30357* (NBG, PRE), zul.; *30962* (NBG, PRE), aust.; *31309* (NBG, PRE), spic.; *31969* (NBG, PRE), spic.; *32266* (NBG, PRE), zul.; *32449* (NBG, NU, PRE), aust.
Cooper, T.M. *288* (BM, GRA, K, PRE, TCD, Z) moss.; *309* (BOL), aust.; *1066* (BM, K, TCD, Z), spic.; *3336* (K), moss.
Cotterrell, D. *1* (GRA), acuti.
Crawford, R. *313* (PRE), aust.

Dahlstrand, K.A. *512* (J, PRE), aeth.; *1358* (J), aeth.; *1847* (GRA), moss.

Daly, M.F. *800* (GRA, PRE), glom.

Daly & Sole *170* (GRA), glom.

Davidse, G. *33648* (PRE), aeth.

Davidson, L.E. *414* (J), spic.

Davidson & Mogg *33329* (K, PRE), spic.

Deall, G.B. *2443* (PRE), cogn.; *2578#$* (PRE), aust.

Devenish, N.J. *197* (PRE), aust.; *687* (BM, GRA, PRE), acuti.; *1512* (MO, PRE), spic. x zul.; *1806* (PRE), spic.

De Winter, B. *371* (PRE), acuti.; *9724* (PRE), spic.; *9818* (PRE), zul.

De Winter & Codd *181* (BM, PRE), cogn.

Dieterlen, A. *601* (NH), acuti. + subi.; (PRE), acuti. + cogn., (SAM), acuti.; *758#$* (BM, K, NH, PRE, SAM), glom.; *860* (BM, PRE), aust.; *890* (NBG, PRE), glom.; *1158* (PRE), acuti.; *1234* (NBG, PRE), subi.

Dieterlen & Dieterlen *860* (BM, K), subi.

Dinter, M.K. *s.n. anno* 5.04.1911 (B), cogn.; *1770* (SAM), cogn.

Diamini, B. *s.n. sub NBG 1134* (NBG, PRE), aust.

Downing, B.H. *175* (NU, PRE), acuti.; *228* (NU), cogn.; *245* (NU, PRE), aust.; *257* (NU, PRE), cogn.; *258* (NU, PRE), acuti.

Drège, J.L. *623* (GRA), clav.

Drège, J.F. *s.n.*, Stylkloof (K), glom.; *s.n. sub C. glomerata "c"* or *"e"* - illegible (BM), glom.; *s.n. sub C. glomerata "d"* (S), glom.; *s.n. sub C. glomerata "e"* (S, TCD), glom.; *s.n. sub C. glomerata "f"* (S), glom.; *s.n. anno* 1840 (?), aeth.; *1563* (BM, K, P, S, TCD), clav.; *1583* (K, P, S), clav.; *2450#$* (BM, K, P, S, SAM, TCD), div.; *3962* (P, S), acuti.; *4367* (S), subi.; *7398* (BM, K, P, S, TCD), aeth.

Drews, B.K. *145* (PRE), cogn.

Dümmer, R. *1980* (NBG), aeth.

Du Plessis, C.J. *1733* (PRE), spic.

Du Preez, J. *1712* (PRE), glom.

Duthie, A.V. *s.n. anno* 4.11.1931 (STE), aeth.; *514* (BOL), clav.; *709* (GRA, STE), glom.

Ecklon, C.F. *s.n. anno* 10.1823 (S), clav.; *s.n. anno* 1842 (S), clav.
Ecklon & Zeyher *118* (BOL, PRE), glom.; *120* (MO, PRE), clav.; *121* (PRE), clav.; *121* (NBG), aeth. + clav.; *187* (BM, BOL, K, PRE, SAM), glom.; *912* (S), clav.
Edwards, D. *529* (BM), zul.; *4391* (PRE), cogn.
Ellery, W. *275* (J, PRE), cogn.
Ellis, R.P. *2962* (PRE), aust.; *3043* (PRE), cogn.
E.S.C.A. Herbarium *174* (K, Z), clav.; *177* (Z), eckl.

Flanagan, H.G. *919* (GRA, PRE, Z), moss.; *1007* (BOL, GRA, PRE), clav.; *2005* (PRE), aust.; *2013* (BOL, K, PRE), mono.; *2748* (PRE), zul.; *2795* (Engcobo), (PRE), glom.; (Nqamakwe), (SAM), glom.
Forbes, P.L. *397* (J), spic.; *399* (J), spic.; *412* (J), glom.; *421* (J), cogn.; *599* (J), aeth.; *635* (J), glom.
Forrester & Goover *s.n. "A"* (J, NU), spic.; *231* (PRE), zul.
Fourcade, H.G. *s.n. anno* 11.1928 (BOL), aeth.; *3174* (BOL), aeth.; *1142* (BOL, GRA, STE), aeth.; *1832* (BOL), clav.; *1958* (STE), aeth.; *4135#$* (BOL, PRE, STE), aeth.; *4895* (BOL), clav.; *4907* (BOL, STE), clav.
Fourie, E. *2038* (PRE), spic.
Fries & Fries *3231* (S), zul.
Furness & Phillipson *86* (MO), acuti.; *128* (MO), aust.; *172* (MO, PRE), cogn.

Galpin, E.E. *1741* (GRA, PRE), moss.; *2454* (K, PRE), zul.; *2475* (GRA, K, PRE), moss.; *4843* (GRA, PRE), clav.; *5602* (GRA, PRE), glom.; *6881* (BOL, PRE), cogn.; *6882* (BOL, GRA, NH, PRE), subi.; *10253* (PRE), acuti.; *11889* (BOL, PRE), spic.
Gandoger, M. *s.n. anno* 6.1906 (MO), subi.
Gane, J.C. *s.n. sub TRV 17151* (PRE), zul.

Gant & Gant *38* (GRA), clav.

Geldenhuys, C.J. *962* (PRE), aeth.; *981* (PRE), aeth.

Getliffe, F.M. *1018* (J, PRE), spic.

Gibbs Russell, G.E. *2148* (MO, PRE), cogn.

Giffen, M.H. *703* (PRE), moss.; *1586* (PRE), sylv.

Gill, W. *s.n.* (K), aeth.

Gillett, J.B. *1323* (STE), aeth.; *2138* (STE), aeth.; *2159* (STE), aeth.

Gilliland, H.B. *s.n. sub J24646* (J), aust.; *s.n. sub J26932* (J, PRE), glom.

Glen, H.F. *1393* (PRE), spic.; *2432* (PRE), moss.

Goetghebeur, P. *4451* (PRE), spic.; *4505* (PRE), cogn.; *4534* (PRE), zul.; *4542* (PRE), spic.

Gordon-Gray, J.L. *640* (NU), glom.; *757* (NU), glom.; *1052* (NU), glom.

Gordon-Gray, K.D. *5013* (NU), cogn.; *6076* (BUDW, NU, PRE), spic.

Guthrie, F. *1338* (BOL), aeth.

Guy & Ward *69* (PRE), cogn.

Haagner, A. *s.n. sub PRE 57253* (PRE), glom.

Hafstrom, A. *s.n. anno* 13.12.1934 (S), clav.

Hafstrom & Acocks *102* (S), aust.

Hafstrom & Lindeberg *s.n. anno* 1.10.1936 (S), aeth.; *s.n. anno* 9.11.1936 (S), clav.

Haines, R.W. *7025* (PRE), spic.

Harvey, W.H. *349* (BM, K), eckl.

Hasselt, Kuhl & Reinwardt *s.n.* (S), clav.

Haygarth, W. *s.n. sub Medley Wood 4201* (BOL, K, NH), cogn.

Hearne & De Jager *s.n. anno* 4.1975 (J), zul.; *s.n. sub J58206* (J), spic.

Heatley, M. *s.n. sub C.E. Moss 2627* (J), spic.

Heatley & Moss *sub C.E. Moss 2772* (J, K), cogn.

Hemm, G. *181* (J, PRE), spic.; *416* (J, PRE), zul.

Henderson, M.R. *1857* (NBG), clav.

Hepburn, I. *163* (GRA), acuti.; *292* (GRA), subi.; *293* (GRA),

glom.

Heymans, W. *115* (PRE), aust.

Hilliard, O.M. *1313* (NU), zul.

Hilliard & Burtt *8404* (NU), zul.; *8449* (NU, PRE), zul.; *9367* (NU, PRE), aust.; *9367A* (NU), cogn.; *9669* (NU, PRE), mono.; *9674* (NU, PRE), glom.; *9721* (NU), zul.; *11762* (NU, PRE), cogn.; *11856* (NU, PRE), zul.; *12125* (NU), subi.; *13211* (NU, PRE), glom.; *13319* (NU), zul.; *13809* (NU, PRE), cogn.; *13878* (NU, PRE), zul.; *13976* (NU, PRE), cogn.; *14221#$* (NU, PRE), spic.; *14457* (NU, PRE), zul.; *14458* (NU, PRE), spic.; *14497* (NU, PRE), spic.; *14546* (NU), zul.; *14641* (NU, PRE), acuti.; *14735* (NU, PRE), glom.; *14809* (NU), zul.; *15405* (NU), spic.; *15408* (NU), zul.; *15420* (NU, PRE), zul.; *15657* (NU), cogn.; *15830* (NU), cogn.; *16271* (NU), zul.; *16320* (NU), moss.; *16364* (NU), glom.; *16380* (NU), cogn.; *16512* (NU), subi.; *16652* (NU), subi.; *17001* (NU, PRE), cogn.; *17036* (NU, PRE), aust.; *17885* (NU), aust.; *18517* (NU, PRE), aust.; *18518* (PRE), glom.; *18688* (PRE, S), subi.; *18689* (NU), cogn.; *18987* (PRE), eckl.; *19026* (NU, PRE, S), glom.

Hilliard, Burtt & Manning *17240* (" PRE, S), glom.

Hilner, O. *73* (GRA), clav.; *131* (GRA, PRE), clav.; *136* (GRA, PRE), glom.; *172* (GRA, PRE), clav.; *396* (GRA), zul.; *451* (GRA, PRE), glom.; *521* (GRA, PRE), cogn.

Hoener, F.K. *1464* (PRE), cogn.; *1579* (NU), acuti.; *1609* (NU, PRE), acuti.; *1627* (K, MO, NU, PRE), acuti.; *1910* (PRE), glom.

Holub, E. *1558* (K), acuti.; *1559* (K), acuti.

Horn, D.H.S. *s.n. sub SKF 2382* (PRE), aeth.

Howlett & Howlett *14* (PRE), zul.

Hugo, L. *2059* (PRE, STE), aeth.

Huntley, K.D. *383* (BM, NU), aust.

Hutchinson, J. *1309* (BOL, PRE), aeth.

Hutton, H. *s.n.* coll. Katberg (TCD), aust.; *112* (GRA), spic.; *144* (BM, PRE), aust.; *145* (BM, GRA), acuti.; *147* (GRA), zul.; *357* (GRA), aust.

