**INTRODUCTION**

In the first half of 19th century, the University in Vilna (now Vilnius in Lithuania) and the high school at Krzemieniec (now Kremenchets in the Ukraine) were the most dynamic centres of Polish botanical research (Köhler, 1994). The scientists at these centres were involved, among other things, in taxonomic and floristic studies of the local flora, and the gathering of rich herbarium collections. They co-operated with the botanical research centres of contemporary Europe, exchanging letters, seeds and specimens. Some collections from these herbaria survive and contain floristic and taxonomic material of great importance (Babicz & Grebecka, 1988).

One of the leading figures at that time was Jan Fryderyk Wolfgang (1775–1859) was the outstanding expert on *Potamogetonaceae*. Twelve of the names he proposed in a manuscript of a monograph on *Potamogeton* were validly published by Schultes & Schultes (1827). Of these, four names are now the correct names for the respective taxa, one for a species (*P. rutilus* Wolfg.) and three for hybrids (*P. ×nerviger* Wolfg., *P. ×salicifolius* Wolfg. and *P. ×undulatus* Wolfg.). Ten names of *Potamogeton* taxa described by Wolfgang are typified in this paper, together with two names proposed by his collaborators, Besser and Gorski. The identity of these names is discussed.

**KEYWORDS:** herbarium, history of botany, Lithuania, nomenclature, *Potamogeton*, typification.

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**Potamogeton taxa proposed by J. F. Wolfgang and his collaborators**

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In the first half of 19th century Jan Fryderyk Wolfgang (1775–1859) was the outstanding expert on *Potamogetonaceae*. Twelve of the names he proposed in a manuscript of a monograph on *Potamogeton* were validly published by Schultes & Schultes (1827). Of these, four names are now the correct names for the respective taxa, one for a species (*P. rutilus* Wolfg.) and three for hybrids (*P. ×nerviger* Wolfg., *P. ×salicifolius* Wolfg. and *P. ×undulatus* Wolfg.). Ten names of *Potamogeton* taxa described by Wolfgang are typified in this paper, together with two names proposed by his collaborators, Besser and Gorski. The identity of these names is discussed.

**KEYWORDS:** herbarium, history of botany, Lithuania, nomenclature, *Potamogeton*, typification.
tic research, especially in the regions of Volhynia and Podolia, and accumulated a rich herbarium (Mowszowicz, 1957–1959). Wolfgang co-operated with Besser, and many of the specimens collected by Wolfgang were kept in Besser’s personal herbarium. Many of the duplicates in these collections ultimately were widely distributed.

Another important botanist in Vilna at that time was Stanisław Batys Gorski (1802–1864), a student and successor of Wolfgang. Like the latter, he lectured on botany, pharmacy and pharmacology at the Medical-Surgery Academy (established in 1832, after Vilna University was closed) and at the same time did floristic and taxonomic research. Gorski exchanged letters and plant material with the outstanding botanists of his time, notably Heinrich Gottlieb Reichenbach (1824–1889), a son of Heinrich Gottlieb Ludwig Reichenbach (1793–1879). Gorski’s collection of orchids was used by one of the collectors in B, BM, BP, BR, BRNM, C, CGE, G, H, K, KRA, KRAM, L, LE, M, P, PRC, S, UPS, W, WAG, WU-Hal, Z, and ZT. Most of Wolfgang’s specimens from Besser’s herbarium are in the Potamogeton collection in St. Petersburg’s herbarium (LE).

We located altogether more than 120 authentic specimens of 12 names proposed by Wolfgang, Gorski or Besser. In most cases, the data given on herbarium labels is poor, as was usual in the early 19th century. Often only the taxon name, place or country of origin and name of the collector or of the personal herbarium involved are given. More or less full information is only exceptionally provided (e.g., “Potamogeton undulatus Wolfg., E fluvio Waka, Lithuania, legit Wolfgang, Herb. W. Besser”). In some duplicates, the record is very space-saving and abbreviated to taxon name, country and herbarium owner (e.g., “Potamogeton undulatus Wolfg., E Lithuania, Herb. W. Besser”). In a few cases, Wolfgang indicated the authenticity of his specimen instead of giving a description of the plant’s origin (e.g., “Potamogeton undulatus mihi!, J. Wolfgang,”). The majority of the labels are written in the same, easily recognizable and legible handwriting, in black ink. Date of collecting of the material is rarely given. In a few cases, the dates on the labels indicate the year the specimen was acquired by an institution (e.g., “Potamogeton niger W., Herb. Besser a. 1824, e fl. Waka, Lithuania,”). These dates are usually written in a different handwriting and in a different coloured (blue, violet) ink.

