

Contribution to the lichen-forming fungi from the Canary Islands

III. The genus *Cladonia*

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Abstract

Seventeen species of the genus *Cladonia* are reported from the Canary Islands (Gomera and La Palma). *C. iberica* and *C. umbricola* are new to the Macaronesian Region while *C. diversa* is new to the Canary Islands.

Key words: Lichenized Ascomycetes, *Cladonia*, mycoflora of Canary Islands.

Resumen

Se relacionan diecisiete especies del género *Cladonia* muestreadas en las Islas Canarias (Gomera y La Palma). *C. iberica* y *C. umbricola* son primeras citas macaronésicas, mientras que *C. diversa* constituye una nueva cita canaria.

Introduction

During lichenological field work in the Canary Islands visiting the islands of Gomera and La Palma in 1994 and 1995, the first author collected, among other lichens (ETAYO 1996a, 1996b), several samples of the genus *Cladonia* that were chemically tested by the second author. The chemical constituents were identified using thin layer chromatography (TLC) according to standardized procedures (WHITE & JAMES 1985).

The genus *Cladonia* is still insufficiently known in Canary Islands. ABBAYES (1946; 1947; 1960) published data of this group and many records were compiled by TAVARES (1952) but without indication of author and locality. The bibliographic references are to be found in the Macaronesian checklist published recently by HAFELLNER (1995) but no analysis of the chemical substances were published. The material studied is deposited in the personal herbarium of the first author [hb. Etayo].

The species

Cladonia caespiticia (PERS.) FLÖRKE

It was reported from Gomera and La Palma by ØSTHAGEN & KROG (1976). The material contains fumarprotocetraric acid.

La Palma, from Breña Baja to La Cumbre, on stones, mixed with *C. rangiformis*, 760 m, 10.VIII.1995, J. Etayo 13924.

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***Cladonia coccifera* (L.) WILLD.**

It was previously reported to Canarias (Gran Canaria and Hierro) by ØSTHAGEN & KROG (1976) but this is the first record to Gomera.

Gomera, in the lookout of Tajenke hill, on mossy trunks of *Erica*, 1240 m, 8.VIII.1994, J. Etayo 13928.

***Cladonia coniocraea* (FLÖRKE) SPRENG.**

La Palma, recreational area of Pared Vieja, in the pathway to Los Lomos, on *Erica* branches, 1180 m, 10.VIII.1995, J. Etayo 13930.

***Cladonia dimorpha* S. HAMMER**

The first record of this taxon was from Gomera, Tagamiche, 850 m, 1980, Follmann 26682 [B, H, KOELN] (BURGAZ & AHTI 1994). It was considered as a widespread species but usually it is overlooked.

Gomera, 2 km in the road from San Sebastián to Hermigua, on soil mixed with *C. rangiformis* in *Pinus* woodlands, 2.VIII.1994, J. Etayo 13957.

La Palma, in the way from Breña Baja to La Cumbre, on stones, mixed with *C. ramulosa*, 760 m, 10.VIII.1995, J. Etayo 13965. 19 km in the way from Santa Cruz to El Paso, before the tunnel, on slopes of the pathway to Los Lomos, 1000 m, 10.VIII.1995, J. Etayo 13929.

***Cladonia diversa* ASPERGES**

In the Macaronesian Region it has been only reported to Azores Islands by PURVIS & JAMES (1993). First record from the Canary Islands.

Gomera, Hermigua, Tajake hill, on trunks and soil in the "laurisilva" woodland, 1300 m, 4.VIII.1994, J. Etayo 13944.

***Cladonia firma* (NYL.) NYL.**

It was reported from the Canary Islands by KLEMENT (1965). It contains atranorin and fumarprotocetraric acid.

Gomera, Agulo, Sobreagulo ravin, road from La Cerpa to Los Príncipes, 860 m, on soil with shrubs of the "fayal-brezal", 5.VIII.1994, J. Etayo 13948.

La Palma, pathway from Cumbre to Cabeza de Vaca, on soil with *Pinus* woodland, mixed with *Leptogium corniculatum*, 1250 m, 10.VIII.1995, J. Etayo 13939. Breña Arriba, on subhorizontal exposed rocks, 540 m, 10.VIII.1995, J. Etayo 13936.

***Cladonia foliacea* (HUDS.) WILLD.**

The samples have small squamules, yellowish green, growing in exposed situations. They contain fumarprotocetraric and usnic acids.

Gomera, Agulo, Sobreagulo ravin, in the road from La Cerpa to Los Príncipes, on soil, "fayal-brezal", 865 m, 5.VIII.1994, J. Etayo 13943.

La Palma, Las Tricias, rocky ravin in the "tabaibal", 300 m, 11.VIII.1995, J. Etayo 13942.

