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Calicium chlorosporum new to Europe

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Abstract: Sarrión, F. J.; Burgaz, A. R. & Tibell, L. 2007. *Calicium chlorosporum* new to Europe. *Bot. Complut.* 31: 23-25.

Calicium chlorosporum has been found for the first time in Europe. It was growing on wood of *Abies pinsapo* in southern Spain. The description of the taxa and related species as well as a world distributional map is provided.

Key words: *Calicium*, chorology, Europe, Spain.

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Calicium chlorosporum se cita por primera vez en Europa. Ha sido encontrado sobre madera de *Abies pinsapo* en el sur de España. Se hace una descripción del taxón, se publican las características taxonómicas para diferenciarlo de taxones afines y se publica el mapa de distribución mundial.

Palabras clave: *Calicium*, corología, Europa, España.

INTRODUCTION

During a study of calicioid lichens of the Iberian Peninsula (Sarrión *et al*. 1999) some problematic specimens were encountered. One was identified as *Calicium chlorosporum* F. Wilson not hitherto recorded from Europe. *Calicium chlorosporum* was described from Australia, where it is widespread (Tibell 1987, McCarthy 2006), and has subsequently been reported from Mexico to Peru (Tibell 1987, 1996, Tibell & Ryan 2004), Madagascar (Aptroot 1990) and India (Tibell 2006). The Spanish specimen was found growing on wood of *Abies pinsapo* in Sierra de Las Nieves (Málaga Province), at an altitude of 1.050 m. This pinsapo-fir woodland occurs in the meso-supra-Mediterranean bioclimatic belt, and it is part of the basophilic *Paeonio broteroi-Abietetum pinsapo* community (Rivas-Martínez *et al*. 2002). This community belongs to the relict circum-Mediterranean fir forests, which are formed by several endemic fir species that survive in isolated locations. It is fragmented and occupies deep soils formed from Jurassic calcareous and dolomite bedrocks. The localities have a very complicated and abrupt relief with an understorey rich in endemic and oceanic vascular plant species. The forest is surrounded by evergreen sclerophyllous forest of *Quercus ilex* subsp. *ballota* or deciduous *Q. faginea* woodlands.

The pinsapo-fir woodlands are located in the Sistema Bético range in southern Spain, in a varied topography close to the Mediterranean Sea. They receive the first humid clouds from the sea in the rainy season, and suffer many mists; during the summer drought the northern slopes have a high temperature, and a very high humidity. Sharp changes in microclimate and vegetation occur between the northern humid slopes and the cold, dry southern slopes. There is no climate data available for the locality of *C. chlorosporum*, but at the nearby Grazalema village the climate is Mediterranean with very little summer drought and a high annual mean rainfall (2223 mm – in fact the highest precipitation in Spain). The annual mean temperature is 16,6 ºC.

The discovered of *C. chlorosporum* in the area extends its known distribution considerably (Fig. 1), and reflects the climate diversity of the Iberian Peninsula.

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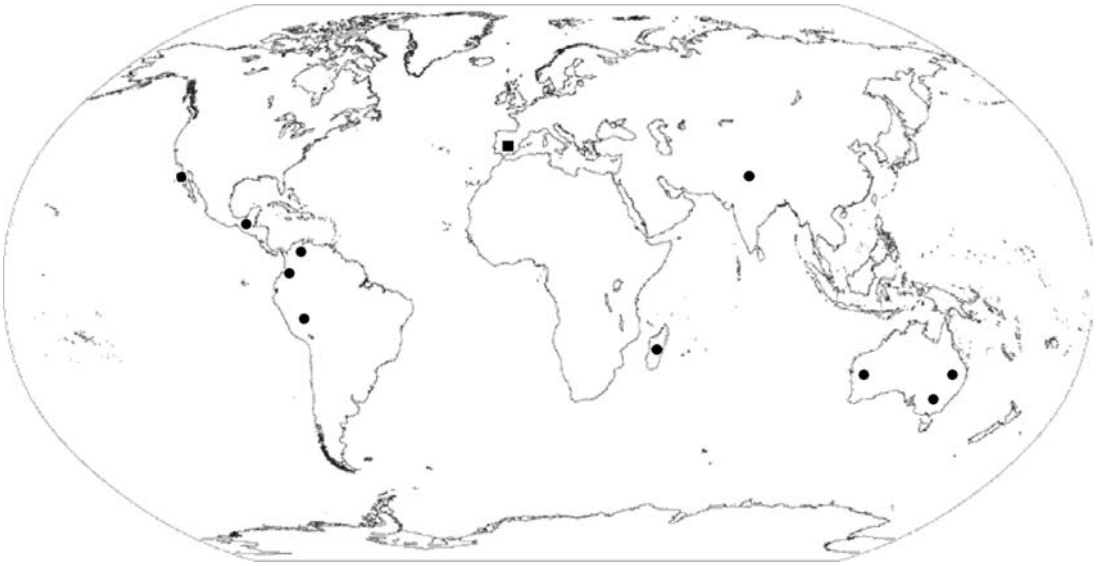

Fig. 1– World distribution of *Calicium chlorosporum.* ●, known localities. ■, new record.

