



Rubus violaceifrons (Rosaceae), a new bramble species from Bohemia (Central Europe, Czech Republic)

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Abstract

Rubus violaceifrons, a new species from central and north-eastern Bohemia (Czech Republic) is described and illustrated, and its distribution is characterized in detail. We classify it as a member of the series *Pallidi* of the subgenus *Rubus*, section *Rubus* and subsection *Hiemales*, although its weak specimens partly resemble *R. guentheri* from ser. *Glandulosi*. Like all species of *R. ser. Pallidi* studied so far, *R. violaceifrons* is tetraploid, as determined using flow cytometry. A detailed morphological comparison of the new bramble species with similar taxa is presented. A determination key including all taxa of the *R. ser. Pallidi* occurring in the Czech Republic is provided.

Key words: apomictic taxa, batology, ploidy level, taxonomy

Introduction

The genus *Rubus* L. (1753: 492) is one of the taxonomically most complicated groups of vascular plants. In Europe, it is represented by no less than about 800 accepted species. Most of them (763) were described before 2010 (Kurtto *et al.* 2010), but numerous new species were discovered in the last decade, especially in Central Europe (see Jansen 2010, 2018, Weber 2010, Plieninger 2011, Trávníček & Žíla 2011, Király *et al.* 2013, 2015, 2019, Martensen 2013, 2014, Beek 2014, 2017a, 2017b, 2018, Maliński *et al.* 2014, Wolanin *et al.* 2016, 2020, Beek & Meijer 2017, Drenckhahn 2017, Mikoláš 2017, Schön 2017, Drenckhahn *et al.* 2018, Kosiński *et al.* 2018, Trávníček *et al.* 2018, Beek *et al.* 2019, Sander 2019, Sochor *et al.* 2019, Drenckhahn & Weber 2020, Hohla *et al.* 2021, Kosiński *et al.* 2021, Sander 2021, Trávníček *et al.* 2021).

About 98% of European species are native taxa and about 97% of them are endemic to the (sub)continent. Apart from thirteen species, all European members belong to the taxonomically rich group *Rubus* subgen. *Rubus* (Kurtto *et al.* 2010). The vast majority of the species in this subgenus are known or suspected to be polyploid apomictic (agamospermous, pseudogamic) units (Gustaffson 1942, Weber 1995, 1996, Krahulcová *et al.* 2013, Sochor *et al.* 2019) formed predominantly via hybridization of ancestral taxa (Sochor *et al.* 2015, Šarhanová *et al.* 2017).

During our long-term research of the genus *Rubus* (particularly *R. subgen. Rubus*) in the territory of the Czech Republic, we have repeatedly collected a morphologically stable biotype of bramble which somewhat resembles *R. guentheri* Weihe in Bluff & Fingerhuth (1825: 679) from *R. ser. Glandulosi* (Wimmer & Grabowski 1829: 33) Focke (1877: 355). Our subsequent detailed study of this taxon revealed its heavier growth with usually 4–5-foliolate leaves on primocanes, bigger prickles and some other differences from *R. guentheri*. For these reasons, we assess it as a member of *R. ser. Pallidi* W.C.R. Watson (1946: 344). In this group, the new taxon is similar particularly to the species *R. josholubii* H.E. Weber (2000: 234). Geographically, this bramble taxon is scattered across a relatively large area in central and eastern Bohemia in the Czech Republic. Here we describe this new species for science and introduce its fundamental biological features.

Material and methods

The field studies on which this article is based were carried out between 1995 and 2020 at over 1,500 bramble localities in the Czech Republic and adjacent countries. Both herbarium specimens and living plants in the field were studied morphologically. Material stored in the following public herbaria was used for study of morphology and distribution: HOMP, OL, PR, PRA, PRC (for herbarium acronyms see Thiers 2021). The private herbaria of P. Havlíček, P. Lepší, J. Velebil and V. Žíla were studied, too. In our comparative morphological study of the new species, we also considered the following literature sources: Weber (1987, 1995, 2000), Holub (1995), Ranft (1995), Zieliński (2004) and Sander & Jansen (2020). In the list of paratypes, localities are provided according to the phytogeographical division of the Czech Republic, see Skalický (1988). Information on herbarium labels written in languages other than English was translated, and, if missing, geographical coordinates and elevation figures were added with the help of online maps (Mapy.cz 2022). This information is enclosed in square brackets.

