

**A NEW CHEMICAL STRAIN OF
CLADONIA FURCATA (HUDS.) SCHRAD. (LICHENES)**

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The well-known and widespread lichen species *Cladonia furcata* (Huds.) Schrad. is usually very constant in its chemistry: fumarprotocetraric acid is its main secondary metabolite, sometimes accompanied by atranorin. Recently a new chemical strain, characterised by the presence of psoromic acid instead of fumarprotocetraric acid or atranorin, was found in Portugal by the first two authors during phytosociological investigations of heath vegetations. The plants are preserved in the herbarium of the Institute of Systematic Botany, University of Utrecht (U), leg. Barendregt & v.d. Dries nr. 1–2 (U).

Morphologically the plants with psoromic acid represent the slender form of *C. furcata*, which is the predominant form in lowland western Europe (fig. 1). The podetia are c. 3 cm long and up to 0.8 mm wide, branching regularly



Fig. 1. (Huds.) Schrad. Plant with psoromic acid, from Penhas Douradas, Portugal, leg. Barendregt & v.d. Dries nr. 1 (U).

but not very densely dichotomously, and olivaceous green to brownish in colour. Their habit varies from creeping and loosely tufted to erect and densely tufted. Squamules are present only occasionally, on the lower parts of the podetia, and are roundish with a crenulated margin, up to c. 1.2 mm wide.

The slender form was treated as a distinct variety by SANDSTEDE (e.g. 1931): *C. furcata* var. *racemosa* (Hoffm.) Flk., which name was corrected by THOMSON (1967) into *C. furcata* var. *furcata*. It is usually very distinct from *C. furcata* var. *pinnata* (Flk.) Vain., the commonest form in the central european mountain areas, which has much thicker podetia with more numerous and larger squamules.

The specimens with psoromic acid lack apothecia, and only a few podetia bear pycnidia on the tips. Consequently longitudinal fissures are nearly absent. No morphological differences between the plants with aberrant chemistry and those with the usual chemistry from the same localities could be observed.

The presence of psoromic acid was indicated by the yellow colour reaction upon application of paraphenylene diamine solution, and checked by TLC (WALKER & JAMES 1980, solvent system A). No trace of atranorin or fumarprotocetraric acid was found.

The new chemical strain of *Cladonia furcata* was found in six phytosociological relevés (fig. 2). One was made in the Serra de Montemuro (Serra de Bigorne) near Carvalhosa (7°56' W, 40°57' N) at an altitude of c. 1100 m. The five other relevés were in the northern parts of the Serra da Estrela in the surroundings of Penhas Douradas (7°32' W, 40°25' N to 7°35' W, 40°24' N) at 1300 to 1525 m. All localities are situated in the higher parts of the mountains, on windy, rocky places with a severe climate. Soils are 5–40 cm deep and consist of humous or sandy material with gravel, mostly on granite. pH-Values are between 4.7 and 5.0.

The vegetation of the plots can be characterised as an open heathland vegetation, 25–50 cm high. It shows characters of both *Ericion umbellatae* and *Juniperion nanae* and resembles the *Junipero-Ericetum aragonensis* (BRAUN-BLANQUET et al. 1964). Frequent species are *Halimium alyssoides*, *Erica australis* and *E. umbellata*, accompanied by e.g. *Agrostis delicatula*, *Sedum brevifolium* and *Lotus corniculatus*. Codominant in one or two relevés each are *Calluna vulgaris*, *Chamaespartium tridentatum*, *Echinopartium lusitanicum* and *Ulex europaeus*. Cryptogams are very abundant, mostly with cover percentages of 10%, and showing a high diversity. The following species were listed from the six relevés: the mosses *Bartramia pomiformis*, *Campylopus flexuosus*, *C. pilifer*, *Ceratodon purpureus*, *Dicranum scoparium*, *Grimmia trichophylla*, *Hypnum jutlandicum*, *Pleuroidium acuminatum*, *Polytrichum juniperinum*, *P. piliferum*, *Racomitrium canescens*, *R. heterostichum*, and the lichens *Cladonia arbuscula*, *C. bacillaris*, *C. cervicornis*, *C. chlorophaea*, *C. coccifera*, *C. fimbriata*, *C. floerkeana*, *C. macilenta*, *Coelocaulon aculeatum*, *Hypogymnia physodes*, *Peltigera rufescens* and *Sphaerophorus globosus*.

The discovery of a strain with psoromic acid in *Cladonia furcata* is an indication of the limited taxonomic value of a replacement of fumarprotocetraric acid

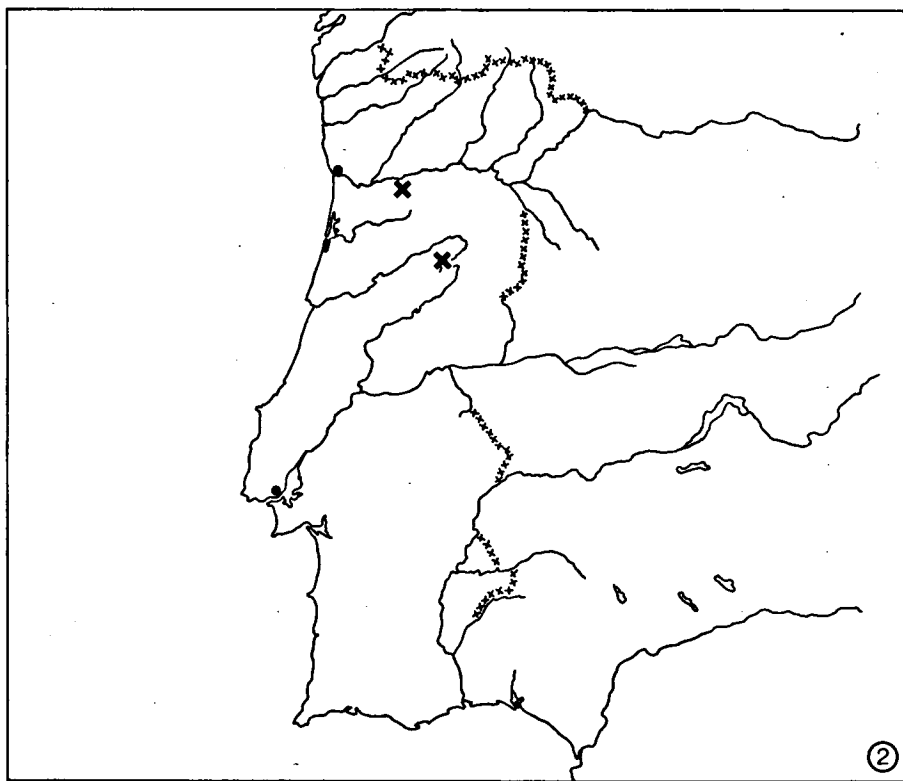


Fig. 2. Map of Portugal. The crosses mark the localities where plants of *Cladonia furcata* (Huds.) Schrad. with psoromic acid were found.

by psoromic acid. This may have consequences for the taxonomic position of *Cladonia rappii* Evans, or the *C. cariosa*-group. Moreover it forms another example of the increased chemical variation in southern european populations of common european lichens (cf. LEUCKERT & POELT 1978).

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