

A record of *Didymium subreticulosporum* from Australia

Teresa Van Der Heul¹

¹84 Noble Parade, Dalmeny, New South Wales, 2546. Australia

E-mail: tvdh@bigpond.com

Received: 24 September 2022

Accepted for publication: 8 November 2022

Published: 23 November 2022

Editor: Steven L. Stephenson

Abstract: *Didymium subreticulosporum* was described in 1997 from material collected in Spain and has since been reported from Mexico. A recent specimen of *Didymium* from Australia, which appears to represent this species, is described, illustrated, and discussed herein.

Keywords: biogeography, distribution, ecology, slime mold

This work is licensed under a Creative Commons Attribution 4.0 International License

Introduction

Didymium is a very large genus that encompasses more than 90 species, about 18 of which are known from Australia (Stephenson 2021; Lado 2004-2022). Most members of the genus are relatively easy to recognize from the stellate lime crystals that cover the surface of the peridium (Martin and Alexopoulos 1969) but particular species can be difficult to distinguish (Clark and Haskins 2018).

People from across Australia often send their specimens of myxomycetes to me in the hope I can assist with an identification. In general, it is possible to work through the various keys acquired over the years to determine each specimen. Occasionally, however, one completely confuses me, as this one did. Carlos Lado of the Real Jardín Botánico de Madrid kindly answered several emails, based on his Mexican research, with many image attachments, and confirmed my determination. The rows of mostly stellate lime crystals were something I had not observed in previous observations of species of *Didymium* and knew instinctively that this was something different.

Normally, one would expect to find a peridium on such a species. The peridium consists of white calcareous crystals which appear to be closely packed. There were no crystals in the hyaline capillitium, which was rather scanty. Spores were reticulate but the mesh was broken on one side. It appears that germination may occur from this area as we were able to capture the formation of a couple of myxamoebae. All microscopic observations are described below.

Didymium subreticulosporum Oltra, G. Moreno & Illana is described as being succulenticolous due to its consistent fruiting on the cladodes of *Opuntia* (commonly known as the prickly pear cactus) in early stages of decay (Lado et al. 2000). Currently, *D. subreticulosporum* appears to have been recorded

only from Spain and Mexico (Oltra et al. 1997) and thus would seem to be rare. However, as discussed herein, the recent collection from Australia is suggestive of this species.

Other species of *Didymium* have crystalline lime in the capillitium but lack the numerous long white swellings which hold rows of mostly stellate lime crystals. Possibly this is a new species of *Didymium*, but only morphological studies will answer this. This specimen has been lodged with the Department of Agricultural Research, Herbarium, Orange, New South Wales, Australia.

Observations by contemporary collector Baiba D. Mellups (Leongatha, Victoria):

“The first month of spring began with many warm days and little rainfall at Dogwood Garden, a five-acre, temperate zone garden created approximately 50 years ago amidst grazing farmland. It is home to conifers, oaks and eucalypts and an array of perennials, bulbs and ‘weeds.’

The spring bulbs that had budded were yearning for the spring rains which did eventually come. A deluge of the first day of October was followed by many rainy days for the following two weeks interspersed with warm sunny days of about 17°C. This seemed like perfect weather to encourage fungal and myxomycete growth both in the nearby forest and garden.

Whilst tending the garden I have found a variety of fungal genera (e.g., Leucoagaricius, Agrocybe, Lachnum, and Tremella) in the soil and leaf litter mix. However, aside from Fuligo septica, I have not observed the tiny myxomycetes that I find in the forest, despite my occasional scrutinizing of leaf litter with torch and magnifying glass. But, in mid October 2021 whilst searching for Aquilegia seedlings, there they were, myxomycete fruiting bodies (sporangia)!