DNA ploidy was assessed using flow cytometry based on the relative fluorescence of stained nuclei from fresh leaf tissue. Analyses were carried out on a Partec CyFlow ML flow cytometer equipped with a Partec UV LED kit (365 nm, 10 mW; both Partec GmbH Germany) in the laboratory of the Department of Botany, Palacký University (Olomouc, Czech Republic). Samples were prepared according to the protocol of Doležel *et al.* (2007) in LB01 buffer with PVP-40 and stained with 4',6-diamidino-2-phenylindole (DAPI). *Zea mays* L. (1753: 971)'CE-777' was used as an internal standard.

We follow the taxonomic concept that to merit description as a taxonomic species (in accordance with Weber 1996), an apomictic bramble biotype must be sufficiently widely distributed in the countryside. Specifically, it must have many mutually distant localities and a distribution area that is at least 50 km in diameter.

Results and discussion

Rubus violaceifrons P. Havlíček, Trávn. & Velebil, *sp. nov.*

TYPE:—Central Bohemia, Praha-východ distr., Říčany town, clearing along forest road in the Říčanský les wood 40 m S of the Říčanská hájovna gamekeeper's lodge and 2.2 km SE of church in the Masarykovo náměstí square, scattered, 49°58'29.2"N, 14°40'13.3"E, 390 m a.s.l., 17 June 2020, J. Velebil 200711 (holotype: PR 973721 – inflorescence, PR 973722 – primocane leaves; isotypes: BRNM 829163; CB 105073; OL 38085; PR 973723, 973724, 973725, 973726, 973727; PRA 20405, 20406). Fig. 1, 2.

DESCRIPTION:—Shrub 30–100 cm tall. Primocane stems low to medium high arching, relatively thin, (4–)5–6.5(–8) mm in diameter, angled, with flat or slightly furrowed sides, greyish light green (sometimes whitish or purplish pruinous) and sometimes dark purplish spotted in shaded places or intensively suffused with brown-red in sunlit sites, with ca. 50 mainly simple hairs per 1 cm of stem side and with numerous somewhat unequal violet (or olive green and reddish when shaded) stalked glands up to 2 mm long; prickles numerous, (9–)11–20(–28) per 5 cm of stem length, almost equal, quite slender, straight to only very slightly curved, slightly declining, with a slightly compressed base, glabrous or sparsely hairy at the base, suffused red, with a yellowish tip, (2–)2.5–4(–4.5) mm long, with a (2.0–)2.3–3.3(–3.7) mm wide base.

Primocane leaves pedate, (3–)4–5-foliolate (when 3-foliolate then with basal lobes on lateral leaflets), leaflets usually not contiguous, almost flat, quite stiff, leathery and shiny, deep green, glabrous or with few hairs (near margins), and often with innumerable small sessile glands above, yellowish-green or only slightly greyish beneath, with simple or sometimes also with scattered tufted (mainly on veins) hairs, distinctly hairy to the touch; terminal leaflet with mid-long petiolule (petiolule length 25–35% of leaflet lamina length), usually obovate, broadly obovate to suborbicular, most often slightly cordate at the base, with an almost gradually acuminate apex (5–)12–17(–19) mm long, with an almost flat, indistinctly double (periodically) serrate margin, principal teeth apiculate (sometimes with a retrorse apex), usually broader than long, with incisions 1.5–2(–3) mm long; lateral leaves slightly smaller than the terminal one, basal leaflets distinctly smaller, with petiolules 2–4(–6) mm long; petioles usually longer than the basal leaflets, 5–7.5(–9) cm long, densely hairy, with numerous stalked glands and with (5–)10–15(–20) straight or slightly curved, slightly declining prickles, round or only shallowly canaliculated at the base; stipules narrowly lanceolate.

Inflorescence conical, usually short, distal 3–5(–8) cm long part leafless. Inflorescence leaves predominantly ternate (the uppermost 1–2 leaves simple), with scattered adpressed simple hairs and shortly stalked glands above, with numerous simple and tufted (and rarely stellate) hairs beneath; axis slightly flexuous, densely hairy, with numerous

stalked glands and with 5–7 prickles on 5 cm axis length, prickles almost straight, slightly declining, 2–4 mm long, inflorescence branches pointing obliquely upwards or patent; pedicels (4–)6–12(–18) mm long, densely hairy, mainly with adpressed tufted hairs, with numerous stalked glands and with 0–2(–4) acicular prickles 1–2 mm long.



FIGURE 1. Holotype of *Rubus violaceifrons* (PR 973721 – inflorescence).



FIGURE 2. Holotype of *Rubus violaceifrons* (PR 973722 – primocane leaves).

