Considerations on the Genus Callithamnion (Ceramiaceae, Rhodophyta) in the Canary Islands

MARTA SANSON & M. CANDELARIA GIL-RODRIGUEZ

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Actually, the taxonomy of the genus Callithamnion Lyngbye is not clear at all. The morphology of the thallus is considered very plastic under several environmental conditions (Harris 1962) and until now the application of names have been confused.

The genus Callithamnion have been studied in many localities under different aspects (Rosenvinge 1924; Mathias 1927; Boddeke 1958; Harris 1962 & 1966; Edwards 1969 & 1979; Whittick 1978; Price 1978; Dixon & Price 1981). However, the available information about the Callithamnion from the Canary Islands was limited to records of occurrence.

Until the critical assessment of Price et al. (1986) about the seaweeds of the western coast of tropical Africa and adjacent islands, where the Callithamnion are treated, seven species of this genus have been recorded from the Canary Islands:
C. byssoides Arnott ex Harvey in Hooker
C. corymbosum (J.E. Smith) Lyngbye
C. ellipticum Montagne
C. gallicum Nägeli
C. granulatum (Duluzeau) C. Agardh
C. hookeri (Dillwyn) S.F. Gray
C. tetragonum (Withering) S.F. Gray


The present paper was designed to provide a critical revision of the genus Callithamnion in the Canary Islands as well as to propose a provisional key to the Canarian species.

Material and methods

Data were obtained from plants collected in intertidal pools of different localities in the Canary Islands and deposited at TFC (Department of Vegetal Biology, University of La Laguna, Canary Islands) and from the literature.

The fresh samples were studied before and after fixation in 4% formalin in sea-water and mounted in 20% aqueous 'Karo' dextrose for permanent slides.
Results and discussion

It was pointed out previously that nine species of Callithamnion have been reported from the Canary Islands (see Price et al. 1986; Morales-Ayala & Viera-Rodriguez 1988; Sanson et al. 1991).

However, three of these are probably confused records. C. ellipticum was recorded by Montagne (1841) with some doubts, suggesting the relationship between this species and C. spongiosum Harvey. According to Price et al. (1986), Montagne's plants resembles a modified C. granulatum plant. Besides, no locality for this species was mentioned by him (Boergesen 1930). After Montagne (1841), C. ellipticum have not been recorded from this archipelago. Likewise, the C. gallicum record from the Canary Islands is mixed up. Sauvageau collected a few small specimens that referred to this species in Orotava (Tenerife) and Mlle Vickers referred a plant collected in Gran Canaria to "C. gallicum?" (Boergesen 1930). Later, C. gallicum have not been collected in the Canary Islands.

C. granulatum (Figs 3, 10, 11) was collected in Gran Canaria (Delgado et al. 1986) and once in Tenerife (Gil-Rodriguez 1980). According to Price et al. (1986) and our own observations, is singular that there were so few records of this species from the Canary Islands. In similar Mediterranean conditions C. granulatum is common. Nevertheless, although Feldmann-Mazoyer (1940), Feldmann (1942) and Gaykal (1958) included the Canary islands in the distribution area of this species, the presence of C. granulatum in this archipelago is uncertain.

On the contrary, the other six species of Callithamnion have been collected more recently:

- C. byssoides (Fig. 1) have been reported from La Palma (Gil-Rodriguez et al. 1985), Gomera (Harsun-Tabraue et al. 1984), Gran Canaria (Boergesen 1930; Weisscher et al. 1985; Jorge et al. 1986) and La Graciosa (Viera-Rodriguez 1985). Only two specimens of this species were collected in Tenerife (TFC PhyC. n° 4047, 4101).

- C. corymbosum (Fig. 2) have been collected in La Palma (Gil-Rodriguez et al. 1985), Gomera (Harsun-Tabraue et al. 1984), Tenerife (Lopez-Hernandez & Gil-Rodriguez 1982), Gran Canaria (Vickers 1936; Boergesen 1930; Delgado et al. 1986), Lanzarote (Gil-Rodriguez et al. 1985) and La Graciosa (Viera-Rodriguez 1985).

Recent collections in Tenerife have shown that specimens of this species are relatively common in intertidal pools of exposed localities, i.e. Puerto de la Cruz.

