Potamogeton schweinfurthii A. Benn., a new species for Europe

***Potamogeton schweinfurthii* A. Benn. – druh nově nalezený v Evropě**

Zdeněk K a p l a n

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The occurrence in the Mediterranean part of Europe of the African species *Potamogeton schweinfurthii* is recorded for the first time. So far, this native but overlooked species has been found on five major Mediterranean islands: Corsica, Sardinia, Malta, Kefallinía (Ionian Islands, Greece) and Crete. The species is most similar and presumably closely related to the mainly Eurasian *P. lucens*, with which it has been partly confused. The nomenclature and a description of *P. schweinfurthii* are provided, and its taxonomy and how it differs from similar taxa discussed. All known localities are listed, together with voucher specimens preserved in the major European herbaria. A distribution map of *P. schweinfurthii* in the Mediterranean region is presented.

K e y w o r d s : aquatic plants, distribution range, first record, herbarium, Mediterranean region, phytogeography, *Potamogetonaceae*, taxonomy

Introduction

The species of *Potamogeton* L. (*Potamogetonaceae*) in Europe are relatively well known. It was the contribution of taxonomists such as A. Bennett, G. Fischer, J. O. Hagström, J. E. Dandy and G. Taylor who, in the first half of 20th century, stabilized the number of recognized *Potamogeton* species occurring in western, central and northern Europe. In his treatment for Flora Europaea (manuscript finished before 1976) Dandy (1980) recognized 22 species of *Potamogeton* occurring in Europe. At that time *Potamogetonaceae* of E Europe were independently being revised by A. A. Mäemets. Her studies led to the discovery of a new species *P. sarmaticus* Mäemets (Maemets 1979) and extensions in the range in Europe of the predominantly Siberian species *P. subsibiricus* Hagstr. (Miaemets 1980) and *P. subretusus* Hagstr. (Myaemets 1979). The tradition of European taxonomic research on *Potamogetonaceae* culminated in the degree of precision and completeness in a recent monograph of British pondweeds by Preston (1995). Occasional attempts to split the widely accepted species into many poorly defined "small" species are generally not adopted by other researchers (see Kaplan 2002 for a review of two examples). Because the species are well known, contemporary European *Potamogeton* taxonomy concentrates on the hybrids, particularly their diversity and life history (e.g., Bobrov & Reshetnikova 2002, Fant et al. 2001a, 2001b, 2003, Fant & Preston 2004, Hollingsworth et al. 1995, 1996, Kaplan 2001, Kaplan & Fehrer 2004, Kaplan & Wolff 2004, Kaplan et al. 2002, King et al. 2001, Preston et al. 1998a, 1998b, 1999, Wolff et al. 1997, Zalewska-Gałosz 2002) rather than on the species (e.g. Kaplan & Štěpánek 2003).

During an examination of herbarium material of *Potamogetonaceae* in European herbaria (among others B, BM, BP, BR, BRNM, BRNU, BRVU, C, CGE, G, GOET, K, LD,

LE, M, P, PR, PRC, S, U, UPS, W, WU, Z, ZT) for a monograph of this family within the framework of Species Plantarum Project – Flora of the World, among the numerous specimens from the Mediterranean part of Europe, 10 collections were found that did not fit the delimitation of any species hitherto known from Europe (cf. Dandy 1980). These were found to be identical with African species *P. schweinfurthii* A. Benn.

Nomenclature and description

Potamogeton schweinfurthii A. Benn. in Dyer, Fl. Trop. Afr. 8: 220. 1901 ("Schweinfurthii"), nomen propositum ad conservationem (cf. Kaplan & Symoens 2004).

Type: "Plantæ Abyssinicæ, Im Zana [sic!] See [= Lake T'ana, Ethiopia] (in offenem Wasser, nah am Ufer) bei Angasha, 9 Novbr. [18]63, Schimper 1359" (proposed conserved type: K, see Kaplan & Symoens 2004; duplicates: B†, BM, CGE, E *n. v.*, W†).

– *P. capensis* Scheele ex A. Benn., Ann. K. K. Naturhist. Hofmus. Wien 7: 287. 1892, nom. nud.
Authentic specimens: Im flüsse Zwartkopsrivier (Distr. Uitenhage) [= Zwartkops River, by Uitenhage, Eastern Cape, South Africa], Januar 1830, Zeyher 919" (BREM, CGE, K, W†).