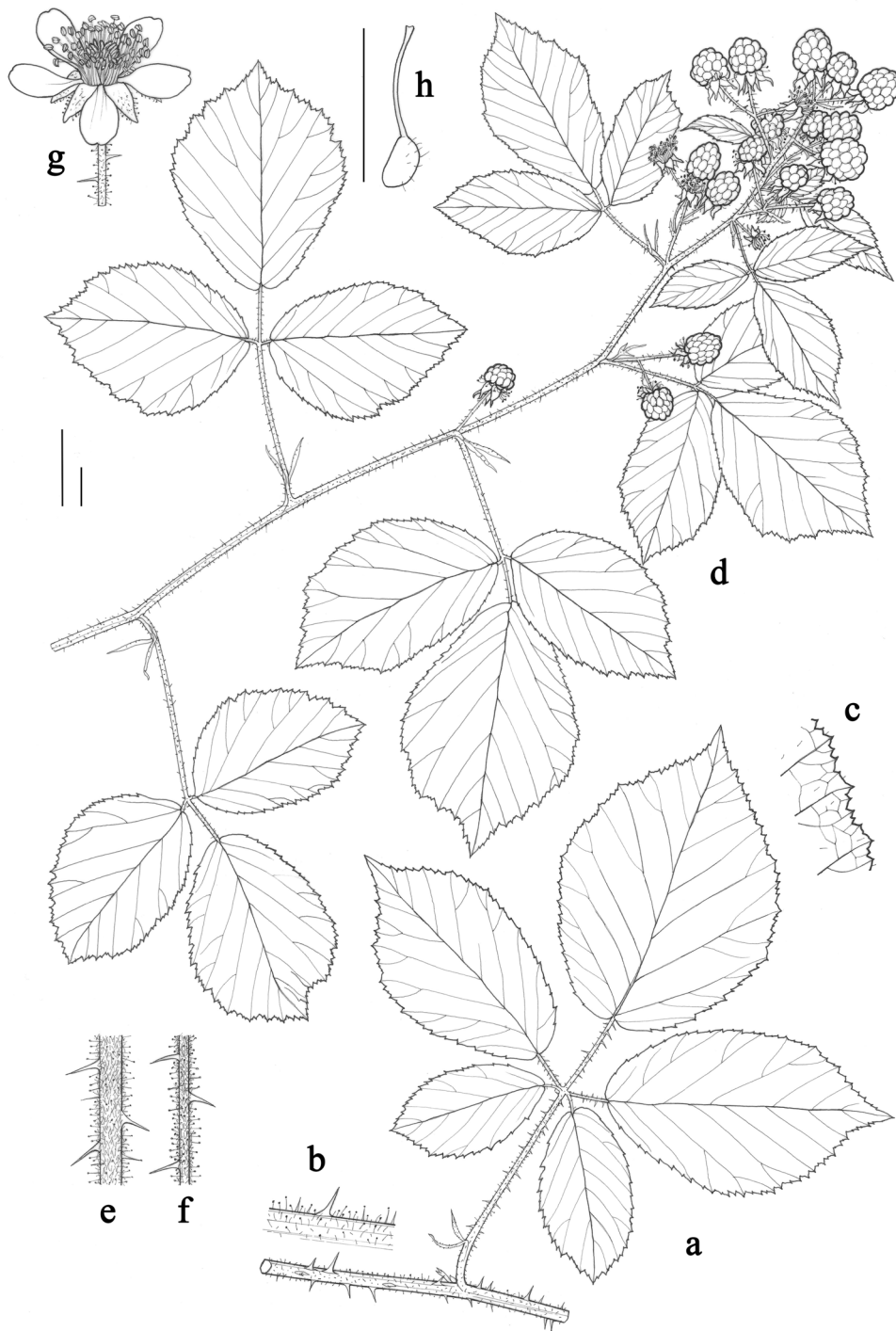


FIGURE 3. *Rubus violaceifrons*: a: section of primocane stem with leaf; b: detail of primocane stem indumentum; c: detail of terminal leaflet margin; d: infructescence; e: detail of section of inflorescence axis; f: detail of section of peduncle; g: flower; h: carpel. Scale bars 1 cm, short – a, d; middle – b–c, e–g; long – h. Del. A. Skoumalová.

