

***Bryum valparaisense* Thér. (Bryaceae, Bryophyta), new to the bryophyte flora of France**

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Abstract – *Bryum valparaisense* Thér. is reported new to France. It was collected on the Mediterranean coast in the eastern part of Dept. Pyrénées-Orientales. Its ecological requirements and the new locality are briefly described.

Bryophytes / Mosses / Bryales / rhizoidal tubers / Pyrenées-Orientales

INTRODUCTION

Bryum valparaisense Thér. was named as a species new to science by Thériot (1917). It was redescribed as a new species under the name *B. pyriferum* Crundw. & Whiteh. from the Canary Islands (Crundwell *et al.*, 1978). Subsequently Arts *et al.* (1995) showed the conspecificity of the two species. The distribution of *Bryum valparaisense* was reviewed by Arts *et al.* (1995), Preston & Finch (2006) and Rams *et al.* (2008). As a result, it is currently known from South America, North America, North Africa and Europe. In Europe, it has been reported from Portugal (Townsend, 1994), Spain (Rams *et al.*, 2008), SW. England (Preston & Finch, 2006) and the Canary Islands (Crundwell *et al.*, 1978; Long *et al.*, 1981). Although still incompletely known, its distribution can be considered as southern-temperate.

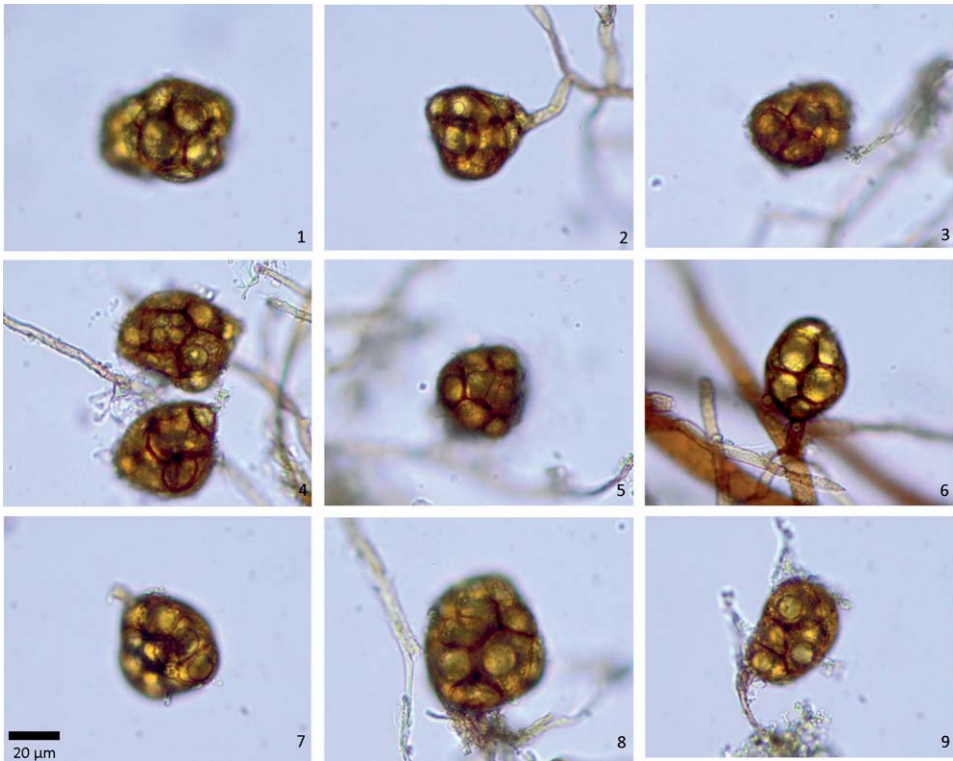
In the course of a bryological survey in Pyrénées-Orientales (France), we had the opportunity to observe several interesting species. Among them was *Bryum valparaisense*, which was hitherto unknown in the Spanish or French Catalan countries (Casas *et al.*, 2001; Thouvenot, 2002) and not recorded in other parts of France (Düll, 1985, 1992; Augier, 1966). Comments on its habitat, ecology and diagnostic characters are given in this paper. Moss nomenclature follows Hill *et al.* (2006). All the samples were collected by the author and are deposited in the private herbarium of V. Hugonnot.

NEW LOCALITY

France: Pyrénées-Orientales, Banyuls-sur-Mer, Cap Rederís, Long. 3,159746 ; Lat. 42,463837; alt. 2 m, 6 April 2011, V. Hugonnot.

Bryum valparaisense was observed on a semi-exposed rocky shore with little vegetation, at a distance of approximately 10 m from the Mediterranean sea. It was growing directly on a thin layer of detritic mineral material together with

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Figs 1-9. Variation in morphology of *Bryum valparaisense* Thér. tubers from Pyrénées-Orientales (V. Hugonnot).

only *Bryum dichotomum* Hedw. in the immediate vicinity. The area occupied was nearly 1 m². Dense colonies of *Trichostomum brachydonium* Bruch and *Tortella flavovirens* (Bruch) Broth. were present at a distance of a few meters. The absence of more robust bryophytes was characteristic within the small patches occupied by *Bryum valparaisense*.