Even though the arrangement of the text on herbarium labels sometimes differ between herbarium sheets of a single taxon, we believe that most, if not all, authentic specimens of each of Wolfgang’s taxa were all collected at the same time and place. Specimens in each of these
collections are similar in general habit and basic features such as shape and length of leaves, length of internodes, stage of development of generative organs, etc., and in the coloration change caused by drying, which suggests they were prepared simultaneously. Plants of Potamogeton show marked phenotypic plasticity in morphology, not only between localities but also seasonally at one site (Kaplan, 2002). It is unlikely that almost identical phenotypes of a rare taxon could be found and collected within the limited area around Vilnius repeatedly over a few years or even from different sites. We therefore think that all specimens of each taxon belong to a single gathering made from one locality at one time. This assumption is supported by the account of Lithuanian plants by Gorski (in Eichwald, 1830), who records most of Wolfgang’s taxa only from their type locality still several years after the specimens were collected.

**TYPOIFICATIONS**


Type citation: “In lacubus circa Daugierdziszki et Solkieniki Lithuaniae, Wolfg. fil.” [nowadays Daugirdiškės and Salkininkai, Distr. Traku, Lithuania].


The specimens are a small, low-growing form of *Potamogeton filiformis* Pers., but not juvenile plants as most are fertile, bearing mature fruits. The identity of *P. fasciculatus* with this species was probably first recognized by Bennett (1890), and his synonymy was followed in many works including those of Ascherson & Graebner (1897), Graebner (1907), Hagström (1916), Yuzepczuk (1934) and Wiegleb & Kaplan (1998).


= *P. gramineus* L.

Type citation: “In fluvio Kawa Sibiriæ. Merck. Herb. Stev.”

Lectotype (designated here): “ex Sibiriæ ulteriora, ad fluvium Kawa, Merck [C. Merck], Herb. Steven” (H).

The type sheet bears a single stem of *Potamogeton gramineus*, with only submerged leaves and a young inflorescence, and several labels including one with a diagnosis written by Wolfgang himself. The plants are the morphotype with relatively long and narrow submerged leaves and without floating leaves, which is found particularly in deep clear waters of lakes throughout the range of the species. We do not think the recent attempt to distinguish this form as a separate species under the illegitimate name *P. wolfgangii* (Galinis, 1963a; Paphenkov, 1997) is justifiable. *Potamogeton gramineus* shows a wide range of phenotypic plasticity so it is unwise to split it into several species based on a few morphological features (Hagström, 1916: 208; Kaplan, 2002).


= *P. lucens* L.

Type citation: “In fluviis Wilia et Waha [sic!] prope Wilnam, Wolfg.” [nowadays Neris (Viliya) and Voke (Vaka) rivers, in Vilnius, Distr. Vilnius, Lithuania].

Potamogeton macrophyllus Wolfg., In fluv. Lithuan. leg. Wolfg.” (BM); “Potamogeton macrophyllus Wolfg., In fluv. Lithuan., Herb. W. Besser” (BM, K); “Potamogeton macrophyllus Wolfg., In aquis fluviatilibus Lithuaniae, Herb. W. Besser” (M, Z); “Potamogeton macrophyllus Wolfg., Lithuauen, [Herb.] Besser” (M); “Potamogeton macrophyllus Wolfg., Lithuania, leg. Wolfgang, com. Dr. Woloszczak” (G, S); “Potamogeton macrophyllus Wolfg., E Lithuania, Herb. W. Besser” (BRNM, G, S); “Ex herbariohorti Petropolitani, Potamogeton macrophyllus Wolfg., In aquis stagn. Lithuaniae, Besser” (WU-Hal); “Potamogeton macrophyllus Wolfg., In fluvio Waka et Wilia prope Vilnam, legit Horaninow dedit” (UPS). Possible syntypes: “Potamogeton macrophyllum. Wolfg., ... Wolfg. mon. ined. icon. n. 16., In flavio Waka et Wilia (circa Werki) prope Vilnam, 1826” (KRA); “Potamogeton macrophyllus Wolfg., In flavio Waka et Wilia prope Vilnam, legit Gorski, 1826” (KRA).

