

## New species for the Bulgarian flora

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Received: July 30, 2012 ▷ Accepted: August 05, 2012

**Abstract.** *Phytolacca esculenta*, *Celtis tournefortii*, *Parthenocissus inserta*, and *Prunus serotina* are reported for the first time from Bulgaria, while the occurrence of *Salix viminalis* in the country has been definitively confirmed. The first record on invasive spreading of *P. serotina* in Bulgaria is presented.

**Key words:** alien species, Bulgaria, *Celtis tournefortii*, invasive plants, new taxa, *Parthenocissus inserta*, *Phytolacca esculenta*, *Prunus serotina*, *Salix viminalis*

### Introduction

The flora of Bulgaria is rather well known, so there are rare findings of any species which has not been recorded so far, especially among the woody plants. However, this happens occasionally, both in the herbaria and in the field. It relates not only to the taxa that are difficult to distinguish from well recognizable common plants, but also to morphologically very characteristic species. In the latter case, the plants are usually of foreign origin, but very often they are noticed only after they begin to enter natural vegetation. This article provides information about the occurrence of *Salix viminalis*, *Celtis tournefortii*, *Phytolacca esculenta*, *Parthenocissus inserta*, and *Prunus serotina* in Bulgaria. The two former species are native to Europe and are known from the neighboring countries, the three latter taxa are alien plants. Short descriptions are provided, with emphasis on characters distinguishing them from morphologically similar common species.

### Material and methods

Herbarium material representing all taxa has been compared to plants kept in the Herbarium of the Institute of

Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (SOM) and in the Herbarium of the Institute of Dendrology, Polish Academy of Sciences, Kórnik, Poland (KOR). As far as possible, descriptions of the species are based on herbarium specimens collected in the Balkan Peninsula and on personal data. Living plants and/or herbarium specimens were photographed.

### Results and discussion

#### *Phytolaccaceae*

*Phytolacca esculenta* Van Houtte, Fl. Serres Jard. Eur. 4: 398 (1848)

**Sofia region:** Sofia, near the river Perlovska, westwards of Berovs' Factory, in ruderal places 13.06.2000, coll. & det. D. Stoyanov sub *Ph. americana* L. (SO 100637, 100638).

– Sofia, northeastern part of the city, near the Chavdar Bridge, in ruderal shrubby places, 42.70222°N, 23.35040°E, 530 m, 18.07.2012, coll. & det. A. Petrova & J. Zieliński & (SOM 168722-168725, 168730) (Figs 1–3).

SOM houses a herbarium specimen correctly determined as *Ph. esculenta* (SOM 167693), collected during 2011 from the region of Mt Sredna Gora (*Western*), but



Fig. 1. Locality of *Phytolacca esculenta* (photo J. Zielinski).



Fig. 2. *Ph. esculenta*: flowers and unripe fruits (photo J. Zieliński).

unpublished yet. Most probably, new localities will be found in the future, judging by Balogh & Juhász (2008) reports that in Hungary that plant has started to spread recently.

#### Species description

Perennial herb, with stout, 1–2(2.5) m high stems. Leaves 10–30 cm long, 5–15 cm wide, broadly ovate, with obtuse or abruptly acuminate apex. Racemes 5–25 cm long, compact, erect even when in fruit. Flowers with 8 stamens, filaments widened at the base. Fruits are depressed-globose berries with 8 separate (free) carpels, intensive purplish-black.