– *P. lucens* var. *azoricus* A. Benn., J. Bot. 42: 71. 1904, nom. nud. ("azorica")
– *P. azoricus* A. Benn. ex Hagstr., Kungl. Svenska Vetenskapsakad. Handl. 55(5): 198 et 265. 1916, nom. nud.
Authentic specimens: "Island of St. Michael, Azores, 1848, T. C. Hunt" (BM, CGE, K); "Azores, San Miguel, 26 VIII 1894, Wm. Trelease 962" (BM, K).

= *P. repens* Hagstr., Kungl. Svenska Vetenskapsakad. Handl. 55(5): 170. 1916 [1 November]; Hagstr. in R. E. Fr., Wiss. Erg. Schwed. Rhodesia-Kongo-Exp. 1911–1912, 1(2): 185. 1916 [December].
Type: [Zambia:] "Exped. Suecica in reg. Central.-Africanis 1911–12, Potamogeton repens J. O. Hagstr. n. sp., Rhodesia bor. orient.: in lacu Bangweolo ad Kasomo, 19 IX 1911, leg. R. E. Fries 655" (holotype: UPS, photo: BM, PRA; isotype: Z).

= *P. nodosus* var. *billotii* f. *angustissimus* Hagstr., Kungl. Svenska Vetenskapsakad. Handl. 55/5: 188. 1916 [1 November]; Hagstr. in R. E. Fr., Wiss. Erg. Schwed. Rhodesia-Kongo-Exp. 1911–1912, 1(2): 186. 1916 [December].
Type: [Zambia/Zimbabwe border:] "Exped. Suecica in reg. Central.-Africanis 1911–12, Potamogeton nodosus Poir. var. Billotii (F. Schultz) f. angustissimus J. O. Hagstr. n. sp., Rhodesia: in flumine Zambesi ad Victoria Falls, VII 1911, leg. R. E. Fries 137" (holotype: UPS, photo: PRA).

= *P. promontoricus* Hagstr., Kungl. Svenska Vetenskapsakad. Handl. 55(5): 182. 1916.
Type: [Western Cape, South Africa:] [label 1:] "Potamogeton No. 5. E. Z., 2. 7." [label 2:] "Cap. bon. spei [= Cape of Good Hope], Drege" [label 3:] "Potamogeton promontoricus mihi ad int., 8 III 1906. Determ. O. Hagström." (holotype: UPS, photo: BM, PRA).

= *P. capensis* Scheele ex Hagstr., Kungl. Svenska Vetenskapsakad. Handl. 55(5): 203. 1916.
Type: [label 1:] "Im flüsse Zwartkopsrivier (Distr. Uitenhage) [= Zwartkops River, by Uitenhage, Eastern Cape, South Africa], Januar 1830 [C. L. P. Zeyher] 919" [label 2:] Pot. capensis Scheele, determ. O. Hagström, 07" (lectotype: S, designated by Kaplan & Symoens 2005; isolectotypes: BREM, LD).

= *P. venosus* A. Benn., Trans. & Proc. Bot. Soc. Edinburgh 29(1): 52. 1924.
Type: [South Africa:] "Natal [= KwaZulu-Natal], In a pool Umhlonqwe, April 18th. 1884, J. M. Wood 3015" (holotype: K; isotypes: BM, BOL, NH).

= ? *P. bunyonyiensis* Denny et Lye, Kew Bull. 28: 120. 1973.
Type: "Uganda, Rubanda county, District Kigezi U2, near Kifuka Resthouse, Lake Bunyoni [sic!], Latitude: 1° 17' South, Longitude: 29° 55' East, Altitude: 1950 meters, Grid: RJ-23-58, Habitat: in 1–2 m deep water at lake-shore, 22/4 1970, Leg. K. A. Lye, A. B. Katende & P. Denny 5216" (holotype: K).

Rhizome slender, terete, perennial. Stem unbranched or sparingly branched, slender, terete; specialized dormant turions not developing. Submerged leaves almost always present, sessile, subsessile to shortly petiolate; lamina membranous, narrowly lanceolate to oblong-elliptical, 65–170 (–250) mm long, (3–) 7–24 (–28) mm wide, 4–17 (–21) times as long as wide, the lowest leaves often reduced to phyllodes, green-brownish or reddish, seldom fresh green, generally 7 (–9)-veined, rarely up to 13-veined, lower leaves sometimes

Fig. 1. – *Potamogeton schweinfurthii* from Sardinia (24 VI 1980, E. Bocchieri & A. Poledrini s. n., CAG); scale bar = 3 cm.

