

RESEARCH NOTE

Nomenclature and typification of *Gelidiella tenuissima* (Gelidiales, Rhodophyta)

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B. SANTELICES AND J.M. RICO. 2002. Nomenclature and typification of *Gelidiella tenuissima* (Gelidiales, Rhodophyta). *Phycologia* 41: 436–440.

The nomenclature and the type material of the entity presently known as *Gelidiella pannosa* (Feldmann) Feldmann & Hamel are considered. It is concluded that *G. tenuissima* Feldmann & Hamel is the correct name for the species lectotypified by the specimen located in the lower left corner of the herbarium sheet 7913802 of Herb. Thuret (PC, Paris), collected in Biarritz, France, on 25 June 1868. The following names are considered synonyms of *G. tenuissima*: *Gelidium tenuissimum* Thuret, *G. pannosum* Bornet non Grunow, *G. pannosum* Weber van Bosse, *Echinocaulon pannosum* Feldmann, *Gelidiella pannosa* (Bornet) Feldmann & Hamel, *G. pannosa* (Feldmann) Feldmann & Hamel, and *G. tenuissima* (Thuret) Feldmann & Hamel. Syntypes of this species are found in the Thuret Herbarium (PC, Paris) and in Holmes' Herbarium at the British Museum, London.

INTRODUCTION

Gelidiella pannosa (Feldmann) Feldmann & Hamel is a small, mat-forming, filamentous red alga reported from various localities in warm temperate, subtropical, and tropical seas, including the Great Barrier Reef in Australia, Thailand, Vietnam, Indonesia, the Yeayama Islands in Japan, the Marshall Islands, Puerto Rico, the Canary Islands, Portugal, Morocco, Atlantic France, the Mediterranean, Senegal, Mauritania, Aldabra, Bangladesh, India, Kenya, and the Seychelles (Hatta & Prud'homme van Reine 1991; Silva *et al.* 1996; Shimada & Masuda 2000). Until 1936, the species was generally reported as *Gelidium pannosum* Bornet non Grunow. Between 1936 and 1970 it was called *Gelidiella tenuissima* Feldmann & Hamel. However, in 1961, Fan concluded that *G. tenuissima* was a superfluous *nomen novum* for *G. pannosa* (Feldmann) Feldmann & Hamel. This latter binomial has been in use over the last 30 years, but the basionym accepted by Fan (1961) was not validly published. This motivated us to reassess the nomenclature of *G. pannosa*. In this article we first summarize the taxonomic and nomenclatural history of the species. Then, we evaluate the validity of the names proposed and lectotypify the species.

TAXONOMIC AND NOMENCLATURAL HISTORY

In 1868, Bornet and Thuret collected in Biarritz, France, a small gelidioid that, on 25 June 1868, Thuret labelled as *Gelidium tenuissimum*. This name, however, was used only on the herbarium sheets and was never validly published.

Later, Grunow (1874) described as a new species a small, turf-forming gelidioid alga that had been collected in Samoa, naming it *G. pannosum*. While studying the Biarritz material collected in 1868, Bornet (1892, p. 267) concluded that it was referable to the species described by Grunow. Bornet remarked on the size and shape of the erect axes and the disposition and shape of the tetrasporangia. He also noticed the lack of internal rhizines in the erect axes and the regular disposition of the cortical cells in longitudinal rows. Although he noticed that the plants from Biarritz lacked anastomoses between the horizontal axes, Bornet thought that perhaps this character did not have the importance or stability attributed to it by Grunow. He therefore concluded that the specimens from Biarritz were so similar to *G. pannosum* that they must be conspecific. In 1895, Schmitz placed *G. pannosum* in his recently created genus *Gelidiopsis*. While studying the related species *Gelidium variable* J. Agardh, Schmitz (1895) had found its cystocarpic structure to be different from that of other *Gelidium* J.V. Lamouroux species and similar to those of the genus *Ceratodictyon* Zanardini. Complementing these observations with anatomical studies, Schmitz (1895) recognized that *G. variable* also lacked an apical cell and internal rhizines. Therefore, he erected the genus *Gelidiopsis* to accommodate *Gelidium variable* and also *G. pannosum*, which became *Gelidiopsis pannosa* (Grunow) Schmitz.