The species is rather similar and closely related to *Ph. americana*. Perhaps this is the reason for its late discovery in the country. The most distinguishing morphological features are: the fruits with 8 free carpels (Fig. 3b), racemes erect in ripening, and flow-

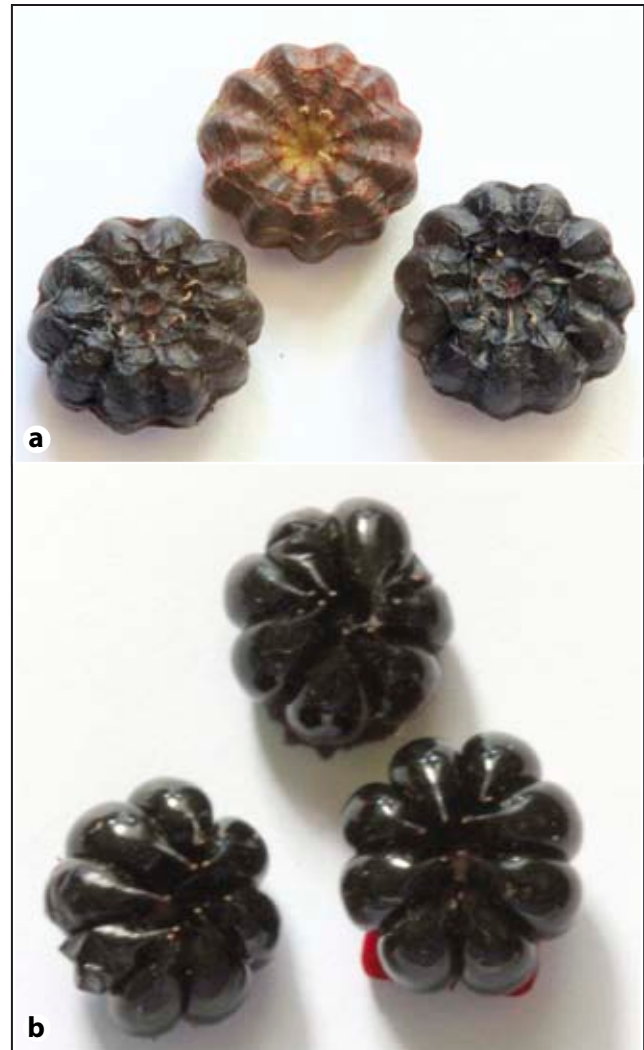


Fig. 3. Fruits of: a, *Ph. americana*; b, *Ph. esculenta* (photo R. Natheva).

ers with 8 stamens and broadly ovate leaves in *Ph. esculenta*; while *Ph. americana* has fruits with 10 united carpels (Fig. 3a), nodding racemes, 10 stamens and ovate-lanceolate leaves.

The native range of the species is China. Webb (1964) reported the plant as more or less naturalized locally in Romania. According to Balogh & Juhász (2008), in the last decade it has been reported from many parts of Europe and in some places it got naturalized.

#### Salicaceae

*Salix viminalis* L., Sp. Pl. 1021 (1753)

**Rhodopi Mts (Central):** Asenovgrad, eastwards of the Chetiridesette Izvora locality, LG-34, 26.091961, coll. N. Vihodcevsky sub *Salix incana* Schrank (SO 15532, SOM 104811) (Figs 4, 5a).

*Salix viminalis* is a species with an extensive range, spreading mostly in moderate climate regions from western Spain in SW Europe, to the basin of river Lena in Northeast Russia (Skvortsov 1968). In Europe it occurs in most of the countries, and is absent only from the northernmost parts of the continent (Island, Finland, N Sweden, and N Norway) and its southernmost areas (Portugal, S Italy, Mediterranean islands). On the Balkan Peninsula it grows in Croatia, Serbia, Bosnia, Herzegovina, and in Macedonia, where the species has its southernmost natural stands (Rechinger 1964; Jalas & Suominen 1976; Chmelař & Meusel 1979; Meikle 1984; Martini & Paiero 1988; Romo 1997; Larsson 2000).