Fig. 2. – *Potamogeton schweinfurthii* from Malta (24 X 1974, L. Y. Th. Westra & J. v. Rooden 214, BRVU); scale bar = 3 cm.

only 5-veined, minutely denticulate, cuneate at base, acute to mucronate at apex; petiole mostly 0–30 mm long (rarely that of the uppermost leaves up to 70 mm long but not in the Mediterranean region), mostly 0–0.2 times as long as the lamina. Floating leaves mostly absent but sometimes present (rarely so in the Mediterranean region), petiolate; lamina coriaceous, narrowly oblong to elliptical, 65–160 mm long, 14–28 mm wide, 4–6 times as long as wide, light green, opaque, often with a reddish or brownish tinge, 11–13-veined, entire at margins, mostly narrowly cuneate at base, acute to mucronate and often apiculate at apex; petiole (26–) 50–117 mm long, 0.3–1.6 times as long as the lamina, sometimes narrowly winged towards the lamina, never with a discoloured section. Stipules axillary, convolute, 20–95 mm long, persistent, relatively narrow throughout their length, acute. Peduncles 40–210 mm long, 2–4 times as long as the fruiting spike, thicker than the stem, at least towards the spike, terminal or lateral in the axils of upper submerged leaves (mostly on the 2nd–4th, exceptionally up to 14th node from the top), seldom in the axils of floating leaves. Spikes cylindrical, 40–70 mm long in fruit, contiguous. Flowers numerous, with 4 carpels. Fruits[1] 2.9–3.9 (–4.1) mm long, greyish green or dark green to yellowish green or sometimes yellow-brown, with ± obtuse and low dorsal keel. (Figs 1, 2).

Stem anatomy: stele of trio type, rarely of proto or oblong type, endodermis of U-type, interlacunar bundles present, in one circle (rarely in two circles of which one is incomplete), subepidermal bundles absent or scattered, pseudohypodermis present, one-layered.

Distribution

Potamogeton schweinfurthii is a species with wide distribution in Africa. The first description was based on material from tropical East Africa (Bennett 1901). Later it was reported from many other countries in Africa from Libya and Egypt in the north to the southernmost tip of South Africa (e.g. Dandy 1937, Berhaut 1954, Andrews 1956, Ozenda 1958, Obermayer 1966, Hepper 1968, Denny & Lye 1973, Lisowski et al. 1978, Symoens 1984, Jafri 1984, Lye 1995, 1997). Also the populations called "*P. lucens*" in the Azores, for which Bennett (1904) proposed an invalid designation "var. *azoricus*", were recently identified as *P. schweinfurthii* by Wiegleb (1995). The distribution of this species in Africa and surrounding islands (in addition to the Azores it occurs on Madagascar) was recently revised and described in detail by Kaplan & Symoens (2005).

The recently discovered European specimens of *P. schweinfurthii* came from six localities on five islands in the Mediterranean Sea (see also Fig. 3):

Corsica: "Réservoir de Peri, près de Vallaciola (Corse, dép. Haute-Corse, à l'WNW d'Alistro), rive sud-ouest, alt. env. 80 m", 10 VIII 1987, coll. J. Lambinon 87/582 (in Société pour l'Échange des Plantes vasculaires de l'Europe et du Bassin méditerranéen, fasc. 22, no. 13725), as *P. lucens* (BRNM, C, M, MSB); "Corse, dép. Haute-Corse, Réservoir de Peri, près de Vallaciola (à l'WNW d'Alistro), alt. env. 80 m, rive SW", 10 IX 1990, coll. J. Lambinon 90/Co/464, as *P. lucens* (M).

Sardinia: "Plantes de Sardaigne, Rio Cannas" [near San Vito, Cagliari Province], 23 VII 1958, coll. Stemmler, undetermined (G). "Rio Picocca, Burcei, Cagliari", 24 VI 1980, coll. E. Bocchieri & A. Poledrini, as *P. lucens* (CAG) (Fig. 1); recollected at the same place on 19 VII 1980 (CAG) and 5 VI 1981 (CAG).