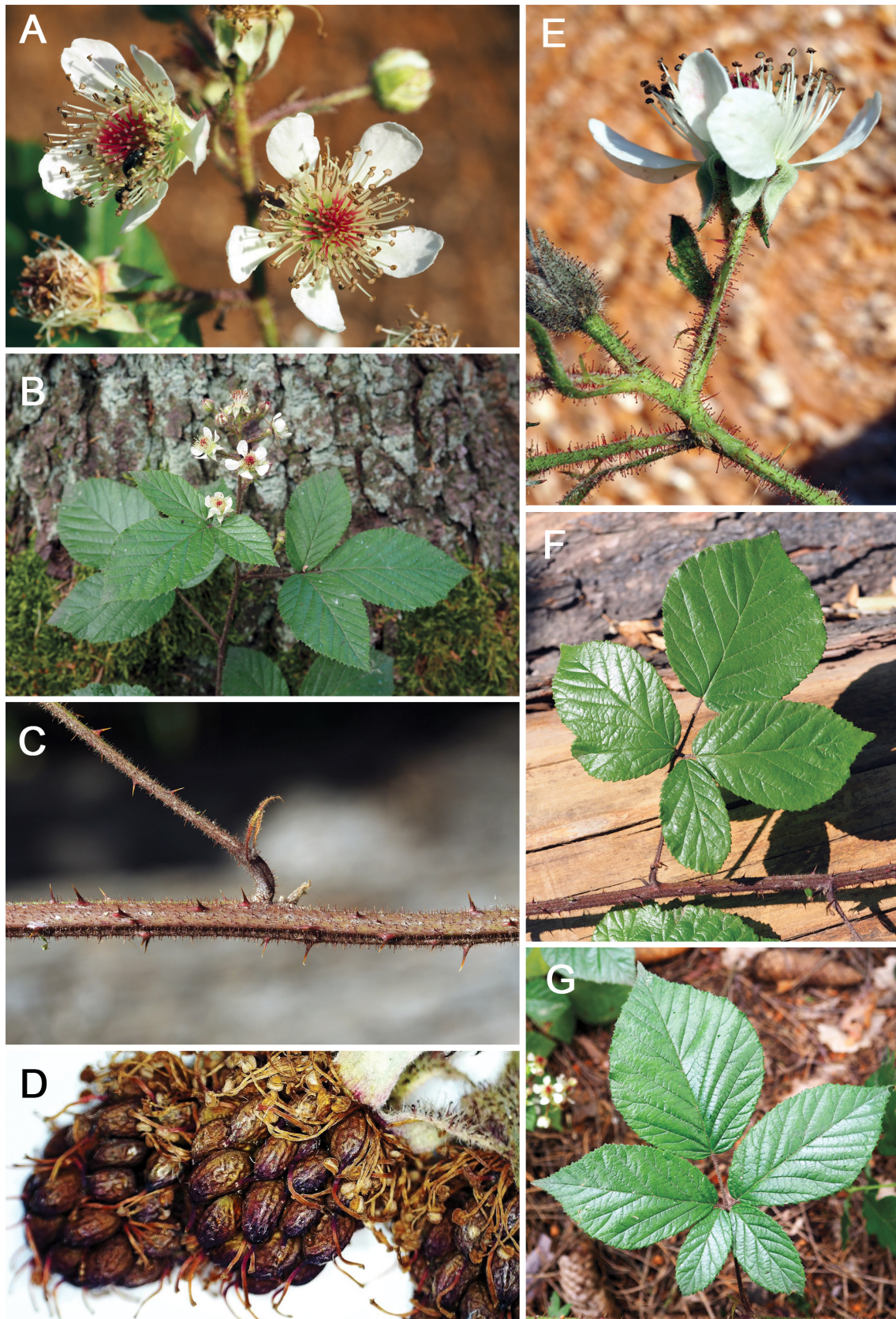


FIGURE 4. *Rubus violaceifrons*: A: flowers; B: inflorescence; C: primocane stem with basal part of leaf petiole; D: detail of gynoecium; E: detail of part of inflorescence; F: 4-foliolate primocane leaf; G: 5-foliolate primocane leaf. Photos J. Velebil.

Flowers mid-sized, (1.7–)2.1–2.3 cm in diameter; sepals long pointed, 6–7 mm in length (including appendix), often with a lanceolate appendix (1.7–)2.2–2.7(–3.2) mm long, usually reflexed after anthesis, on the back greyish,

tomentose, with a white felted margin, and with numerous dark red stalked glands which are a little shorter than protruding simple hairs, sometimes also with whitish pricklets; petals white, obovate elliptical, emarginate, not contiguous, (9.0–)9.2–9.6(–10.4) mm long, (4.7–)5.3–5.7(–6.1) mm wide; stamens longer than styles, filaments white, anthers glabrous; carpels with tufted to stellate (rarely simple) hairs or glabrescent, styles distinctly dark red-violet; receptacle glabrous or with few short hairs. Collective fruit mostly well developed, subglobose, (0.7–)0.9–1.2(–1.4) cm long, 1.1–1.3 cm wide, blackish and shiny when mature, with small, numerous, (16–)20–34(–49) drupelets.

Phenology:—Flowering: June and July.