The problem of the occurrence of *S. viminalis* in Bulgaria has been unclear and rather controversial for a long time. The species was mentioned for the first time in the country in 1880, by Pančić: “In rivularibus m Tri Čuke – Stara Planina” (Pančić 1883) and few years later the information was repeated by Velenovský (1891). The plant was also recorded further by

Stojanov and Stefanov from several different localities (Stojanov & Stefanov 1924), but in 1966 in the fourth edition of *Flora of Bulgaria*, the information on occurrence of *S. viminalis* in Bulgaria was considered incorrect and probably related to *S. elaeagnos* (Stojanov & al. 1966). According to the authors of the above *Flora*, the species is only locally cultivated in Bulgaria for basket-making. In the latest edition of *Flora of Bulgaria*, Velchev (1996) mentioned *S. viminalis* as a species seldom naturalized or cultivated. According to Delkov (1984), it does not occur naturally in Bulgaria and is only cultivated in some places.

The only known herbarium specimens of *S. viminalis* kept in Bulgarian herbaria are those cited above and collected by N. Vihodcevsy in Asenovgrad. The Bulgarian locality is closest to the natural stands of the species in Macedonia, and the distance of about 130 km separating Bulgarian and Macedonian populations is rather short for an anemochorous species. Vihodcevsy, a very experienced field botanist and outstanding plant collector, was most probably fully convinced that he was gathering wild-growing plants, but determined them as *S. incana* Schrank (= *S. elaeagnos* Scop.). Few years later V. Velchev, the author of the *Salix* account in *Flora of Bulgaria* (Velchev 1966), corrected this name to *S. elaeagnos*. A couple of years ago, the same plants were determined as *S. elaeagnos* subsp. *angustifolia* (Carriot) Rech. f. The above facts confirm definitively the occurrence of *S. viminalis* in Bulgaria and allow the suggestion that it is a native species in the country. Anyway, special field observations are advisable, in order to dispel all doubts.

#### Species description

Tall shrub, seldom small tree up to 6(–8) m. Stems numerous, erect or suberect. Annual twigs long, flexible, densely appressed-grey-hairy, glabrescent. Decorticated wood without ridges, smooth. Buds ovate, appressed to twigs, grey-hairy, glabrescent. Leaves alternate; blade 10 to 15(–18) cm, linear to narrowly linear-lanceolate, tapering into a long narrow acumens, narrowly cuneate at base, with narrowly revolute apparently entire margin; upper surface green, slightly lustrous, glabrous to sparsely pubescent; lower surface densely covered with appressed, silky ± shiny dense indumentum; hairs ± parallel to lateral veins. Petioles up to 1 cm. Stipules narrow, lanceolate, straight to facate, often wanting on slender stems. Catkins appearing before leaves, up to 3–4 cm long, subsessile, with few small, narrow silky-hairy

