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Title: Typification of *Blechnum spicant* var. *fallax* Lange (Blechnaceae)

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AR: member of the editorial council of the *Acta Societatis Botanicorum Poloniae*; other authors: no competing interests.

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SHORT COMMUNICATION

Typification of *Blechnum spicant* var. *fallax* Lange (Blechnaceae)

Paweł Wąsowicz¹, Łukasz Folcik², Adam Rostański^{2*}¹ Icelandic Institute of Natural History, Borgir við Nórðurslóð, 600 Akureyri, Iceland² Department of Botany and Nature Protection, Faculty of Biology and Environmental Protection, University of Silesia in Katowice, Jagiellońska 28, 40-032 Katowice, Poland* Corresponding author. Email: adam.rostanski@us.edu.pl**Abstract**

Blechnum spicant var. *fallax* Lange is a fern taxon endemic to Iceland where it occurs in the vicinity of hot springs on geothermally heated soils. The taxon was first described by a Danish botanist Johan Martin Christian Lange in 1880 on the basis of plant material collected by Christian Grønlund in Iceland. Because its holotype was not designated in the protologue, we examined the extant original material including illustrations from *Flora Danica* and a single plant on sheet C10021769 (deposited in C) that was the basis for the respective plate. We select this specimen as the lectotype of *Blechnum spicant* var. *fallax*.

Keywords

lectotype; *Blechnum spicant*; Iceland; nomenclature; Lange; Grønlund; Blechnaceae; hard-fern; deer fern

Introduction

Blechnaceae is an important leptosporangiate fern family distributed mainly in tropical regions of America and Australasia that comprises around 220–250 taxa in an uncertain number of genera [1,2]. It is estimated that about 80% of the species within Blechnaceae belong to the genus *Blechnum* [3]. *Blechnum* is well known for a very complex taxonomy and huge uncertainty regarding species relationships within the genus [3,4].

Blechnum spicant (L.) Roth. is the only species from Blechnaceae with a circumpolar distribution that occurs in temperate and even cold regions of the Northern Hemisphere [5].

It is clear that there is a significant morphological variation within *B. spicant* and several infraspecific taxa have been described including *B. spicant* subsp. *homophyllum* Merino, *B. spicant* var. *imbricata* Rostr., *B. spicant* var. *elongata* B. Boivin, *B. spicant* subsp. *nipponicum* (G. Kunze) A. Löve & D. Löve.

In Europe, the species is represented by the typical subsp. *spicant*, which is heterophyllous with different fertile and sterile fronds. There are, however, two homophyllous taxa described from Europe: *B. spicant* subsp. *homophyllum* Merino present in north western Spain and northern Portugal and *B. spicant* var. *fallax* Lange known from Iceland.

Icelandic plants belonging to var. *fallax* are homophyllous, prostrate, with all the leaves in a rosette, which is pressed to the ground. Leaves are very short (2–5 cm), pinatifid, lanceolate, and almost straight, with extremely short petioles on all the leaves, light green or inconspicuous brownish, with a few scales at the base. The rachis is distinctly green up to the tip of the frond [6].

Plants belonging to this taxon were first found by a Danish botanist Christian Grønlund during his excursion to Iceland in 1876 [7]. He found the plant growing on the cone of a large hot spring called Deildartunguhver in western Iceland. According to our best knowledge, the taxon can be considered endemic to Iceland.

Until now, the name *Blechnum spicant* var. *fallax* Lange has remained untypified according to modern nomenclatural practice, and our study aimed to designate a type for this name.

Typification

The protologue of *B. spicant* var. *fallax* can be found on page 11 of the 17th volume of *Flora Danica* [8] and includes a short morphological description and a geographic location:

Blechnum spicant var. *fallax* Lge. Differt a forma typica frondibus fertilibus et sterilibus conformibus, lanceolatis, pinnatisectis, segmentis steriliis obtusis, fertiliis acutiusculis. [...] In terris borealibus raro. [...] var. *fallax* ad thermas (23° R.) Tunguhver pr. Reikholt Islandiæ inter muscos a cl. Grøn-lund detecta est.

