Gelidiella tinerfensis Seoane-Camba (Gelidiaceae, Rhodophyta): nomenclatural validity, typification, and taxonomic status

Wm. J. Woelkerling *Department of Ecology, Environment and Evolution, La Trobe University, Bundoora, Victoria 3083 Australia* (W.Woelkerling@latrobe.edu.au)

Giovanni Furnari *Department of Biological, Geological and Environmental Sciences, Section Vegetal Biology, University of Catania, via A. Longo 19, 95125 Catania, Italy* (furnari.giovanni41@gmail.com)

Roser Guardia *Plant Biodiversity Resource Centre, University of Barcelona, C/ Baldiri Reixac, 2, 08028 Barcelona, Spain* (cedocbiv@ub.edu)

Cesira Perrone *Department of Biology, University of Bari "A. Moro", via E. Orabona 4, 70125 Bari, Italy* (cesiraperrone@alice.it)

Uncertainty accompanies the nomenclatural validity, typification, and taxonomic status of the alga originally published as *Gelidiella tinerfensis* Seoane-Camba (1977: 133). Is the name validly published in the context of the current *ICN* (*International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code)*, Turland *et al*. 2018)? What original material (*ICN* Art. 9.4) exists; has a nomenclatural type been properly designated; and where is it housed? What is the current taxonomic status of *G. tinerfensis*?

In introducing *Gelidiella tinerfensis*, Seoane-Camba (1977) provided a Latin binomial and a Latin description, illustrated its distinctive morphological features, and indicated (p. 129) that in December 1972 he had collected a single alga from one locality near Puerto de la Cruz, Tenerife, Canary Islands (Spain) (p. 133, last sentence of Latin description). This constitutes a single gathering as defined in the *ICN* (Art 8.2 footnote). Seoane-Camba (1977) did not designate a type, however, until 10 years later (Seoane-Camba 1987) when **BCF** 02011 was formally designated as the nomenclatural type, and was linked to the earlier Latin description (Seoane-Camba, 1977). He referred to his choice as the holotype.

By contrast, Athanasiadis (2016: 415, including footnote 16), apparently unaware of Seoane-Camba's (1987) explicit type designation, considered *Gelidiella tinerfensis* to be nomenclaturally invalid, stating. "No (holo)type (or any gathering) indicated, apart from 'déc.1972.. une localité'. Art. 40.3 does not apply as several illustrations were included. Hence an invalid name (Art. 40.1; 40.2)." Athanasiadis (2016) cited the Melbourne Code (Mc Neill *et al*. 2012), but Art. 40.1 and 40.2 are unchanged in the Shenzhen Code (Turland *et al*. 2018), and the slight change in wording of Art. 40.3 (see Turland *et al*. 2018: Preface, p. xx; text p. 97 for details) does not affect statements made by Athanasiadis (2016) about *Gelidiella tinerfensis*.

ICN Art 38.1 (Shenzhen Code) specifies that in order to be validly published, the name of a new taxon must *(a)* be accompanied by a description or diagnosis or by a reference to a previously and effectively published description or diagnosis and *(b)* comply with the relevant provisions of Art. 32-45. Was *Gelidiella tinerfensis* validly published by Seoane-Camba (1977), or by Seoane-Camba (1987), or is the name still not validly published?

ICN Art. 40.1-40.3, referred to by Athanasiadis (2016: 415), explain what is acceptable as an "indication" of the type. Art 40.3 states in part that "…mention of a single specimen or gathering (Art 40.2) or illustration, even if that element is not explicitly designated as type, is acceptable as indication of the type of a name of a new species…". Use of the word "or" in Art 40.3 means that

mention of only one of the three options (specimen; gathering; illustration) is required for acceptability. Furthermore, nowhere in Art. 40.1-40.3, as suggested by Athanasiadis (2016: 415), or indeed anywhere in the *ICN*, is there a statement that Art. 40.3 does not apply if more than one illustration is included in an original account. Similarly, the requirement (Art. 44.2) for an illustration or figure for valid publication of a new species of a non-fossil alga after 1 January 1958 does not mean that including more than one figure renders the name invalid. Were this so, very few algal names introduced since 1 January 1958 would be considered validly published. Seoane-Camba (1977) provided four illustrations (drawings), three involving several parts. As noted above, Seoane-Camba mentioned that a single gathering from a single locality collected in December 1972 was involved, and thus all illustrations are presumed to pertain to this gathering. Moreover, the mention of a single gathering constitutes an acceptable indication of the type, even if a type is not explicitly designated.

The above analysis, together with other data in Seoane-Camba (1977), led us to conclude that the 1977 account of Seoane-Camba meets all of the requirements of *ICN* Art 38.1 for valid publication, including those (Art. 44.1, 44.2) applying explicitly to non-fossil algae, and consequently we have concluded that the name *Gelidiella tinerfensis* was validly published by Seoane-Camba (1977).