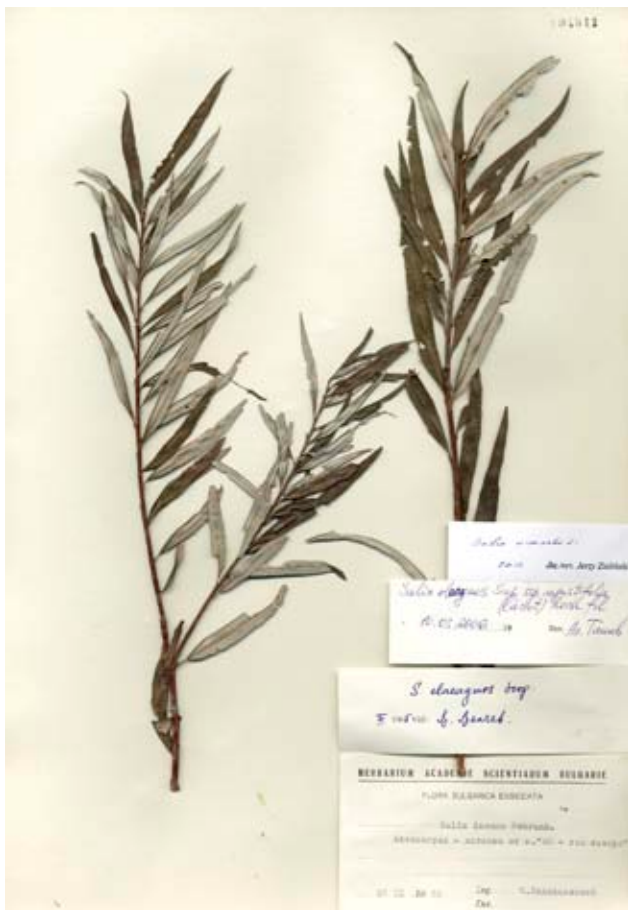
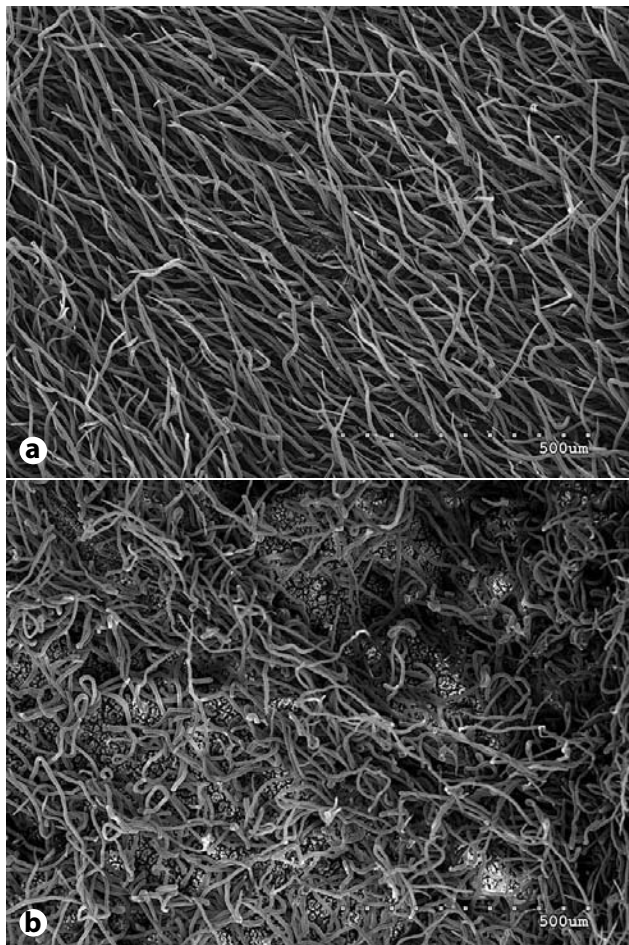


Fig. 4. *Salix viminalis*: a herbarium specimen (SOM 104811) (photo S. Angelov).

leaves; rachis densely hairy. Nectary 1, linear-cylindrical. Bracts brown to reddish-brown or black, lighter below, long-hairy. Stamens 2; filaments free, glabrous; anthers yellow. Ovary and capsule subsessile, densely silky-hairy; style distinct, with  $2 \pm$  divergent, usually not bifid stigmas, 0.8–1.5 mm long. Capsule narrowly flask-shaped, densely hairy, up to 6 mm long.

Within its natural range, the species grows in wet places, along slowly flowing rivers and streams, along canals, around lakes and ponds. In many countries it is introduced and cultivated for basket-making, its rods are also used for the construction of fences and for reinforcement of the banks of canals and streams (Chmelař & Meusel 1979; Newsholme 2002). *Salix viminalis* is rather variable species, especially in the size and shape of leaves. The forms with shorter and narrower leaves, as those from Asenovgrad, are very similar to *S. elaeagnos*, but this similarity is only superficial. The leaves of the latter species are dull to-



**Fig. 5.** SEM of abaxial leaf surface: **a**, *Salix viminalis* (from SOM 104811); **b**, *S. elaeagnos*, (from KOR 19400). (photo D. Tomaszewski).

mentose below, densely covered with tangled, rather loose hairs (Fig. 5b); filaments are partly connate and hairy in the lower half, bracts yellowish, ovary and fruits are glabrous. Both species belong to different sections of the genus *Salix* – *S. viminalis* to the sect. *Viminella* Seringe [= sect. *Vimen* (Seringe) Dum.], while *S. elaeagnos* to the section *Canae* A. Kern. (Skvortsov 1968; Argus 1997).

