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South African Journal of Botany 77 (2011) 55–58
SOUTH AFRICAN JOURNAL OF BOTANY
www.elsevier.com/locate/sajb

# *Isolepis namaquana* (Cypereae, Cyperaceae), a new endemic species from the winter rainfall area of South Africa

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Received 1 April 2010; received in revised form 3 May 2010; accepted 12 May 2010

**Abstract**

A new species, *Isolepis namaquana* Muasya & J.Viljoen, is described and illustrated. It is known from two localities in Namaqualand: near Kamieskroon and at the foot of the Matsikammaberge, where it grows in ephemeral wetlands. The tufted annual species is diagnosed by floral and fruit characters including glume size, bifid stigma and colliculate nutlet surface ornamentation.


*Keywords:* Cyperaceae; Cypereae; Isolepis; New species; Taxonomy; South Africa

## 1. Introduction

*Isolepis* R.Br. comprises 74 species of annual and perennial herbs occurring mostly in temperate regions of the southern hemisphere (Govaerts et al., 2007). In Southern Africa, the genus has its highest species diversity in the winter rainfall area, where annual species occur in ephemeral wetlands while perennials frequently form mats at the edge of wetlands or float in shallow fresh water (Archer, 2000; Muasya and Simpson, 2002). *Isolepis* is included in tribe Cypereae (Goetghebeur, 1998; Muasya et al., 2009a), and together with *Ficinia* Schrad., *Hellmuthia* Steud. and *Scirpoides* Ség. forms a clade sister to *Cyperus* L. sensu lato (Muasya et al., 2001, 2009b). Spikelet morphology has been used to separate *Isolepis* from *Cyperus*: *Isolepis* has terete spikelets with a spiral glume arrangement whereas *Cyperus* has flattened spikelets with distichously arranged glumes (Goetghebeur, 1998). However, some Cape annual species with flattened spikelets and a distichous glume arrangement, previously described as *Cyperus,* have recently been transferred to *Isolepis* based on a re-interpretation of morphology and evidence from molecular phylogenetic data (Archer, 1998; Muasya and De Lange, 2010; Muasya et al., 2007, 2009b). Extreme reduction and convergence of morphological features makes separation within and between Cyperaceae genera

Table 1
Comparison of morphological features among the species studied, showing ranges with medians in parentheses. All length (*L*) and width (*W*) measurements in mm.

| | *I. trachysperma* *n*=27 | | *I. sororia* *n*=39 | | *I. namaquana* *n*=20 | |
|---|---|---|---|---|---|---|
| Culm number | 14–114 | (28) | 3–90 | (24) | 6–60 | (35) |
| Culm *L* | 28–115 | (67) | 22–210 | (72) | 67–269 | (129) |
| Leaf sheath *L* | 3–19 | (9) | 4–22 | (11) | 5–72 | (15) |
| Leaf blade *L* | 1–37 | (16) | 1–62 | (6) | 3–137 | (35) |
| Leaf blade *W* | 0.2–1.0 | (0.5) | 0.1–0.7 | (0.3) | 0.5–1.2 | (0.7) |
| Involucral bract *L* | 2.0–9.6 | (5. 5) | 1.0–9.0 | (2.0) | 3.0–12.0 | (7.4) |
| Spikelet number | 1–3 | (2) | 1–3 | (2) | 1–6 | (2) |
| Spikelet *L* | 1.4–4.2 | (3.2) | 1.7–5.9 | (3.4) | 4.9–10 | (7) |
| Spikelet *W* | 1.2–2.1 | (1.6) | 1.3–2.4 | (1.6) | 1.9–4.0 | (2.4) |
| Glume number | 8–32 | (18) | 7–36 | (15) | 12–40 | (21) |
| Glume *L* | 1.0–1.9 | (1.4) | 1.2–1.8 | (1.4) | 1.8–3.9 | (2.7) |
| Mucro *L* | 0–0.3 | (0.2) | 0–0.1 | (0) | 0–0.3 | (0.2) |
| Stamen number | 2–3 | | 2 | | 3 | |
| Anther *L* | 0.2–0.4 | (0.25) | 0.2–1.0 | (0.3) | 0.6–1.7 | (1.1) |
| Style branching | Trifid (bifid) | | Bifid (trifid) | | Bifid | |
| Nutlet *L* | 0.50–0.85 | (0.70) | 0.65–0.90 | (0.80) | 0.60–1.30 | (1.10) |
| Nutlet *W* | 0.35–0.60 | (0.50) | 0.40–0.70 | (0.60) | 0.55–1.00 | (0.85) |
| Nutlet ornamentation | Aculeate to tuberculate | | Reticulate | | Colliculate | |
| Nutlet colour | Dark brown | | Brown | | Golden to black | |

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doi:10.1016/j.sajb.2010.05.005

difficult, so taxonomy relies heavily on floral and fruit shape and size. The spikelet, glume and nutlet (fruit) shape and size, and nutlet ornamentation are particularly important in separating *Isolepis* species (Muasya and Simpson, 2002).

