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REVIEW

S. B. Gorski's Bryological Collection in the Herbarium of Vilnius University

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Abstract

Stanisław Batys Gorski (1802–1864) was a pharmacist, botanist, and entomologist. At the beginning of the nineteenth century, he headed the Vilnius University Botanical Garden and lectured on botany at the Imperial University of Vilnius and the Vilnius Medical and Surgical Academy. It is a known fact that the Herbarium of Vilnius University (WI) contains Gorski's largest collection of vascular plants. In 2016, the nineteenth-century collection of bryophytes in WI was analyzed. The analysis of handwriting on specimen labels, as well as their style, showed that more than half of the collection had been compiled by Gorski. The purpose of this study is to present Gorski's reassembled bryological collection, which contains 729 specimens of bryophytes and is stored in the Herbarium of Vilnius University.

Keywords

bryophytes; mosses; liverworts; nineteenth century; herbarium specimens

Stanisław Batys Gorski's botanical activities

Stanisław Batys Gorski (1802–1864) was born in the village of Dvurce, Grodno Province, Brest district, in present-day Belarus. In 1820–1825, he studied at the Imperial Vilnius University, majoring in botany and zoology in the first year and medicine in the latter part of his studies. While still a senior student, Gorski held the position of assistant to the Imperial Vilnius University professor of pharmacy, Johann Friedrich Wolfgang (1776–1859), who, besides medicine, was also interested in natural sciences. It was Wolfgang who aroused Gorski's interest in botany and zoology. In 1823 and 1826, Gorski went to the Białowieża Forest to study plants. Results of these expeditions are reported in his paper "O roślinach zubrom upodobanych jakoteż innych w puszczy Białowiezkiej" (About favorite plants of bisons and other plants from the Białowieża Forest) [1]. In 1830, Gorski was appointed as head of the Imperial Vilnius University Botanical Garden and, from 1831, he started lecturing botany. His further activities were related to Vilnius educational institutions, the fate of which was decided by the Russian Czarist Government. After the closure of the Imperial Vilnius University in 1832, the Department of Medicine and Surgery was retained and reorganized into the Vilnius Medical and Surgical Academy. At the Department of Pharmacy at the Academy, Gorski worked his way up the career ladder from assistant to professor. However, he lost his position there in 1840 when the first-, second-, and third-year study programs at the Academy of Medical Surgery were terminated. Being already retired, he twice traveled to the countries of Central and Southern Europe. He visited botanical gardens and museums of natural history in Austria, Italy, Switzerland, and Germany and established contacts with the famous German botanists Heinrich Gottlieb Ludwig Reichenbach (1793–1879) and Heinrich Gustav Reichenbach (1824–1889). On both trips, Gorski

took a large collection of plants from Lithuania with him and distributed the specimens among museums, academies, and individual botanists. In 1851, he settled in Paliesius manor in Švenčionys district (the present-day Ignalina district, Lithuania), where he practiced medicine and horticulture, and collected plants and insects [2–9].

Gorski's research legacy consists of approximately 20 works, five of which are devoted to botany. The most valuable are those that include information about plant species and their distribution. In “Wyliczenie roślin naczyniowych Litewskich postrzeganych od r. 1820–1829” (Enumeration of vascular plants seen in Lithuania in 1820–1829) [10], he presented a list of more than 1,900 plants growing on the territory of what was then Lithuania. The paper “Rzadsze rośliny okolic Wilna” (Rarer plants of Vilnius surroundings) [11] is famous for the list of rare vascular plants growing around Vilnius. Lists of plants growing in specific places (near Kruhlo Lake and in the Botanical Garden of Vilnius Medical and Surgical Academy), were presented in his papers “Relacja o zdarzonym fenomenie na jeziorze zwanem Kruhło w uroczyszczu Grażalszkiem” (An account of the phenomenon at Kruhlo Lake) [12] and *Catalogus plantarum in caldaris, tepidaris, frigidarisque Horti Botanici Acad. Caesar. Medicochirurgicae* (Catalogue of plants from the Botanical Garden of Vilnius Medical and Surgical Academy) [13]. In *Icones Potamogetonarum, Characearum, Characearum, Cyperacearum et Graminearum* (Icons) [14], he presented tables of plant species and their drawings. However, bryophyte species were not included in these publications.