Jacobsen, N.H.G. *842* (PRE), spic.; *1796* (PRE), moss.; *2361* (PRE), spic.

Jacot Guillarmod, A. *128* (PRE), cogn.; *696* (PRE), glom.; *1201* (PRE), glom.; *1733* (PRE), glom.; *2055* (PRE), mono.; *3795* (PRE), acuti.; *5701* (PRE), acuti.; *7461* (GRA, PRE), glom.; *7604* (GRA), aeth.

Jacot Guillarmod, Getliffe & Mzamane *194* (K), cogn.; *250* (K), glom.; *273* (PRE), cogn.; *273* (GRA, Z), subi.

Jacottet & Jacottet *422-B515* (Z), acuti.

Johnson, S.M. *1150* (GRA, PRE), zul.

Jordaan, M. *220* (NH), spic.

Jordaan, P.G. *s.n. anno* 1.1933 (STE), clav.

Joubert, P. *s.n. sub PRE 39181* (PRE), acuti.

Junod, H.A. *2249* (PRE, Z), spic.; *4107* (PRE), zul.; *4114* (PRE), spic.; *5498* (PRE), spic.

Kerfoot, O. *8245* (J), moss.

Kerfoot, Gooyer & Eastman *247* (J), zul.; *248* (J), zul.; *250* (J), spic.; *251* (J), spic.; *262* (J), moss.

Killick, D.J.B. *303* (NU), spic.; *985* (PRE), spic.; *991* (NH, NU, PRE), cogn.; *1847* (BM, CPF, K, NU, PRE), mono.; *2354* (PRE), glom.; *4092* (K, PRE), mono.; *4150* (PRE, Z), glom.; *4299* (PRE), subi.; *4336* (PRE), glom.; *4448* (PRE), glom.; *4593*+#$* (PRE, ROML), mono.

Kinges, H.G. *1635* (PRE), glom.

Kluge, J.P. *1520* (PRE), zul.; *1616* (PRE), spic.; *2011* (PRE), aust.; *2474* (NBG, PRE), moss.

Krige, J.D. *222* (PRE), spic.

Kuntze, O. *s.n. anno* 2.03.1894 (K), moss.

Lambinon & Reekmans *82/263* (MO, PRE), spic.

Leendertz, R. *s.n. sub TRV 6022* (PRE), cogn.; *s.n. sub TRV 6038* (PRE), glom.; *s.n. sub TRV 8068* (PRE), cogn.

Lennox, F. *s.n. anno* 5.01.1964 (NU), zul.

Levyns, M.R. *235* (BOL), clav.; *3454* (BOL), clav.; *4466* (BOL), clav.; *5954* (B, BOL), eckl.; *6346* (BOL), clav.; *6347*

(BOL), clav.; *7120#$* (B, BOL), cogn.; *7936* (BOL), acuti.; *8223* (BOL), aeth.; *8390* (BOL), clav.; *8681* (BOL), clav.; *9513* (BOL), eckl.; *10053* (BOL), clav.

Liebenberg, L.C.C. *3115* (PRE), spic.; *3324* (PRE), spic.; *7008* (PRE), cogn.; *7319* (K, PRE), acuti.; *7557* (PRE), cogn.; *7847* (PRE), aeth.

Loubser, J.W. *3186* (STE), clav.; *3251* (MO), clav.

Louw, W.J. *1217* (PRE), glom.; *1522* (PRE), acuti.; *1874* (PRE), spic.; *2144* (STE), spic.

Lowrey, T.K. *s.n. sub PRE 60417#$* (PRE), moss.

Loxton, A.E. *34* (NU), spic.; *38* (NU, PRE), moss.

Lubke, R.A. *174* (PRE, S), glom.; *279* (B, PRE), cogn.; *294* (NU, PRE), glom.; *298* (NH, PRE), cogn.; *299* (PRE), subi.

Lynes, H. *1726* (BM), acuti.

MacCallum, I. *625&626* (GRA, PRE), cogn.; *137/128* (PRE), spic.

MacMurtry, D. *2688* (PRE), acuti.

MacOwan, P. *s.n. sub SAM 22656* (SAM), glom.; *115* (BOL, GRA, TCD), glom.; *1013* (BOL, GRA, S, Z), clav.; *1349* (BOL), clav.; *1446* (S), clav.; *1608* (BOL, S, Z), moss.; *1963* (K, SAM), acuti.; *3392* (BOL, GRA, PRE, STE, Z), clav.

Maguire, B. *2729A* (J), spic.

Marloth, R.H. *s.n. sub PRE 39187* (PRE), aeth.; *3488* (PRE), aeth.; *3900* (PRE), aeth.; *9696* (PRE), div.

Martin, A.R.H. *4232* (K), cogn.; *4500* (K), aeth.; *4548* (K), eckl.

Matthews, G.C. *872A* (NBG), subi.

Medley Wood, J. *s.n. anno* 4.02.1898 (NU), spic; *s.n. sub HNAA 1690* (BM), aust.; *s.n. sub PRE 39153* (PRE), spic.; *1190* (BM, BOL, NH, SAM), spic.; *4038* (BOL, GRA), aust.; *4981* (BM, PRE), aust.; *6157* (BM, BOL, PRE), aust.

Meebold, A. *14386* (B), cogn.; *14387* (B), acuti.; *14388* (B), spic.; *14391* (B), acuti.

Meeuse, A.D.J. *9924* (PRE), spic.; *9939* (PRE), spic.

MerxmÜller, H. *553* (PRE), zul.

Michell, M.R. *235* (PRE), clav.

Middlemost, A.J. *1873* (NBG), aeth.

Miller, O.B. *346* (PRE), acuti.

Moffet, R.O. *439* (PRE, STE), glom.

Mogg, A.O.D. *s.n. sub PRE 39284* (PRE), zul.; *879* (PRE), aust.; *1364* (PRE), aust.; *3216* (PRE), acuti.; *6219* (GRA, PRE), zul.; *6427* (GRA), aust.; *6619* (GRA), zul.; *6737* (GRA), zul.; *13950* (PRE), zul.; *15902* (PRE), cogn.; *16792* (BM, PRE), glom.; *17497* (GRA, PRE), glom.; *28176* (J), spic.

Mohle, G.L. *213* (PRE), aust.

Moll, E.J. *1179* (NH, NU, PRE), aust.; *1381* (NU, PRE), acuti.; *1397* (PRE), zul.; *1788* (MO, NU, PRE), spic.; *2436* (NH, NU), acuti.; *2444* (NU), aust; *2887* (PRE), moss.; *3448* (PRE), spic.

Moll & Mauve *2436* (PRE), acuti.; *2444* (PRE), aust.

Morwe, F.O. *72* (PRE), cogn.

Moss, C.E. *2322* (J, K), acuti.; *2325* (J), acuti.; *2755* (J), aust.; *5235* (J), cogn.; *5514* (J), aeth.; *5525* (J), clav.; *7586* (J), clav.; *7603* (J, K), aeth.; *7626* (BM, J, K), eckl.; *12047* (J), glom.; *13949* (BM, J), glom.; *15576* (K, PRE), spic.; *15577* (K, NU, PRE), moss.; *15816* (K), aust.; *17294* (J, K), glom.; *17810* (J), aust.

Moss, C.E. & Rogers *253* (S), spic.

Moss, M. *s.n. sub C.E. Moss 17460* (BM, J), aeth.; *s.n. sub C.E. Moss 17461* (J), aeth.; *s.n. sub C.E. Moss 17498* (BM, J), spic.

Muir, J. *3029* (GRA, PRE), glom.; *3364* (GRA, PRE), glom.

Muller, D.B. *163* (PRE), glom.; *1962* (PRE), glom.

Muller, P.J. *2098* (PRE), spic.; *2387* (PRE), spic.

Muller & Scheepers *274* (PRE), spic.

Mund, J.L.L. *s.n.* (S), aeth.; *s.n.* (S), eckl.; *s.n.* (S), glom.

Murray, D.P. *s.n. sub PRE 39127* (PRE), glom.; *778* (PRE), acuti.

Musil, C.F. *541* (NH, PRE), aust.

Nel, J.P. *345* (NBG, PRE), spic.
Nelson, W. *72* (K), cogn.
Nicholas & Briggs *1963* (NH, PRE), spic.
Nicholson, H.B. *1098* (PRE), acuti.; *1105* (PRE), zul.
Norval, C.M. *22* (PRE), aust.

Obermeyer, A.A. *s.n. sub TRV 28271* (PRE), spic. *s.n. sub TRV 30902* (PRE), spic.; *225* (PRE), spic.; *914* (PRE), zul.; *1116* (PRE), aust.
O'Callaghan, M. *1534* (STE), eckl.
O'Callaghan, Van Wyk & Fellingham *137* (PRE, STE), glom.
Oldevig-Roberts, M. *107* (S), aeth.

Pappe, C.W.L. *s.n. anno* 9.1832 (BOL), clav.; *s.n. anno* 1.1862 (BM), eckl.; *s.n. anno* 1862 (BM), glom.; *s.n. sub SAM 22765* (SAM), glom.
Parker, R.N. *4355* (BOL, MO, NBG), clav.
Paterson, F.M. *2362* (BOL), clav.
Paterson, T.V. *902* (GRA), clav.
Pearson, A. *s.n. sub Harvey 346* (BM), clav.
Pearson, H.H.W. *6789*$ (BOL, K), div.
Pegler, A. *151* *anno* 19.10.1904 (BOL), clav.; *anno* 19.10.1907 (BM), clav.; *anno* 22.10.1910 (PRE), cogn.; *1150* *anno* 22.11.1904 (BOL), aust.; *anno* 22.10.1910 (BM, K), aust.; *2368* (STE), aust.
Peter, A. *50553* (B), aeth.
Phillips, E.P. *30* (GRA), aeth.
Phillips, J. *5* (GRA), eckl.
Phillipson, P.B. *227* (MO, PRE), glom.; *623* (MO, PRE), glom.; *690* (PRE), glom.; *701* (K, MO, PRE), cogn.; *704* (MO), subi.; *711* (MO), subi.; *788* (PRE), glom.; *940* (MO), moss.; *1170* (MO, PRE), zul.
Physick, R. *82* (NU), zui.
Pillans, N.S. *3888* (BOL), eckl.; *10880* (MO), clav.
Pott, R. *5227* (PRE), aust.; *5571*$ (PRE), zul.
Potts, G. *s.n. sub BLFU 1094* (BOL, NU), glom.

Prior, R.C. (= Alexander) *s.n. anno* 2.09.1846 (K), clav.; *s.n. anno* 26.09.1846 (K), clav.; *s.n. anno* 0.1847, Uitenhage (BM), aeth.; *s.n. anno* 14.09.1847 (K), aeth.; *s.n. anno* 12.1847 (K, PRE), glom.

Rattray, G. *286* (GRA), zul.; *839* (GRA), clav.

Rehmann, A. *68* (BM), aeth.; *1793* (Z), eckl.; *4039* (BM), aust.; *5627* (K, Z), zul.; *5628* (Z), spic.

