

MALVACEAE

A NEW SPECIES OF *CORCHORUS* IN SOUTHERN AFRICA

INTRODUCTION

Corchorus L., a genus of Malvaceae *s.l.* (previously in Tiliaceae) comprises \pm 100 species widely distributed throughout the tropics, subtropics and warm temperate regions of the world (Wild 1984; Edmonds 1990; Heywood 1993; Bayer & Kubitzki 2003). Species of *Corchorus* are either annual or perennial herbs or small shrubs, sometimes arising from a woody rootstock, with simple to stellate hairs (Wild 1984; Edmonds 1990). *Corchorus* species occupy a wide range of habitats ranging from swamps and riverine conditions, to forest, bushland, woodland and open savanna, and cultivated fields. They also colonize diverse soil types ranging from sand, clay, black turf and loam, on quartz and granite to limestone (Edmonds 1990; Lebrun & Stork 2003).

Recent molecular phylogenetic analyses of the chloroplast genes *atpB*, *rbcL* and *ndhF* have placed the Tiliaceae among the core Malvales *sensu lato* (Angiosperm Phylogeny Group 1998). Within this group, analyses show Tiliaceae to be paraphyletic, with *Corchorus* excluded from Tiliaceae *sensu stricto* (Alverson *et al.* 1998, 1999; Bayer *et al.* 1999; Whitlock *et al.* 2001).

Since Linnaeus established the first four *Corchorus* species, *C. capsularis* L., *C. hirsutus* L., *C. olerorius* L., and *C. siliquosus* L. in *Species plantarum* (Linnaeus 1753) and *Genera plantarum* (Linnaeus 1754), (*C. olerorius* being the type species of the genus), many additional species have been described. The last floristic account of *Corchorus* in southern Africa was published by Wild in 1984 in which 15 species were recognized. Despite this publication, confusion regarding species limits and relationships within the genus is still not resolved or fully understood. This is evident from the herbarium studies which have shown that many specimens have been misidentified and that there are different opinions as to what constitutes real species.

Current taxonomic treatments do not allow for effective identification of certain species, resulting in curatorial problems in all southern African herbaria. The genus is currently under revision. A new species of *Corchorus* was discovered during field excursions and the study of morphological variation within the genus. The new species together with *C. trilocularis* L. and *C. confusus* Wild are very similar in floral and vegetative morphology and

it is difficult to identify them from herbarium specimens when capsules are not available. *Corchorus trilocularis* L. and the related species form a distinct group distinguished by the \pm straight capsules and fruiting pedicels. *Corchorus trilocularis* is an annual, whereas *C. confusus* and the new species are perennials. These three species form a group that is confined to the eastern parts of Africa extending up to Tanzania, with *C. trilocularis* occurring in other tropical and subtropical regions of tropical Africa, Madagascar, Asia, Australia and the Middle East. DNA studies also support this grouping (Moeaha *et al.* in press).

***Corchorus argillicola* M.J.Moeaha & P.J.D.Winter, sp. nov.**

TYPE.—Limpopo, 2328 (Mokopane): \pm 2 km N of Mapela, \pm 30 km N of Mokopane (Potgietersrus), (-DD), 4 June 2002, P.J.D. Winter 5764 (PRE).

C. confusus Wild et *C. triloculari* L. capsuli pedicellisque fructificantibus plusminusve rectis affinis sed capsuli omnino hirsutis non porcatis ab ambabus speciebus differt.

Perennial herb with prostrate or spreading stems from a woody rootstock; branches with pubescence all around stem, or sometimes with line of short hairs on one side of stem only. *Leaf blade* narrowly ovate, 30–50(–80) \times 10–18(–25) mm, obtuse in basal leaves, crenate or serrate-crenate, sometimes with pair of basal setae, pubescent on both surfaces, especially on nerves, hairs not tubercle-based; petiole up to 15 mm long, pubescent; stipules up to 7 mm long, setaceous, pubescent. *Inflorescence* of (1)2–4-flowered cymes opposite upper leaves; peduncles 3–5(–20) mm long, pubescent, pedicels up to 3–5(–7) mm long, pubescent. *Sepals* narrowly lanceolate, up to 8 mm long, pubescent abaxially. *Petals* yellow, narrowly obovate, up to 8 \times 5 mm, with short ciliate claw, androgynophore \pm 0.5 mm long, with an annulus. *Stamens* numerous. *Ovary* cylindrical, densely pubescent; style \pm 2.5 mm long, slender, glabrous, stigma cuspidate. *Capsules* up to 90 mm long; fruiting pedicel straight, densely or sparsely pubescent, without longitudinal ridges. *Seeds* numerous, black, \pm 1.5 \times 1 mm. Figure 6.