Gorski's correspondence, i.e., his letters to Johan Wolfgang and Anton Jankiewich and Jankiewich's letter to Wolfgang (Vilnius University Library, Department of Manuscripts) also contained some information on plants. However, the only bryophyte mentioned therein was the liverwort *Marchantia polymorpha*.

Plant material collected by Gorski

Gorski's manuscript stored at the Library of Vilnius University contains lists of his plant collections. The introduction to the chapter “Herbarium generale Polonicum et Lithuanicum” states that specimens were collected from the following locations: Livonia, Mohilyow, Minsk, Kaunas, Grodno, Vilnius, Volyn', Podillya, Ukraine, and Poland, the Carpathian Mountains of Galicia, and the Botanical Garden of Vilnius University. Material for the herbarium was collected by Gorski as well as by other people. According to the manuscript, the whole collection consisted of 52 folders. From the second one onwards, the folders were numbered as fasciculi. The first folder included fungi, lichens, algae, and liverworts, while the second and third folders contained exclusively mosses. In the fourth folder, moss duplicates from the second and third folders were stored. Some information regarding the location of Gorski's herbarium during the interwar period was imparted by Polish botanists Witold Sławiński and Jakub Mowszowicz [2,15]. According to these authors, Gorski's plant collections were housed at Kiev University, Jagiellonian University in Cracow, the University of Warsaw, and Department of General Botany of the University of Stefan Batory in Vilnius.

According to information published by the Lithuanian botanist Vytautas Galinis, some specimens collected by Gorski were stored in the Herbarium of the M. G. Kholodny Institute of Botany of the Ukrainian Academy of Sciences, currently the National Herbarium of Ukraine (KW), together with the collections of Wilibald Besser and Ivan Schmalhausen [4,5]. They were probably obtained through herbarium exchange between Gorski and researchers in Kiev [16]. However, these collections include only vascular plants, not bryophytes. According to P. Köhler, the herbarium of the W. Szafer Institute of Botany, Polish Academy of Sciences (KRAM) does not have any specimens collected by Gorski [17], and the latest information indicates that there are no specimens collected by Gorski in the Herbarium of the University of Warsaw (WA) (personal inquiry).

We discovered that some specimens of vascular plants collected by Gorski are stored in other European herbaria. Some of Gorski's material was found in the Herbarium of the Vienna Museum of Natural History (Naturhistorisches Museum Wien) (W), Herbarium of the Botanical Garden and Botanical Museum of Berlin – Dahlem (Botanischer Garten und Botanisches Museum Berlin-Dahlem, Zentraleinrichtung der Freien Universität Berlin) (B), Herbarium of the Natural History Museum in London (BM),

and Herbarium of the Royal Botanic Garden, Kew (K). However, none of these herbaria include bryophyte specimens collected by Gorski (personal inquiries). Gorski's largest collection, consisting of 1,922 sheets of vascular plants, is deposited in the Herbarium of Vilnius University (WI) [18].

According to Mowszowicz [15], Gorski's herbarium stored at the Department of General Botany of the University of Stefan Batory contained collections of bryophytes as well as vascular plant collections. These collections had been obtained from the Public Library and Vilnius Medical Society. Mowszowicz described the collection of bryophytes as being rich and of good quality. It included species from the surroundings of Vilnius such as *Dicranum majus*, *Splachnum ampullaceum*, and *Meesia uliginosa* [15].

In search of Gorski's bryophyte collection

In 2016, we carried out a detailed analysis of the nineteenth-century bryophyte collection (about 1,300 specimens) in the Herbarium of Vilnius University. It was stored in various ways: part of the collection was kept in a simple cardboard folder, another part in three original nineteenth-century folders. In all folders, bryophyte specimens were stored between half-folded sheets of paper. Finally, the third part of the bryophyte collection was found in cartons, containing about 300 envelopes with bryophyte specimens. Although the specimens had been placed in new envelopes, the original labels were preserved.