Reid, C. *463* (PRE), cogn.; *825* (J, PRE), aust.; *849* (J, PRE), spic.; *983* (J, PRE), moss.; *1018* (J, PRE), spic. x zul.; *1022* (PRE), cogn.; *1113* (J, PRE), spic.; *1115**+* (J, PRE), burch.; *1121#$* (J, PRE), burch.; *1127* (J, PRE), aeth.; *1128**+#$* (J, PRE), eckl.; *1129**+#$* (J, PRE), clav.; *1130* (J, PRE), ?aeth.; *1130A* (J, PRE), ?clav.; *1131* (J, PRE), eckl.; *1132* (J, PRE), aeth.; *1137**+#$* (J, PRE), glom.; *1144**+* (J, PRE), aeth.; *1146* (J, PRE), eckl.; *1147* (J, PRE), clav.; *1148* (J, PRE), glom.; *1149* (J, PRE), aeth.; *1153* (J, PRE), glom.; *1154* (J, PRE), glom.; *1184* (J, PRE), glom.; *1186**+#$* (J, PRE), spic. x zul.; *1187* (J, PRE), cogn.; *1188**$* (J, PRE), spic.; *1189* (J, PRE), zul.; *1191+* (J, PRE), spic.; *1192**+#$* (J, PRE), zul.; *1198* (J, PRE), moss.; *1202* (J, PRE), glom.; *1203* (J, PRE), zul.; *1204**+* (J, PRE), moss.; *1205* (J, PRE), cogn.; *1210**+#$* (J, PRE), cogn.; *1212**+#$* (J, PRE), subi.; *1337**+$* (J, PRE), sp. nov.; *1367**+#$* (J, PRE), acuti.; *1368**+* (J, PRE), aust.; *1370**+#$* (J, PRE), sylv.

Rennie, M.A. *1145* (NU), acuti.; *1347* (NU), acuti.

Repton, J.F. *1102* (PRE), acuti.

Retief, Reyneke, Coetzer & Reid *1135* (PRE), aust.

Roberts, B.R. *5310* (PRE), cogn.; *5311* (PRE), cogn.

Rodin, R.J. *3923* (PRE), cogn.

Rogers, F.A. *s.n. sub Moss 3184* (Z), clav.; *4433* (BOL), clav.; *14933* (BM), aust.; *18683* (Z), spic.; *18837* (BM, Z), spic.; *18880* (J, Z), spic.; *22321* (Z), spic.; *23578* (PRE), spic.; *23743* (Z), spic.; *30202* (S), moss.; *30212* (Z), moss.; (S), moss. + aust.

Rose-Innes, R. *232* (J, PRE), cogn.

Rothe, L. *216* (B), clav.
Roux, J.P. *1321* (NBG, PRE), subi.
Rudatis, A.G.H. *s.n. sub STEU 2142* (STE), acuti.
Rycroft, H.B. *52* (NH, NU), zul..

Salisbury, F.S.S. *s.n. anno* 11.1915 (GRA), clav.
Salter, T.M. *9680* (BM), clav.; *9693* (BM, BOL), aeth.
Sanderson, J. *s.n.* (TCD), zul.
Scheepers, J.C. *61* (PRE), spic.; *763* (B, PRE), cogn.
Schelpe, E.A.C.L.E. *205* (NU), moss.; *247* (NU), spic.; *871* (NH, NU), acuti.; *884* (NU), aust.; *1495* (NU), moss.
Schlechter, R. *s.n. sub TRV 5498* (PRE), spic.; *3541* (Z), acuti.; *4759* (BOL, GRA, Z), spic.; *6286* (BM, GRA, NBG, PRE), glom.; *6341* (GRA, Z), zul.; *9665* (BM, MO, PRE, S, Z), clav.; *10070* (B, LM, BOL, PRE), glom.
Schmitz, M. *4162A* (PRE), glom.; *6848* (PRE), glom.; *6867* (PRE), subi.; *7004* (PRE), glom.; *7126* (PRE), cogn.; *7910* (PRE), acuti.; *7911* (PRE), acuti.; *8466* (PRE), glom.
Schoenland, S. *3380* (GRA, PRE), clav.; *3441* (GRA, PRE), aeth.; *3578* (GRA), aeth.; *3584* (GRA), aeth.; *4114* (GRA), zul.; *4123A* (GRA), zul.
Schrire, B. *771* (NH), zul., *1699* (NH), zul.
Schweickerdt, H.G. *1816* (B), spic.
Scott Elliot, G.F. *355* (BM), moss.
Sidey, J.L. *3582* (PRE), zul.
Sim, T.R. *s.n. sub PRE 39171* (PRE), cogn.; *928* (NU), clav.; *929* (NU), moss.; *2832* (GRA), glom.
Simon, P.H. *s.n. sub NH 29857* (NH), eckl.
Small, W. *8* (PRE), acuti.
Smart, B. *s.n. sub Rogers 26750* (Z), aeth.; *s.n. sub Rogers 26751* (PRE), aeth.
Smith, C.A. *5173* (PRE), glom.
Smith, P.A. *1066* (MO, PRE), cogn.; *1531* (MO, PRE), cogn.
Smook, L. *1057* (MO, PRE), cogn.; *1075* (PRE), mono.; *1262* (PRE), spic.; *5908* (PRE), glom.; *6511* (PRE), glom.; *6654* (PRE), glom.

Snijman, D. *389* (NBG, PRE), clav.
Sparrman, A. *s.n.* (S), aeth.
Stalmans, M. *356* (PRE), spic.
Stent, S.M. *s.n. sub PRE 5613* (PRE), cogn.
Steyn, M. *889* (NBG), spic.
Stokoe, T.P. *8101* (BOL, PRE), clav.
Story, R. *3687* (PRE), moss.
Sutton, J.D. *724* (PRE), glom.
Strey, R.G. *2855* (PRE), spic.; *3430* (BM), cogn.; *3430* (PRE), aust.; *6122* (PRE), zul.; *6265* (NH, PRE), zul.; *6911* (PRE), zul.; *9179* (PRE), moss.; *9332* (NH, PRE), zul.; *10552* (BUDW, NH, NU, PRE), acuti.
Symons, R.E. *18* (PRE), acuti.

Taylor, H.C. *1047* (NBG), aeth.; *5225* (PRE, STE), clav.; *6988* (BOL, PRE), clav.; *7998A* (PRE, STE), aeth.; *8305* (PRE, STE), aeth.; *10403* (PRE, STE), aeth.
Taylor, L.E. *3566* (NBG), clav.; *5410* (NBG), zul.; *5804* (NBG), clav.
Taylor, P.B. *41* (NU, PRE), glom.; *77* (NU, PRE), acuti.
Taylor, R.H. *422* (NH), cogn.
Theron, G.C. *653* (PRE), aeth.; *929* (B, BM, PRE), glom.
Theron, G.K. *1650* (PRE), spic.; *1931* (PRE), cogn.; *2403* (PRE), cogn.
Thode, J. *s.n. sub STEU 3571* (STE), aust.
Thorncroft, G.T. *s.n. sub PRE 15183* (PRE), aust.; *s.n. sub PRE 15184* (PRE), moss.
Thunberg, C.P. *s.n.* (S), clav.; *s.n.* (microfiche No. 21788, PRE), clav.; *s.n.* (microf. No. 21837, PRE) glom.; *s.n.* (microf. No. 21950, PRE), clav.; *s.n.* (microf. No. 21960, PRE), aeth.
Trauseld, W.R. *838* (PRE), aust.
Troughton, S.C. *863* (GRA), cogn.
Turner, B.J. *439* (PRE), glom.; *468* (PRE), glom.
Tyson, W. *242* (BOL), acuti.; *580* (GRA), acuti.; *1837* (BOL, PRE, SAM), acuti.

Ubbink, B. *698* (PRE), acuti.; *206* (PRE), glom.

Van Daalen, J.C. *178* (PRE), aeth.
Van der Merwe, C. *2377* (PRE), acuti.
Van der Merwe, P. *1386* (PRE, STE), aeth.
Van der Schiff, H.P. *1978* (PRE), spic.; *4591* (PRE), spic.
Van Jaarsveld, E.J. *216* (PRE), spic.
Van Rensburg, H. *s.n. sub J24652* (J), aust.; *s.n. sub J37011* (J), spic.
Van Vuuren, D. *103* (PRE), spic.; *294* (PRE), aust.; *424* (PRE), spic.
Van Wyk, A.E. *3664* (PRE), spic.; *6988* (J, PRE), zul.; *6990* (PRE), moss.; *7541* (NH, PRE), moss.
Van Wyk, S. *229* (PRE), cogn.; *458* (PRE), glom.
Venter, S. *1057* (PRE), spic.; *9231* (PRE), spic.
Verdoorn, I.C. *477* (PRE), acuti.
Verreaux, P.J. *s.n. anno* 1838 (K), glom.
Viljoen, A.J. *21* (PRE), glom.
Von Breitenbach, F. *70* (PRE), aeth.
Von Maltitz, L. *s.n. sub J27279* (J, PRE), acuti.
Vorster, H.E. *170* (PRE), glom.

Wager, H.A. *s.n. sub PRE 39183* (PRE), cogn.; *s.n. sub TRV 23137* (PRE), cogn.
Wager, V.A. *s.n. anno* 20.12.1962 (NH), clav.
Wahlberg, J.A. *s.n. anno* ?1839 (S), acuti.
Walgate, M. *s.n. sub PRE 39197* (PRE), acuti.
Wall, E. *2412* (S), aeth.
Wallich, N. *s.n. anno* 25.11.1842 (BM, TCD), clav.; *50* (K, TCD), clav.
Ward, C.J. *637* (NU), zul.; *638* (NU, PRE), aust.; *716* (BUDW, NU), cogn.; *1221* (BUDW, NU), cogn.; *5044* (BUDW, NH, PRE), zul.; *5080* (BUDW, PRE), cogn.; *6965* (BUDW, NU, PRE), acuti.; *7198* (BUDW, NH, PRE), zul.; *8094* (BUDW, NU, PRE), cogn.; *8739* (NU, PRE), spic.; *9285* (BUDW, PRE), eckl.; *10050*

(BUDW), cogn.
Wells, M.J. *3375* (GRA), aeth.
Werdermann & Oberdieck *1543* (B, PRE), subi.; *1903* (B, K, PRE), spic.
Werger, M.J.A. *E&W114* (PRE), glom.
West, O. *102* (PRE), zul.; *161* (PRE), spic.; *826* (BM, PRE), aust.; *827* (PRE), acuti.
Westfall, R.H. *758* (PRE), spic.; *952* (PRE), spic.; *1019* (PRE), spic.
Whellan, J.A. *1478* (PRE), clav.; *1483* (K, PRE), eckl.; *1502* (PRE), glom.; *1734* (PRE), clav.; *1750* (PRE), eckl.
White, G. *127* (GRA), clav.
Wiese, H.E. *s.n. sub BOL 31656* (BOL), aeth.
Willan, K. *s.n. anno* 2.1978 (NU), zul.
Williams, I. *2846* (NBG, PRE), clav.; *3373* (PRE), aeth.;
Williams, S.L. *753* (MO), clav.
Williamson, A.T. *115* (GRA), aeth.
Williamson, C. *390* (K), cogn.; *407* (K), glom.
Wilman, M. *s.n. sub BOL 24203* (BOL, PRE), aeth.; *s.n. sub KMG 2983* (BOL), glom.
Wilms, F. *1592* (BM), spic.; *2345* (BM), aust.
Wirminghaus, J.O. *186* (GRA), clav.
Wolley-Dod, A.H. *1362* (BOL), clav.; *1650* (BM), clav.; *1954* (PRE), clav.; *2086* (BM, BOL), eckl.; *2115* (BM), aeth.; *2195* (BOL), clav.; *2748* (BM), glom.; *2883* (PRE), clav.; *3299* (BM, PRE), clav.; *3467* (BOL), clav.; *3471* (BM, BOL), eckl.; *3492* (BOL, K), glom.; *3518* (PRE), clav.; *3535* (BOL, PRE), eckl.
Worsdell, W.C. *s.n. anno* 11.1912 (K), clav.
Wright, C. *s.n. anno* 1853-56 (K), clav.
Wright, F.B. *717* (NU), cogn.
Wyley, A. *s.n.* (TCD), aeth.