## Ulmaceae

*Celtis tournefortii* Lam., Encycl. 4: 138 (1797)

**West Frontier Mts:** Mt Maleshevska, Palatski Vrah, 09.04.2009, coll. & det. V. Vutov & D. Dimitrov sub *Celtis australis* L. (SOM 165082) (Figs 6, 7).

The genus *Celtis* is represented in Europe by three species: *C. australis* L., *C. plachoniana* K.I. Chr. (= *C. glabrata* Steven ex Planchon, non Sprengel) and *C. tournefortii* Lam. In the *Flora of Europe* (Tutin 1964; Jalas & Suominen 1976), *C. caucasica* Willd. was also recorded for Bulgaria and Macedonia, but apparently these data actually related to *C. planchoniana* (Browicz & Zieliński 1977, 1982, as *C. glabrata*). In Bul-



**Fig. 6.** *Celtis tournefortii*: a herbarium specimen (SOM 165082) (photo S. Angelov).

garia, the occurrence of two *Celtis* species has been so far documented by herbarium specimens: *C. australis* and *C. planchoniana*. *Celtis tournefortii* was also recorded from the country (Tutin 1964), but that information has been considered incorrect by Georgiev & Palamarev (1966) and it was omitted in the *Atlas Florae Europaeae* (Jalas & Suominen 1976). Herbarium studies of the newly collected plant specimens kept in SOM have definitively revealed that the latter species also occurs on Bulgarian territory.

*Celtis tournefortii* has a wide distribution, but everywhere it is a rather rare species, with localities scattered from Sicily, Crete and the Balkan Peninsula, through Crimea and Anatolia, and up to Caucasus and W Iran (Tutin 1964; Zieliński 1979; Browicz & Zieliński 1982, Christensen 1997). It was found in Bulgaria only three years ago by V. Vutov and D. Dimitrov in Mt Maleshevska, quite near the Bulgarian-Macedonian frontier. According to Micevski (1993), the species is not rare in Macedonia. The herbarium specimen collected in Mt Maleshevska is represented by one sterile branchlet, but there is no doubt that it belongs to *C. tournefortii*.

#### Species description

Shrub or small tree, up to 6 m tall. Twigs appressed-pubescent. Leaves 2–6 cm long, no more than twice as long as wide, broadly ovate to narrowly ovate, usually strongly oblique at base. With the right side much longer than the left side, occasionally subcordate, narrowly acute to subacuminate, simply serrate except in basal part, distinctly appressed-pubescent, glaucous or glaucous-green and lighter beneath. Fruit yellow or orange, when mature, 9–12 mm in diameter. Pedicels

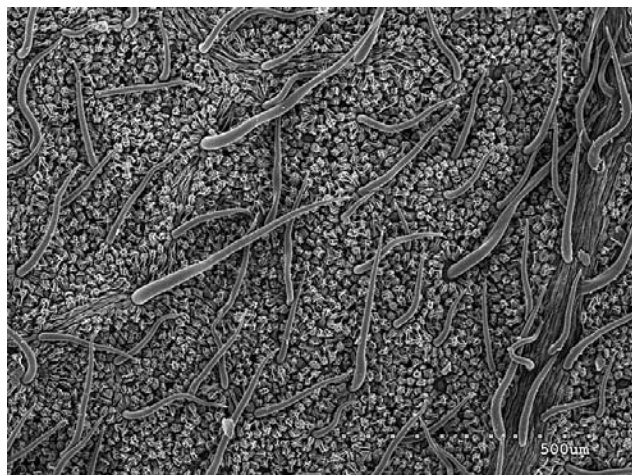


Fig. 7. *Celtis tournefortii*: SEM of abaxial leaf surface (from SOM 165082) (photo D. Tomaszewski).

± twice as long as petioles. Stones weakly sulcate, almost smooth, with 4 ridges.