- C. hookeri (Fig. 4) was recorded for the first time from the Canary Islands in La Graciosa (Viera-Rodriguez 1985). However, Dixon & Price (1981), Lawsson & John (1982), Arelde (1970, as Aglaophamnion scopulorum (C. Agardh) G. Feldmann] and Gayral (1966, as Aglaophamnion scopulorum (J. Agardh) G. Feldmann] included the Canary Islands in the distribution area of this species. In recent collections from Tenerife this species have not been found.

- C. tetragonum (Fig. 5) have been collected in Tenerife (Afonso-Carrillo et al. 1979; Lopez-Hernandez & Gil-Rodriguez 1982), Gran Canaria (Boergesen 1930; Delgado et al. 1986; Jorge et al. 1986), Fuerteventura (Afonso-Carrillo & Gil-Rodriguez 1980), Lanzarote (Gil-Rodriguez & Afonso-Carrillo 1980) and La Graciosa (Viera-Rodriguez 1985).

- C. neglectum (see Wynne 1986) (Fig. 6) have been recently found in the Canary Islands (Gran Canaria) for the first time (Moraes-Ayala & Viera-Rodriguez 1988). Until now, this species have not been collected in the rest of the archipelago.

Finally, C. decompositum was also recently collected at Puerto de la Cruz (Tenerife, Canary Islands) for the first time (Sanson et al. 1991).

According to Harris (1962) and Dixon & Price (1981), there are many features too plastic to be utilized for separating species in Callithamnion. Nevertheless, Harris (1962) proposed another characters sufficiently non-plastic to be used:

1. number of nuclei in mature cells,
2. number of branches in spermatangiophore,
3. number of cells in spermatangiophore branches,
4. shape of carpogonial branch,
5. length of cells,
6. number of tetrasporangia on each cell,
7. shape of chromoplast masses,
8. origin of laterals,
9. shape of gonimoblasts on first-formed gonimo-blast,
10. length of gonimoblasts,
11. relative rate of growth of laterals.
However, some of these features are ephemeral and others variable in the Canarian material (i.e. length of cells).

The following provisional key (adapted from DIxon & PRICE 1981) establish the main features to segregate the Canary Islands species; nevertheless, further studies are needed in order to propose a definitive key of the Canarian species of Callithamnion.

**Provisional key for the genus Callithamnion on the Canary Islands**

<table>
<thead>
<tr>
<th></th>
<th>Lateral of limited growth not overtopping the axis on which they arise</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1*</td>
<td>Lateral of limited growth overtopping bearing axis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Protuberances of lateral ramuli arising from the first product of a principal apical cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2*</td>
<td>Protuberances of lateral ramuli arising on or after the second product of a principal apical cell</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C. byssoides</td>
</tr>
<tr>
<td>3</td>
<td>Apical cells of limited growth ramuli rounded terminally, sometimes finish off in a long hialine hair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3*</td>
<td>Apical cells of limited growth ramuli very small and conical</td>
<td></td>
<td>C. tetragonum (Figs 7-8)</td>
</tr>
<tr>
<td>4</td>
<td>Cell lengths not exceeding 5 x breath in any part of the thallus</td>
<td></td>
<td>C. hookeri</td>
</tr>
<tr>
<td>4*</td>
<td>Cell lengths exceeding 5 x breath in axes and principal lateral branches</td>
<td></td>
<td>C. corymbosum (Fig. 9)</td>
</tr>
<tr>
<td>5</td>
<td>Apical organization always complanate; the lower two cells of primary laterals with adaxial branches</td>
<td></td>
<td>C. decompositum</td>
</tr>
<tr>
<td>5*</td>
<td>Apical organization alternate-spiral or irregular; the lower two cells of primary laterals with alternate branches</td>
<td></td>
<td>C. hookeri</td>
</tr>
</tbody>
</table>

**C. neglectum** (Fig. 12) have not been included in this key because of the lack of sufficient data about the specimens from the Canary Islands. Only once have been collected from the archipelago (MORALES-AYALA & VIERA-RODRIGUEZ 1988).

**Summary**

After a critical revision of the records of the Callithamnion species from the Canary Islands as well as the study of new material, the presence of six species of this genus is confirmed: C. byssoides, C. corymbosum, C. decompositum, C. hookeri, C. tetragonum and C. neglectum. However, three of the previously reported species have probably been confused (C. granulatum, C. ellipticum and C. gallicum). A provisional key to identify the Canarian species is given.

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**References**


The authors' address
M. SANSON and M.C. GIL-RODRIGUEZ, Departamento de Biología Vegetal, Universidad de La Laguna, E-38271 La Laguna, Islas Canarias, España.