Young, E.M. *s.n. sub Moss 15336* (BM, J), moss.
Youthed. *141* (PRE), spic.

Zeyher, C.L.D. *41* (PRE), aeth.; *4443* (NBG, [illegible]), aeth.; *4443*

(S), clav.; 4444 (S), clav.; 4957 (PRE, S), clav.; 4979 (?), eckl.

Zietsman, P.C. 1994 (PRE), div.

Sine Leg. 15 (NU), spic.; 598 (S), clav.; 684 (BM), aeth.; 654 (TCD), aeth.

1.2. LIST OF SPECIES COLLECTED IN EACH DEGREE SQUARE IN SOUTHERN AFRICA (See Map 1)

1822: (1) cogn.
1823: (1) cogn.
1824: (1) cogn.
1922: (1) cogn.
1923: (1) cogn.
2017: (1) cogn.
2229: (3) aust., spic., zul.
2230: (2) spic., zul.
2328: (1) spic.
2329: (5) aust., cogn., moss., spic., zul.
2330: (4) aust., cogn., spic., zul.
2427: (1) spic.
2428: (1) cogn.
2429: (1) spic.
2430: (4) aust., moss., spic., zul.
2431: (1) spic.
2525: (1) acuti.
2526: (1) spic.
2527: (4) acuti., aust., cogn., spic.
2528: (4) acuti., aust., cogn., glom.
2529: (2) cogn., spic.
2530: (3) aust., cogn., spic.
2531: (4) aust., moss., spic., zul.
2626: (1) burch.
2627: (4) acuti., aust., cogn., glom.
2628: (4) acuti., aust., cogn., glom.
2629: (2) aust., glom.
2630: (3) aust., cogn., spic.
2631: (4) aust., cogn., spic., zul.
2723: (1) burch.
2725: (2) div., glom.
2727: (1) glom.
2729: (2) spic., zul.

2730: (5) acuti., aust., cogn., glom., spic. (Recent addition: C. mossii, not indicated on Map 1.)
2731: (3) moss., spic., zul.
2732: (1) cogn.
2823: (1) burch.
2824: (1) glom.
2826: (1) glom.
2827: (1) glom.
2828: (9) acuti., aust., cogn., glom., mono., moss., spic., subi., zul.
2829: (6) acuti., aust., mono., moss., spic., zul.
2831: (2) spic., zul.
2832: (1) cogn.
2917: (1) div.
2925: (1) glom.
2926: (1) glom.
2927: (3) acuti., glom., subi.
2928: (3) cogn., glom., subi.
2929: (10) acuti., aust., cogn., glom., mono., moss., spic., subi., sylv., zul.
2930: (7) acuti., aust., cogn., moss, spic., subi., zul.
2931: (1) zul.
3018: (1) div.
3026: (1) glom.
3027: (4) acuti., cogn., glom., subi.
3028: (4) acuti., cogn., glom., subi.
3029: (6) acuti., aust., cogn., glom., moss., zul.
3030: (2) acuti., zul.
3119: (1) sp. nov.
3120: (1) div.
3123: (2) acuti., glom.
3124: (1) glom.
3125: (1) div.
3126: (1) glom.
3127: (2) glom., zul.
3128: (2) moss., zul.

3129: (2) clav., cogn.
3130: (1) zul.
3218: (1) clav.
3220: (1) div.
3223: (1) acuti.
3225: (3) acuti., glom., moss.
3226: (7) acuti., aust., cogn., glom., moss., sylv., zul.
3227: (7) acuti., aust., clav., cogn., glom., moss., zul.
3228: (4) aust., clav., glom., zul.
3318: (5) aeth., clav., div., eckl., glom.
3319: (1) glom.
3320: (2) acuti., aeth.
3321: (1) aeth.
3322: (4) aeth., clav., eckl., glom.
3323: (1) aeth.
3324: (1) clav.
3325: (4) aeth., clav., eckl. glom.
3326: (4) clav., eckl. glom., zul.
3327: (3) clav., eckl., glom.
3418: (4) aeth., clav., cogn., eckl.
3419: (3) aeth., clav., eckl.
3420: (3) aeth., clav., glom.
3421: (3) clav., eckl. glom.
3422: (4) acuti., aeth., eckl., glom.
3423: (5) aeth., cogn., clav., eckl. glom.
3424: (2) aeth., clav.
3425: (1) clav.

2. "DELTA" DATA

2.1. CHARACTER LIST

(See Jermy & Tutin, 1968; Pankhurst & Chater, 1988.)

NOTE: Numerical characters were measured in a central position, on a mature inflorescence of a non-depauperate plant.

#1. Plants <relative height>/
1. very tall, 1.4-1.7 m or more/
2. of medium height, 0.1-1.4 m tall <implicit>/
3. very short, less than 60 mm tall/

#2. Plants <height including inflorescence>/
mm tall/

#3. Plants <habit>/
1. caespitose (i.e. with very short rhizomes)/
2. long-rhizomatous/

#4. Rhizomes <diameter>/
mm in diameter/

#5. Shoot scales and basal leaves <whether with red colouration>/
1. developing extensive anthocyanin colouration/
2. not developing extensive anthocyanin colouration (or sometimes small patches)/

#6. Leaves <whether glaucous due to epicuticular wax>/
1. glaucous/
2. not glaucous/

#7. Leaves <colour>/
1. yellow-green/
2. mid-green/

3. dark green/

#8. Leaves <whether with conspicuous transverse venation>/
1. with conspicuous transverse venation, especially in dry material/
2. usually without conspicuous transverse venation/

#9. Basal leaf sheaths <shape>/
1. folded/
2. tubular/

#10. Old basal leaf sheaths <whether spongy>/
1. becoming spongy/
2. not becoming spongy/

#11. Old basal leaf sheaths <mode of splitting of inner face>/
1. inner face splitting into connected fibrillae/
2. inner face tearing into membranous strips/
3. inner face simply splitting/

#12. Largest basal leaf blade <length>/
mm long/

#13. Largest basal leaf blade <width>/
mm wide/

#14. <Basal leaf> blade <cross-section shape>/
1. flat in cross-section/
2. channelled in cross-section/
3. keeled in cross-section/
4. plicate in cross-section/

#15. <Basal leaf> blade <adaxial surface indumentum>/
1. adaxial surface scabrid <in vicinity of veins>/
2. adaxial surface papillate/

3. adaxial surface glabrous/

#16. <Basal leaf> blade <abaxial surface indumentum>/
1. abaxial surface papillate/
2. abaxial surface glabrous/
3. abaxial surface scabrid/

#17. <Basal leaf> blade <margin indumentum>
1. margins proximally papillate, distally scabrid/
2. margins proximally glabrous, distally minutely scabrid/
3. margins glabrous/

#18. Lowest culm leaf sheath mouth <shape>/
1. truncate/
2. concave/
3. convex/

#19. Lowest culm leaf sheath mouth <texture>/
1. membranous/
2. herbaceous/

#20. <Lowest culm leaf> ligule <colour>/
1. whitish/
2. stramineous/
3. with ferruginous spots/
4. fuscous/

#21. <Lowest culm leaf> ligule <apex shape>/
1. apex acute/
2. apex obtuse/
3. apex emarginate/

#22. <Lowest culm leaf> ligule <height>/
mm high/

#23. <Lowest culm leaf> ligule <texture>/
1. membranous/
2. herbaceous/
3. cartilaginous/

#24. Culms <cross-section shape>/
1. terete in cross-section/
2. triangular in cross-section/
3. sharply triangular in cross-section/

#25. Culms <diameter>/
mm in diameter/

#26. Culms <culms and internodes description>/
1. uppermost internode very long, the lower all more -or-less basal, very short, concealed by leaf sheaths/
2. internodes all of about equal length, exposed/
3. very short, concealed by leaf sheaths/

#27. <Culms><number of> nodes exposed/

#28. Inflorescence <description>/
1. unispicate/
2. glomerate-spicate to glomerate-paniculate/
3. paniculate/
4. comprising a raceme of spikes/

#29. Inflorescence <diameter>/
mm in diameter/

#30. Inflorescence <length>/
mm long/

#31. Basal inflorescence bract <description>/
1. glume-like/

2. bristle-like/
3. leaf-like/

#32. Basal inflorescence bract <whether reflexed at maturity>/
1. sharply reflexed near base of blade at maturity/
2. not reflexed near base of blade at maturity/

#33. <Basal inflorescence bract> sheath <length>/
mm long/

34. <Basal inflorescence bract> blade <length>/
mm long/

#35. Opposing bracteole <description>/
1. tubular, membranous, usually concealed by bract sheath/
2. not applicable/

#36. Primary inflorescence units <number> <applies to the southern African glomerate-spicate and paniculate taxa, which have bisexual branches>/

#37. Primary inflorescence units <number from each node>/
1. 1 from each node/
2. usually 1, or sometimes 2 branches from basal nodes/

#38. Primary inflorescence units <applies to glomerate -spicate and paniculate taxa> <orientation>/
1. erect/
2. suberect/
3. spreading/

#39. Spikes <number>/

#40. Spikes <orientation>/
1. erect or suberect/
2. spreading/
3. pendulous/

#41. Spikes <whether clustered>/
1. clustered <basal spike sometimes remote>/
2. not clustered, excepting frequently apical 2-3 (usually staminate) spikes/

#42. The largest <primary inflorescence unit> <i.e. branch or spike> <length>/
mm long/

#43. The largest <primary inflorescence unit> <width>/
mm wide/

#44. The longest peduncle exserted by <length>/
mm/

#45. Peduncles <indumentum>/
1. hairy/
2. scabrid on angles/
3. glabrous/

#46. Bracts subtending higher order branches <of paniculate inflorescences>/
1. with a long setaceous cusp/
2. without a long setaceous cusp <implicit>/