Three original folders were of particular interest (Fig. 1). One of the folders was labeled "Musci frondosi lithuanici et indigeni determinati a Cl^o Sendter Hamburgi 1845, a.n. 218 – 263, Fasciculus 34", another "Musci frondosi lithuanici. Duplicatae cognicenda. Fasciculus 35". However, there was no label on the third folder, just glue traces. At the bottom right corner of the cover, all three folders had handwritten labels: "Herb. gen. pol. et lith. N 3", "Herb. gen. pol. et lith., N. 4", and "Herbar. gen. lith. et pol., N 43", respectively (Fig. 1). These notes matched the name of the collection referred to in Gorski's manuscript, i.e., "Herbarium generale Polonicum et Lithuanicum". However, we spotted several discrepancies in numbering. According to the manuscript, folder No. 43 was not meant to contain bryophytes. Possibly, the folder, which was also without

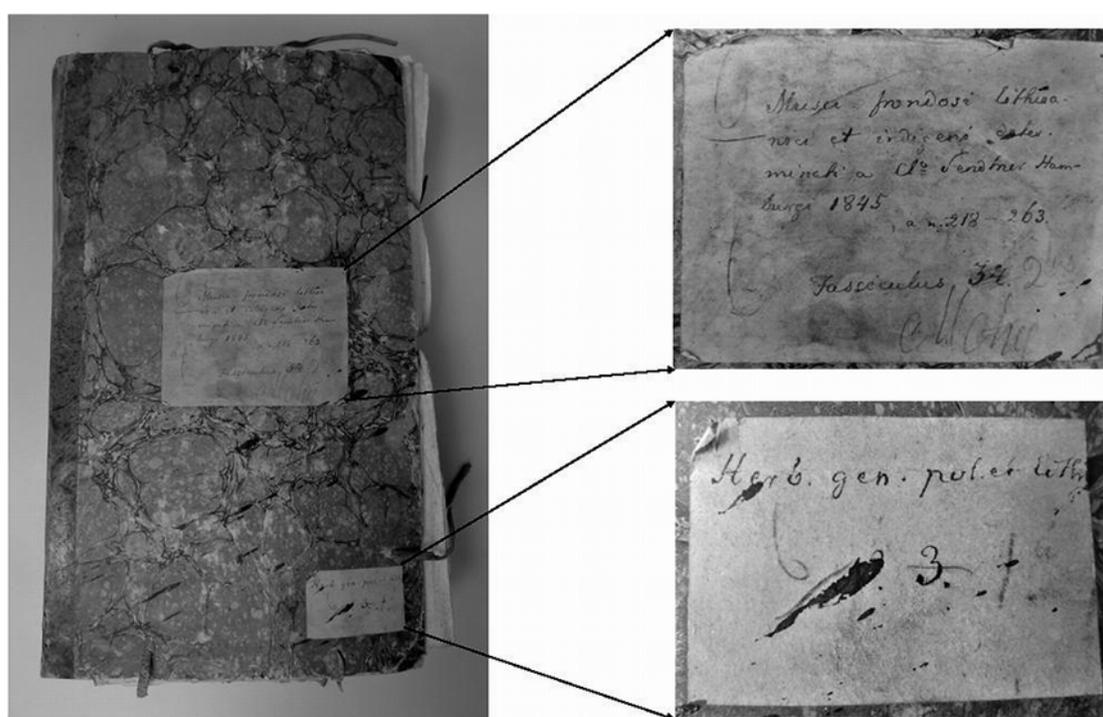


Fig. 1 Labels on the original nineteenth-century folder containing the bryophyte collection.

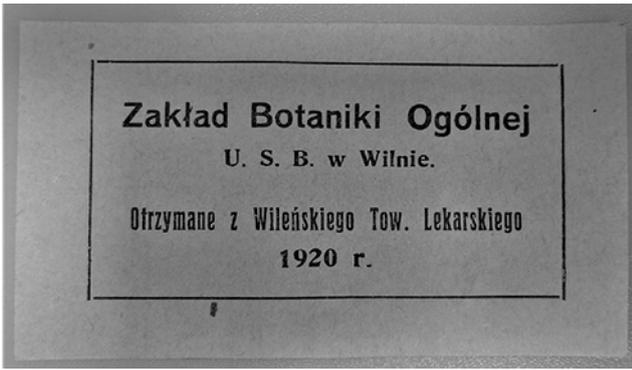


Fig. 2 The label found among herbarium sheets indicating that the collection was obtained from Vilnius Medical Society.