We also received independent assessments as to whether the name *Gelidiella tinerfensis* was validly published by Seoane-Camba (1977) from nomenclatural experts W. Greuter, K. Gandhi, and N. Turland (here acknowledged), all of whom also concluded that the name was validly published in Seoane-Camba (1977).

The type of the name of a species is either a single specimen or an illustration as defined in *ICN* Art. 8.1 (Shenzhen Code). A specimen (defined in Art. 8.2) involves a gathering or part of a gathering and may consist of a single organism, of parts of one or several organisms or of multiple small organisms; and a specimen may involve a single preparation (e.g., a single herbarium sheet) or more than one preparation, as defined in Art. 8.3.

Although Seoane-Camba (1977) provided a nomenclaturally acceptable “indication” of a type for *Gelidiella tinerfensis*, no nomenclatural type was formally “designated” until Seoane-Camba (1987) chose **BCF** 02011 as the ‘holotypus’. The specimen is depicted here in Fig. 1. Seoane-Camba (1987) did not, however, indicate whether or not **BCF** 02011 constituted the entire gathering (or part of it) collected in December 1972 from the locality near Puerto de la Cruz, Tenerife, Canary Islands. Thus, there has been uncertainty whether **BCF** 02011 should be called the holotype or instead the lectotype (see Art. 9.1 Note 1, 9.3, 9.10).

According to entries in *Index Herbariorum* (https://www.nybg.org/scence-project/index-herbariorum-upgrade) for **BCF** (Herbario Laboratori de Botànica, Facultat de Farmàcia, Universitat de Barcelona, Barcelona, Spain) and **BCN** (Herbarium of the University of Barcelona, Plant Biodiversity Resource Centre, University of Barcelona), all specimens in **BCF** were transferred to and incorporated into **BCN** in 2001.

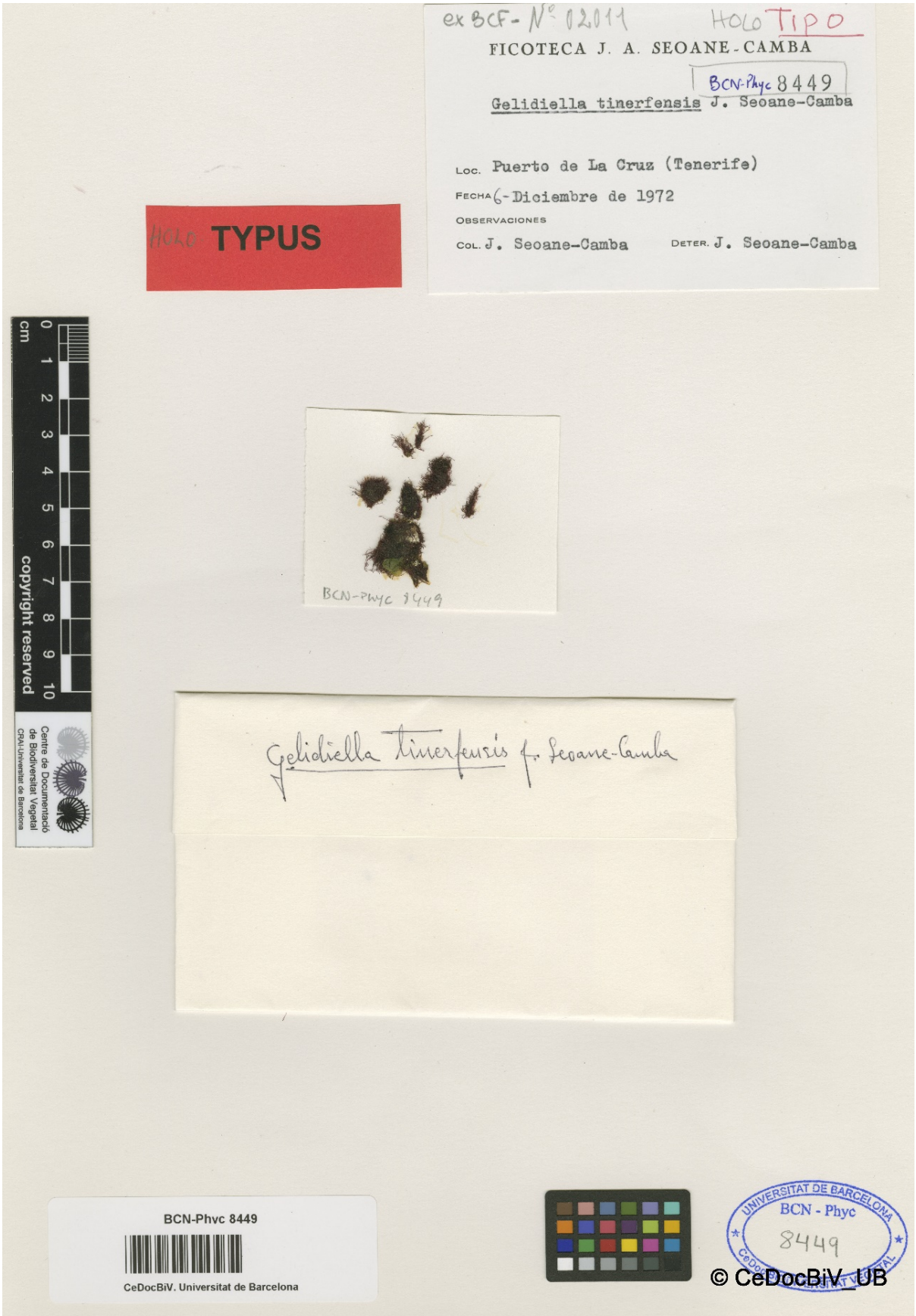

Fig. 1. Lectotype of *Gelidiella tinferensis* Seoane-Camba. See text for details.