#47. Bracteoles <subtending higher order branches> <of paniculate inflorescences> <description>/
1. inflated/
2. not inflated/

#48. Apical spikes <whether staminate>/

1. usually staminate/
2. frequently androgynous/
3. occasionally androgynecandrous/
4. occasionally gynecandrous/
5. occasionally with staminate and pistillate spikelets mixed/

#49. Staminate spikes <number>/

#50. Pistillate spikes <number>/

#51. Bisexual spikes <number>/

#52. Small accessory spikes <whether present>/
1. occasionally present at base of basal pistillate spikes/
2. not present/

#53. Bracts of staminate spikelets <whether dimorphic>/
1. extremely dimorphic/
2. not or only slightly dimorphic/

#54. Anthers <length>/
mm long/

#55. Bracts of pistillate spikelets <length>/
mm long/

#56. Bracts of pistillate spikelets <width>/
mm wide/

#57. Bracts of pistillate spikelets (including awn) <length relative to perigynium>/
1. longer than perigynium/
2. the same length as the perigynium/
3. shorter than perigynium/

#58. Bracts of pistillate spikelets <width relative to perigynium>/
1. wider than perigynium/
2. the same width as the perigynium/
3. narrower than perigynium/

#59. Bracts of pistillate spikelets <body, disregard carina and awn> <colour>/
1. hyaline with ferruginous striae/
2. green/
3. yellow/
4. stramineous/
5. stramineous with light to heavy ferruginous striae and hyaline margins/
6. golden-brown/
7. golden-brown, with wide hyaline margins/
8. ferruginous/

#60. Bracts of pistillate spikelets <body indumentum>/
1. scabrid (mainly on distal half)/
2. glabrous, but ciliate distally on margin/
3. glabrous/

#61. Bracts of pistillate spikelets <body, disregard carina and awn> <shape>/
1. lanceolate/
2. ovate-lanceolate/
3. ovate/
4. broadly ovate/
5. obovate/

#62. Bracts of pistillate spikelets <carina description>/
1. carina broad, 3-nerved/
2. carina narrow, 1-nerved/

#63. Bracts of pistillate spikelets <apex shape>/

1. apex acuminate/
2. apex acute/
3. apex cuspidate/
4. apex obtuse/
5. apex emarginate/

#64. Bracts of pistillate spikelets <whether awned>/
1. awned/
2. muticous/
3. carina terminating sub-apically/

#65. <Bracts of pistillate spikelets> awn <length>/
mm long/

#66. <Bracts of pistillate spikelets> awn margin <whether scabrid>/
1. scabrid/
2. glabrous/

#67. Mature perigynium <whether stipitate>/
1. stipitate/
2. not stipitate/

#68. Mature perigynium <whether bearing a callus> <examine detached fruit>/
1. with a conspicuous basal callus/
2. without a basal callus/

#69. Mature perigynium <whether rostrate>/
1. rostrate/
2. erostrate/

#70. Mature perigynium <how oriented relative to axis>/
1. suberect/
2. spreading/
3. reflexed/

#71. Mature perigynium <whether inflated>/
1. much inflated/
2. slightly inflated/
3. not inflated/

#72. Mature perigynium <shape in cross-section>/
1. narrowly elliptic in cross-section/
2. elliptic or rotund in cross-section/
3. elliptic with flat base in cross-section/
4. shallowly triangular in cross-section/
5 triangular in cross-section/
6. triangular with rounded base in cross-section/
7. triangular with winged base in cross-section/

#73. Mature perigynium <colour>/
1. hyaline/
2. white/
3. green/
4. greyish green/
5. bright yellow/
6. stramineous/
7. golden brown/
8. mid-brown/
9. ferruginous/
10. ferruginous spotted/
11. rostrum whitish/
12. rostrum stramineous/

#74. Mature perigynium <whether base corky>/
1. with a layer of corky material/
2. without a layer of corky material/

#75. Mature perigynium <length>/
mm long/

#76. Mature perigynium <width>/
mm wide/

#77. Mature perigynium <texture>/
1. membranous/
2. herbaceous/
3. cartilaginous/

#78. Mature perigynium <nervation>/
1. conspicuously many- (more than 10-) nerved/
2. with four to six conspicuous curved nerves on abaxial surface/
3. with two conspicuous curved submarginal nerves on abaxial surface/
4. few- (two- or three-) or inconspicuously nerved/

#79. Mature perigynium <excluding rostrum> <indumentum>/
1. glabrous/
2. mainly glabrous, with a few short conical hairs near distal end/
3. papillate, with hollow papillae/
4. papillate, with solid papillae/
5. scabrid on margins/
6. scabrid in distal half/

#80. Rostrum <shape>/
1. abrupt/
2. tapered/

#81. Rostrum <length>/
mm long/

#82. Rostrum <whether bent upwards>/
1. straight/
2. sharply bent upwards/

#83. Rostrum <margin> <whether winged>/
1. margin winged/
2. margin not winged/

#84. Rostrum <margin> <indumentum>/
1. margin scabrid/
2. margin glabrous/

#85. Rostrum <apex> <description>/
1. apex deeply bidentate/
2. apex shallowly bidentate/
3. apex truncate/

#86. <Rostrum> apical teeth <length>/
mm long/

#87. <Whether rhachilla present within perigynium>/
1. rhachilla always present within perigynium/
2. rhachilla sometimes present in perigynia of basal spikelets/
3. rhachilla absent from perigynia/

#88. Style base <you have to dissect perigynium> <whether twisted>/
1. twisted/
2. slightly bent/
3. straight/

#89. Stigmas <number>/
1. 3/
2. 2/

#90. Mature nutlet <cross-section shape>/
1. triangular in cross-section/
2. shallowly triangular in cross-section/

3. narrowly elliptic in cross-section/

#91. Mature nutlet <shape>/
1. square/
2. obovate/
3. ovate/
4. elliptic/

#92. Mature nutlet <whether clawed>/
1. broadly clawed/
2. narrowly clawed/
3. not clawed/

#93. Mature nutlet <length>/
mm long/

#94. Mature nutlet <width>/
mm wide/

#95. Mature nutlet <colour>/
1. blackish/
2. fuscous/
3. fuscous with lighter angles/
4. yellowish-brown/
5. stramineous/
6. whitish/

#96. Mature nutlet <epidermis description>/
1. glabrous/
2. minutely papillose/

#97. Flowering and fruiting <months>/
1. August/
2. September/
3. October/
4. November/

5. December/
6. January/
7. February/
8. March/
9. April/
10. May/
11. June/
12. July/

#98. Growing in <light conditions>/
1. full sun/
2. light shade/
3. full shade/

#99. Growing in <moisture conditions>/
1. perennially waterlogged/
2. seasonally waterlogged/
3. wet or moist/

#100. Growing in <broad vegetation type>/
1. marshland/
2. wet flush/
3. riparian situations/
4. under sclerophyllous shrubs/
5. forest margin/
6. forest interior/

#101. Growing on <substratum type>/
1. sandy substratum/
2. dolerite-derived substratum/
3. dolomite-derived substratum/
4. clay or loam substratum/
5. basaltic substratum/

#102. Receiving rainfall <regime>/
1. in summer/

2. in winter/
3. in all seasons/

#103. Occurring <altitudinal distribution>/
1. at sea level/
2. near the coast/
3. in the midlands/
4. in montane areas/
5. on the alpine plateau/
6. in the interior/

#104. <Occurs> in <province or country of southern Africa>/
1. Namibia/
2. Botswana/
3. Transvaal/
4. Orange Free State/
5. Swaziland/
6. Natal/
7. Lesotho/
8. Cape Province/
9. Transkei/

#105. In Transvaal occurring in the/
1. north/
2. east/
3. central areas/
4. west/
5. south/
6. not occurring in Transvaal <implicit>/

#106. In Cape Province occurring in the/
1. north/
2. north-west/
3. central areas/
4. south-west/

5. south/
6. east/
7. not occurring in Cape Province <implicit>/

2.2. ITEMS LIST

#1. C. spicato-paniculata <C.B. Cl.>/
,1000-1400 3,1 4,4 5,2 6,2 7,3 8,2 9,? 10,2 11,3 12,600
13,8.5-14 14,1/4 15,1 16,2 17,2 18,1/2 19,1 20,2/4 21,1-2
22,3 23,1 24,2 25,2-3 26,2 27,(1-)2-3 28,3 29,35-40
30,270-335 31,3 33,25-50 34,290 36,4-6 37,2 38,3 42,40-60
43,25-35 44,50-60 45,1 46,1 47,1 53,2 54.1.5-2.2 55,3-4
56,1.5-1.8 57,3 58,2 59,4/5 60,1/2<rarely> 61,3 62,2
63,2/4 64,1<shortly> 65,0.5-0.7 66,1 67,2 68,1 69,1 70,1
71,3 72,5 73,3/7 74,2 75,5-[illegible].5 76,1.2 77,2 78,2 79,6 80,1
81,2 82,1 83,2 84,1 85,1 86,0.6-1 87,3 88,3 89,1 90,1 91,4
92,2 93,2.4-3 94,1-1.2 95,3 96,1 97,1-12 98,2 99,3 100,5
101,4 102,1 103,3&4 104,3&5&6 105,1&2&3

#2. C. zuluensis <C.B. Cl.>/
2,1020-1120 3,1 4,2.5-3(-5) 5,2 6,2 7,1/3 8,2 9,1 10,2
11,3 12,500-650 13,7-12 14,1 15,1 16,2 17,2 18,2 19,2 20,4
21,1/2 22,4 23,1 24,2 25,1.5-2.7 26,2 27,2-3 28,3 29,20-50
30,240-505 31,3 33,20-60 34,170-360 36,5-6 37,2 38,1/2
42,50-95 43,8-20 44,25-85 45,1 46,1 47,2 53,2 54,2.8-3.5
55,3.5-4.5 56,2 57,3 58,3 59,5 60,2 61,3 62,2
63,4<usually>/5 64,1<shortly> 65,(0)-1 66,1 67,2 68,1 69,1
70,1 71,2 72,7 73,3 74,2 75,4.5-6 76,1.5-2 77,2 78,3 79,6
80,2 81,1.2-2 82,2 83,2 84,1 85,2 86,0.4-0.7 87,3 88,3
89,1 90,1 91,2 92,2 93,2.5-3.5 94,1.2-1.8 95,3 96,2
97,2-10 98,1/2 99,3 100,5 101,4 102,1/3 103,2-4
104,3&5&6&8&9 105,1&2 106,6

