Rhamphidium purpuratum Mitt.: its vegetative propagation and distribution

Theo Arts

Introduction

*Rhamphidium purpuratum* Mitt. (Pottiaceae, subfam. Trichostemoideae Limpr.), syn.: *R. rechingeri* J. Baumg. (Gradstein 1970) and *Dicranella tenerifae* Winter, is a peculiar acrocarpous moss belonging to a small genus of less than fifteen species (Wijk et al. 1958–1969). Nine species are known from tropical and subtropical regions in Central and South America and three from Southeast Asia. Only one species, *R. purpuratum*, occurs in and is confined to Europe and Macaronesia.

*R. purpuratum* is illustrated in Mitten (1870), Geheeb and Herzog (1910) and Winter (1913). It does not resemble any other European member of Pottiaceae, but often displays a striking resemblance to *Dicranella schreberiana* and *D. grevilleana* and hence, based on a sterile specimen, it was described as *Dicranella tenerifae* (Winter 1913). *R. purpuratum* is however rather variable in gametophyte as well as sporophyte characteristics (Gradstein 1970, Long et al. 1981).

In March 1988 I collected *R. purpuratum* from three localities in Madeira and observed rhizoidal tubers, which reminded me of those in *Ditrichum cylindricum* (Whitehouse 1966). The tubers were cultivated on agar.

The culture technique is the same as reported by Arts (1986). All available specimens from the herbaria Arts, DUIIS, Fl, INA, L, LISU, Schwab, U, have been studied.

Morphology of rhizoids and rhizoidal tubers (Figs 1, 2)

Rhizoids pale yellowish to hyaline, smooth. Main rhizoids rather strong and abundant, up to 50 μm wide, distantly branched. Rhizoidal tubers laterally arranged on the main rhizoids; sprouting directly out of the rhizoid initial cells or terminating short rhizoidal stalks; pale brownish to hyaline, similar in colour to or slightly darker than the rhizoids; (75) 100–150 (200) μm in length and 60–80 μm in width; consisting of (112–3(4) large subspherical or tub-shaped cells arranged in a row; each tuber cell usually accompanied on its distal side by 1(2) small lenticular initial cells about 20–30 μm in diameter; outer cell walls thickened, smooth, surrounded by a hyaline layer 3–5 μm thick.

The rhizoidal tubers are rather frequently present. I observed them in 4 out of 7 specimens investigated which were properly collected with sufficient substrate.

The following list includes some specimens with rhi-

Madeira, between Poiso and Ribeiro Frio, alt. 1200 m, on wet rock along the road, leg. Arts 15638, 10 Mar 1988; Faja do Penedo, valley of the Ribeira do Porco, on rock-wall along forest road, leg. Arts 16297, 19 Mar 1988; São Roque do Faial, alt. 400 m, on steep earth-slope along the road, leg. Arts 15740, 10 Mar 1988.

The specimen Arts 15638 has been successfully cultivated. In culture protonemal filaments emerged from the initial cells of the rhizoidal tubers, giving rise to a very pale scarcely branched rhizoidal system, mainly concentrating at the substrate surface. After several weeks, very pale, nearly hyaline protonemal tubers, similar in shape to but smaller than the rhizoidal tubers observed in nature, occurred laterally on the main protonemal filaments (Fig. 2).

Habitat and distribution (Fig. 3)

Rhamphidium purpuratum seems to be restricted to localities with a very mild and humid micro-climate, where it occurs on more or less calcareous loamy soils, soil layers on rocks, tuff and schists. Often on irrigated walls, dripping rocks and beside wells.

It has been collected in Europe: Crete, Portugal and in Macaronesia: the Azores (Faial, Flores, São Jorge, São Miguel and Terceira), the Canary Islands (Tenerife) and Madeira (Gradstein 1970, Eggers 1982, Düll 1984). The indication refers to specimens which I examined from the above mentioned herbaria. Additional locality: the Azores: Isle of Pico, Gratoes, alt. 900 m, leg. B. Gogalves no. 586, 9 Aug 1971 (LISU).

The species is locally rather common in the Azores and Madeira but very rare in the Canary Islands, where it has been collected only twice in Tenerife (Long et al. 1981). Elsewhere it is restricted to only two known European localities. In Crete it has been collected on several occasions at the same locality; in 1943 by K. H. Rechinger (Baumgartner 1943), in 1967 by S. R. Gradstein and J. H. Smittenberg (Gradstein 1970) and in 1972 by R. Düll (herb. DUIS). In Portugal it was discovered by A. Luísier in 1943 (herb. INA) but obviously never recollected. Düll (1984) erroneously recorded it for Spain based on a specimen from the Azores (Span. Inst.).

From its special habitat requirements and the fact that all other extant species of Rhamphidium occur in tropical or subtropical regions we may conclude that R. purpuratum has a tropical origin and displays a relict distribution (Hertzog 1926). Gradstein (1970) reported capsules without spores in two collections from Crete: "archesporium aborted by the invasion of mucous colonies of micro-organisms into the theca".

The frequent occurrence of drought-resistant rhizoidal tubers undoubtedly favours survival during seasonal drought periods and may have contributed to prevent its extinction in Europe. Future protection of at least its few European localities seems to be urgently needed.

Fig. 1. Rhizoidal tubers in Rhamphidium purpuratum Mitt. 1-9: from a specimen collected in nature (Arts 15638).

Fig. 2. Protonemal tubers in Rhamphidium purpuratum Mitt. 1-14: from agar culture, started with rhizoidal tubers (Arts 15638).
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References