The specimens collected in Biarritz and identified as *Gelidium pannosum* Grunow by Bornet were later examined by Weber van Bosse (1921, p. 223). She had previously studied *G. rigidum* (Vahl) Greville, finding that this species also lacked an apical cell and intracellular rhizines (Weber van Bosse 1904) and she therefore transferred *G. rigidum* to *Gelidiopsis*. When she came to study the Biarritz material, being aware of the importance of these taxonomic features, Weber van Bosse (1921) realized that the entity described as *Gelidium pannosum* by Bornet (1892) was different from the species described by Grunow because the French plants had an obvious apical cell. Therefore, she referred to the Biarritz alga as '*Gelidium pannosum* Bornet, non Grunow'.

Weber van Bosse (1928) reopened the discussion of the taxonomic affinities of the various specimens mentioned earlier. Stressing the presence of an apical cell and the lack of internal rhizines, she wondered if these taxa did not belong to the genus *Echinocaulon* Kützinger,

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which had been erected by Kützting (1843) on the basis of *Gelidium spinellum* Kützting and characterized precisely by the presence of an apical cell and the lack of internal rhizines. Weber van Bosse's suggestion was examined by Feldmann. Between 1929 and 1930, Feldmann studied several collections of marine algae from Cherchell, Algeria, where he found a species of gelidioid alga lacking internal rhizines and exhibiting an apical cell. To identify that species, he reviewed the differences between *Gelidium*, *Gelidiopsis*, and *Echinocaulon* and described several new species in these genera. His findings were published in three studies that appeared in 1931. One of them (Feldmann 1931a) is cited in the other two articles, and it can therefore be assumed to have been written first. Here, Feldmann (1931a) redescribed *Echinocaulon*, including in it four species: *E. rigidum* (Vahl) Kützting, *E. rigidiusculum* (Grunow) Feldmann, *E. setaceum* Feldmann, and *E. nigrescens* Feldmann. In other studies, Feldmann provided an extended description of *E. nigrescens* (Feldmann 1931b, p. 229), proposed the new combination *E. (?) ramellosum* (Feldmann 1931c, p. 11), and discussed the circumscription of *Echinocaulon*.

Feldmann referred to the Biarritz specimens in two of the 1931 publications. In his treatment of the genus *Echinocaulon*, Feldmann (1931a, footnote on p. 154) assigned them to '*Gelidium pannosum* Bornet (*non* Grunow)', which Feldmann thought might belong to a different genus. [je laisse de côté, pour le moment, le *Gelidium pannosum* Bornet (*non* Grunow) et le *Gelidium Borneti* Weber v. B. qui ne possèdent pas de rhizines et se rapprochent, par ce caractère, du genre *Echinocaulon*, mais qui mériteraient peut-être de constituer un genre distinct'].

Feldmann (1931c) refers in passing to the Biarritz alga under two different names, *G. pannosum* Bornet *non* Grunow and *E. (?) pannosum*. While discussing the taxonomic position of *E. (?) ramellosum*, Feldmann indicated that the anatomical structure of this alga resembled that of *Echinocaulon* as defined by Feldmann (1931a). However, other characters did not fit with his concept of *Echinocaulon*, particularly the regular disposition of tetrasporangia and cortical cells. Then he added (1931c, p. 11) 'Ces deux caractères la rapprochent, au contraire, du *Gelidium pannosum* Bornet *non* Grunow'. On p. 12, Feldmann (1931c) discussed again the validity and stability of these characters, indicating 'de même, la disposition sériée des tétrasporanges si caractéristique des *Echinocaulon* (?) *ramellosum* et *pannosum* se retrouve également chez un vrai *Gelidium*'. Finally, on p. 13, Feldmann (1931c) summarized his observations of *E. (?) ramellosum*, stressing its similarity with '*Gelidium pannosum* Bornet *non* Grunow'.