#3. C. divisa <Huds.>/
2,100-415 3,2 4,1.5-5 5,2 6,2 7,1 8,2 9,2 10,2 11,3
12,(140)-150 13,2-2.5 14,2 15,2 16,2 17,2 18,1 19,1 20,4
21,2 22,1.5 23,1 24,2 25,1 26,1 28,2 29,7-8 30,12-17 31,2
33,0 34,10-17 36,5-7 42,5 43,2 53,2 54,2.8-3.2 55,4.5-5
56,2.5 57,1 58,1 59,7 60,3 61,3 62,1 63,2 64,1-2 65,0.3
66,1 67,2 68,2 69,1 70,1 71,3 72,2 73,7 74,2 75,4.2 76,1.8
77,3 78,1 79,1 80,2 81,1.5 82,1 83,2 84,1 85,2 86,0.8 87,3
88,3 89,2 90,3 91,3 92,1 93,2 94,1.6 95,4 96,1 97,2-11
98,1 99,1 100,1 101,1 102,2 103,2&6 104,4&8 106,2&3

#4. C. glomerabilis <Krecz.>/
2,(100)-675 3,2 4,1.5-3.5 5,2 6,2 7,1 8,2 9,2 10,2 11,3
12,130-300 13,2.5-5(-9) 14,1/2 15,2 16,2 17,1 18,1 19,1
20,1/2 21,2 22,1.5-2 23,1 24,2 25,1-3 26,1 28,2 29,8-15
30,15-60 31,2 33,0 34,10-45(-140) 36,7-10 42,5-15 43,5-10
53,2 54,1.7-2.6 55,3-5.5 56,1.3-2 57,3 58,3 59,6/8 60,1/2
61,3 62,2 63,2/4<rarely> 64,1/2 65,0-2 66,1 67,1/2 68,2
69,1 70,2 71,3 72,3 73,6/9 74,1 75,(3-)3.5-5.5
76,(1.1-)1.8-2.2 77,3 78,1 79,1 80,2 81,0.8-2 82,1 83,1
84,1 85,2 86,0.3-0.7 87,2 88,3 89,2 90,3 91,1 92,1
93,1.7-2.2 94,1-1.7 95,4 96,1 97,2-10 98,1/2 99,1 100,1
101,4 102,1/2/3 103,2-5 104,3&6&7&8&9 105,5 106,3&4&5&6

#5. C. austro-africana <(Kuekenth.) Raymond>/
2,250-605 3,1/2 4,3 5,2 6,1 7,1/2 8,2 9,1 10,2 11,2
12,300-480 13,3-7 14,1/4 15,3 16,1 17,2 18,2 19,1 20,4
21,1 22,7-11 23,1 24,3 25,2 26,1 28,4 30,50-310 31,3 32,2
33,3 34,150-380 35,1 37,1 39,4-6 40,3 41,2 42,25-70
43,7-11 44,20-150 45,2 48,1/3 49,0-1 50,3-5 51,0-1 52,2
53,2 54,2.5 55,4.5-6.5 56,0.8-1.2 57,1 58,3 59,1 60,2/3
61,3 62,1 63,4/5 64,1 65,2-4.2 66,1 67,1 68,2 69,1 70,1
71,2 72,1 73,8/9&11 74,2 75,3-4 76,1.5-1.8 77,3 78,4 79,4
80,1 81,0.3-0.5 82,1 83,2 84,2 85,3 87,3 88,3 89,2 90,3
91,2 92,3 93,1.9-2.2 94,1-1.7 95,3 96,2 97,2-10 98,1/2

99,1 100,1/3 101,4 102,1 103,3&4 104,3&4&5&6&8&9
105,1&2&5 106,6

#6. C. mossii <Nelmes>/
1,1 2,1400 3,1 4,5 5,2 6,1 7,3 8,2 9,1 10,2 11,3 12,485
13,12-16 14,1/4 15,3 16,1 17,1 18,3 19,1 20,4 21,1/3 22,20
23,1 24,2 25,2.5-4 26,2 27,2 28,4 30,280-560 31,3 32,2
33,50-225 34,185-600 35,1 37,1 39,7-9 40,3 41,2 42,120-185
43,5-8 44,15-100 45,2 48,1/2/3/4/5 49,0-1 50,0 51,6-8 52,2
53,2 54,3.5-4 55,4-5.5 56,1-1.5 57,1 58,3 59,7 60,3 61,1
62,2 63,2 64,1/2 65,0-0.3 66,1/2 67,1 68,2 69,1 70,1
71,2/3 72,5 73,3/6&11 74,2 75,2.5-3.5 76,1-1.5 77,1 78,4
79,1 80,1 81,0.5-0.6 82,1 83,2 84,2 85,2 86,0.2 87,3 88,2
89,1 90,1 91,2/4 92,2 93,1.8-2 94,1-1.2 95,1/3 96,1
97,1-10 98,2/3 99,1 100,3&6 101,4 102,1 103,3&4
104,3&6&8&9 105,1&2 106,6

#7. C. aethiopica <Schkuhr>/
2,470-1190 3,1 4,3-6 5,1 6,1 7,3 8,2 9,1 10,2 11,2
12,800-1150 13,7-12 14,1/3/4 15,3 16,1 17,1/2 18,1 19,1
20,2 21,1 22,1.3-2.5 23,1 24,2 25,1.5-3 26,2 27,1-2 28,4
30,165-445 31,3 32,2 33,35-90 34,190-580 35,1 37,1 39,4-6
40,1/3 41,2 42,30-75 43,7-8 44,(17)-130 45,2/3 48,1
49,1-2 50,3-5 51,0 52,2 53,2 54,2.2-6 55,4-6 56,1.5-3 57,2
58,3 59,5/8 60,2 61,3 62,1 63,2/5 64,1 65,0.5-1.8 66,1
67,2 68,2 69,1 70,1 71,1/2 72,1 73,3/6&10 74,2 75,5.5-6.5
76,1.2-4 77,3 78,1 79,1 80,2 81,1.2-1.6 82,1 83,2 84,2
85,1 86,0.6-1 87,2 88,1 89,1 90,1 91,2 92,3 93,2.5-2.8
94,1.2-1.8 95,3 96,2 97,2-11 98,2/3 99,3 100,5 101,4
102,2&3 103,2&3 104,8 106,4&5

#8. C. sylvatica <Huds.>/
2,470 3,1 4,1.5-3 5,2 6,2 7,3 8,2 9,1 10,2 11,3 12,450
13,7-9 14,1 15,3 16,2 17,1 18,2 19,1 20,2/4 21,3 22,5 23,1
24,2 25,1.5-2 26,2 27,1-2 28,4 30,200-330 31,3 32,2
33,25-50 34,300 35,1 37,1 39,7-8 40,1 41,2 42,35-45 43,6-7

44,35-70 45,2 48,1 49,1 50,6-7 51,0 52,2 53,2 54,2.2
55,4-5 56,1.5 57,2 58,3 59,1 60,3 61,1 62,1 63,2 64,1
65,0.5-1 66,1 67,1 68,2 69,1 70,1 71,3 72,6 73,3/7 74,2
75,4.5-4.7 76,1.3 77,1 78,4 79,1 80,1 81,2 82,1 83,2 84,1
85,2 86,0.2 87,3 88,3 89,1 90,1 91,4 92,3 93,2.3-2.4
94,1.3-1.4 95,3 96,1 97,4-10 98,3 99,3 100,3&6 101,4 102,1
103,3 104,6&8 106,6

#9. C. burchelliana <Boeck.>/
2,340-440 3,1 4,1.5-2.5 5,2 6,2 7,2 8,2 9,1 10,2 11,3
12,200-210 13,4-5 14,1 15,3 16,2 17,1 18,3 19,1 20,4 21,1
22,2-4 23,1 24,2 25,1.2-1.7 26,2 27,1 28,4 30,80-440 31,3
32,2 33,15-55 34,220 35,1 37,1 39,3-5 40,1 41,2 42,10-25
43,3-8 44,8-22 45,3 48,1 49,1-2 50,1-3 51,0-3 52,2 53,2
54,2-2.2 55,2.5-3 56,2-2.2 57,3 58,3 59,4 60,2 61,4 62,1
63,4/5 64,1<shortly> 65,0.2-0.4 66,1 67,2 68,2 69,1 70,1
71,1 72,5 73,3/6&10 74,2 75,3-3.5 76,1.6-2 77,3 78,1 79,1
80,1 81,0.5 82,1 83,2 84,1 85,2 86,0.2 87,3 88,2 89,1 90,1
91,2 92,2 93,2-2.4 94,1-1.4 95,3 96,2 97,3-5 98,1 99,1
100,1 101,3 102,1 103,6 104,3&8 105,4 106,3

#10. C. ecklonii <Nees>/
2,170-710 3,1 4,1.5 5,2 6,2 7,1 8,2 9,2 10,2 11,2
12,80-340 13,2.5-4 14,2/4 15,3 16,2 17,2 18,2 19,1 20,4
21,2/3<occasionally> 22,1 23,1 24,2 25,1-2 26,2 27,0-1
28,4 30,20-50 31,3 32,1 33,0-25 34,60-190 35,1 37,1 39,4-5
40,2 41,1 [illegible],15-22 43,7-10 44,0 45,3 48,1 49,1 50,(0-)3-4
51,0-3 52,1/2<usually> 53,2 54,2.5 55,4.2-5 56,1.8-2.2
57,3 58,3 59,8 60,3 61,3 62,1 63,4/5 64,1<shortly>
65,0.8-2 66,1 67,1 68,2 69,1 70,1 71,1/2 72,6 73,3/6&10
74,2 75,4.5-5.5 76,1.8-2.5 77,3 78,1 79,1 80,1 81,0.7-1.2
82,1 83,2 84,2 85,2 86,0.3-0.5 87,3 88,1/2 89,1 90,1 91,2
92,1 93,2.5-3.2 94,1.5-2 95,3 96,2 97,3-9 98,1 99,1 100,1
101,1 102,1&3 103,1 104,8 106,4&5&6

#11. C. monotropa <Nelmes>/
1,3 2,20-60 3,1/2 4,1-1.5 5,2 6,2 7,[illegible] 9,1 10,2 11,2
12,65-100 13,2.2-3 14,1/3 15,[illegible] 16,2 1[illegible]8,2 19,1 20,1
21,2 22,2 23,1 24,2 25,0.5-1 26,3 27,[illegible] 30,12-20 31,3
32,2 33,2-4 34,[illegible]5-45 35,1 37,1 39,3-4[illegible] 41,1 42,7-9
43,7-9 44,0 45,3 48,1 49,0-1 50,2-3 51,0-1 52,2 53,2
54,1-2 55,2.5-3 56,1.2 57,3 58,3 59,3&8 60,3 61,1 62,1
63,4/5 64,1/2/3 65,0-0.2 66,1 67,2 68,2 69,1 70,1-2 71,1
72,2 73,5 74,2 75,4-4.5 76,1.2-1.5 7[illegible]8,1 79,1 80,2
81,1.2-1.8 82,1 83,2 84,2 85,2 86,(0.[illegible]0.5-0.7 87,3 88,3
89,1 90,1 91,2 92,3 93,1.5-1.8 94,1 95,2 96,2 97,5-7 98,1
99,2 101,4 102,1 103,5 104,7