The Melbourne Code [9] states that original material comprises those specimens and illustrations (both unpublished and published either prior to or together with the protologue) upon which it can be shown that the description or diagnosis validating the name was based (Article 9.3). In the case described, the original material consists of at least several elements:

- Illustrations (watercolor paintings) being a part of Plate 2983 that accompanies the protologue. The plate (see Fig. 1) contains illustrations of two different varieties; var. *fallax* was depicted on several elements of Plate 2983. Illustrations 2 and 3 in Plate 2983 show general habit of the plant from two different perspectives – a view from below (Illustration 2) and a view from above (Illustration 3; not numbered in the original plate). However, they do not picture the same plant because Illustration 2 shows the plant with five smaller leaves, while Illustration 3 shows the plant with six bigger leaves; therefore, it is evident that these illustrations were based on two different individuals. Additionally, morphological details of var. *fallax* were depicted in Illustrations c (“Frons fertilis formæ Islandicæ”), d (“2 segmenta frondis fertilis ejusdem”), and e (“eadem a latere inf.”). It is unclear whether Illustrations f and g depict morphological details of var. *fallax* or var. *imbricata*, since detailed explanations are lacking.
- A herbarium sheet identified in Natural History Museum of Denmark (herbarium C) and belonging to the Flora Danica Collection (C10021769). The sheet contains clearly heterogeneous plant material consisting of two plants (marked as plant No. 1 and plant No. 2) as well as three leaves mounted above Plant 2 (Fig. 2). Plant 1 is labeled as *Blechnum spicant* (L.) Roth f. *imbricata*. The species name on the original label signed by Grøn-lund and glued below plant two is “*Blechnum boreale* Sw. var.” The label also contains information on the collection place: “Island: Tunguhver, varme Kilde” [Iceland, Tunguhver, warm spring]. Another label was also glued above the original label. It contains identification “*Blechnum spicant* var. *fallax* Lge.” and a sentence in Danish “Dette Exemplar tegnet til *Flora Danica*” [This sample was drawn for *Flora Danica*]. Both labels bear a stamp “Herb. Joh. Lange”. The appearance of both plants from the sheet and their numeration clearly corresponds with the Plate 2983 published in *Flora Danica* [8].

It is almost certain that the above-mentioned elements of the original material do not constitute a comprehensive list, since two different (!) plants were depicted on the Plate 2983 in *Flora Danica*. Our research in the C herbarium also showed the presence of another sheet annotated as *Blechnum spicant* var. *fallax* Lange collected by Grøn-lund, but it cannot be proved that the description of the taxon was also based on it.

None of the above elements can be treated as a holotype as we cannot point out the only element upon which the validating diagnosis was based (Art. 9.1 Note 1 and Art. 9.3 of the Code [9,10]). Moreover, no specimens were explicitly cited in the protologue [8]. In such a case, Article 9.12 of the Code states that “the lectotype must be



Fig. 1 The Plate 2983 from *Flora Danica* [8] with the *Blechnum spicant* var. *fallax* (Illustration 2 in top left part of the plate).