[1] The morphological terminology for the fruit in *Potamogeton* varies greatly between authors. The fruit has been interpreted as a drupe, achene or even as part of an aggregate fruit (drupelet, nutlet). None of them seem to be satisfactory. In this paper, the general term "fruit" is used, following the Flora of the World glossary (Orchard 1999), for each seed-bearing structure formed from the ovary after flowering. The fruit of *Potamogeton* is drupaceous but not strictly a drupe.

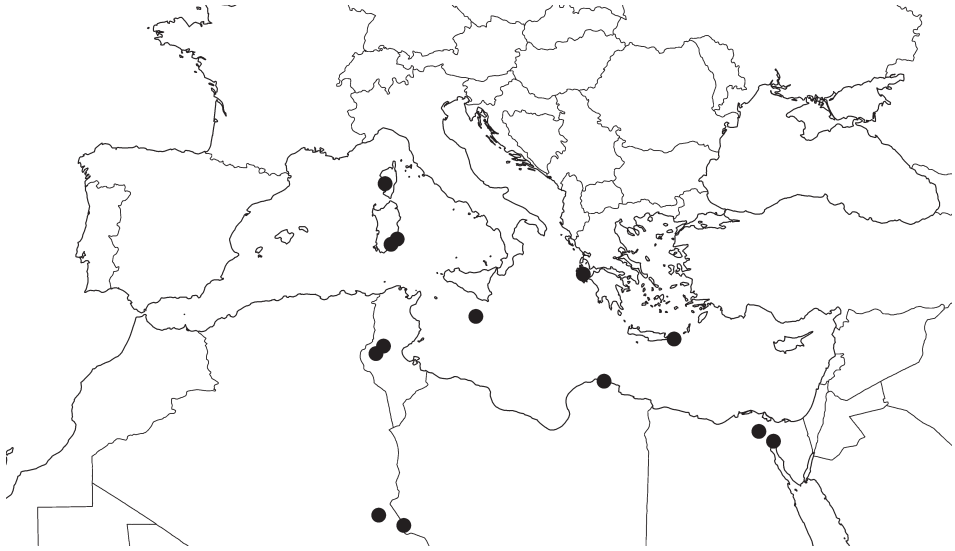

Fig. 3. – Distribution of *Potamogeton schweinfurthii* in the Mediterranean region based on herbarium specimens.

Malta: "Malta, between Mellieha and Mellieha Bay, in water storage basin", 24 X 1974, coll. L. Y. Th. Westra & J. v. Rooden 214, as *P. alpinus* (BRVU, G, U) (Fig. 2).

Greece, Ionian Islands: "Griechenland: Ion. Insel Kefallinía, Ep. Kranéas, Eliós, Süßwassergraben beim Dorf Kateliós, 2–3 m", 17 VII 1977, coll. J. Damboldt 37/122/77, as *P. lucens* (B). (This collection was determined as "? *P. schweinfurthii*" by G. Wiegleb in February 1998.)

Greece, Crete: "Eparchia Sitia: prope Kato Zakros, 35°06' N, 26°15'30" E, 5–20 m", 20 IV 1976, coll. W. Greuter & A. Charpin 13279, as *P. lucens* (G); "Abundant in The Cistern, E. wing of the Minoan palace, Kato Zakros, alt. approx. 10m, lat. 35° 05' N, long. 26° 16' E, East Crete", 27 IX 1996, coll. C. D. Preston 96/246 (CGE, PRA).

Although all these collections from the Mediterranean part of Europe were made during the past five decades, *P. schweinfurthii* is unlikely to have only recently invaded this area. The more probable explanation of its recent discovery is that it is rather scarce in the Mediterranean region (as is usual at the borders of species' ranges) and has been overlooked by field botanists. Aquatic habitats suitable for this species (as well as for majority of European *Potamogeton* species) are certainly uncommon around the Mediterranean Sea. In addition, *P. schweinfurthii* is rare at all these sites. Among more than 1300 collections of *Potamogeton* from the Mediterranean part of Europe studied only 0.77 % belonged to *P. schweinfurthii*. Another relevant feature is that aquatic plants are usually neglected during fieldwork. Particularly in the Mediterranean region, collectors generally concentrate on thermophilous vegetation rather than hydrophytes. The fact that the species was collected only after 1958 seems to be the result of more intensive collecting. The number of collections of aquatic plants in general increased rapidly during the second half of the 20th century (Z. Kaplan, unpubl.). Similarly, although *P. schweinfurthii* has been known from Africa for more than 100 years, it has only recently been recorded from Algeria, Tunisia, Burkina Faso and Niger (Kaplan & Symoens 2005). The third attribute supporting a longer history of the occurrence of *P. schweinfurthii* in the Mediterranean part of Europe is that not all its populations appear to be ephemeral. Even from the little information available it is obvious that this species persists at some of its Mediterranean sites. It was for the first time collected at Káto Zákros, Crete, in 1976, and recollected at this site again 20

years later. The collection from Rio Cannas, Sardinia, is dated 1958; the recent record of "*P. lucens*" from the same river by Ballero (1988) undoubtedly is also *P. schweinfurthii*.