its main label, had been “borrowed” from other groups of plants sometime later. Furthermore, Gorski’s vascular plant collection in the Herbarium of Vilnius University was kept in nonoriginal folders. The observations that, in some places, the sheets of paper had been signed by Alexandr Sergejev, the supervisor of collections at Vilnius Public Library [19], and that there were some labels with the inscription “Otrzymane z Wileńskiego Tow. Lekarskiego” (received from Vilnius Medical Society) between sheets (Fig. 2) support the idea that these could be the collections mentioned by Mowszowicz [15]. Moreover, we found handwritten notes signed by Mowszowicz, which indicated that the compiler of these bryophyte collections was Gorski. Meanwhile, the preliminary analysis showed that the specimens stored in all folders and boxes had been collected by several individuals, including botanists

of the nineteenth century such as J. F. Wolfgang, J. Fedorowicz, and J. Pabrėža. Because of frequent transportation to different institutions, the specimens could have got mixed up. In addition, at certain stages of herbarium processing, specimens collected by different collectors were grouped by species names, and not by collectors’ names; and part of the collection was placed in envelopes.

An expert analysis of handwriting, which was performed by comparing the handwriting on specimen labels with that in original letters written by Gorski and with that on specimen labels in the vascular plant collection, confirmed that more than half (56%) of the collection had been compiled by Gorski. Around 70% of the specimens stored in three original folders had labels handwritten by Gorski, whereas, in the nonoriginal folder, such specimens accounted for about 30%. Some specimens with labels handwritten by Gorski were also detected between those placed in the envelopes. So, based on the results of these investigations, we picked out specimens with the labels handwritten by Gorski and reassembled his bryophyte collection.

Characteristics of Gorski’s bryophyte collection

Gorski’s reassembled bryophyte collection comprises 729 specimens (Tab. S1). The labels handwritten by Gorski (Fig. 3) have a peculiar structure. All inscriptions on specimen labels were made in black ink. The species name was written in Latin in the central part of the label. Some labels contained references to species identification.

Most of them (90%) were numbered. The information was either in Latin or Polish. Only 20% of the labels had information about localities. As a collecting locality, Lithuania was indicated in 21% of such labels. Different abbreviations (Lith., Lithua., Lithuan.) were sometimes used instead of the full name of the country. The most common names of cities or settlements found on the labels were Vilnae, Vilna, Kalwarya, Werki, Boltupie. Among the collected bryophytes, there are species that have never been recorded in the territory of Lithuania [20], e.g., *Catoscopium nigratum*, *Cynodontium polycarpon*, *C. strumiferum*, or *Timmia austriaca*. This fact shows that the material was collected over an extensive area within the Russian Empire and during Gorski’s travels to Europe. As indicated by Gorski in his manuscript chapter “Herbarium exoticum europaeum”, the plants collected from other parts of Europe were placed together with those collected from the territory of Lithuania. Most of the specimens (37%), with information about sampling localities, were collected from Italy (Cesate, Chiavenna, Rome, Casoli, Como Lake, and Sardinia), and about 20% of them were

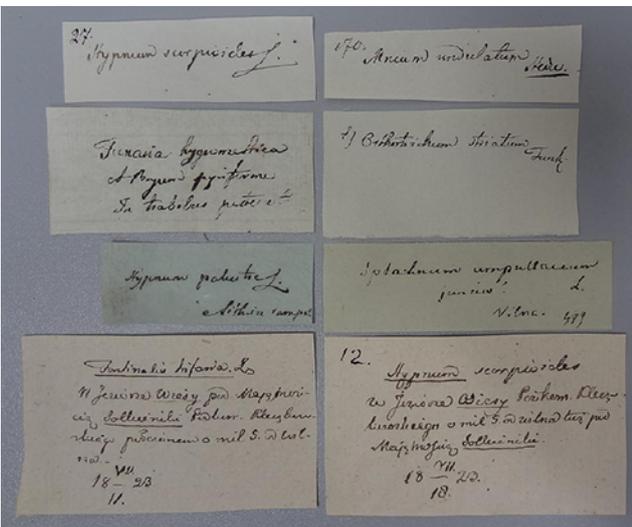


Fig. 3 Examples of bryophyte specimen labels from Stanisław Batys Gorski’s collection.