DNA-ploidy level:—Tetraploid, $2n = 4x$ (~28); the ploidy level was determined by Michal Hroneš at the Department of Botany of Palacký University in Olomouc. Voucher specimen: Ráby village (distr. Pardubice), forest clearing near a crossroad N of the village, 50°04'52"N, 15°48'12"E, leg. B. Trávníček, 13 Aug 2020, OL (under collection code R64/20). This ploidy level is typical of *Rubus* ser. *Pallidi*, all karyologically examined taxa of the series (twelve species) were tetraploids (Kurtto *et al.* 2010, Krahlucová *et al.* 2013, Sochor *et al.* 2019).

Ecology:—*Rubus violaceifrons* most often grows in margins, clearings and openings of coniferous and mixed woodlands and forest plantations, usually in somewhat shaded places. It is clearly a nemophilous bramble species according to the concept of Weber (1995: 296). It is usually found on permeable, moderately humid to slightly dry soils that neutral to slightly acidic. The elevation range of the species spans from 175 m a.s.l. (Káraný and Nový Vestec villages) to 590 m a.s.l. (Otradovice village).

Distribution:—According to the concept of Weber (1996), *Rubus violaceifrons* is a “regional” bramble species: the longest diameter of its distribution area is about 150 km (Fig. 4). Currently, it is known from 42 localities dispersed in central and eastern Bohemia in the Czech Republic. The species is possibly an endemic taxon of the country, but it could be found also in southern Poland (particularly in the Kłodzko County or in Silesia). In terms of the grid system of the Atlas Florae Europaeae (for the genus *Rubus*, see Kurtto *et al.* 2010), *R. violaceifrons* is present in the following units: 33UWS4, 33UVR1, 33UVR3, 33UVR4, 33UVQ3, 33UWR1, 33UWR2, 33UWR3, 33UWR4.

Etymology:—The epithet “*violaceifrons*” is a reference to the intense colouration of stem parts and their stalked glands, as well as to the very conspicuous red-violet colour of styles in open flowers.

Additional specimens examined (paratypes):—BOHEMIA, phytogeographical region 6. **Džbán:** Kladno, v lese Milř záp. žel. nádraží na jihozápadním okraji města, kulturní smíšená smrčina [Kladno, in the wood called Milř W of the railway station on the SW edge of the town, mixed spruce plantation, 405 m a.s.l., 50°7'50.0"N, 14°5'3.0"E], 26 Jul 1980, *Skalický V.* (PRC!).—**7d. Bělohorská tabule:** Kladno, Kožová hora jižně od města [Kladno, Kožová hora hill S of the town, 425 m a.s.l., 50°7'17.0"N, 14°6'16.0"E], 26 Jul 1980, *Holub J.* (PRA!); Kladno town, forest margin NNE of Kožová hora hill, [435 m a.s.l.] 50°07'06"N, 14°06'26"E, 23 Aug 2000, *Trávníček B.* (OL, sub coll. no. R245/00!); Kladno, j. [Kladno, S], 420–430 m a.s.l., 50°07'11"N, 14°06'28"E, 23 Aug 2000, *Havlíček P.* (herb. P. Havlíček!); Kožová hora [Kožová hora hill, 425 m a.s.l., 50°7'17.0"N, 14°6'16.0"E], 6 Oct 2005, *Hadinec J.* (PRC!); Bohemia centralis, oppidum Kladno, pagus Pletený Újezd: ad marginem silvae, ca 1.5 km situ bor.-bor.-occid. a pago [central Bohemia, Kladno town, Pletený Újezd village: on the edge of a wood ca. 1.5 km NNW of the village, 425 m a.s.l., 50°7'17.0"N, 14°6'16.0"E], 24 Jul 2007, *Žíla V.* (herb. V. Žíla!); Kladno town, forest margin N of Kožová hora hill, 440 m a.s.l., 50°07'17"N, 14°06'16"E, 24 Jul 2010, *Trávníček B.* (OL, sub coll. no. R15/10!); Kladno, při lesní cestě na Kožovou horu (modrá turist. značka), J od železničního přejezdu, ca 0.8 km Z–ZJZ od želez. stanice Kladno [Kladno, along forest road in the direction of Kožová hora hill (blue marked tourist path), S of the railroad crossing, ca. 0.8 km W to WSW of Kladno railway station, 415 m a.s.l., 50°07'36"N, 14°06'06"E, 24 Jul 2010, *Hlaváček R.* (HOMP!); Kladno, ca. 0.2 km NW of the summit of Kožová hora hill, on the edge of a road, 450 m a.s.l., 50°06'55.2"N, 14°06'09.2"E, 24 Jul 2010, *Lepší M.* (CB 79125!); Kladno, ca. 0.8 km NNE of the summit of Kožová hora hill, an edge of a road, 430 m a.s.l., 50°07'16.9"N, 14°06'16"E, 24 Jul 2010, *Lepší M.* (CB 79126!); Kladno, ca. 1 km NNE of the summit of Kožová hora hill, the edge of a forest road, 420 m a.s.l., 50°07'21.4"N, 14°06'19.4"E, 24 Jul 2010, *Lepší M.* (CB 79127!); Malé Čičovice [Malé Čičovice village], 290–300 m a.s.l., 50°09'17"N, 14°15'22"E, 15 Sep 2001, *Havlíček P.* (herb. P. Havlíček!).—**11a. Všetatské Polabí:** Čelákovice, Káraný, bor 0.5 km J od osady [Čelákovice town, Káraný village, pine growth 0.5 km S of the village, 175 m a.s.l., 50°10'44"N, 14°44'50"E], 25 Aug 2002, *Havlíček P.* (PRC!); Lysá nad Labem, Karlov, bor 0.5 km SV od osady [Lysá nad Labem town, Karlov village, pine growth 0.5 km NE of the village, 180 m a.s.l., 50°11'35"N, 14°48'25"E], 25 Aug 2002, *Havlíček P.* (PRC!); Stará Boleslav, Nový Vestec, bor SZ od obce [Stará Boleslav town, Nový Vestec village, pine growth NW of the village, 175 a.s.l., 50°11'16"N, 14°42'51"E], 25 Aug 2002, *Havlíček P.* (PRC!).—**11b. Poděbradské Polabí:** Poříčany, sz. [NW of Poříčany village], 240 m a.s.l., 50°06'40"N, 14°53'43"E, 12 Oct 2000, *Havlíček P.* (herb. P. Havlíček!); Zvěřinec, sv. [NE of Zvěřinec village], 185 m a.s.l., 50°09'34"N, 15°00'54"E, 5 Sep 2000, *Havlíček P.* (herb. P. Havlíček!); Kolín, Záboří nad Labem, ca 650 m VSV kostela v Záboří [Kolín town, Záboří nad Labem village, ca. 650 m ENE of the village church], 200 m