In 1934, Feldmann & Hamel noted that the name *Echinocaulon* had been used by Spach in 1841 for a genus in the Polygonaceae (angiosperms) and that Kützting's *Echinocaulon* was a later homonym. They proposed *Gelidiella* Feldmann & Hamel as a replacement. Feldmann & Hamel (1934) reviewed the known taxa in that genus, recognizing 10 species, one of which was '*Gelidiella pannosa* (Bornet) *comb. nov.*'; the basionym was *Gelidium pannosum* Bornet (*non* Grunow), and *E. pannosum* Feldmann (1931c) was included as a synonym.

Feldmann & Hamel (1936) indicated that Howe had called their attention to the fact that the basionym '*Gelidium pannosum*' Bornet would be a later homonym of *G. pannosum* Grunow and hence invalid; the combination *Gelidiella pannosa* (Bornet) Feldmann & Hamel would therefore also be invalid. Feldmann & Hamel (1936, p. 103) also noted that the use of the epithet *pannosum* in related genera (*Gelidiopsis*, *Gelidium*, *Gelidiella*) could cause confusion. Therefore, they proposed a new name, *Gelidiella tenuissima* Feldmann & Hamel *comb. nov.* On p. 103 of their article, Feldmann & Hamel (1936) characterized the binomial *G. tenuissima* as a new combination, but on p. 102 they started the analysis of this species under the name '*G. tenuissima* *nom. nov.*'.

After 1936, several authors used the name *Gelidiella tenuissima* Feldmann & Hamel (e.g. Dawson 1954; Blomquist & Almodovar 1961), although Boudouresque (1969) used the binomial *G. tenuissima* (Thuret) Feldmann & Hamel, referring to Thuret's manuscript use of '*tenuissimum*'. In 1961, Fan indicated (footnote, p. 340) that Feldmann (1931c) had already proposed the binomial *E. pannosum* for the plant described by Bornet. Using that name as a basionym, and citing articles 32 and 33 of the International Code of Botanical Nomenclature (ICBN), Fan (1961, p. 340) concluded that *G. pannosa* (Feldmann) Feldmann & Hamel was a valid name and therefore had priority over *G. tenuissima* Feldmann & Hamel. *Gelidiella pannosa* is

the name that has been used in recent studies (Hatta & Prud'homme van Reine 1991; Silva *et al.* 1996; Kraft & Abbott 1998; Shimada & Masuda 2000).

THE CORRECT NAME IS *GELIDIELLA TENUISSIMA*

Our historical review shows that eight names have been used for the species currently known as *G. pannosa* (Feldmann) Feldmann & Hamel. In chronological order these are:

Gelidium tenuissimum Thuret (unpublished manuscript of 1868)

Gelidium pannosum Grunow (Bornet 1892)

Gelidium pannosum Bornet, *non* Grunow (Weber van Bosse 1921)

Echinocaulon pannosum Feldmann (1931)

Gelidiella pannosa (Bornet) Feldmann & Hamel (1934)

Gelidiella tenuissima Feldmann & Hamel (1936)

Gelidiella pannosa (Feldmann) Feldmann & Hamel (Fan 1961)

Gelidiella tenuissima (Thuret) Feldmann & Hamel (Boudouresque 1969)

The name *Gelidium tenuissimum* Thuret was never effectively published and cannot be used for this species, and the application of *G. pannosum* Grunow to the Biarritz material (Bornet 1892) is a misidentification. Later research has consistently shown the Biarritz and Samoa plants are different species. The name *G. pannosum* Bornet *non* Grunow, created by Weber van Bosse (1921, p. 223), indicates that she distinguished *G. pannosum* Grunow from the French plants misidentified by Bornet. However, *G. pannosum* Bornet *non* Grunow is a later homonym of *G. pannosum* Grunow and hence invalid. Furthermore, the name should be ascribed to Weber van Bosse.

The name *E. pannosum* was mentioned in passing (Feldmann 1931c, p. 12) during the characterization of the genus *Echinocaulon*. The binomial was intended to be a new combination based on *G. pannosum* Bornet *non* Grunow, but because this was not a validly published name that might serve as basionym, *E. pannosum* Feldmann was a new name. Feldmann did not provide a description or diagnosis, a direct or indirect reference to a previous description or diagnosis, or a reference linking the new name to its replaced name. He also did not cite Weber van Bosse (1921) which, at that time, was the only available reference to *G. pannosum* Bornet *non* Grunow. Thus, *E. pannosum* Feldmann is also invalid (Greuter *et al.* 2000, articles 32 and 33).