Taxonomy and identification

Potamogeton schweinfurthii seems to be closely related to the mainly Eurasian species *P. lucens* L. with which it shares many important morphological and anatomical characters. The exact morphological and geographical delimitation of these similar species is sometimes difficult. Wiegleb & Kaplan (1998) reported the occurrence of transitional forms of unknown status in the Mediterranean region. Only a detailed morphological analysis of the additional recently revealed specimens provided sufficient material for an exact and reliable assigning of some of them to *P. schweinfurthii*.

The collectors who attempted to identify their specimens of *P. schweinfurthii* from the Mediterranean part of Europe considered them to be either *P. lucens* or *P. alpinus* Balb. C. D. Preston (pers. comm.) did not determine on the herbarium label his specimen from Crete but correctly suspected it might belong to *P. schweinfurthii*. All these three species belong to a group of species with submerged leaves that are sessile or only shortly petiolate. Another similar species with the same combination of characters, sometimes confused with *P. alpinus*, is *P. gramineus* L., which together with *P. lucens* and *P. schweinfurthii* belongs to the *P. lucens* group (sensu Wiegleb 1988). The most common broad-leaved *Potamogeton* species in the Mediterranean region is *P. nodosus*, which is often confused with *P. schweinfurthii* in Africa (Kaplan & Symoens 2004, 2005) and is therefore also included in this discussion.

The most similar is the Old-World species *P. lucens* (see also Table 1). In its usual form, which is mostly found in standing water, it differs particularly in having leaves with broader, mostly elliptical lamina, which is 2–6 times as long as wide, and petioles that are almost always 2–7 mm long, with this length being almost the same along the stem (care must be taken to exclude leaves with a reduced lamina, which may have considerably longer petioles). In contrast, *P. schweinfurthii* has leaves with narrowly lanceolate to narrowly elliptical laminas, which are mostly 4–17 times as long as wide. The leaves of this species are often sessile but sometimes the upper leaves (less often all leaves) have short petioles, generally up to 30 mm long, and tend to be longer at the spike than at the base of the stem (some African plants were noted with petioles of the uppermost leaves up to 70 mm long).

Many of the phenotypes of *P. lucens* can be readily distinguished from *P. schweinfurthii*. However, there is a form of *P. lucens*, with considerably prolonged (up to 40 cm long), narrowly lanceolate leaves, occasionally occurring in rivers, which mimics *P. schweinfurthii*. It was described in the past under several names including *P. longifolius* J. Gay and *P. macrophyllus* Wolfg. (Kaplan & Zalewska-Gałosz 2004), and later sometimes treated as a variety of *P. lucens* (e.g. by Hagström 1916). The taxonomic validity of this morphotype has never been tested experimentally. It may be only a phenotype induced by running water, as is known for many other *Potamogeton* species (Kaplan 2002). All transitional forms of *P. lucens* between plants with extremely long and narrow leaves and those with elliptical leaves occur, and it is certainly impossible to define a clear-cut line between them. The form with long narrow leaves has been collected throughout most of the range of the species, including France, Sweden, Lithuania, European Russia and Siberia, which suggests its polytopic origin. Nowadays, it is only exceptionally recognized in formal taxonomic classification.

Table 1. – Diagnostic characters and geographical ranges of *P. schweinfurthii* and of the most similar European and Mediterranean *Potamogeton* taxa.

