

A remarkable new species of *Siphula* (lichenized fungi) from South Africa

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Abstract: KANTVILAS, G., ZEDDA, L. & ELIX, J. A. 2003. A remarkable new species of *Siphula* (lichenized fungi) from South Africa. – *Herzogia* 16: 21–25.

The new species, *Siphula flavovirens* Kantvilas, Zedda & Elix, is described and its systematic relationships are discussed. The new species appears to occupy a rather isolated position in the genus. It has a unique chemistry comprising usnic acid and caloploicin, the latter compound being recorded in *Siphula* for the first time. The species is known from the region Namaqualand (South Africa).

Zusammenfassung: KANTVILAS, G., ZEDDA, L. & ELIX, J. A. 2003. Eine bemerkenswerte neue Art der Gattung *Siphula* (lichenisierte Pilze) aus Südafrika. – *Herzogia* 16: 21–25.

Die Flechte *Siphula flavovirens* Kantvilas, Zedda & Elix wird neu beschrieben und ihre verwandtschaftliche Stellung diskutiert. Wegen der einzigartigen Chemie (Usninsäure und Caloploicin) scheint die Art eine ziemlich isolierte Stellung innerhalb der Gattung *Siphula* einzunehmen. Caloploicin wird erstmals für diese Gattung nachgewiesen. Die neue Art ist bisher nur von der Region Namaqualand (Südafrika) bekannt.

Key words: Lichenized Ascomycetes, taxonomy, terricolous lichens, caloploicin.

Introduction

Southern Africa, together with the Mascarene Islands, represents one of the major centres of diversity for the lichen genus *Siphula* Fr. Seven species were listed for South Africa by DOIDGE (1950), although this included several synonyms, whereas MATHEY (1974) in her regional revision treated five species. More recently KANTVILAS (2002), on the basis of studies of herbarium material, accepted five species for the area, plus one further undescribed species. All represent geographically rather restricted taxa, with *S. torulosa* (Thunb. ex Ach.) Nyl., *S. verrucigera* (J.F.Gmelin) R.Sant. and the undescribed taxon apparently endemic to the Cape, and *S. mascarena* Mathey and *S. abbatiana* Mathey endemic to the Mascarene Islands and Madagascar respectively. The fifth accepted species for Africa is the widespread *S. decumbens* Nyl. Recently a further species has been discovered in Namaqualand, South Africa, and this remarkable taxon is described here.

Materials and methods

The species was collected by the second author in the course of studies on lichen diversity and terricolous lichens forming biological soil crusts in South Africa. The morphology and anatomy of the thallus were studied using light microscopy. Thin-layer chromatography and high performance liquid chromatography were carried out using standard methods (WHITE & JAMES 1985, FEIGE et al. 1993).

Siphula flavovirens Kantvilas, Zedda & Elix sp. nov.

Species parva, flavovirens, lobis fragilibus, farinosis, complanatis, *Siphulae decumbenti* similis sed compositione chemicali singulari, ex acido usneico et caloploicino constanti, praecipue differens.

Type: Republic of South Africa: Northern Cape Province: Namaqualand, Quaggasfontein 478, about 20 km southern from the village of Soebatsfontein, 17°33'18.8"E, 30°13'25.1"S, 380 m a.s.l., 4.4.2001, in succulent Karoo vegetation, on soil among granites, L. Zedda 5415 (PRE – holotype; HO, M 0038404 – isotypes), L. Zedda 5384 (M 0038402 – topotype).

Thallus fruticose, forming tufts or mats to c. 10 mm tall, most frequently 5–9 mm, over shallow soil. Lobes broadly flattened, erect to ascending, sometimes decaying at the base, densely crowded, convoluted and entwined, occasionally fenestrate, very brittle, 2–4 mm tall, 0.5–3 mm wide, with dorsal and ventral surfaces identical; surface dull yellow-green in the upper and outer parts, sometimes rather pale beige-brown to brown near the base or within the clumps, very scabrid, mealy, unevenly puckered, dimpled and lumpy; apices and margins irregularly ragged, abraded, eroded and lacerate, not thickened. Thallus in section 150–200 µm thick, with an algal layer of 120–130 µm. Cortex not developed, with the outer layer of the lobes comprised of loose, short-celled hyphae extending out from the medulla; medullary hyphae 2–4 µm thick, thin-walled; photobiont cells ± spherical, 6–16 µm diam. Rhizines black, subterete and 0.1–0.3 mm wide at point of attachment to lobes, becoming fused, twisted, strand-like and flattened to c. 1 mm wide and 6 mm long.

Chemistry: usnic acid and caloploicin: cortex K-, C-, KC+ yellowish, P-.



Fig. 1: Habit of *Siphula flavovirens* (scale = 5 mm).