The plants belong to a form of Potamogeton lucens L. with exceptionally long leaves. Such phenotypes, found in rivers throughout most of the range of the species, are sometimes also designated P. longifolius J. Gay. In the literature, the name P. macrophyllus is commonly synonymized with P. lucens.


[= P. alpinus Balb.]

Type citation: “Specimina nostra, a cel. Eschsholtz in Unalaschka lecta” [Unalaska Island, Aleutian Islands, Alaska, United States].


This name was given to plants of Potamogeton alpinus Balb. with long narrow submerged leaves and no floating leaves. Phenotypes like this have sometimes been considered as an infraspecific taxon of this species (e.g., P. alpinus var. tenuifolius in Ogden, 1943; P. alpinus subsp. tenuifolius in Hultén, 1960). However, the concept of an infraspecific subdivision in P. alpinus was abandoned and the name P. microstachys fully synonymized with P. alpinus in recent revisions (e.g., Reveal, 1977; Wiegleb & Kaplan, 1998; Haynes & Hellquist, 2000). The cultivation experiments proved that leaf shape and size are dependent on environmental conditions and cannot be used for delimiting of taxa (Kaplan, 2002).


[= P. alpinus Balb. × P. lucens L.]

Type citation: “In fluvio Wierzchnia circa Lelany Lithuaniae, Wolfgang”.


Application of this name has been unclear. Earlier authors associated it with Potamogeton alpinus, either as its synonym (Bennett, 1889) or as an infraspecific taxon (as P. alpinus var. purpurascens subvar. nerviger by Ascherson & Graebner, 1897; and Graebner, 1907). Fischer (1907) was the first to suggest that it might actually be the hybrid between P. alpinus and P. lucens. Hagström (1916) considered Lithuanian plants to be identical with British P. ×griffithii, which is the hybrid P. alpinus × P. praecox. The affinity with P. alpinus is obvious. However, the minutely denticulate margins of submerged leaves and the broadly acute leaf apex clearly show the influence of P. lucens. We therefore follow Dandy (1958; 1975), Dandy & Taylor (1967), Preston (1995) and Wiegleb & Kaplan (1998) and consider the name P. ×nerviger Wolfg. as the correct name for the hybrid between P. alpinus and P. lucens.


[= P. nodosus Poir.]

Type citation: “In Borysthene in Gubernio Chersonensi, Andrzejowsky” [in Dnieper River, prov. Kherson, Ukraine].

Lectotype (designated here): “Potamogeton petiolatus Wolfg., ... Wolfg. monogr. ined. n. 4, In flumine Borysthenes (Dniepr.) legit Andrzejowsky ...” (KRA). Syntype or isolectotype: “Potamogeton petiola-
Potamogeton pumilus Wolfg. in Schult. et Schult. fil., Mant. 3: 354. 1827.


Lectotype (designated here): “Potamogeton fluctians, near Philad.” (LE). The type clearly belongs to the North American and British species now called Potamogeton pumilus. This identity was first suggested by Bennett (1891c), who studied another original specimen and identified it as P. Claytonius Tuckerm. (now itself a synonym of P. ephyrus, see Wiegleb & Kaplan, 1998). Bennett’s identification was adopted also by Fernald (1932) in his revision of this group of linear-leaved Potamogeton species.


Type citation: “In lacubus et stagnis circa Vilnam, Wolfg.” [Vilnius, Distr. Vilnius, Lithuania].


This rich collection consists of Potamogeton lucens-like plants with markedly elongate, sessile and semi-amplexicaul submerged leaves. Some of the specimens are robust mature plants whereas others are less so being characterised by slender side branches with small leaves. These extremes are connected by intermediate forms that may be seen among the numerous specimens cited above.