They appeared as whitish-grey speckles on the almost black, well dampened, decomposing leaves that had fallen from the 40-year-old Garrya elliptica and to a lesser extent on the long, fibrous skeletal remains of Siberian Iris leaves. The area of leaf litter that the sporangia were scattered over was approximately 20 sq.cm. located beneath the drip-line of the Garrya. The site receives about an hour of direct sunlight, otherwise it is shaded by the heavy leaf canopy of the Garrya and species of Camellia.

*The sporangia were about 1 mm tall. Some of them were scattered over the entirety of the leaf whilst others lined up on the leaf veins. The physical characteristics of the hypothallus on the leaf made me think of a *Didymium* species as it reminds one of the buttressed root systems of ancient trees. Their whitish grey peridium suggests calcareous lime crystals. I collected a few leaves and photographed the sporangia that same day using an Olympus TG6 camera (macro mode, 20 stacks) (Fig. 1A & B). What I noted was a golden orb, the columella, within the split peridium and the spore mass was a dark brown colour. I was unable to pinpoint this to species using the resources available to me.*

Description and Microscopic Observations

Fruiting body a stalked sporangium, erect, gregarious, 0.8–1.0 mm tall in small groups of two or three and sometimes appearing to be fused together when close, sub-globose, umbilicate at the base, 0.5–1.0 mm diameter covered by calcareous crystals, white to bluish grey.

Hypothallus membranous, irregular, contiguous for the group, dark brown.

Stalk slender, striate, blackish lighter at apex, appears orange under transmitted light, shows isolated platelets by transmitted light, orange yellow towards the apex.

Peridium covered with small stellate crystals closely packed with short spikes; these are smaller than the spores; dehiscence irregular.

Pseudocolumella prominent, off white to yellowish.

Capillitium consisting of a few fine delicate tubules, scantily branched, smoky brown to hyaline 1–2 µm; strings of stellate crystals forming long lines, with the longest spikes 0.5–0.8 µm long.

Spores black in mass paler brown by transmitted light 8–10 μm in diameter, reticulate with a broken mesh on one side.

Plasmodium not observed.



Figure 1. Fruiting bodies of *Didymium subreticulosporum*. A and B, specimen the day of collection. C and D, specimen when we received it.