*Celtis tournefortii* may only be mistaken for the closely related *C. planchoniana*, but it differs from the latter mostly by the persistently pubescent stems and leaves (Fig. 6). The *Celtis* account in *Flora of Bulgaria* (Georgiev & Palamarev 1966) is already out of date, so a new key to the determination of Bulgarian species of *Celtis* is given below.

1. Leaves glabrous, occasionally scabrous on juvenile or grazed plants . . . . . *C. planchoniana*
- 1\*. Leaves pubescent on both sides . . . . . 2
2. Leaves lanceolate to ovate-lanceolate, long-acuminate. Fruit brownish-black, when ripe. Stone strongly reticulate-rugose . . . . . *C. australis*
- 2\*. Leaves ovate to narrowly ovate, narrowly acute to subacuminate. Fruit orange or yellow. Stone almost smooth . . . . . *C. tournefortii*

#### Vitaceae

*Parthenocissus inserta* (A. Kern.) Fritsch., Excursionsfl. Österr. ed. 3: 321, 789 (1922)

[= *P. quinquefolia* auct. non (L.) Planch., A. & C. DC., Monogr. Phan. 5: 448 (1887)]

**Sofia region:** Sofia, in northeastern part of the town, near the Chavdar Bridge, in ruderal shrubby places 42.70222°N, 23.35040°E, 530 m, 18.07.2012, coll. & det. J. Zieliński & A. Petrova (SOM 168727-168729) (Fig. 8).



Fig. 8. *Parthenocissus inserta* (photo D. Stoykov).

*Parthenocissus inserta* is a species native to North America, where it is widespread in the southern regions of Canada, NW and W parts of the United States. It was introduced to Europe as an ornamental climber and spreads spontaneously in many countries (Webb 1968). In some regions it is very common, mainly in the broadleaf forests, where it climbs on trees or covers the forest floor. However, it often grows among thickets in the urban areas, especially in less intensively managed places.

#### Species description

Climbing shrub by means of leaf-opposed tendrils. Leaves alternate, digitate. Leaflets usually (3–)5(–7), up to 12 cm long, elliptic or oblong, acutely coarsely serrate, dark-green and  $\pm$  lustrous above, lighter and shining-green beneath. Tendrils with 3–5 twining branches, without adhesive disc at apex. Inflorescence leaf-opposed, dichotomously branched. Flowers small, actinomorphic; sepals 5, united at apex, petals free. Fruit a bluish-black, usually slightly bloomy berry, c. 8 mm in diameter, with 3–4 seeds. The species spreads by rooting stems and fruits that are eaten and dispersed by birds. Locally, it is invasive, e.g. in the Czech Republic (Pyšek & al. 2002), Greece (Krigas & Kokkini 2004; Arianoutsou & al. 2010), Belgium (Verloove 2006), Romania (Anastasiu & al. 2007; Anastasiu & Negrean 2009), etc.

*Parthenocissus inserta* is reported for the first time from Bulgaria, however, it is quite possible that the species is not rare in the country, but simply misidentified for the similar and closely related *P. quinquefolia*. The latter species, seldom naturalized (Webb 1968), has leaflets with more numerous and smaller teeth on the margin, they are dull above, usually glaucescent beneath, the tendrils have 5–12 branches with adhesive disc at apex. By means of such tendrils and adventitious roots it climbs walls, buildings, chimneys, etc.

#### Rosaceae

*Prunus serotina* Ehrh., Gartenkalender 3: 284 (1784) [= *Padus serotina* (Ehrh.) Borkh., Arch. Bot. (Leipzig) 1 (2): 38 (1797)]

**Vitosha region:** Mt Vitosha, Bukara loc., at forest edges, 42°38'05"N, 23°13'55"E, 1320 m, 15.09.2006, in fruits, coll. J. Zieliński, A. Petrova & R. Natcheva (SOM 168692) (Fig. 9).