***Cladonia furcata* (HUDS.)SCHRAD.**

This is a morphological and chemically very variable taxon. Our samples contain fumarprotocetraric acid and some have atranorin and physodalic acid, too.

Gomera, Hermigua, Contadero, pathway to the Ermita, 1000 m, on slopes of the "laurisilva", with *Parmotrema crinitum*, 6.VIII.1994, J. Etayo 13923, 13956. Hermigua, near the lookout of Tajaque, on soil, 1300 m, 4.VIII.1994, J. Etayo 13954.

La Palma, recreational area of Pared Vieja, in the pathway to Los Lomos, on soil with *Pinus* woodlands, 1180 m, 10.VIII.1995, J. Etayo 13953. Near the radio antenna, pathway to cumbre Nueva, on soil of the "laurisilva" woodland, 1400 m, 15.VIII.1995, J. Etayo 13955 & A. Rebolé.

***Cladonia iberica* BURGAZ & AHTI**

This taxon was recently described from the Mediterranean Region of Spain (BURGAZ & AHTI 1994). This is the first report from the Macaronesian Region. The sample contains atranorin and protolichestirenic acid.

Gomera, Agulo, Sobreagulo ravin, road from La Cerpa to Los Príncipes, on soil, heathland, 865 m, 5.VIII.1994, J. Etayo 13947.

***Cladonia macilenta* HOFFM. var. *bacillaris* (GENTH)SCHAER.**

The samples contain squamatic, usnic and traces of barbatic acid and belong to the chemotype II of *C. macilenta* (= *C. bacillaris* GENTH). This chemical variety has not been reported earlier from the Macaronesian Region.

La Palma, Cumbre Nueva, near the radio antenna, pathway to Cumbre Nueva, on *Pinus* trunks, 1550 m, 11.VIII.1995, J. Etayo s.n. & A. Rebolé.

***Cladonia ochrochlora* FLÖRKE**

La Palma, Cumbre Nueva, in the radio antenna of the pathway to Cumbre Nueva, on *Erica* branches, 1400 m, 11.VIII.1995, J. Etayo s.n. & A. Rebolé.

***Cladonia ramulosa* (WITH.) J.R.LAUNDON**

It has only been reported from the Canary Islands in the Macaronesian Region (TAVARES 1952 - as *C. pytirea* (FLK.)FR.).

La Palma, way from Breña Baja to La Cumbre, on stones, mixed with *C. dimorpha*, 760 m, 10.VIII.1995, J. Etayo 13965.

***Cladonia rangiformis* HOFFM.**

This is a very variable taxon, very often encountered in the Canary Islands. It grows on soil of the "laurisilva" woodland. The samples contain atranorin and rangiformic acid.

Gomera, Km 12 in the road from La Degollada de Peraza to San Sebastián, on rocks, 820 m, 7.VIII.1994, J. Etayo 13962. Hermigua, La Ermita, pathway of Los Políticos, 935 m, 4.VIII.1994, J. Etayo 13958. Km 2 in the road from San Sebastián to Hermigua, 2.VIII.1994, J. Etayo 13957. Agulo, Sobreagulo ravin, road from La Cerpa to Los Príncipes, on soil in heathland, 865 m, 5.VIII.1994, J. Etayo 13964. Vallehermoso, La Bruma, on soil in the "laurisilva", 1000 m, 5.VIII.1994, J. Etayo 13952.

La Palma, La Cumbrecita, 1190 m, on rocks, 10.VIII.1995, J. Etayo 13961. Breña Arriba, on exposed subhorizontal rocks, 10.VIII.1995, J. Etayo 13963. Way to La Cumbrecita, 100 m before El Riachuelo, 950 m, on rocks, 10.VIII.1995, J. Etayo 13960. 19 km in the way from Santa Cruz to El Paso, before the tunnel, on slopes of the pathway to Los Lomos, 1000 m, 10.VIII.1995, J. Etayo 13959. Way from Breña Baja to La Cumbre, on stones, mixed with *C. caespiticia*, 760 m, 10.VIII.1995, J. Etayo 13924.

***Cladonia squamosa* HOFFM.**

It is a common species growing on branches of *Erica* mixed with *Spahaerophorus globosus* in Garajonay as it was recorded by MESTER (1986). It contains squamatic and traces of barbatic acid.

Gomera, Hermigua, lookout of El Bailadero, on *Erica* in a *Taxus* woodland, 1010 m, 4.VIII.1994, J. Etayo 13391.

La Palma, recreational area of Pared Vieja, pathway to Los Lomos, on *Pinus* in "fayal-brezal", 1180 m, 10.VIII.1995, J. Etayo 13945.

***Cladonia subcervicornis* (VAIN.)KERNST.**

It has been reported from Canary Islands by TAVARES (1952). The samples contain atranorin and fumarprotocetraric acid.