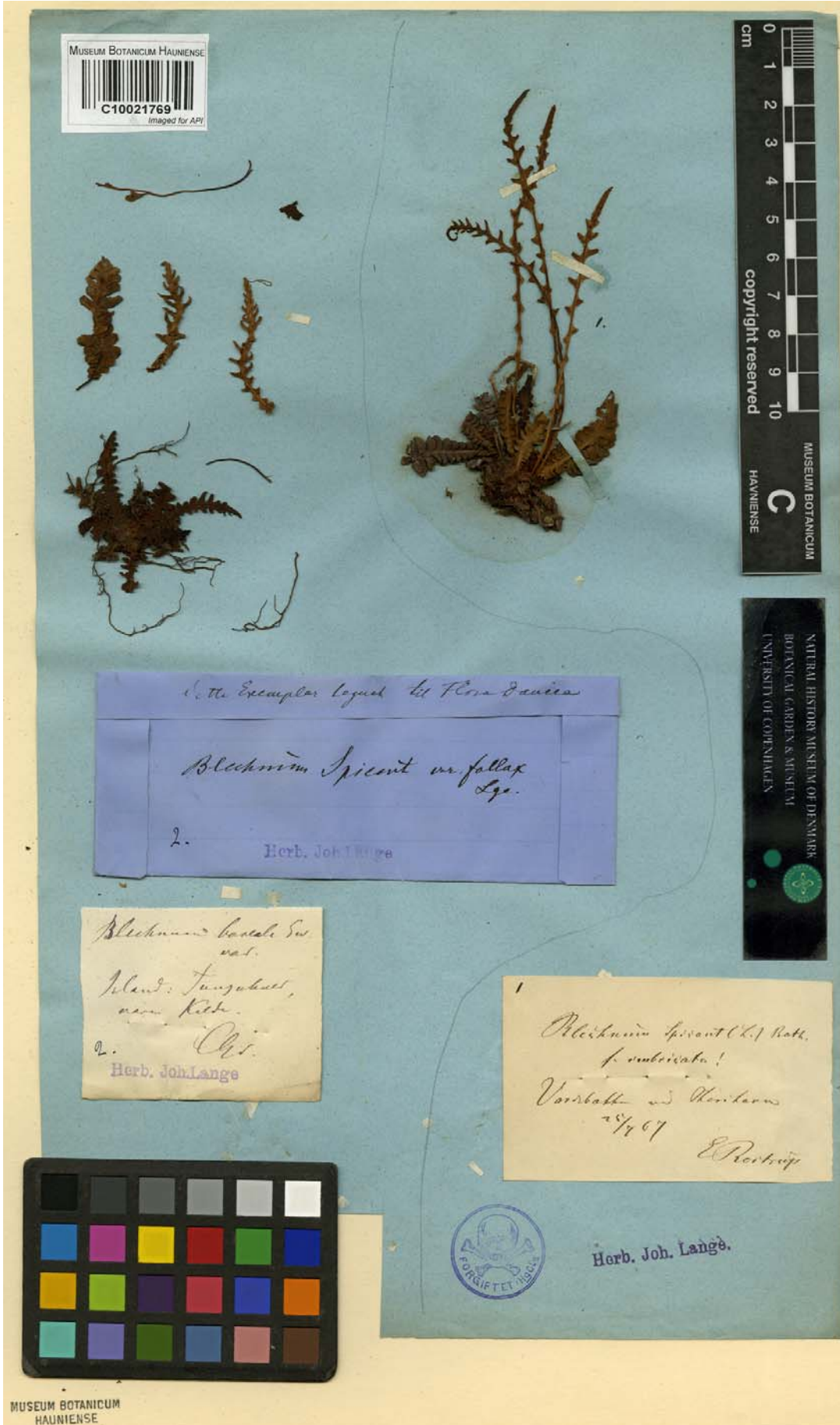


Fig. 2 Herbarium sheet C10021769 with the lectotype of *Blechnum spicant* var. *fallax* Lange (left hand specimen, i.e., plant No. 2 and its separate parts).

chosen from among the uncited specimens and cited and uncited illustrations that comprise the remaining original material, if such exist". These three latter elements have equal priority. We decided to designate the specimen – plant No. 2 preserved on the herbarium sheet deposited in C (barcode C10021769) as a lectotype of the name. There is no doubt that it is the specimen depicted in one of the illustrations being a part of the Plate 2983 (that accompanies the protologue). Our choice ensures that all the important characters of the taxon (e.g., shape and color of scales) can be analyzed in detail. The formal typification may be thus summarized as follows:

***Blechnum spicant* var. *fallax* Lange**, Flora Danica, Fasc. 50, No. 2983 (1880). **Lectotype (designated here)**: Island, Tunguhver, varme Kilde, *Ch. Grønlund s.n.* [C barcode C10021769, left hand specimen, i.e., plant No. 2 and its separate parts (digital image!)].

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