a.s.l., 50°01'30,0"N, 15°21'26,6"E, 5 Jul 2002, *Lepší M.* (herb. P. Lepší); Velký Osek, Veltruby, bor a lemy u železniční zastávky V u obce [Velký Osek village, Veltruby village, pine growth and belts of vegetation around railway stop E of the village, 195 m a.s.l.], 50°04'24"N, 15°12'01"E, 31 Oct 2002, *Havlíček P.* (PRC!).—**12. Dolní Pojizeří:** Stará Lysá (Lysá nad Labem), bor (s akátem) 1.3 km s. od obce [Starý Lysá village (Lysá nad Labem town), pine growth (with black locust) 1.3 km N of the village], 210 m a.s.l., 50°14'14"N, 14°48'06"E, 7 Aug 2001, *Havlíček P.* (herb. P. Havlíček!); Kochánky (Benátky nad Jizerou) [Kochánky village (Benátky nad Jizerou town)], 240 m a.s.l., 50°17'12"N, 14°47'08"E, 8 Aug 2001, *Havlíček P.* (herb. P. Havlíček!); Stará Boleslav, paseka při trati pod vedením vysokého napětí V od železniční stanice [Stará Boleslav town, clearing near the railway under power lines E of the railway station], 180 m a.s.l., 50°12'36,9"N, 14°41'37,1"E, 3 Jul 2002, *Lepší M.* (herb. P. Lepší!); Benátky nad Jizerou, Luštěnice, les při silnici [Benátky nad Jizerou town, Luštěnice village, wood along road, 225 m a.s.l., 50°19'08"N, 14°54'08"E], 28 Aug 2002, *Havlíček P.* (PRC!); Milovice, Všejanya, les při cestě 1.5 km JZ od obce [Milovice town, Všejanya village, wood along road 1.5 km SW of the village, 210 m a.s.l., 50°15'06"N, 14°56'19"E], 28 Aug 2002, *Havlíček P.* (PRC!).—**13a. Rožďalovická tabule:** les při silnici mezi obcemi Lišice a Chlumec nad Cidlinou [wood along road between Lišice village and Chlumec nad Cidlinou town, 265 m a.s.l., 50°10'45"N, 15°24'51"E], 1 Aug 1988, *Holub J.* (PRA!); Lišice (Chlumec nad Cidlinou), les u obce [Lišice village (Chlumec nad Cidlinou town), wood next to the village, 265 m a.s.l., 50°10'45"N, 15°24'51"E], 10 Jul 1989, *Holub J.* (PRA!); Lišice (Chlumec nad Cidl.), les u silnice při jv. okraji obce [Lišice village (Chlumec nad Cidlinou town), wood along road on the SW edge of the village], 260–270 m, 50°10'45"N, 15°24'51"E, 29 Sep 2000, *Havlíček P.* (herb. P. Havlíček!); Chlumec nad Cidlinou: podél plotu uzavřeného vojenského prostoru na okraji lesního komplexu u silnice JV obce Lišice [Chlumec nad Cidlinou town: along a fence of a restricted military area in woods along a road SW of the village, 265 m a.s.l., 50°10'45"N, 15°24'51"E], 29 Sep 2000, *Hadinec J. & Havlíček P.* (PRC!); Nymburk, Chudíř u Jabkenic, při silnici na Loučeň, v lese nad Novým rybníkem [Nymburk town, Chudíř u Jabkenic village, along road in the direction of Loučeň town, in wood above Nový rybník pond], 230 m, 50°18'04,5"N, 15°00'56,1"E, 3 Jul 2002, *Lepší M. & Lepší P.* (herb. P. Lepší!).—**14a. Bydžovská pánev:** Nechanice, Třesovice, doubrava 0.5 km JV od obce [Nechanice town, Třesovice village, oak wood 0.5 km SE of the village, 275 m a.s.l., 50°15'31"N, 15°41'50"E], 28 Aug 2002, *Havlíček P.* (PRC!); Cerekvice nad Bystricí, doubrava SV od obce [Cerekvice nad Bystricí village, oak wood NE of the village, 290 m a.s.l., 50°20'12"N, 15°43'53"E], 28 Sept 2002, *Havlíček P.