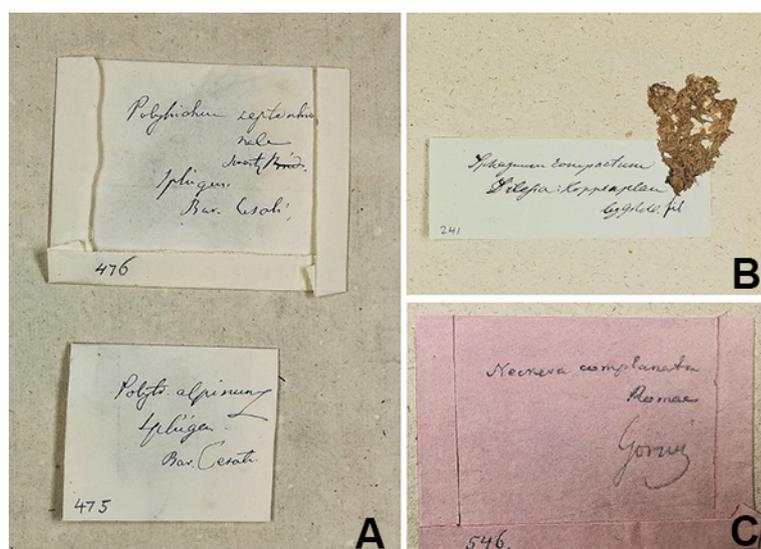


Fig. 4 Examples of the specimens collected or obtained by exchange during Gorski's travels in Europe: (A) envelopes of specimens with two localities in different regions of Europe given: Casate (Italy) and Splügen (Switzerland); (B) a specimen from the Silesia region; (C) a specimen from Rome with Gorski's signature on the envelope.

from the Silesian region. All specimens from the current territory of Belarus (8%) were collected in 1850 from the vicinity of Postavy. The labels attached to specimens collected from Switzerland (8%) usually bore the words “ex Helvetia”. Some specimens (2%) were collected from Germany, from the vicinities of Dresden and Radebeul. Besides the designation of one locality, some labels indicated two localities in different regions of Europe, e.g., the same label had references to Rome (Italy) and Silesia (Central Europe), Cesate (Italy) or Casoli (Italy), and Splügen (Switzerland) (Fig. 4). Probably, the specimens of the same species collected from different localities were put in one envelope.

Only in 2% of the labels, habitats were specified in more detail, e.g., “Paludes” (mire), “W Jeziore” (in the lake), “In sylvā” (in the forest), “Truncis” (trunks), “Ad terram” (on the soil). Two specimens were collected in the Botanical Garden of Vilnius University (“In horto botanica” and “Ad muros in horto botanica”). The dates of specimen collection

indicated on some labels, e.g., 1823, 1834, and 1835, refer to the time when Gorski collected his vascular plant herbarium in the Białowieża Forest and in the vicinity of Vilnius [1,11].

During his visits to European countries, Gorski collected specimens himself or obtained them through exchange. They were usually placed in envelopes, which were stuck to the inside of the folder. All information on the envelope was written in different handwriting: part of it was written (usually not by Gorski) in black ink; next to it, there was the information handwritten in graphite pencil by Gorski. Two specimens from Sardinia and Rome carried Gorski's signature. The specimens of the other part of his foreign collection were placed in folders with the labels handwritten by one person, which strongly suggests that these specimens were obtained through exchange (Fig. 4).

In some cases, labels were cropped, and only species names were left. This was probably done sometime later, during collection processing. Let us hope that no valuable information was lost.

Among 729 bryophyte specimens, only 14 were of liverworts, the others were specimens of mosses (Tab. S1). This coincides with the description of the collection in the manuscript: liverworts were found in the same folder with fungi, lichens, and algae, while mosses were kept in three separate folders. The specimens were given 275 species names and 55 genus names. The most common names used by Gorski for the specimens include *Hypnum triquetrum* (15 specimens), *Funaria hygrometrica* (11 specimens), *Hypnum rutabulum* (11 specimens), and *Hypnum palustre* (10 specimens). Sometimes, the same species was given different synonymous names, for example, *Hypnum proliferum* and *Hypnum splendens*. The species *Plagiomnium undulatum* was given not only three synonymous names *Bryum ligulatum*, *Mnium ligulatum*, and *Mnium undulatum*, but also, based on its undulate leaves, the name *Catharinea undulata*, which is a synonym of the species *Atrichum undulatum*. In turn, the names *Bryum ligulatum* and *Mnium undulatum* were used for *Atrichum undulatum*. Thirty-eight specimens in the collection were unnamed, and 24 had only the genus name. In 2016, the collection was revised, and all specimens were reidentified. According to the recent nomenclature [21–25], the number of species has decreased (235), while the number of genera has increased (130) (Tab. S1). Due to the bad condition of some specimens, 15 of them were not identified, while three were only given a genus name. The revision showed that only half of the specimens had been identified correctly (Tab. S1, Fig. 5). It is not surprising that similar species were misidentified by the collector or supervisor because it is difficult to identify bryophyte species by their external characteristics. However, it is unlikely that the species could have been given essentially different species names,