The specimens clearly belong to a hybrid between a member of Potamogeton lucens-group (sensus Wiegleb, 1988) and a species with leaves clasping the stem. The identity of the parental species remained unclear for a long time. First Bennett (1891a), commenting on Richter’s account of European plants, noticed that “P.
salicifolius Wolfg. belongs rather to decipiens than to macrophyllus". Soon after, Ascherson & Graebner (1897) and Graebner (1907) indicated that P. salicifolius was similar to their P. lithuanicus, which they regarded as the hybrid involving P. alpinus and P. lucens.

Hagström (cited by Bennett, 1908, and later in Hagström, 1916) considered the collections from Vilnius as consisting of two different hybrids: Potamogeton ×nitens Weber (= P. gramineus × P. perfoliatus) and P. ×decipiens (= P. lucens × P. perfoliatus). The original P. ×salicifolius was restricted to the synonymy of P. ×nitens. Hagström’s view has been widely followed by Russian and Baltic authors (Yuzepczuk, 1934; Galinis, 1969; Mäemets, 1979; Czerepanov, 1995). At that time Bennett (1908) stated that the original P. ×salicifolius was “the same as lithuanicus Gorski … [which are] certainly not nitens Web., nor decipiens Nolte (sensu stricto)” but “lucens × alpinus”.

In 1958, Dandy rather surprisingly reinstated the name Potamogeton ×salicifolius for the hybrid P. lucens × P. perfoliatus. Unfortunately, he left no detailed discussion of why he chose this name. From his note on the variation of this hybrid in his account of British hybrids (Dandy, 1975) it may be deduced that he had the relatively narrow-leaved river phenotypes, from among the specimens gathered by Wolfgang in his mind when writing “this hybrid … varies greatly in leaf-shape according to the type of water in which it is growing, being narrower-leaved in stronger currents”.

The type collection shows a great deal of morphological variation, which we consider is a result of phenotypic plasticity and/or different stages of development of the different parts of the plant body (main stem vs. side branches). We therefore believe the type collection is taxonomically uniform, most likely consisting of plants derived both fresh Danish material and Wolfgang’s herbarium specimens. We agree with Dandy that it is a hybrid between P. ×salicifolius and P. perfoliatus have repeatedly been collected in the type locality.

The somewhat unusual narrow-leaved phenotype seen in the type collection of Potamogeton ×salicifolius may be the result of it being encountered in running water. Also collections of P. lucens from the Neris (Vilija) River in Vilnius have markedly narrow and prolonged leaves, see, e.g., collections by T. Symonowiczówna (in E. Woloszczak, Fl. Polon. Exs. no. 677), in BM, G, K, LE, S, WU-Hal; or S. B. Gorski (in H. G. L. Reichenbach, Fl. Germ. Exs. no. 2501) in BM, BR, CGE, G, K, LE, P, PRC, S, UPS, W, WAG, ZT. River phenotypes like these are known to occur in many Potamogeton taxa. They usually revert to the ordinary form when cultivated in standing water (Kaplan, 2002).

Potamogeton ×undulatus Wolfg. in Schult. et Schult. fil., Mant. 3: 360. 1827, pro sp. [= P. crispus × P. praelongus Wulf.]

Type citation: “In fluvio Waha [sic!] prope Wilnam, Wolfg.” [Voke (Vaka) River, near Vilnius, Distr. Vilnius, Lithuania].


An important contribution to the acceptance of Potamogeton ×undulatus as a hybrid involving P. crispus and P. praelongus was made by Baagõe (1897) who studied both fresh Danish material and Wolfgang’s herbarium specimens. Baagõe provided a detailed analysis of the morphology and stem anatomy of this plant, a descrip-
tion of its habitats, a list of the studied specimens and literature records, and an analysis of the literature dealing with its name.

The Baagöe’s interpretation, even when still only personally communicated, was promptly adopted by his contemporaries: Raunkiaer (1896), Fryer (1897) and Ascherson & Graebner (1897). Since then, the name has been widely used in the literature and adopted, e.g., by Graebner (1907), Hagström (1916), Dandy & Taylor (1967), Dandy (1980), Preston (1995), Wiegleb & Kaplan (1998) and Zalewska-Gałosz (2002).

**Potamogeton divaricatus** Wolffg. in Schult. et Schult. fil., Mant. 3: 355. 1827.

Type citation: origin not given but indicated as being preserved “in herb. Gilibert” as “P. setaceus”.

We failed to locate any authentic material of this name in studied herbaria. The identity of the name is unclear; it has never been adopted since its first introduction and there is practically no mention of it in modern literature.