* (PRC!); Hradec Králové, Libčany, doubrava při silnici SV od obce [Hradec Králové town, Libčany village, oak wood along road NE of the village, 290 m a.s.l., 50°11'45"N, 15°42'18"E], 28 Sept 2002, *Havlíček P.* (PRC!); Nechanice, Horní Dohalice, les SV od obce [Nechanice town, Horní Dohalice village, wood NE of the village, 280 m a.s.l., 50°17'09"N, 15°42'52"E], 28 Sept 2002, *Havlíček P.* (PRC!); Nechanice, Zavadilka, smrčina 0.7 km JZ od osady [Nechanice town, Zavadilka village, spruce wood 0.7 km SW of the village, 275 m a.s.l., 50°17'N, 15°39'05"E], 28 Sept 2002, *Havlíček P.* (PRC!).—**14b. Hořícké chlomy:** Dachovy 2 km S od Hořic, u lesní cesty 600 m JJV od křižovatky v Dachovech (JJV od pramene "Kalíšek") [Dachovy village 2 km N of Hořice town, along a forest road 600 m SSE of crossroad in Dachovy (SSW of Kalíšek spring)], 370 m a.s.l., 50°22'46"N, 15°38'32"E, 7 Aug 2005, *Ducháček M.* (PR 679759!); Hořice, Holovousy, les SZ od obce [Hořice town, Holovousy village, wood NW of the village, 335 m a.s.l., 50°22'44"N, 15°34'09"E], 2 Dec 2002, *Havlíček P.* (PRC!).—**15a. Jaroměřské Polabí:** Vilantice (Dvůr Králové n. L.), smrčina při silnici zsz. od obce [Vilantice village (Dvůr Králové nad Labem town), spruce wood along road WNW of the village], 310–320 m, 50°22'14"N, 15°46'10"E, 10 Aug 2001, *Havlíček P.* (herb. P. Havlíček!); Velehrádek (Dvůr Králové n. L.), křoviny u silnice a paseka 0.3 km sz. od osady [Velehrádek village (Dvůr Králové nad Labem town), scrub along road and clearing 0.3 km NW of the village], 310–330 m a.s.l., 50°23'38"N, 15°45'15"E, 10 Aug 2001, *Havlíček P.* (herb. P. Havlíček!).—**15b. Hradecké Polabí:** Hradec Králové, Dolní Přím, les 1 km V od obce [Hradec Králové town, Dolní Přím village, wood 1 km E of the village, 300 m a.s.l., 50°14'20"N, 15°43'45"E], 28 Sept 2002, *Havlíček P.* (PRC!); Hradec Králové, Těchlovice, les při silnici SV od obce [Hradec Králové town, Těchlovice village, wood along road NE of the village, 285 m a.s.l., 50°12'38"N, 15°43'22"E], 28 Sept 2002, *Havlíček P.* (PRC!); Nové Město nad Metují, Velká Jesenice, les 0.9 km JZ od kostela v obci [Nové Město nad Metují town, Velká Jesenice village, wood 0.9 km SW of church in the village, 275 m a.s.l., 50°21'08"N, 16°02'08"E], 13 Oct 2002, *Havlíček P.* (PRC!).—**15c. Pardubické Polabí:** Časy (Holice), les 0.9 km s. od osady [Časy village (Holice town), wood 0.9 km N of the village, 230 m a.s.l., 50°04'45"N, 15°53'41"E], 27 Oct 2000, *Havlíček P.* (herb. P. Havlíček!); Pardubicko: obec Časy: okraje silnice a v borovém lese u silnice do obce Choteč ca. 1.5 km SSZ obce [Pardubice region: Časy village: ditches along a road and in a pine wood along a road in the direction of Choteč village ca. 1.5 km NNW of the village, 230 m a.s.l., 50°04'45"N, 15°53'41"E], 27 Oct 2000, *Hadinec J. & Havlíček P.* (PRC!); Týnec nad Labem, dispersim in colle Šibeník (236.5 m), in vicinitate oppiduli orient. [Týnec nad Labem town, scattered on Šibeník hill (236.5 m), to the E in the vicinity of the town], 225 m a.s.l., 50°02'56"N, 15°22'24"E, 10 Sep 2002, *Marek M.* (PR 683630!); Ráby, s. [Ráby village, N of the village, 235 m a.s.l.,