#12. C. cognata <Kunth>/
2,340-765 3,1/2 4,2.5-4 5,2 6,2 7,1 8,1 9,[illegible] 10,[illegible] 11,2/3
12,230-680 13,6-8 14,1 15,1 16,3 17,2 18,1/2<usually> 19,[illegible]
20,2 21,1/2 22,4 23,1 24,3 25,2-3 26,2 27,1-2 28,4
30,115-195 31,3 32,2 33,0-20 34,300-500 35,1 37,1 39,3-6
40,1/3 41,1/2 42,20-70 43,7-11 44,0-65 45,2 48,3 49,0-2
50,2-6 51,0-1 52,2 53,2 54,2.3-2.5 55,5-6 56,1.2-1.8 57,2
58,3 59,8 60,3 61,2 62,1 63,4/5<sometimes> 64,1 65,1.2-3
66,1 67,1 68,2 69,1 70,2 71,1 72,2 73,6&9 74,[illegible] 75,4-5.2
76,1.5-2 77,3 78,1 79,1 80,1 81,[illegible].1-2 82,1 83,2 84,2 85,1
86,0.5-1 87,3 88,1 89,1 90,1 91,2[illegible] 92,3 93,1.7-2.8
94,1.2-1.5 95,3 96,2 97,3-12 98,1/2 99,1 100,1/2/3 101,4
102,1/2/3 103,1&2&3&4&5 104,1&2&3&4&5&6&7&8&9 105,1&2&3
106,4&6

#13. C. acutiformis <Ehrh.>/
2,450-800 3,1&2 4,5 5,2 6,1 7,2 8,2 9,1 10,1 11,1 12,550
13,5-10 14,1/4 15,3 16,1 17,2 18,2 19,2 20,1/2/4 21,1
22,14 23,1 24,3 25,2-3 26,1 28,4 3[illegible],130-400 31,[illegible] 32,2 33,0
34,140-570 35,1 37,1 39,5-7 40,1 41,2 42,300-800 43,4-8
44,0-50 45,2 48,1 49,1-3 50,(1-)3(-4) 51,0-2 52,2 53,1
54,2.5-4 55,3-5.5 56,0.6-1.2 57,1 58,3 59,[illegible] 60,2 61,1 62,1
63,1[illegible]5 64,1 65,1.3-3 66,1 67,1 68,2 69,1 70,[illegible] 71,3 72,5

73,4&[illegible] 74,2 75,3-4 76,1.6-2 77,3 78,1 79,3 80,1 81,0.8-1
82,1 83,2 84,2 85,2 86,0.3 87,3 88,3 89,1 90,1 91,2 92,3
93,1.7-2 94,1.2-1.5 95,4 96,1 97,1-9 98,1 99,1 100,1
101,3/4 102,1/3 103,3&4&5&6 104,3&4&6&7&8&9 105,5 106,5&6

#14. C. glavata <Thunb.>/
1,1 2,410-1700 3,1 4,[illegible]-5 5,[illegible] 6,1 7,1 8,2 [illegible],1 10,2 11,3
12,300-500 13,6-11 14,4 15,3 16,1 17,1 18,2 19,1 20,1&3
21,1 22,35 23,1 24,2 25,1.5-3 26,2 27,(0)-2 28,4
30,115-650 31,3 32,2 33,23-90 34,110-350 35,1 37,1
39,(3)-6 40,1 [illegible]1,2 42,30-100 43,[illegible]15 44,0-45 45,2 48,1
49,1-3 50,1-4 51,0-3 52,1 53,2 54,3-5.5 55,5-6 56,1.9-4
57,3 58,3 59,5 60,2 61,[illegible]62,1 63,1/5 64,1 65,0.7-2 66,1
67,2 68,2 69,1 70,2 71,1 72,4 73,3/6&10 74,2 75,6-7
76,2.5-3 77,3 78,1 79,1 80,1/2<sometimes> 81,1-1.5 82,1
83,2 84,1 85,1 86,0.5-1 87,3 88,2 89,1 90,1 91,2 92,2
93,2.8-3.5 94,1.7-2.5 95,3 96,2 97,1-6 98,1 99,1 100,1
101,4 102,2&3 103,1&2 104,8&9 106,4&5&6

#15. C. subinflata <Nelmes>/
2,285-900 3,1 4,2.5-3 5,2 6,1 7,2 8,2 9,1 10,2 11,2 12,220
13,6-10 14,1/4 15,3 16,1 17,1 18,2 19,1 20,1&3 21,1
22,35(-45) 23,1 24,2 25,1.5-2 26,2 27,2-3 28,4 30,65-110
31,3 32,2 33,15-25 34,60-165 35,1 37,1 39,4-6 40,1 41,2
42,20-40 43,9-11 44,6-23 45,2 48,1 49,1-2 50,3-5 51,0-2
52,1 53,2 54,2.5-3.2 55,3.5-5 56,1.5-2.5 57,3 58,3 59,8
60,3 61,4 62,1 63,2/5<usually> 64,1<shortly> 65,0.5-1 66,1
67,1 68,2 69,1 70,2<usually>/3 71,1 72,2 73,3/6/10 74,2
75,4-6 76,1.2-2.5 77,3 78,1 79,1 80,1 81,1-1.2 82,1 83,2
84,2 85,2 86,0.3-0.6 87,3 88,2 89,1 90,1 91,2 92,3
93,2.2-2.8 94,1.2-1.8 95,3 96,2 97,4-6 98,1 99,2 100,2/3
101,4 102,1 103,4&5 104,6&7&8 106,6

#16. C. sp. nov./
2,460<at flowering and fruiting time> 3,1 4,2.5-3 5,2 6,2
7,2 8,2 9,2 10,2 11,2 12,220 13,0.75 14,2 15,3 16,2 17,2

18,2 19,1 20,4 21,2 22,1 23,1 24,1 25,0.8-1.2 26,1 28,1
29,7 30,14-28 31,1 33,0 34,6-25 53,2 54,0 55,6 56,3.2 57,1
58,1 59,7 60,3 61,5 62,2 63,3 64,1/2 65,0-0.5
66,1<sparsely> 67,2 68,2 69,2 70,1 71,3 72,1 73,1&7 74,2
75,4 76,2 77,1 78,4 79,2 87,1 88,3 89,1 90,2 91,1 92,3
93,4 94,2 95,4 96,1 97,3-4 98,2 99,2 100,4 101,2 102,2
103,6 104,8 106,2

2.3. TABULAR KEY

Characters - 106 in data, 76 included, 18 in key.

Items - 16 in data, 16 included, 18 in key.

RBASE = 1.40 ABASE = 2.00 REUSE = 1.01 VARYWT = .80

Number of confirmatory characters = 1

Average length of key = 3.7 Average cost of key = 1.4

Maximum length of key = 5 Maximum cost of key = 2.2

Characters included 1 3 5-11 14-21 23-24 26 28 31-32 35
37-38 40-41 45-48 52-53 57-64 66-74 77-80 82-85 87-92 95-96
98-106

Character reliabilities 1,7 3,5 5,8 6-7,5 8,7 9-10,5 11,4
14-15,5 16-18,3 19,2 20-21,5 23-24,5 26,5 28,9 31,5 32,7
35,5 37,5 38,7 40,9 41,8 45-46,5 47,8 48,5 52,5 53,6
57-62,5 63-64,6 66-70,5 71,7 72-74,5 77,6 78-79,7 80,5
82-83,5 84,6 85,7 87-88,5 89,9 90-92,5 95-96,5 98-99,5 100,7
101-102,5 103-104,7 105-106,5

C. sp. nov.		28A											
C. divisa		28B	57A	58A									
C. glomerabilis		28B	57C	58C									
C. spicato-paniculata		28C	47A	71C									
C. zuluensis		28C	47B	71B									
C. aethiopica	2	28D	40A	85A	5A	7C							
C. clavata		28D	40A	85A	5B	7A	1A	8B					
C. cognata	2	28D	40A	85A	5B	7A	1B	8A					
C. burchelliana		28D	40A	85B	71A	61D	84A	60B					
C. subinflata		28D	40A	85B	71A	61D	84B	60C					
C. sylvatica		28D	40A	85B	71C	61A	79A	78D					
C. acutiformis		28D	40A	85B	71C	61A	79C	78A					
C. ecklonii		28D	40B	1B	32A								
C. monotropa		28D	40B	1C	32B								
C. aethiopica	2	28D	40C	89A	79A	5A	60B						
C. mossii		28D	40C	89A	79A	5B	60C	1A	8B				
C. cognata	2	28D	40C	89A	79A	5B	60C	1B	8A				
C. austro-africana		28D	40C	89B	79D								

3. METHODS

3.1. Critical Point Drying

(Based on Neumann et al., 1982)

1. The material was fixed in FAA in the field.
2. A Balzers Union Critical Point Drier was used.
3. Keeping the material submerged in FAA, small pieces were placed in the flow-through capsules provided.
4. They were then placed in DMP (Di-methoxy propane), 2 hours.
5. They were then placed in 100% acetone, 5 minutes.
6. Ensuring that the capsules would be submerged, acetone was poured into the chamber of the critical point drier.
7. The metering valve plus the valve on the CO_2 cylinder were opened.
8. The capsules were transferred to the chamber of the drier, and the chamber lid was replaced securely.
9. The Precool valve was opened and the chamber cooled to 5° C.
10. The Precool valve was closed and the stirrer button switched on.
11. The Gas In valve was opened, allowing the pressure to rise to 40-60 atm., and filling the chamber to the glass on the cap.
12. At this stage there was a 50% mixture of acetone and liquid CO_2 present in the chamber.
13. The Gas Out valve was opened and the liquid in the chamber dropped to just above the top of the capsules. The specimens were not allowed to dry out.
14. The Gas Out valve was closed. Steps 11 to 14 were repeated until most of the acetone was removed. Precooling was carried out when the temperature rose above 15° C.
16. The Gas In valve was opened and the chamber filled,

then the Gas Out valve was opened simultaneously, allowing a slow exchange of CO_2 for a few minutes until all the acetone was expelled.

17. The Gas Out valve was closed and the chamber was refilled. The Gas In valve was closed.
18. All valves were closed tightly and the stirrer was switched off.
19. The temperature control was set to 40° C and the Heat button switched on.
20. Temperature and pressure increased simultaneously; at 90 atm. the Gas Out valve was opened.
21. At about 100 atm. the Metering valve was opened; the pressure was carefully maintained below 110 atm.
22. Upon reaching a temperature of 40° C, at a pressure of 90-110 atm., the Critical Point of CO_2 was reached and the material was dry.
23. Care was taken to allow the pressure to descend slowly. The metering valve was opened slowly and a controlled pressure drop of 5-10 atm. per minute was carried out. The Gas Out and Metering valves could then be opened completely.
24. All buttons were switched off and the dry specimens were removed from the chamber; the cap was replaced tightly.
25. The line between the CO_2 cylinder and the critical point drier was emptied by opening the Gas In valve, and finally the Gas In and Gas Out valves were closed.