Diagnostic characters and relationships: this species was included in *Corchorus confusus* by Wild (1958), but



FIGURE 6.—*Corchorus argillicola*. A, flowering branch, \times 1; B, base of plant showing smaller basal leaves with rounder apices, \times 1; C, flower, \times 2; D, base of leaf showing seta, \times 4; E, capsules, \times 1; F, apically oriented palmate hairs found on capsules, \times 50. Artist: G. Condy.

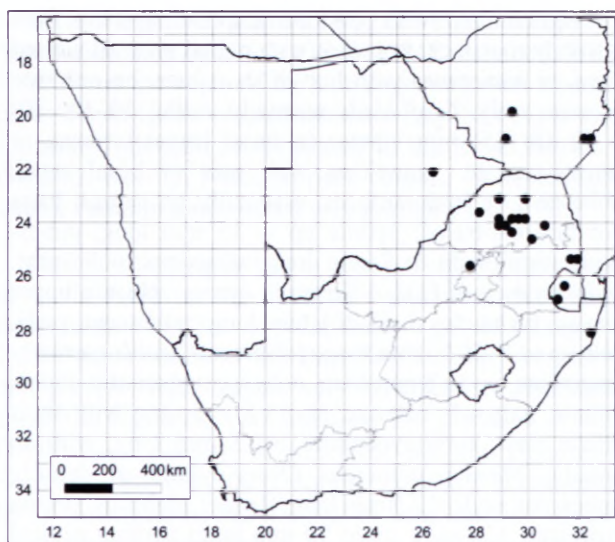


FIGURE 7.—Known distribution of *C. argillicola*.

the comparison of live and herbarium material indicates that two distinct taxa are involved and that the populations from deep black turf or clay soils represent a distinct species, ecologically separated from *C. confusus*. *Corchorus argillicola* is related to *C. confusus* and *C. trilocularis* by the more or less straight capsules and fruiting pedicels. Herbarium specimens of these three species may easily be confused. Wild (1958, 1984) hypothesized the confusion of *C. confusus* and *C. trilocularis* in herbarium material to the possibility that *C. confusus* is of hybrid origin with *C. trilocularis* and *C. asplenifolius* as putative parents. However, field visits have indicated that these species are quite different. The new species differs mainly in the distribution of trichomes, which occur all over the surface on the capsules, and in the lack of longitudinal ridges on the capsules at all stages of development. In contrast, the capsules of *C. confusus* are angular, and sparsely scabrous on the angles or glabrous, whereas in *C. trilocularis* they have trichomes confined to the ridges and on the angles, and are otherwise glabrous. Furthermore, this new taxon is a perennial, whereas *C. trilocularis* is an annual weed of cultivation.

Distribution and habitat: *Corchorus argillicola* is restricted to deep black turf and clayey soils below 1 300 m. It occurs mainly in the Limpopo basin, but extends to the Chipinge District in SE Zimbabwe and to Maputaland in northern KwaZulu-Natal (Figure 7). It seems to be an ecologically specialized relative to *C. confusus*, which occurs in a much wider range of conditions including rocky and sandy habitats in savanna and Grassland Biomes at altitudes up to 1 600 m.

Etymology: the specific epithet *argillicola* refers to the clay soils to which this species is restricted.

Specimens examined

ZIMBABWE.—1929 (Gweru): Shangani Dist., (–CD), *Feiertag s.n.* (SRGH). 2032 (Chipinge): 7 km S of Chisumbanja, (–CC), *Pope & Müller 1532* (SRGH); Chipinge Dist., *Phipps 99* (SRGH); 6 km S of Rusongo Hill, (–CD), *Biegel, Pope & Russell 4903* (SRGH).

BOTSWANA.—2226 (Serowe): 60 km NW of Serowe, (–AB), *Wild & Drummond 7286* (PRE, SRGH).

LIMPOPO.—2328 (Baltimore): on Farm Wellust 426 LR, (–CA), *Schmidt 174* (PRU); ± 2 km N of Mapela, ± 30 km N of Mokopane [Potgietersrus], (–DD), *P.J.D. Winter 5764* (PRE). 2329 Polokwane [Pietersburg]: Ben-Lavin Nature Reserve, (–BB), *James 262* (PRU); near turn-off to Chuenespoort from Polokwane, (–CD), *M.J. Moeaha 47* (UNIN); Turfloop Water Course, N of Suiferkuil Experimental Farm, (–DC), *M.J. Moeaha 13* (UNIN). 2428 (Nylstroom): S of Rooisloot, (–BB), *P.J.D. Winter s.n.* (UNIN). 2429 (Zebediela): 8 km W of Moletlane, (–AD), *M.J. Moeaha 49* (UNIN). 2430 (Pilgrim's Rest): 1 mile N of Mokopane (–AA), *Gillett 2807* (PRE); on road between Tzaneen and Hoedspruit, above Selati River, (–BA), *M.J. Moeaha 27* (UNIN); Steelpoort, on Farms Driekop and Winterveld, (–CA), *Siebert & Du Plessis 1550* (PRU).