The combination *Gelidiella pannosa* has been attempted twice (Feldmann & Hamel 1934; Fan 1961), based on two different basionyms – *Gelidium pannosum* Bornet and *E. pannosum* Feldmann – both of them invalid.

Thus, *Gelidiella tenuissima* Feldmann & Hamel (1936) appears to be the correct name for the entity presently known as *G. pannosa*. Its proposal as a new name was in accordance with the ICBN (Greuter *et al.* 2000), and the slight mistake made by Feldmann & Hamel (1936, p. 103) in characterizing this as a 'new combination' should not invalidate it. '*Gelidiella tenuissima* (Thuret) Feldmann & Hamel', as used by Boudouresque (1969), is based on the herbarium name *Geli-*

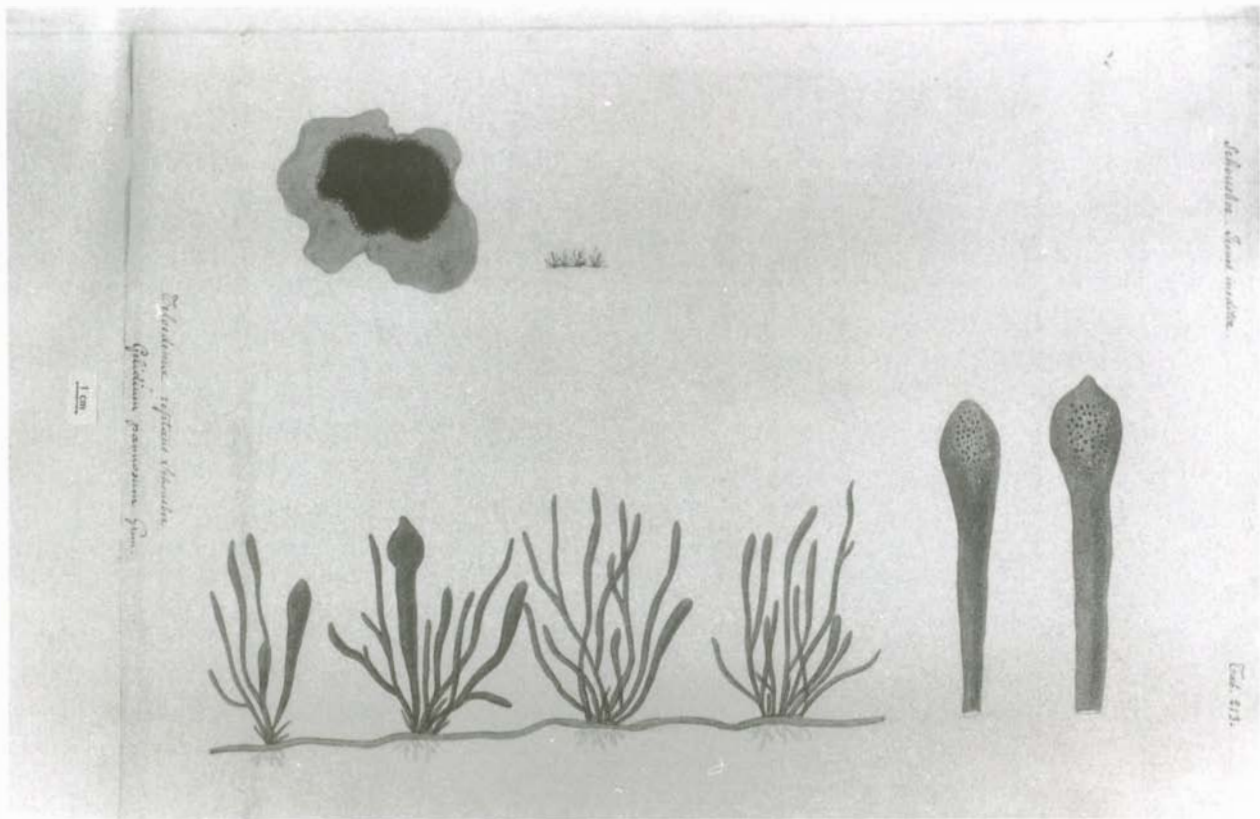


Fig. 1. Photograph of Schousboe's *Icones Ineditae* '*Teloedema reptans* Schousboe'. Note the annotation by Bornet naming this plant '*Gelidium pannosum* Grun.'.

dium tenuissimum Thuret, which was never effectively published. This name should not be used.

