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Two new *Oxalis* (Oxalidaceae) species from the Richtersveld National Park, South Africa

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Abstract

Two new *Oxalis* species from the Richtersveld National Park (South Africa) are described and typified. Both species show strong morphological resemblance to members of the South African *Oxalis* section *Cernuae*. *Oxalis nivea sp. nov.* closely resembles the well-known weed *O. pes-caprae*, but it bears white flowers, and has a very restricted distribution range north of the northernmost known locality of *O. pes-caprae*. *Oxalis rosettifolia sp. nov.* is distinguished from all other species by a combination of a flat basal rosette of leaves, terete petioles, flask-shaped floral tubes and at least some enlarged, spathulate bracts at the terminal articulation of the peduncle. Phylogenetic analyses based on nuclear ITS and plastid *trn*SG data confirmed the placement of both of these species within a clade containing *O. pes-caprae*. The exact placement of these two species differs between ITS- and *trn*SG-based trees, but both analyses confirm a close relationship between the two new species and *O. copiosa* and *O. cf. haedulipes*.

Introduction

The Richtersveld National Park was inscribed on the UNESCO World Heritage List as South Africa's 8th World Heritage Site in 2007 (Fleminger 2008). It is situated at the extreme northernmost corner of Namaqualand, with the Orange River forming its northern and partial eastern borders. The Richtersveld is geologically unique and includes both volcanic and sedimentary formations comprised mainly of granite, gneiss, limestone, schist, layered shale and scattered white quartz (Williamson 2000). The soils are mostly extremely rocky and shallow, except on the sandy plains between the very rugged mountains (Jürgens *et al.* 1999).

The Richtersveld is classified as a desert, with an average annual rainfall of about 150 mm (Fleminger 2008). Although rainfall figures are low, rainfall patterns are fairly constant. Most rain falls in winter, but this is supplemented by sporadic summer thunderstorms and showers during January to April, and during winter by early morning fog that rolls in from the cold Benguela Current in the west (Williamson 2000). While summer daytime maximum temperatures are mostly well above 40°C, winter nights may cool to below freezing, especially at higher elevations (Williamson 2000, Fleminger 2008).

Despite these harsh conditions, the Richtersveld contains the world's richest desert flora (Cowling *et al.* 1998). The frequent description of new plant species from the Richtersveld over the past decades highlights how botanically underexplored this area still is (Williamson & Baijnath 1995, Pierce & Gerbaulet 1997, Snijman & Williamson 1998, Williamson 1999, Klak 2000, Bruyns 2003, Hammer 2005, Manning & Goldblatt 2008, Laraa *et al.* 2009). This may, in part, be ascribed to the remoteness and inhospitality of the region. In addition, many plants endemic to this region escape the dry season below ground as geophytes (Snijman & Williamson 1998, Goldblatt & Manning 2004). Detection of such species would require being in the right place at the right time after good rains. During 2011, the Richtersveld National Park experienced exceptionally good rains during late summer and autumn. This prompted us to visit the park during July 2011

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