NORTH-WEST.—2527 (Rustenburg): Brits, as exiting town area to the east on R566, just north of Brits Abbatoir and south of railway shunter, (–DB), *S.P. Bester 6056* (PRE).

MPUMALANGA.—2531 (Komatiport): Nelspruit, on road between Malelane and Komatiport, 5 km E of turn-off to Coopersdal, (–BC), *M.J. Moeaha 36* (UNIN); Nelspruit, in sugarcane fields ± 5 km S of Komatiport, (–BD), *M.J. Moeaha 34* (UNIN).

SWAZILAND.—2631 (Mbabane): Gollel, Hlatikulu, (–AD), *Compton 29425* (PRE).

KWAZULU-NATAL.—2832 (Mtubatuba): False Bay Park, S sector, (–AB), *Ward 7723* (PRE).

ACKNOWLEDGEMENTS

I would like to thank my supervisor Pieter Winter for drawing my attention to the taxonomy of the genus *Corchorus* and for his continuous encouragement and support during the early stages of my research, and also for his inspiration and constructive criticism, guidance, enthusiasm, genuine interest in my work and for guidance and participation with field work. I am very grateful to the staff and curators of the herbaria mentioned above for making their material available for this study. Special thanks are due to Dr O.A. Leistner for the Latin translation of the diagnosis, Ms Gill Condy for line drawings and Ms Hester Steyn for the distribution map. I am also grateful to Dr J.C. Manning for his valuable comments on the manuscript. A taxonomic analysis of *Corchorus* is a registered M.Sc project at the University of Limpopo.

REFERENCES

- ALVERSON, W.S., KAROL, K.G., BAUM, D.A., CHASE, M.W., SWENSEN, S.M., McCOURT, K.J. & SYTSMA, K.J. 1998. Circumscription of the core Malvales and relationships to other Rosidae: evidence from *rbcL* sequence data. *American Journal of Botany* 85: 857–887.
- ALVERSON, W.S., WHITLOCK, B.A., NYFFELER, R., BAYER, C. & BAUM, D.A. 1999. Phylogeny of the core Malvales: evidence from *ndhF* sequence data. *American Journal of Botany* 86: 1474–1486.
- ANGIOSPERM PHYLOGENY GROUP (APG). 1998. An ordinal classification for the families of flowering plants. *Annals of the Missouri Botanical Garden* 82: 247–277.
- BAYER, C., FAY, M.F., DE BRUIJN, A.Y., SAVOLAINEN, V., MORTON, C.M., KUBITZKI, K., ALVERSON, W.S. & CHASE, M.W. 1999. Support for the expanded family concept of Malvaceae within a circumscribed order Malvales: a combined analysis of plastid *atpB* and *rbcL* DNA sequences. *Botanical Journal of the Linnean Society* 129: 267–303.
- BAYER, C. & KUBITZKI, K. 2003. Malvaceae. In K. Kubitzki & C. Bayer. *The families and genera of vascular plants*, vol. 5. Springer, Berlin.

- EDMONDS, J.M. 1990. Herbarium survey of African *Corchorus* L. species. *Systematic and ecogeographic studies on crop gene pools* 4. International Board for Plant Genetic Resources, Rome.
- HEYWOOD, V.H. 1993. *Flowering plants of the world*. Mayflower, New York.
- LEBRUN, J.P. & STORK, A.L. 2003. *Tropical African flowering plants. Ecology and distribution* 1. Conservatoire et Jardin Botaniques, Genève.
- LINNAEUS, C. 1753. *Species plantarum*, vol. 1. Holmiae, Stockholm.
- LINNAEUS, C. 1754. *Genera plantarum*, edn 5. Lugdoni Batavorum, Stockholm.
- MOEAHA, M.J., WINTER, P.J.D., VAN DER BANK, M. & GROBLER, P. in press. Molecular phylogenetic analysis of selected *Corchorus* species (Malvaceae *s.l.*) in southern Africa. *International Journal of Plant Sciences*.
- WHITLOCK, B.A., BAYER, C. & BAUM, D.A. 2001. Phylogenetic relationships and floral evolution of the Byttnerioideae ('Sterculiaceae' or Malvaceae *s.l.*) based on sequences of the chloroplast gene, *ndhF*. *Systematic Botany* 26: 420–437.
- WILD, H. 1958. Notes and new records of African flowering plants (Tiliaceae). *Bothalia* 7: 422–424.
- WILD, H. 1984. Tiliaceae. In O.A. Leistner, *Flora of southern Africa* 21: 32–42.

M.J. MOEAHA*

*National Herbarium, South African National Biodiversity Institute,
Private Bag X 101, Pretoria, 0001.

MS. received: 2005-08-11.