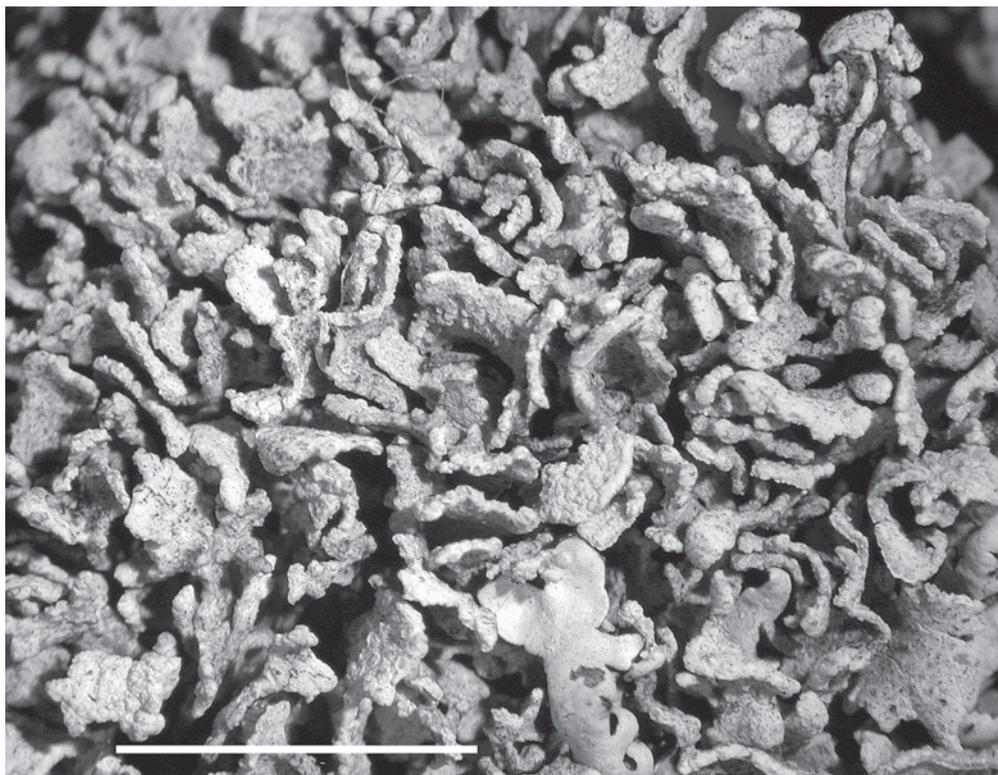


Fig. 2: Details of lobes of *Siphula flavovirens* (scale = 10 mm).

Distribution and ecology

The new species is known from the type locality and from the Western Cape Province, where it was collected on the top of the Gifberg, close to the town of Vanrhynsdorp. In both localities it is locally abundant. It grows on soil in sheltered microhabitats among granites, sandstones, where it forms biological soil crusts. The site of Quaggafontein 478 supports a dwarf Succulent Karoo shrub vegetation, dominated by *Euphorbia mauritanica* L., *Ruschia clavata* L.Bolus and *Cephalophyllum inaequale* L.Bolus, and a Namaqualand rocky hill vegetation. The Gifberg is characterized by a fynbos vegetation, due to higher altitude. The climate of the Succulent Karoo is characterized by the presence of low winter rainfall and extreme summer aridity, with an annual average precipitation of about 140 mm. The area is particularly rich in lichen species on all substrata, probably due to the proximity to the coast which is influenced by frequent fog. Its lichen flora is very poorly known. The new species seems to grow preferably at the base of granite, sandstone rocks, especially “inselbergs”, where water accumulates during rain.

Other specimen examined: Republic of South Africa: Western Cape Province: Namaqualand, Vanrhynsdorp, Gifberg, 18°46'42.2"E, 31°47'19.2"S, 526 m a.s.l., 23.11.2002, in fynbos vegetation, forming biological soil crusts among plane sandstones, L. Zedda 5849 (M 0038981).

Characterisation

The new species is readily characterised by its distinctive yellowish green colour, identical to that displayed by species of the foliose genus *Xanthoparmelia* (Parmeliaceae). All other known species of *Siphula* are generally some shade of white, grey, grey-brown or reddish brown. Although superficially similar to a mat of basal squamules of a species of *Cladonia*, the lobes of *S. flavovirens* have rhizines and identical dorsal and ventral surfaces, features not known in *Cladonia*. The brittle, very scabrid and mealy lobes of the new species are commonly seen in several other species of the genus, especially in *S. decumbens* and its relatives. However, the development of rhizines in *S. flavovirens* is unusual. Typically in species of *Siphula*, the rhizines are subterete and distinctly root-like, forming a clump at the base of the lobes and penetrating the substrate (usually soil). In *S. flavovirens*, many of the lobes appear to lack rhizines, and the portions of thallus within the soil substrate appear to be blackened, flattened, decaying lobe bases. Nevertheless, in other lobes, the 'typical' rhizines are present, although they are frequently strand-like and fused, and form flattened, blackened structures with shorter, subterete, lateral rootlets.

Systematic position

The new species possesses several characters that suggest an outlying position in the genus. Hitherto, all the Southern African taxa belong to what KANTVILAS (2002) termed the '*S. decumbens*' group, characterised by flattened, chalky lobes containing depsides. Three chemical types are represented in the region: (i) thamnolic acid, (ii) baeomycesic and squamatic acids, and (iii) hypothamnolic acid. Although superficially resembling a rather small form of *S. decumbens*, the chemical composition of *S. flavovirens* suggests it is completely unrelated to any member of that group. Usnic acid is unknown in *Siphula*. It was recorded in the Himalayan taxon, *S. himalayensis* (Räsänen) Kantvilas (KANTVILAS 2002), but this lichen is now known to be unrelated to *Siphula* and synonymous with *Lecanora geophila* (Th.Fr.) Poelt (OBERMAYER & KANTVILAS 2003). Similarly, caloploicin has never been recorded in *Siphula* either. This rare depsidone has previously been recorded only from the genus *Caloplaca* (YOSIOKA et al. 1973). The presence of depsidones might suggest a connection between *S. flavovirens* and the *S. fragilis* group where lobaric acid has been recorded, but morphological characters do not support this relationship: *S. fragilis* (Hook.f. & Taylor) J.S.Murray and its allies all have highly distinctive, very broad and thin lobes and are known only from very wet, montane areas of Australasia.

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