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Two new liverworts for the bryophyte flora of Spain

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Abstract – Based on recent bryophyte collections, the presence of *Nardia insecta* Lindb. and *Tritomaria scitula* (Taylor) Jörg. from one locality in the Catalonian Pyrenees is indicated, being their first records for Spain. Data on their ecology are included and their conservation status discussed.

Liverworts / floristics / *Nardia insecta* / *Tritomaria scitula* / chorology / Pyrenees / Spain

Resumen – Sobre la base de recientes prospecciones briológicas, se indica, por primera vez para la Península Ibérica, la presencia de *Nardia insecta* Lindb. y de *Tritomaria scitula* (Taylor) Jörg. de una localidad de los Pirineos catalanes. Se aportan datos acerca de su ecología y se discute su estado de conservación.

Hepáticas / florística / *Nardia insecta* / *Tritomaria scitula* / corología / Pirineos / España

INTRODUCTION

During a recent fieldwork in Les Planes de Son, Central Pyrenees (Lleida province, Catalonia, Spain), aimed to increasing the bryophytic knowledge of this area, we collected two liverworts new to Spain: *Nardia insecta* Lindb. and *Tritomaria scitula* (Taylor) Jörg., with artic-alpine and artic-montane distributions respectively, both extremely rare in the Mediterranean countries (Ros *et al.,* 2007).

Les Planes de Son has an elevation range of 1450-2700 m and contains three major vegetation zones: montane, subalpine and alpine. The combination of limestone and siliceous substrates along with its high mountain climate with oceanic influence results in a great diversity as regards its plant species. A general account of bryophyte flora in Les Planes de Son is given in Cros *et al.* (2010). According to these authors, the catalogue of bryophytes of this area includes 198 taxa (45 liverworts and 153 mosses) some of them interesting from a biogeographical point of view, and extremely rare in the Iberian Peninsula, such as the mosses *Brachythecium turgidum* (Hartm.) Kindb., *Cynodontium strumiferum* (Hedw.) Lindb., *Dicranum leioneuron* Kindb. and *Polytrichastrum alpinum* (Hedw.) G.L. Sm.

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NEW RECORDS

Nardia insecta Lindb.

SPAIN: Lleida, Pallars Sobirà, Alt Àneu, canal de Tonador, 31TCH4018, 2250 m, at base of shady crevices, 1-IX-2007, *L. Sáez* (BCB 55932).

It formed small low dense cushions on a shady and humid limestone cliff. The plants are rarely, if ever, exposed to direct sunlight. *Nardia insecta* was growing together with the mosses *Amphidium mougeotii* (Schimp.) Schimp., *Brachythecium turgidum*, *Dicranoweisia crispula* (Hedw.) Milde, *Encalypta alpina* Sm., *Polytrichastrum alpinum*, *Stegonia latifolia* (Schwägr.) Venturi *ex* Broth. and *Syntrichia norvegica* F. Weber. Sporophytes not observed.

This is the first record for the Iberian Peninsula, although this species is known from the French Pyrenees (Infante & Heras, 2005a). *Nardia insecta* has an artic-alpine distribution and is known in Europe from Northern Europe, Britain, Alps, Central Massif and the Carpathian Mountains, on more or less humic soils, always wet, often by stream or lake margins (Blackstock, 1995). According to several authors (Schuster, 1969; Blackstock, 1995) the distribution of *N. insecta* is incompletely known due to confusion with both *N. geoscyphus* (De Not.) Lindb. and *N. lescurii* (Aust.) Underw. In the locality of Canal de Tonador where *N. insecta* was found, the habitat is not specially wet, but the area is covered with snow for long periods of time.

Tritomaria scitula (Taylor) Jörg.

SPAIN: Lleida, Alt Àneu, northern face of Pic del Pinetó, 31TCH3918, 2500 m, shady rocks on mica-schist substrate, 1-IX-2007, *L. Sáez* (BCB 55931).

The species was found on N-NE-facing shaded to slightly shaded siliceous rocks located on stream banks. It was covering an area of *ca* 150 cm^2, accompanied by the mosses *Polytrichastrum alpinum, Bryum caespiticium* Hedw., *Hypnum revolutum* (Mitt.) Lindb. and *Distichium capillaceum* (Hedw.) Bruch *et* Schimp., together with the fern *Cystopteris fragilis* (L.) Bernh. subsp. *fragilis.* Sporophytes not observed.

This is the first report for *T. scitula* in Spain, although it was reported from Andorra (Sotiaux & Schumacker, 2002). This species usually grows in fissures in neutro basic rocks in the alpine and subalpine region of the mountains. It has an artic-montane distribution and is known in Europe from Scandinavia, Alps and the Carpathian Mountains. This record is the most southerly one in this continent.

The number of localities of *T. scitula* in the Pyrenees is very low, although its habitat preference suggests that it could be more widely distributed. Similar habitats should be explored to identify further occurrences of the plant.

CONSERVATION STATUS

Nardia insecta and *Tritomaria scitula* are very rare species in the Pyrenees where they are at the limits of their ranges. They are probably rare because suitable microclimatic or substrate conditions are constraints for either

their establishment or reproduction. Nevertheless, they are likely to occur at other locations in the Spanish Pyrenees, but until further bryological investigations are made, we cannot determine which species are undercollected and which are actually rare. Following the criteria by Sérgio *et al.* (2006), both species should be preliminary assigned to Data Deficient category.

Nardia insecta forms a very small population on a steep, north-facing, rocky slope. It is threatened by erosion due to off-trail foot traffic. Potential threats are the habitat alteration by rock falls from the northern face of Roca Blanca peak, and the competition with other plants better adapted to this habitat.

The northern face of Pic del Pinetó, where *Tritomaria scitula* was found, was not subject to any form of direct human disturbance until the introduction of recreational rock-climbing a few years ago. At present, rock-climbing activities continue being the sole form of direct anthropogenic disturbance on these cliffs. Plant cover is reduced because of the proximity of *T. scitula* populations to the base of climbing routes. Management plans and conservation actions are needed to minimize the impact caused by direct anthropogenic disturbance on these areas of frequently climbed cliffs.

Spain lacks a specifically protecting legislation for threatened bryophytes (Infante & Heras, 2005b), and very few bryophytes (seven species and two genera) have been proposed for protection at regional level in Catalonia. Protection for this group of plants is currently dependent on habitat protection. Restricted access to the known localities and regulation of rock climbing in areas where *N. insecta* and *T. scitula* grow would be indicated as a means to ensure the survival and viability of these species there.

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