3.2. Acetolysis of Carex fruits

(Based on Ragonese et al., 1984)

1. Samples for acetolysis were removed from pressed herbarium specimens. They were placed in small glass tubes, taking care that the samples would be identifiable after treatment.
2. Acetic anhydride and conc. sulphuric acid were mixed

in the ratio 9 : 1. The acid was poured carefully onto the acetic anhydride, and mixed after each drop added. The mixture was cooled by placing the container under cold running water, to prevent "charring" of the acetic anhydride.

3. A few ml of the mixture in step 2 was added to each tube.
4. For ease of handling the tubes were placed into a small glass bottle which would fit into the cavity of the Struers sonicator. The bottle was half-filled with water.
5. The sonicator cavity was half-filled with water. The bottle with tubes was placed in the cavity, and the lid was placed on the sonicator.
6. The sonicator was switched on and the samples were cleaned with ultrasound for about 60 minutes.
7. The glass tubes were removed and the mixture in the tubes was diluted with glacial acetic acid.
8. The samples were then placed in pure glacial acetic acid, which was gradually diluted with water.
9. The samples were washed with pure water and allowed to air dry.
10. The samples were mounted on aluminium stubs, sputter coated with gold, and scanned under SEM.

3.3. Preparation of Permanent Transverse Sections of Leaves and Culms

(From Ellis, unpubl. laboratory manual)

1. In the field, small segments from the central portion of leaves and culms were placed in FAA.
2. The segments (with numbers) were placed in tubes with porous material at either end, enabling them to be rinsed in running water; this was done for 1 hr.
3. The segments were placed in plastic vials and desilicified by being covered with 40% hydrofluoric

acid for 1½ hrs. This was done in a fume cabinet.

4. The segments were removed from the acid, rinsed in water and returned to the tubes used in step 2, in which they were rinsed under running water for another 3 hrs.
5. The segments were placed in small porous metal baskets which were then placed in a single large metal basket.
6. Dehydration was done in a Sakura automatic tissue processor. The series used was: Methyl Cellosolve (2-methoxyethanol), 100% alcohol, n- propanol, n- butanol. The segments remained in each of these for 6 hrs, and then for at least 12 hrs in Tissue Prep (paraffin wax with a melting point of 56,5° C).
7. Embedding was done in a Vickers embedding Cryo-therm. The moulds used were two right-angled embedding frames placed on top of a brass plate: they could be moved apart or together to change the size of the mould. Molten wax was poured into the mould, and four segments were placed with their lengthwise axes parallel to each other and to the shorter sides of the mould, and at right angles to the longer sides of the mould. The segments were placed as straight as possible, as near as possible to the central plane of the block. The identification tags were placed perpendicularly opposite each segment in the block. The filled moulds were placed into iced water to set for a few minutes.
8. The embedded segments were cut into separate blocks, and the wax trimmed so that there was an equal amount of wax on all sides, with the cutting face square. The blocks were attached perpendicularly to microtome stages by means of melted wax.
9. Sectioning was done on a rotary microtome, at about 12 microns for leaves and 15 microns for culms (problems were experienced due to the large amounts of sclerenchyma tissue present). Wax ribbons containing

sections were floated, shiny side down, in warm water in a section mounting bath.

10. The sections were placed onto cleaned, gelatin-coated glass slides, and placed on a drier for at least 1 hr.
11. The slides were placed in glass staining baskets and taken through the following dewaxing series: xylene - 10 min.; xylene - 10 min.; xylene + 100% alc. (1 : 1) - 5 min.; 100% alc. - 5 min.; 70% alc. - 5 min.
12. The slides were then stained in safranin for 2 days.
13. The slides were washed in slow-running water until the safranin was removed from the glass.
14. The slides were then taken through the following series of stains: 100% alc. + Pikrinsäure (0,5 g pikrin/100 ml alc.) - 15 sec.; 100% alc. + ammonia (5-10 drops/100 ml alc.) - 60 sec.; 100% alc. - 10 sec.; Fast Green - 10 sec.; 100% alc. - 15 sec.; 100% alc. - 15 sec.; 100% alc. + xylene (1 : 1) - 10 sec.; xylene - 5 min.; xylene - 5 min.
15. Cover slips were mounted on the sections using a drop of Canada balsam (soluble in xylene). The slides were placed in an oven at 50° C for 3 days.
16. The slides were scraped clean, dipped in 100% alc. and dried, ready for examination.

3.4. Preparation of material for the ultramicrotome

(Based on unpubl. laboratory manual: University of the Witwatersrand)

1. In the field fresh leaf and culm segments were fixed in FAA.
2. The segments were dissected in 0,2 M sodium cacodylate buffer, then washed in the buffer, three times over 30 min.
3. Working in a fume cabinet, the tissue was placed in a

solution of 2% osmium tetroxide in 0,2 M Na-cacodylate buffer (pH 7,2) for 2 hrs. (The tissue turned black.)

4. The tissue was rinsed twice in 0,05 M Na-cacodylate buffer, and then rinsed again after 30 min.
5. The tissue was dehydrated in the following alcohol series:
   70%, 80%, 90% alc. - 15 min. each; 95%, 100%, 100% alc. - 20 min. each.
6. The tissue was embedded in Spurr's resin in the following series:
   100% alc. : Spurr's (3 : 1) - 30 min.;
   100% alc. : Spurr's (1 : 1) - 30 min.;
   100% alc. : Spurr's (1 : 3) - 30 min.;
   Pure Spurr's - 30 min; pure Spurr's - 1 hr.
   Vacuum infiltration was used during the final stage.
7. Pure Spurr's was poured into the moulds - Beam capsules and Ladd moulds were used - and the pieces of tissue were positioned in the moulds.
8. Polymerization was done in an oven at 60° C for at least 24 hrs.
9. The blocks were then sectioned on the ultramicrotome.

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INDEX OF CURRENT NAMES & *SYNONYMS*

C. acutiformis Ehrh.

C. aethiopica Schkuhr

- var. *iridifolia* (Kunth) C.B. Cl. = C. aethiopica Schkuhr
- var. *latispica* C.B. Cl. = C. clavata Thunb.

C. austro-africana (Kuekenth.) Raymond

C. bisexualis C.B. Cl. = Schoenoxiphium ecklonii Nees var. unisexuale Kuekenth.

C. bolusii C.B. Cl. = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. buchananii C.B. Cl. = Schoenoxiphium rufum Nees

C. burchelliana Boeck.

C. capensis Schkuhr = Schoenoxiphium ecklonii Nees

C. capensis Thunb. = Schoenoxiphium rufum Nees

C. cernua Boott var. *austro-africana* Kuekenth. = C. austro-africana (Kuekenth.) Raymond

C. clavata Thunb.

- forma *lutensis* (Kunth) Kuekenth. = C. clavata Thunb.
- var. *campylostachya* Nees = C. clavata Thunb.
- var. *cylindracea* Wahlenb. = C. clavata Thunb.
- var. *latifolia* Wiild. = C. clavata Thunb.
- var. *triticea* Wahlenb. = C. clavata Thunb.

C. cognata Kunth

- var. *drakensbergensis* (C.B. Cl.) Kuekenth. = C. cognata Kunth

C. condensata sensu C.B. Cl. non Nees = C. zuluensis C.B. Cl.

C. consanguinea Kunth = C. divisa Huds.

C. divisa Huds.

C. drakensbergensis C.B. Cl. = C. cognata Kunth

C. dregeana Kunth = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

- var. *major* C.B. Cl. = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. ecklonii Nees

C. esenbeckiana Boeck. = Schoenoxiphium lehmannii (Nees) Steud.

- var. *elongata* Boeck. = Schoenoxiphium sparteum (Wahlenb.) Kuekenth.

C. extensa sensu C.B. Cl. non Good. = C. ecklonii Nees

C. extensa Good. var. *ecklonii* (Nees) Kuekenth. = C. ecklonii Nees

- var. *latifolia* Boeck. = C. ecklonii Nees

C. flava sensu C.B. Cl. non L. = C. monotropa Nelmes

C. flavescens Burch. ms. = C. burchelliana Boeck.

C. glomerabilis Krecz.

C. glomerata Thunb. = C. glomerabilis Krecz.

C. huttoniana Kuekenth. = C. zuluensis C.B. Cl.

C. indica Schkuhr = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. iridifolia Kunth = C. aethiopica Schkuhr

C. killickii Nelmes = Schoenoxiphium sp.

C. laevigata Wahlenb. = C. aethiopica Schkuhr

C. lanceus (Thunb.) Baill. = Schoenoxiphium lanceum (Thunb.) Kuekenth.

C. leribensis Nelmes = C. glomerabilis Krecz.

C. lutensis Kunth = C. clavata Thunb.

C. macrocystis Boeck. = C. clavata Thunb.

C. merxmuelleri Podlech = C. zuluensis C.B. Cl.

C. monotropa Nelmes

C. mossii Nelmes

C. oederi Retz. var. *cataractae* (R. Br.) Kuekenth., sensu Kuekenth., p.p., = C. monotropa Nelmes

C. pendula sensu C.B. Cl. non Huds. = C. mossii Nelmes

C. petitiana sensu C.B.Cl. non A. Rich. = C. mossii Nelmes

C. phacota sensu C.B. Cl. non Spreng. = C. austro-africana (Kuekenth.) Raymond

C. poiretii Gmel. = Fuirena pubescens Kunth

C. pseudo-cyperus L. var. *cognata* (Kunth) Boott = C. cognata Kunth

C. pubescens Poir. = Fuirena pubescens Kunth

C. ramosa Schkuhr ms. = Schoenoxiphium lanceum (Thunb.) Kuekenth.

C. reflexa Dietr. ms. = C. glomerabilis Krecz.

C. retrorsa Nees non Schweinitz = C. cognata Kunth

C. rivularis Schkuhr = C. divisa Huds. forma rivularis (Schkuhr) Kuekenth., not S. African

C. rufa Baill. = Schoenoxiphium rufum Nees

C. schimperiana Boeck. = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. schlechteri Nelmes = C. glomerabilis Krecz.

C. spartea Boeck. = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. spartea Kunth = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. spartea Wahlenb. = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. spicato-paniculata C.B. Cl.

C. sp. nov. (C. acocksii C. Reid)

C. sprengelii (Nees) Boeck. = Schoenoxiphium sparteum (Wahlenb.) C.B. Cl.

C. subinflata Nelmes

C. sylvatica Huds.

C. triticea Wahlenb. ex Steud. = C. clavata Thunb.

C. uhligii K. Schum. ex C.B. Cl. = Schoenoxiphium lehmannii (Nees) Steud.

C. vesicaria sensu Thunb. non L. = C. clavata Thunb.

C. vulpina sensu C.B. Cl. non L. = C. glomerabilis Thunb.

C. vulpina L. var. *glomerata* (Thunb.) Wahlenb. = C. glomerabilis Krecz.

C. zeyheri C.B. Cl. = Schoenoxiphium ecklonii Nees

C. zuluensis C.B. Cl.


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