**Potamogeton rigidus** Wolffg. in Schult. et Schult. fil., Mant. 3: 359. 1827.

[= ? P. natans L. × P. lucens L. = P. ×fluitans Roth]


Possible authentic material: “Potamogeton praelongus, S[z]czorse” [1823].

We failed to locate any unequivocal type material of this name in studied herbaria. No specimen under this name is preserved in the Jundzill Herbarium in KRAM (see also Köhler, 1995). The identity of the name is doubtful (Bennett, 1893; Hagström, 1916). According to the description, the plant may have been *Potamogeton nodosus* or *P. ×fluitans*. Galinis (1963a) included the name in the synonymy under *P. nodosus*, which is at least in part *P. ×fluitans*, as is obvious from the stem anatomy given in her separate paper (Galinis, 1963b).

There is a specimen in the Jundzill Herbarium in KRAM, originally identified as *Potamogeton praelongus*, which is in fact *P. ×fluitans*, and which was collected at the same locality as that indicated in the protologue of *P. rigidus*. The morphology of this specimen agrees with the original description, and it may well be a duplicate of the original collection studied and used for the description of *P. rigidus* by Wolfgang. However, there is no direct evidence to support this assumption, as the name *P. rigidus* is not attached to the specimen preserved in KRAM.


[= P. lucens L.]

Type citation: “in Volhynia” [historic region, now in WNW Ukraine].


The type specimen is a plant with somewhat bigger and slightly longer leaves than most common forms of *Potamogeton lucens* from standing water. Otherwise, it shows all the diagnostic features of this species and we agree with Bennett (1891b) and Hagström (1916) who synonymized *P. volhynicus* under *P. lucens*.


[= P. lucens L. × P. perfoliatus L. = P. ×salicifolius Wolffg.]

Type citation: “Russisch-Littauen: bei Wilna, Gorski” [Vilnius, Distr. Vilnius, Lithuania].


The name “*P. lithuanicus* Gorski” first appeared in the literature in Reichenbach (1845) who did not adopt it but cited as a synonym of his misapplied “*P. lanceolatus Smith*”. The accompanying illustration agrees with the plants in authentic collections. The name was first adopted and validated by Ascherson & Graebner (1897) and soon after by Zapalowicz (1906), as “*P. alpinus × P. lucens*”. Ascherson and Graebner almost certainly studied a duplicate preserved in B. This authentic specimen, however, was destroyed during World War II. No other duplicate designated by either Ascherson or Graebner is available. That is why we selected a lectotype from among other duplicates of the original collection.

The history of the name *Potamogeton ×lithuanicus* is similar to that of *P. ×salicifolius* (see above). In fact, plants of authentic specimens of these names are morphologically similar. Both sets of specimens originate
from the Neris (Viliya) River in Vilnius, and their close similarity suggests they came from the same clone. The influence of P. lucens is obvious and the slightly yellowish tinge of leaves led authors to believe that the second parent was P. alpinus. However, the markedly acute leaf apex and broadly acute to semiamplexicaul leaf base favours the origin of P. ×lithuanicus as P. lucens × P. perfoliatus. The type collection consists of the river pheno-type of P. ×salicifolius with prolonged leaves. Potamogeton ×lithuanicus was synonymized with this hybrid (under the name P. ×decipiens) by Hagström (1916), Yuzepczuk (1934) and Mäemets (1979).

CONCLUSIONS

Altogether 14 of the Potamogeton names originally proposed by Wolfgang, Besser and Gorski are discussed, and 12 of them typified and interpreted. The names P. rutius Wolfg., P. ×nerviger Wolfg., P. ×salicifolius Wolfg. and P. ×undulatus Wolfg. are the correct names for the respective entities. In spite of an extensive search in 54 European herbaria and loan requests sent to many others, we have not been able to locate authentic material of two of the names, namely P. divaricatus Wolfg. and P. rigidus Wolfg. We would appreciate any supplementary information from readers or herbarium curators on the whereabouts of authentic specimens of these names and of the originals of Wolfgang’s or Gorski’s illustrations.

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Kaplan & Zalewska-Ga»osz • Potamogeton taxa 53 (4) • November 2004: 1033–1041
1041