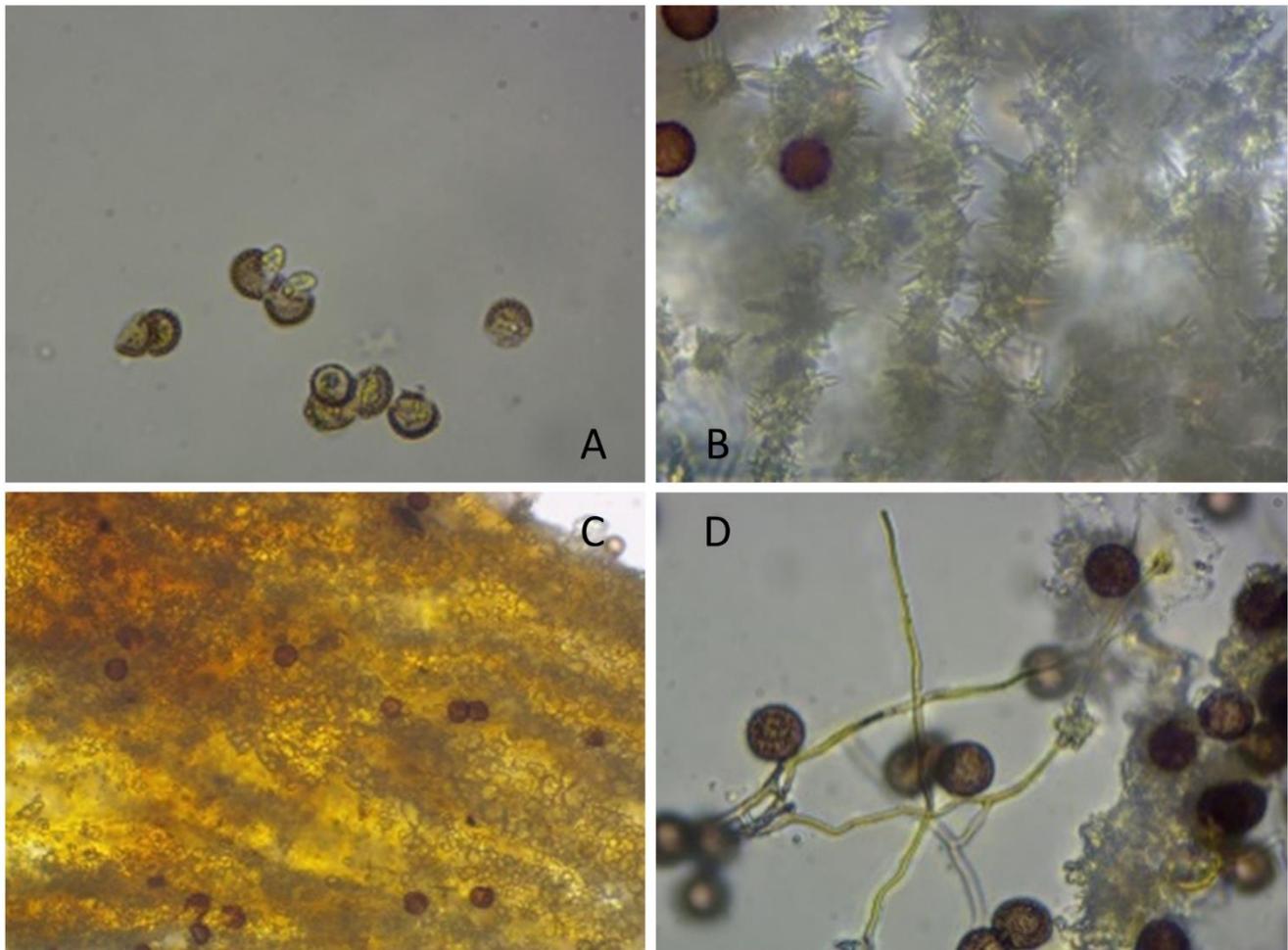


Figure 2. A, Two emerging amoebae at 600x. B, Stellate crystal strings. C, Stalk platelets. D, Spores and capillitium.

Acknowledgments

I wish to thank Dr Carlos Lado of the Real Jardín Botánico, CSIC, Plaz de Murillo 2, 28014 Madrid, Spain, for assisting with information for identification, and Dr. Steve Stephenson of the University of Arkansas, Fayetteville, Arkansas, for many years of mentoring and providing detailed constructive comments. We wish to thank many friends for their encouragement of this private study.

References

Clark J, Haskins EF. 2018. A taxonomic guide to the species of *Didymium* (Didymiaceae, Physarales, Myxomycetes) I. The stipitate species. *Mycologia* 1: 22-62.

Lado C [Internet]. 2005-2022. Real Jardín Botánico, CSIC: Madrid. An on line nomenclatural information system of Eumycetozoa [cited 2022, visited regularly]. Available from: <http://eumycetozoa.com>

Lado C, Mosquera J, Beltrán-Tejera E, Wrigley de Basanta D. 2000. Morphology and ecology of *Didymium subreticulosporum*, *Mycologia* 92(5): 978-983

Martin GW, Alexopoulos CJ. 1969. *The Myxomycetes*. University of Iowa Press, Iowa City.

Oltra M, Moreno G, Illana C. 1997. A rare *Didymium* from Spain. *Mycol. Res.* 101(12): 1508-1510.

Stephenson SL. 2021. *Secretive Slime Moulds. Myxomycetes of Australia*. ABRS, Canberra; CSIRO Publishing, Melbourne.

Wrigley de Basanta D. 2008. Morphology and life cycle of a new species of *Didymium* (Myxomycetes) from arid areas of Mexico. *Mycologia* 100(6): 921-929.