During the present study, we found three herbarium sheets in **BCN** with specimens of original material (*ICN* Art. 9.4) of *Gelidiella tinerfensis***,** each with collection data including the collection date of 6 December 1972 on a label with the printed heading FICOTECA J. A. SEOANE-CAMBA. The herbarium sheet and specimen (Fig. 1) is numbered **BCN**-Phyc-8449; and ex **BCF**- Nº 02011 and HOLOTIPO are annotated by hand. The sheet also has an attached red label with the word HOLOTYPUS partly printed and partly handwritten. This is the specimen Seoane-Camba (1987) cited as the holotype. The other two specimens (not depicted here), kept in a folder numbered BCN-Phyc-8450, have labels with the same collection data as **BCN** Phyc-8449, have attached red labels with the word ISOTYPUS partly printed and partly written by hand, and are numbered **BCN** Phyc-8450 (1/2) and **BCN** Phyc-8450 (2/2) but lack **BCF** numbers. The two are not mentioned in Seoane-Camba (1987). Because a single specimen or illustration was not indicated as the nomenclatural type at the time of original publication (Seoane-Camba 1977) as required in *ICN* Art 9.1 & Note 1, all three specimens originally were syntypes (Art. 9.6). Therefore, the nomenclatural type (**BCF** 02011/**BCN** Phyc-8449) of *Gelidiella tinerfensis* designated by Seoane-Camba (1987) cannot treated as a holotype but rather (Art. 9.10) is correctly referred to as a lectotype. The other two original syntypes [**BCN** Phyc-8450 (1/2); **BCN** Phyc-8450 (2/2)] are best treated as isolectotypes (Art. 9.4 footnote) because they originated from the same original gathering as the lectotype and thus are considered duplicates (as defined in *ICN* Art. 8.3 footnote).

The lectotype (**BCF** 02011/**BCN** Phyc-8449) (Fig. 1) consists of seven clumps of material affixed to a small piece of paper which is housed in a packet attached to a herbarium sheet with collection data and other information.

A fourth specimen from the original gathering is housed in **FCO** (Herbario Departamento de Biología de Organismos y Sistemas Universidad de Oviedo, Spain) on a herbarium sheet numbered **FCO**-Alg 000224, a photo of which we received through the kindness of Eduardo Cires Rodríguez, Curator of the Herbarium. (Another photo of the same specimen was subsequently received from G.H. Boo.) This specimen was collected and identified by Seoane-Camba, and it has the same collection data as the three **BCN** specimens. **FCO**-Alg 000224 is mistakenly annotated by hand with the word "Holotype" and also has a red label with the printed word "HOLOTYPUS", which also is incorrect. In addition, the **FCO**-Alg 000224 specimen data are on a label with the heading **HERBARIUM FCO-ALGAS** rather than a label with the heading FICOTECA J. A. SEOANE-CAMBA. The specimen was probably a gift from the Curator of **BCN** to the Herbarium of Oviedo (J.M. Rico, pers. comm.) and is best treated as isolectotype.

Our analysis provides strong evidence that the name *Gelidiella tinerfensis* was validly published by Seoane-Camba (1977). The name is in accord with the *ICN* and thus is legitimate (see definition in ICN glossary), and it was lectotypified in Seoane-Camba (1987). Since 1977, the species has been retained within *Gelidiella* until Boo *et al*. (2016), based on a combined dataset analysis involving three genes (*cox*1; *psa*A; *rbc*L), transferred it to their newly recognized genus *Millerella* G.H. Boo & S.M. Boo as *Millerella tinerfensis* (Seoane-Camba) S.M. Boo & J.M. Rico. Boo *et al*. (2016: 976) based their taxonomic conclusions on molecular analysis of fragments from both the lectotype (**BCN** Phyc-8449 ex **BCF** 02011) and the isolectotype held in Oviedo (**FCO**-Alg 000224). All but one small fragment of the latter is depicted in fig. 2F in Boo *et al*. (2016), but is mistakenly referred to in the legend as the holotype rather than an isolectotype and mistakenly identified as number **BCF** 02011 rather than **FCO**-Alg 000224.

We are grateful to Sung Min Boo, Ga Hun Boo and José Manuel Rico Ordás for all information dealing with the herbarium sheets of *Gelidiella tinerfensis*. We also express our gratitude to the Editor and the two reviewers who provided excellent reviews that resulted in improvements to the manuscript.

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