La Palma, Puntagorda, in a dry rocky ravin, 665 m, 11.VIII.1995, J. Etayo 13925. Breña Arriba, on exposed subhorizontal rocks, 540 m, 10.VIII.1995, J. Etayo 13936.

***Cladonia subulata* (L.)WEBER ex F.H.WIGG.**

TAVARES (1952) reported this taxon, as *C. cornutoradiata* (COEM.)VAIN., from the Canary Islands.

La Palma, pathway Hoyo del Rehielo in the way to Cumbre, 1420 m, in *Pinus* woodland, 10.VIII.1995, J. Etayo s.n.

***Cladonia umbricola* TØNSBERG & AHTI**

It has very narrow podetia containing squamatic acid and skyrin, being the podetia and squamules with a orange lower base. This is an oceanic taxon distributed in Europe from Norway to Scotland (TØNSBERG & AHTI 1980; PURVIS & al. 1992) and in western North America (BRODO & AHTI 1996). First record to the Macaronesian Region.

Gomera, Hermigua, lookout of El Bailadero, on *Erica*, 1010 m, 4.VIII.1994, J. Etayo 13932. Ibidem, Tajaque, 1300 m, 4.VIII.1994, J. Etayo 13926.

La Palma, 19 km in the way from Santa Cruz to El Paso, before the tunnel, pathway to Los Lomos, on branches in the "laurisilva", 1000 m, 10.VIII.1995, J. Etayo s.n. Cumbre Nueva, 1550 m, *Pinus* with the "fayal-brezal", 11.VIII.1995, J. Etayo s.n. & A. Rebolé.

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References

- ABBAYES, H. DES 1946: Les *Cladonia* (Lichens) des îles Açores. – Portugaliae Acta Biol. 1: 243-254.
- ABBAYES, H. DES 1947: Lichens des îles Açores récoltés en 1937 par V. et P. Allorge. – Rev. Bryol. Lichénol. 16: 105-112.
- ABBAYES, H. DES 1960: L'aire géographique de *Cladonia mediterranea* DUV. & DES ABB. (Lichens) et son écologie d'après de nouvelles observations. – Supplément. Rev. Bryol. Lichénol. 29: 117-118.
- BRODO, I.M., AHTI, T. 1996: Lichens and lichenicolous fungi of the Queen Charlotte Islands, British Columbia, Canada. 2. The Cladoniaceae. – Can. J. Bot. 74 (7): 1147-1180.
- BURGAZ, A.R., AHTI, T. 1994: Contribution to the study of the genera *Cladina* and *Cladonia* in Spain. II. – Nova Hedwigia 59: 399-440.
- ETAYO, J. 1996a: Aportación a la flora liquenícola de las Islas Canarias. I. Hongos liquenícolas de Gomera. – Bull. Soc. linn. Provence 47: 93-110.
- ETAYO, J. 1996b: Contribution to the lichen flora of the Canary Islands. II. Epiphytic lichens from La Palma. – Österr. Z. Pilzk. 5: 149-159.
- HAFELLNER, J. 1995: A new checklist of lichens and lichenicolous fungi of insular Laurimacaronesia including a lichenological bibliography for the area. – Fritschiana 5: 1-132.
- KLEMENT, O. 1965: Zur Kenntnis der Flechtenvegetation der kanarischen Inseln. – Nova Hedwigia 9: 503-582.
- MESTER, A. 1986: Estudio corológico, fitosociológico y ecológico de la Laurisilva del Parque Nacional de Garajonay (Gomera) incluyendo la vegetación epífita. – Tesis de Licenciatura. Escuela Superior Técnica de Aquisgrán. 145 pp. (inérita).
- ØSTHAGEN, H., KROG, H. 1976: Contribution to the lichen flora of the Canary Islands. – Norw. J. Bot. 23: 221-242.
- PURVIS, O.W., JAMES, P.W. 1993: Studies on the lichens of the Azores. Part 1 - Caldeira do Faial. Arquipélago. – Life and Marine Sciences 11A: 1-15.
- PURVIS, O.W., COPPINS, B.J., HAWKSWORTH, D.L., JAMES, P.W., MOORE, D.M. 1992: The lichen flora of Great Britain and Ireland. – London: XXX.
- TAVARES, C.N. 1952: Contribution to the lichen flora of Macaronesia I. Lichens from Madeira. – Portugaliae Acta Biol. (B) 3 (3): 308-391.
- TÖNSBERG, T., AHTI, T. 1980: *Cladonia umbricola*, a new lichen species from NW Europe and western North America. – Norw. J. Bot. 27: 307-309.
- WHITE, F.J., JAMES, P.W. 1985: A new guide to microchemical techniques for the identification of lichen substances. – Brit. Lich. Soc. Bull.(suppl.) 57: 1-41.