Recent fieldwork in the winter rainfall area has yielded unmatched material in the Succulent Karoo. Two populations of the taxon described here, with hundreds of individuals each, growing in ephemeral seepages, have been studied at the foot of the Matsikammaberge and at Kamieskroon (hereafter called Namaqualand). The Namaqualand taxon is a tufted annual growing with and similar to *Isolepis trachysperma* Nees and *Isolepis sororia* Kunth in overall morphology, but differing in a number of reproductive and vegetative characters. We used multivariate methods to test whether the taxa can be separated on overall morphology.

## 2. Materials and methods

A comparative morphological study was undertaken recently on collected specimens as well as herbarium specimens (BOL, K, NBG, NSW, PRE; acronyms follow Index Herbariorum, http://sciweb.nybg.org/science2/IndexHerbariorum.asp). Specimens studied for the Namaqualand taxon are listed in Results, whereas *I. trachysperma* and *I. sororia* specimens are those studied for the *Isolepis* monograph (Muasya and Simpson, 2002). Twenty-three individuals of the Namaqualand taxon, 43 *I. sororia* and 29 *I. trachysperma* were investigated using a dissecting microscope with measuring eyepiece for the following quantitative variables: culm length; leaf sheath length, leaf blade length and width; involucral bract length, spikelet length and width; glume length, glume

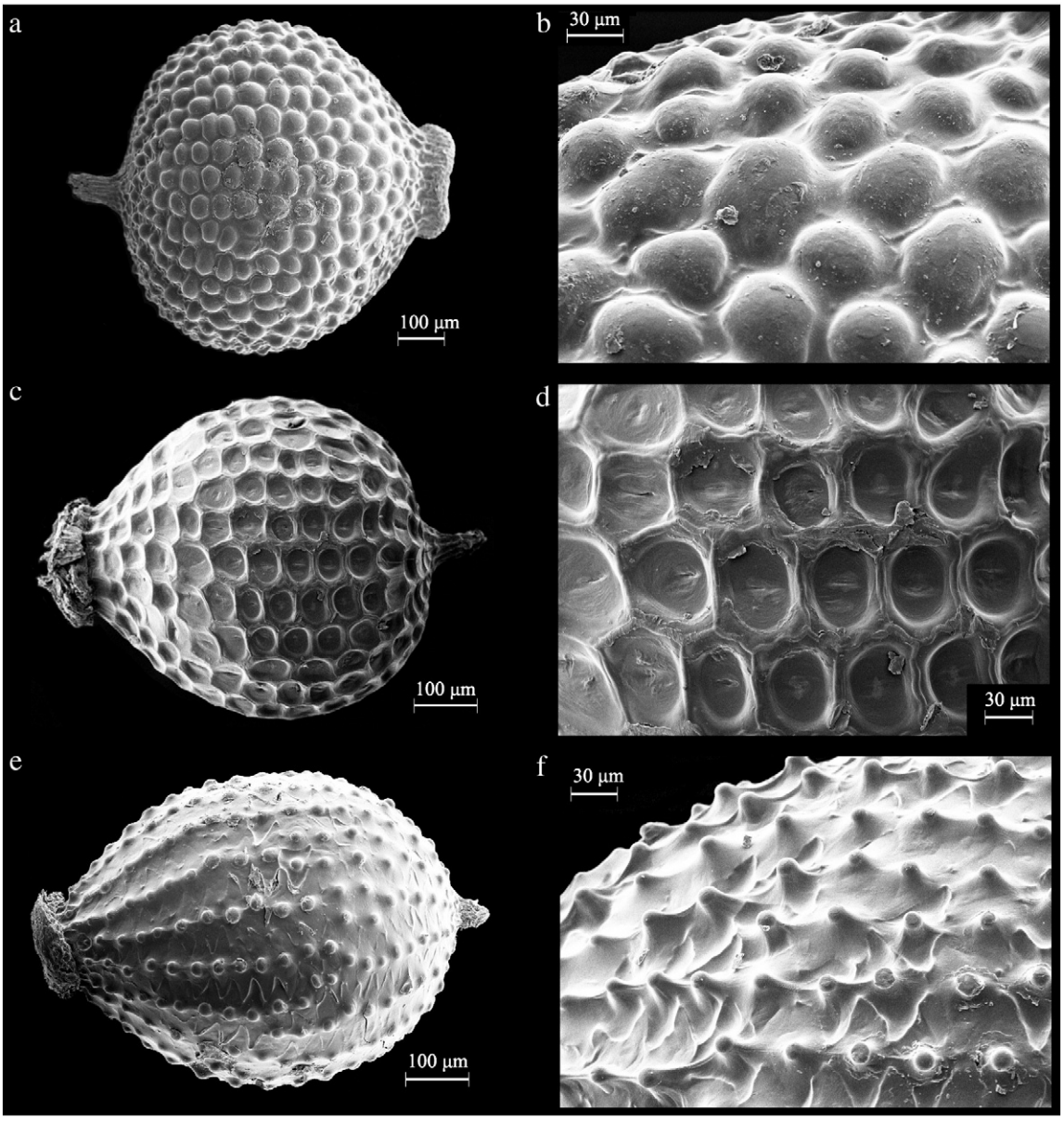


Fig. 1. Nutlet surface ornamentation. (a, b) *Isolepis namaquana*, colliculate; (c, d) *Isolepis sororia*, reticulate; and (e, f) *Isolepis trachysperma*, aculeate–tuberculate.