Taxon	*P. schweinfurthii*	*P. lucens* (usual form)	*P. lucens* (river form with long narrow leaves)
Branching pattern	unbranched or sparingly branched	sparingly to richly branched	sparingly branched
Presence of floating leaves on adult fertile plants	mostly absent, sometimes present but very rare in the Mediterranean region	always absent	always absent
Shape of lamina of submerged leaves	narrowly lanceolate to narrowly elliptical	oblong to broadly elliptical, sometimes additionally also with a few narrowly lanceolate leaves	narrowly lanceolate to oblong-lanceolate
Length:width ratio of lamina of upper submerged leaves	4–17 (–21)	2–6, seldom up to 10 in some leaves in addition to broader leaves	6–20 (–24)
Length of lamina of submerged leaves (mm)	65–170 (–250)	(30–) 70–180 (–240)	120–340 (–400)
Width of lamina of submerged leaves (mm)	(3–) 7–24 (–28)	(15–) 25–65	(5–) 8–35
Number of longitudinal veins in lamina of upper submerged leaves	(5–) 7 (–13)	9–11	(7–) 9 (–11)
Shape of apex of submerged leaves	acute to mucronate	acute to rounded and mucronate	acuminate to long mucronate
Length of petiole of submerged leaves (mm)	0–30 (outside of the Mediterranean region that of the uppermost leaves rarely up to 70)	2–7 (–18), usually of almost the same length along the stem	2–13
Occurrence of phyllodial leaves	often present near the base of the stem	always present near the base of the stem, sometimes also in the upper parts in addition to laminar leaves	always present near the base of the stem
Fruit length (with rare extremes in brackets)	2.9–3.9 (–4.1)	3.3–4.7 (–5.1)	3.3–3.8 (rarely present)
Colour of dry ripe fruit	greyish green to yellowish green	greyish green to yellowish green	yellowish green
Shape of thickening in the endodermal cells in stem	U-type	U-type	U-type
Presence of interlacunar bundles in the cortex of stem	present, usually in one circle, rarely in two of which one is incomplete	present, in 1–3 circles	present, in 1–3 circles
Distribution	Africa and surrounding islands, Mediterranean region south of 42° N	Europe, N. and E. Africa (very rare), W., N. and E. Asia	rarely in Eurasia north of 45° N

P. gramineus	*P. alpinus*	*P. nodosus*	*P. ×salicifolius*
sometimes sparingly but mostly richly branched	always unbranched but occasionally with horizontal leafless stolons	unbranched or sparingly branched	sparingly to richly branched
mostly present	mostly present	almost always present	always absent
narrowly oblong to oblong-lanceolate	narrowly lanceolate to oblong	narrowly oblong to oblanceolate-oblong	narrowly lanceolate to elliptical
5–21	4–11	5–11 (–15)	3–10
(15–) 40–90 (–135)	60–220	(50–) 80–180 (–290)	60–120 (–200)
(2–) 4–8 (–10)	(7–) 10–25	(10–) 14–38	14–40
5–7 (–9)	9–17	11–17 (–21)	(9–) 11–17
acute to mucronate	broadly obtuse or tapering to a narrow but obtuse tip	narrowly obtuse to subacute, never mucronate	acute to rounded and indistinctly apiculate
0	0	(13–) 30–180 (–250)	0 (–1)
always present near the base of the stem	absent	absent	rarely present and only partially reduced
2.4–3.1 (–3.6)	2.7–3.3	3.0–3.9 (–4.0)	absent (sterile plants)
mid green to dark green	ochre brown to light reddish brown	reddish brown	absent (sterile plants)
U-type	O-type	O-type	O-U-type
present, in one outer circle	absent	absent, rarely a few present	present, in 1–2 incomplete circles
boreal and temperate regions throughout the Northern Hemisphere	boreal and temperate regions throughout the Northern Hemisphere	most of the Northern Hemisphere, Africa, N. and W. Australia, Pacific islands, N. South America	rarely among parents in areas of their sympatric occurrence in Eurasia

The morphological distinction of these long- and narrow-leaved forms of *P. lucens* from *P. schweinfurthii* is sometimes very difficult and inevitably requires a detailed knowledge of variation in both species. The river forms of *P. lucens* mostly have leaves with 9 longitudinal veins and short petiole of more or less constant length, whereas *P. schweinfurthii* most often has 7-veined leaves, which are either sessile (most frequently the case in the Mediterranean region) or sometimes with petioles generally up to 30 mm long. There is little morphological differentiation but the identification is facilitated by the fact that the ranges of these two forms are mutually exclusive. The river forms of *P. lucens* are recorded from Eurasia north of 45° N but unknown from the Mediterranean region. In contrast, *P. schweinfurthii* is primarily an African species reaching Europe only in the Mediterranean region south of 42° N (for the distribution of the latter in the Mediterranean region see Fig. 3). There is also some differentiation between habitats: the forms of *P. lucens* with long narrow leaves are confined to running water in rivers, whereas most collections of *P. schweinfurthii* came from standing water (lakes, water reservoirs). It must be pointed out, however, that identification of these plants requires experience and must be done with utmost care.