The specimens collected show the following characters: very small plants (2-4 mm high); leaves with a percurrent costa; mid leaf cells 10-13 µm wide, without a differentiated border; quadrate alar cells; morphology of tubers variable (Figs 1-9), triangular, quadrate, oblong or subcircular in outline, imperfectly subspherical, yellowish brown, very numerous and evenly spaced along rhizoids; tubers (not flattened), from 33 to 60 µm, 2-4 cells wide, with non protuberant cells 11-29 µm wide. Gametangia and sporophytes were absent in the collected specimens.

DISCUSSION

Bryum valparaisense is an addition to the 10 other species of small tuber-bearing *Bryum* [often informally designated as “*Bryum erythrocarpum* complex”] known to occur in France (*Bryum bornholmense* Wink. et R.Ruthe,

B. demaretianum Arts, *B. klinggraeffii* Schimp., *B. radiculosum* Brid., *B. rubens* Mitt., *B. ruderae* Crundw. et Nyholm, *B. sauteri* Bruch et Schimp., *B. subapiculatum* Hampe, *B. tenuisetum* Limpr. and *B. violaceum* Crundw. et Nyholm).

Recognition of *Bryum valparaisense* relies mainly on tuber size, colour and morphology. Though potentially informative and diagnostic, the supposed differences in other gametophytic characteristic (Ochi, 1982) appear to be less reliable. Among European Bryaceae, only *Bryum demaretianum*, *B. sauteri* and *B. tenuisetum* have yellowish tubers comparable in colour to those of *B. valparaisense*. The tubers of *B. demaretianum* and *B. tenuisetum* are mostly more than 100 µm long which is never the case in *B. valparaisense*, where tubers reach a maximum of 80 µm and are more often near 50 µm in diameter. *Bryum sauteri* has flattened pyriform tubers, one cell thick, hence they appear translucent. In *Bryum valparaisense* they are 2-3 cells thick, more or less spherical and appear less translucent (Figs 1-9). *Bryum klinggraeffii* has small bright red or occasionally brownish tubers (yellow in *B. valparaisense*), with more or less bulging marginal cell-walls giving an undulating outline to the tuber (smooth outline in *B. valparaisense*). The publications of Crundwell & Nyholm (1964), Wilczek & Demaret (1974) and Guerra *et al.* (2010) should be consulted for extensive morphological descriptions of the aforementioned species. *Bryum valparaisense* was previously illustrated by Ochi (1982), Crundwell *et al.* (1978), Preston & Finch (2006), Finch & Preston (2006), Porley (2008) and Guerra *et al.* (2010).

The site where *Bryum valparaisense* was found is typical of the Mediterranean zone. Hence, the geographical situation of the newly discovered population resembles the bulk of previously known warm-temperate localities.

The ecological requirements of *Bryum valparaisense* are difficult to sum up because of the great heterogeneity of the habitats colonized in Europe (Preston & Finch, 2006). The species is an early pioneer of almost bare ground that appears tolerant of varied habitats. Tubers are dispersal units which may allow the quick colonization of bare substrates and survival during the unfavourable conditions of the Mediterranean summer. As is the case for most other small tuber-bearing *Bryum*, *B. valparaisense* mostly relies on asexual reproduction, although the balance of sexual and asexual reproduction invites detailed investigation. The predominance of subterranean vegetative reproduction and the inability of the species to compete with more robust and patch-forming mosses may explain why *B. valparaisense* has been observed in the most frequently disturbed micro-habitats left almost bare by trampling (by walkers and occasionally by motor vehicles). *Bryum valparaisense* appears able to tolerate sea-sprays and could as such be considered as a facultative halophyte.

Due to its strong dispersal capabilities by mean of rhizoidal tubers, several finds have been interpreted as recent introductions (Preston & Finch, 2006). *Leptophascum leptophyllum* (Müll.Hal.) J.Guerra et M.J.Cano, a species similar in its ecological and distributional characteristics, is remarkably abundant in neighbouring sites (pers. obs.). However, the discovery of new localities of *Bryum valparaisense* renders its European distribution more coherent and tends to weaken the introduction theory. *B. valparaisense* is nevertheless a transient species which is evidently favoured by human activities.

Bryum valparaisense is a rare species worldwide. In Europe, it has been listed with the IUCN status R [i.e. rare] (ECCB, 1995). To date, the Pyrenean locality is unique but a great number of potential habitats occurs along the rocky coast of the Catalan countries. The very small size of the population (occupying

less than 1 square meter) makes the species highly sensitive to any change at a small scale (e.g. modification of tourist pressure). Although additional survey should potentially reveal new populations, we propose to give *Bryum valparaisense* the R IUCN status for France.

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