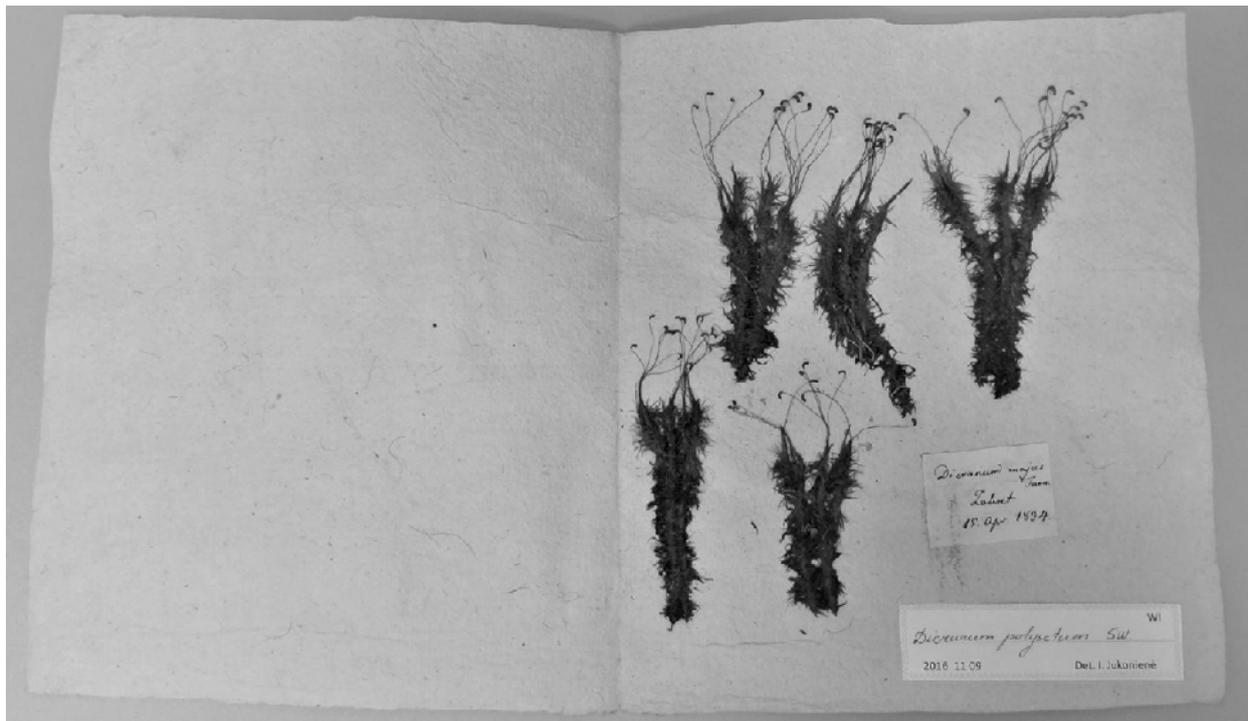


Fig. 5 A specimen of *Dicranum majus* (during revision reidentified as *Dicranum polysetum*) from Gorski's collection.

e.g., we found the label of the pleurocarpous species *Hypnum praelongum* instead of the acrocarpous *Plagiomnium undulatum* or, contrarily, the label of acrocarpous *Barbula unguiculata* instead of the pleurocarpous *Pylaisia polyantha*. The possibility that specimen labels might have got swapped as a result of numerous collection relocations also should not be ruled out.

The consolidation of Stanisław Batys Gorski's bryophyte herbarium is the first step in the processing of the abundant nineteenth-century bryophyte collection in the Herbarium of Vilnius University.

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Supplementary material

The following supplementary material for this article is available at <http://pbsociety.org.pl/journals/index.php/asbp/rt/suppFiles/asbp.3588/0>:

Tab. S1 Catalogue of Stanisław Batys Gorski's bryological collection in the Herbarium of Vilnius University (WI).

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