As listed above, there are several other broad-leaved *Potamogeton* taxa occurring in the southern half of Europe that may be confused with *P. schweinfurthii*. Although superficially similar, *P. alpinus* is relatively easy to distinguish. It differs from *P. schweinfurthii* mainly in having the stem always unbranched (but occasionally with horizontal leafless stolons, which may be misinterpreted as branches), floating leaves mostly present when the plant is in flower, submerged leaves are always sessile and have 9–17 longitudinal veins and an obtuse apex, and phyllodes are always missing.

Another similar species is *P. gramineus*, which like *P. alpinus* usually has floating leaves developed when the plant is flowering and in which the submerged leaves are always sessile. In addition, *P. gramineus* differs from *P. schweinfurthii* in several quantitative characters, such as generally shorter (mostly 40–90 mm long) and narrower (4–8 mm wide) submerged leaves and smaller fruits (mostly 2.4–3.1 mm long).

Most of the phenotypes of *P. nodosus* are quite distinct but as this is one of the most variable and plastic *Potamogeton* species, some forms also occasionally mimic *P. schweinfurthii*. However, the submerged leaves of *P. nodosus* are often long petiolate (with petiole mostly longer than 30 mm), with 11–17 (–21)-veined lamina, which is never reduced to phyllodes and is more or less obtuse at apex (but never mucronate), and the dry ripe fruits are reddish brown.

One more *Potamogeton* taxon has been recently detected in S Europe (Z. Kaplan, unpubl.) that could be confused with *P. schweinfurthii*. This is *P.* ×*salicifolius*, a hybrid between *P. lucens* and *P. perfoliatus*. Most of the phenotypes with elliptical or oblong leaves are easily distinguished from *P. schweinfurthii*. However, like both its parents, this hybrid sometimes produces a narrow-leaved river form. The type collection of the name *P.* ×*salicifolius* itself is of this phenotype (Kaplan & Zalewska-Gałosz 2004). Although these forms may sometimes be superficially very similar to *P. schweinfurthii*, they are readily distinguished by their submerged leaves, which are sessile and slightly amplexicaul at the base, more rounded at the apex and have a higher number of longitudinal veins (11–17). The most important diagnostic characters and geographical ranges of these *Potamogeton* taxa are summarized in Table 1.

Although the identification of *Potamogeton* taxa based on stem anatomy is not discussed in detail here, it is in certain cases a very reliable means of determination (Wiegleb 1990c, Wiegleb & Kaplan 1998). There are several recent studies that successfully used anatomical studies for resolving taxonomic difficulties in *Potamogeton* (e.g. Symoens et al. 1979, Wiegleb 1990a, 1990b, Kaplan 2001, 2005, Kaplan & Wolff 2004, Kaplan & Symoens 2004, 2005). In our case, stem anatomy is helpful for distinguishing *P. alpinus* and *P. nodosus*, as they have a very different stem anatomy from that of *P. schweinfurthii* (selected features listed in Table 1).

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Souhrn

Africký druh *Potamogeton schweinfurthii* byl nově nalezen v Evropské části Středozemí. Dosud byl zjištěn na ostrovech Korsika, Sardínie, Malta, Kefalonie (šestý největší řecký ostrov ležící v Jónském souostroví) a na Krétě. Těžiště rozšíření druhu je v kontinentální Africe, kde se vyskytuje od Libye (kde je vzácný) a Egypta směrem na jih přes celou Afriku (zvláště však její východní část) až k nejjižnějšímu výběžku Jižní Afriky, a dále je znám z Azorských ostrovů a Madagaskaru. *Potamogeton schweinfurthii* je ve Středozemí s největší pravděpodobností původní, byl však dosud přehlížen především kvůli své vzácnosti na okraji areálu. Druh je nejvíce podobný a patrně také nejpříbuznější převážně eurasijskému druhu *P. lucens*, od něhož se liší zvláště listy buď zcela přisedlými nebo s řapíkem až 3 cm dlouhým, a užší, úzce kopinatou až úzce eliptickou čepelí.

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