The natural range of *Prunus serotina* is connected with North America, where the species occurs

from Canada and the United States in SW regions of Mexico and Guatemala (Fowells 1965). In 1623 it was imported to Europe (Wein 1930) as an ornamental plant but later, especially in the 19<sup>th</sup> century, the species began to be planted widely as a forest tree or to enrich poor forest habitats. It quickly got out of control and started to spread spontaneously (Scholz & Scholz 1995; Weber 2003; Koutika & al. 2011). Now the species occurs throughout most European countries, except those on the Balkans Peninsula, and Portugal on the Iberian Peninsula, but all signs show that it has not yet finished its expansion (Webb 1968; Starfinger 2010).

*Prunus serotina* has all characters of an invasive species: a rather broad ecological scale allowing it to exist in very different habitats, rich production of easily germinating seeds, edible fruits dispersed both by birds and mammals, and resistance to local diseases and pathogens. It is a fast-growing tree that colonizes forest gaps and edges, both in disturbed and natural vegetation. Its saplings and young plants can survive for a long time under shade and under proper conditions to grow rapidly. A dense shrub layer can eliminate the local plant species and prevent rejuvenation of native forest trees. It can exert allelopathic effects on other species (Csizsár 2009; Starfinger 2010). The species is included in the list of “Worst invasive alien species threatening biodiversity in Europe” (Annex 1. 2007)

*Prunus serotina* is cultivated in some city parks in Bulgaria (Valev 1973; Dimitrov 2004) but information about its cultivation in forests is very scanty and general (Delkov 1984; Gramatikov 1992). As far as we know, cases of its intensive naturalization in the country have not been noted so far.



Fig. 9. *Prunus serotina* from Mt Vitosha (photo R. Natcheva).

Several years ago we observed this species, fully naturalized on Mt Vitoshka, in the Bukara Locality, along the road from Boyana to Kopitoto. Ten or fifteen old trees grow there, in a wet depression on the right side of the road, not far from a picnic area. All generations were present there: from numerous saplings to abundantly fruiting adult individuals. In our opinion, on Mt Vitoshka *P. serotina* is in local but already very advanced stage of colonization. This fact should not be ignored, because with time the species may become a real problem for the vegetation on the mountain. The plant is very difficult to eradicate. After cutting the tree numerous sprouts appear around the stocks, so only uprooting of trees is effective (Starfinger 2010). In case of shrubby specimens, cutting below the root-neck is sufficient (W. Bugała, pers. comm.).

### Species description

A deciduous tree, up to 20(–30) m tall, but usually smaller. Bark dark-brown, irregularly fissured and exfoliating on old trunks. Young twigs glabrous. Leaves 5–12 cm long, oblong-ovate, oblong-lanceolate, elliptic to oblong-elliptic, narrowly rounded to cuneate at base, acuminate at apex, serrulate, dark-green and lustrous above, light-green beneath and often villous along the midrib, usually with not very conspicuous veins, firm when mature. Petioles 5–25 mm, with 2–4 glands near the blade. Flowers white, 8–10 mm across, in erect to nodding racemes 6–14(–15) cm long; pedicels 3–8 mm long. Calyx campanulate, glabrous inside, usually persistent in fruit. Fruits globose, 8–10 mm across, dark-purple-black, with bitter and sweet flesh and smooth stone.

*Prunus serotina* is rather easy to distinguish from the native *P. padus*. The latter species differs by the following features: leaves never villous along the midvein, lateral veins distinctly prominent beneath, calyx deciduous after flowering, stone sulcate. It normally flowers distinctly earlier than the American newcomer, so both taxa are reproductively isolated.

**Acknowledgements.** Financial support of the National Science Fund under Project DO-02-194 is gratefully acknowledged. We are grateful also to Dr Dominik Tomaszewski (Institute of Dendrology, Kórnik) for the SEM photographs, from IBER, Sofia to Svetlan Angelov for the photos of the *Celtis* and *Salix* herbarium specimens and to D. Stoykov for *Partenocissus inserta*.

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