RESULTS

Calicium chlorosporum F. Wilson

In Bailey, *Queensland Dept. Agric. Bull.* 7: 29 (1891). Illustration: Tibell (1987, Fig. 8).

Thallus verrucose, pale yellowish, or immersed, photobiont trebouxioid. Ascomata c. 1 mm high, with brownish pruina on the outer side of the capitulum, and young mazeadia often with a superficial yellowish pruina. Asci cylindrical, 35-50 x 3,5-4,5 µm, with uniseriate or somewhat overlapping spores. Ascospores brownish, ellipsoidal, 8-12 x 4-5 µm, with spirally arranged ridges and some cracks which distort the ridges in mature ascospores. Thallus K+ yellow turning red, KC+ orange to reddish, Pd+ orange yellowish. It contains norstictic and placodiolic acids, an unidentified xanthones.

C. chlorosporum is similar to *C. salicinum* and *C. viride* in the presence of brown pruina covering the lower side of the capitulum, but faint yellowish pruina of the young mazaedium is diagnostic. Asci with biseriately arranged spores and spirally arranged ridges in semi-mature spores are also features shared with *C. viride*, but in contrast to *C. viride* the asci of *C. chlorosporum* are cylindrical. *C. salicinum* can be distinguished from *C. chlorosporum* by the slightly smaller spores and a yellow pruina is never found in *C. salicinum*. *C. chlorosporum* is closely related to *C. adspersum*. In a recent molecular analysis of a selection of *Calicium* species along with other species in the Caliciaceae, *C. adspersum* is the sister-group of *C. chlorosporum* (Tibell 2006). These two species are also similar in spore ornamentation, and *C. adspersum* sometimes has a yellow pruina on the mazaedium. They differs, however, in so far that *C. adspersum* has clavate asci, larger spores and usually much shorter and stouter apothecia, which do not have a brown but a yellow pruina on the lower side (Table 1).

It is an epiphytic or lignicolous species in Spain occurring in the south, in a humid and warm climate. It has a temperate to subtropical world distribution. *C. salicinum* is a widespread species common in woodland areas of the Iberian Peninsula, while *C. viride* has a circumboreal distribution being more common in the Euro-Siberian Region, and is rare in the Mediterranean Region (Sarrión *et al*. 1999). *C. adspersum* has a wide distribution in the Northern Hemisphere and occurs both in Europe and North America. In Spain it occurs in the Málaga Province (Sarrión *et al*. 1999).

Specimen examined: Hs, **Málaga**: Parauta, Sierra de Las Nieves, 30SUF1860, 1050 m, on wood of *Abies pinsapo*, 3-I-1993, *F. J. Sarrión 41* (MACB 91876).

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Table 1
Diagnostic features of *Calicium chlorosporum, C. adspersum, C. salicinum* and *C. viride*.

	C. chlorosporum (source Tibell 1996)	***C. adspersum*** (source Tibell 1999)	***C. salicinum*** (source Tibell & Ryan 2004)	***C. viride*** (source Tibell & Ryan 2004)
Thallus	verrucose, yellowish	granular, greyish	immersed, grey	granular, green
Capitulum	brownish pruina and often yellowish pruina	yellowish pruina	brown pruina	brown pruina
Ascus size (µm) and shape	33-50 x 3,5-4,5 cylindrical	24-33 x 6-8 clavate	35-44 x 3-4 cylindrical	20-25 x 4-5 clavate
Ascospore size (µm)	8-12 x 4-5	13-17 x 6-8	8-10 x 3,5-4,5	11-14 x 5-7
Arrangement of spores in the asci	uniseriate to biseriate	biseriate to threeseriate	uniseriate	biseriate to threeseriate
Ascospore ornamentation	spirally arranged ridges; occasional irregular	cracks spirally arranged ridges	spirally arranged ridges; occasional irregular cracks	spirally arranged ridges to cracked-areolate
Chemistry	norstictic and placodiolic acids, xanthones	norstictic and vulpinic acids	norstictic and placodioloic acids	rhizocarpic acid and epanorin

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