TYPIFICATION

Gelidium tenuissima was described by Bornet (1892, p. 267) on the basis of the specimens collected by Thuret and himself at Biarritz in 1868 and a description by Schousboe under the unpublished name *Teloedema reptans*. Bornet acknowledged, however, that no specimens of this *T. reptans* were present in the exsiccata that included most of the collections made by Schousboe in Morocco and southern Spain, which were compiled and distributed by L. Kralik under the name '*Algae schousboeanae*'. So, Bornet referred to one of the descriptions and illustrations included in Schousboe's '*Icones*' (reproduced in Fig. 1), which are a collection of 368 handwritten pages and 431 plates of seaweeds collected by P.K.A. Schousboe in Morocco. The only copy is kept at the Museum of Natural History in Paris (PC; Holmgren *et al.* 1990). On the other hand, Feldmann & Hamel (1936) considered that the plants depicted in the *Icones* (Fig. 1) were nothing more than a variety of *G. pusillum* (Stackhouse) Le Jolis.

In the Herbarium Thuret (PC), there are six sheets with specimens of *Gelidiella tenuissima* from Biarritz, of which one is chosen here as a lectotype. This sheet has five clumps mounted separately (Fig. 2), each labelled 'Herb. Thuret', 'G. Thuret' (in Thuret's hand), and 'Biarritz! 25 Juin 1868' (in Bornet's hand). There is another label: 'Herb. Thuret *Gelidium*

tenuissimum, Nob.(is)./(*Acrocarpus*)/Biarritz! Grottes de la falaise du/Casino 25 Juin, 1868 forma de/petits tapis ras sur le plafond des/grottes obscures'. Also attached is a piece of paper, in an unidentified hand, with a list headed: '*Gelidia bor-netiana*', including 'a) fibris intracellularibus nullis (*Gelidium* (*Acrocarpus*) *gracile* Kg (*G. intricatum* Kg var?) *Algae Bermudiana*, Tab. N 36 (cum tetraspores) *Gelidium tenuissimum* Thuret (*Gelidio pannosa* Gru. Maxima affinis)'. These annotations are in accordance with the protologue (Feldmann & Hamel 1936). Also, the reference to the similarity in habit to '*Callithamnion elegans*' in the attached piece of paper leads indirectly to the description of this entity in Bornet & Thuret (1876, p. 32), where there is a mention of the place and date of collection (Biarritz, June 1868 and July 1870), which is probably concordant with the dates when *Gelidiella tenuissima* was collected. We hereby designate the specimen in the lower left corner as a lectotype (Fig. 2). The remaining sheets in PC, and two more sheets, one from Holmes' herbarium (donated by Bornet) and annotated 'presumably type of *Gelidiella pannosa* (Feldmann) Feldmann & Hamel, Ian R. Price 18.v.1982' and the other from Thuret's Herbarium, identified as 'presumably (syn)type of *Gelidiella pannosa*' by Ian R. Price, both at BM, are designated as syntypes.

The lectotype is a tetrasporophyte with flattened stichidia and regular transverse rows of tetrahedrally divided tetrasporangia. No rhizines were observed in sections from this plant. Because the later homonym *Gelidium pannosum* Weber van Bosse, the invalid name *E. pannosum* Feldmann, and *Geli-*

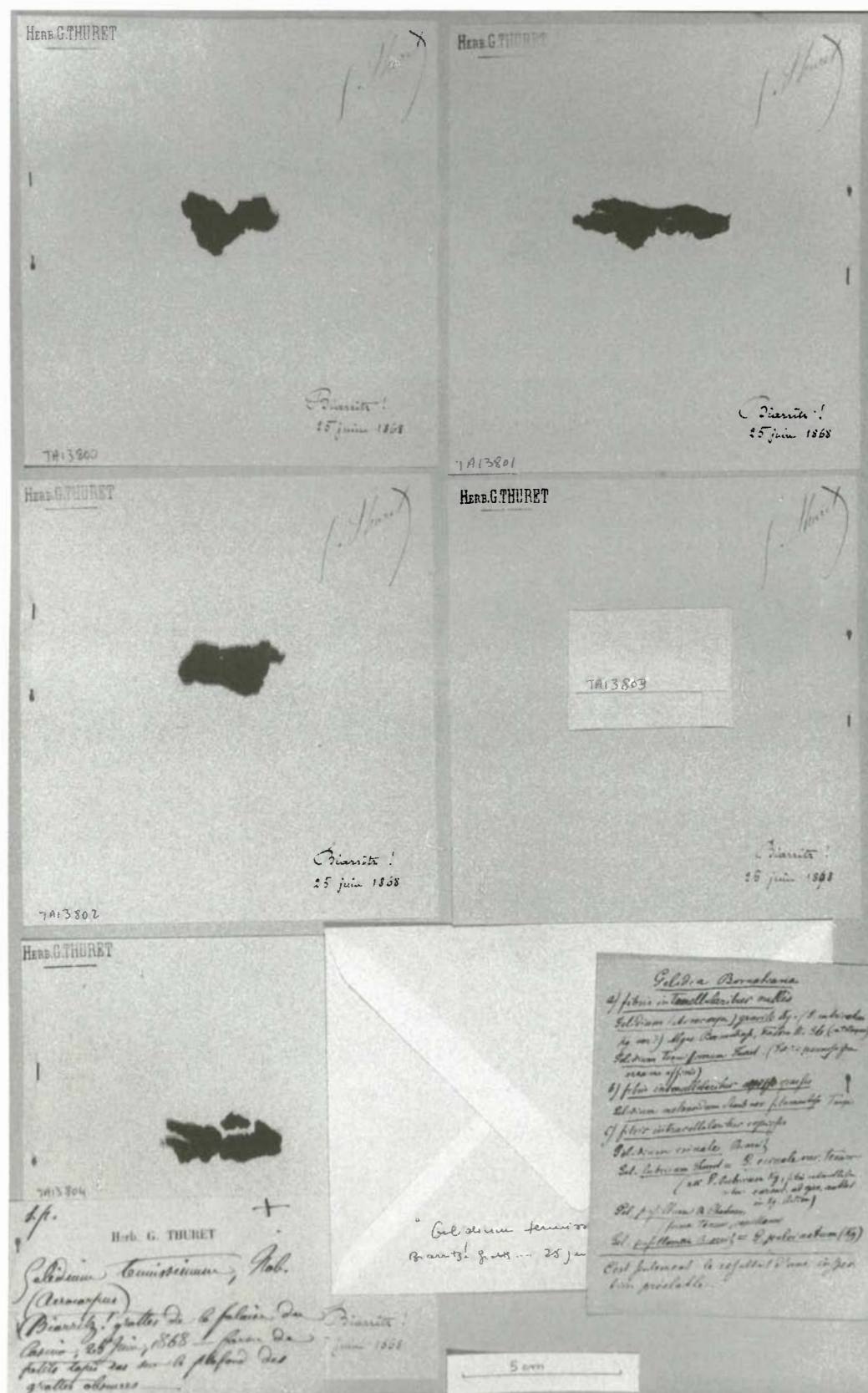


Fig. 2. *Gelidiella tenuissima*. Herbarium sheet from Thuret's herbarium (PC). The clump in the lower left corner is the selected lectotype.

diella tenuissima Feldmann & Hamel are homotypic, this lectotypification affects all three names.

ACKNOWLEDGEMENTS

Supported by grant FONDECYT 1990160. We offer our gratitude to Professor I.A. Abbott for much help with the literature and for correcting and improving the manuscript. Professor P.C. Silva offered generous nomenclatural advice, in spite of our different opinion on the validity of *E. pannosum*. J.M. Rico is a Marie Curie Fellow, supported by HCM (CT-93-0452) and TMR grants (CT-95-0043) from the European Union. The pictures reproduced in Figs 1 and 2 were provided by the Laboratoire de Cryptogamie, Muséum Nationale d'Histoire Naturelle, Paris.

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Accepted 18 February 2002