50°04'52"N, 15°48'12"E], 16 Aug 2000, *Havlíček P.* (herb. P. Havlíček!); Ráby village, forest margin near crossroad N of the village [235 m a.s.l., 50°04'52"N, 15°48'12"E], 13 Jul 2015, *Trávníček B.* (OL, sub coll. no. R2/15!); Ráby village, forest margin near crossroad N of the village [235 m a.s.l., 50°04'52"N, 15°48'12"E], 13 Aug 2020, *Trávníček B.* (OL, sub coll. no. R64/20!).—**41. Střední Povltaví:** Radlák (Praha-západ distr.), scrub along a forest road 230 m SSW of summit of Spáleníště hill (421 m) NW of the village, 405 m a.s.l., 49°54'49.6"N, 14°29'14.2"E, 3 Jan 2021, *Veľbil J.* (herb. J. Veľbil, 210101!).—**43b. Miličinská vrchovina:** Neustupov, Otradovice (Votice), lem silnice a smrčina 0.4 až 1 km j. (j.v.) od obce [Neustupov town, Otradovice village (near Votice town), ditches and spruce wood along a road 0.4–1 km S (SSE) of the village], 570–600 m a.s.l., 49°38'06"N, 14°41'01"E, 17 Aug 2001, *Havlíček P.* (herb. P. Havlíček!); Otradovice (Benešov distr.), scrub along a road in a wood on the S margin of the village, 570 m a.s.l., 49°38'08.5"N, 14°40'55.1"E, 17 Jul 2020, *Veľbil J.* (herb. J. Veľbil, 1707113!).—**55e. Markvartická pahorkatina:** Vrch Loreta mezi obcemi Podhradí a Hlásná Lhota [Loreta hill between the villages of Podhradí and Hlásná Lhota, 380 m a.s.l., 50°25'23.0"N, 15°17'46.0"E], 28 Jul 1987, *Holub J.* (PRA!).—**56c. Trutnovské Podkrkonoší:** Svoboda nad Úpou, smrčina 1.5 km JJZ od kostela v obci [Svoboda nad Úpou town, spruce wood 1.5 km SSW of the village church, 575 m a.s.l., 50°36'39"N, 15°48'35"E], 25 Nov 2002, *Havlíček P.* (PRC!).—**56e. Červenokostelecké Podkrkonoší:** Červený Kostelec, jv. [Červený Kostelec town, SE of the town, 425 m a.s.l., 50°28'15"N, 16°05'51"E], 31 Oct 2001, *Havlíček P.* (herb. P. Havlíček!).—**57a. Bělohradsko:** Hořice, Lukavec u Hořic, les při silnici 0.7 km JV od obce [Hořice town, Lukavec u Hořic village, wood along road 0.7 km SE of the village, 370 m a.s.l., 50°23'07"N, 15°37'32"E], 2 Dec 2002, *Havlíček P.* (PRC!).—**64a. Průhonická plošina:** Klánovice: PR Klánovický les, u lesní cesty (červená turistická značka), ca 0.5 km VJV od budovy železniční stanice Praha-Klánovice, ca 1.5 km J–JJZ od kostela Nanebevzetí Panny Marie, na okraji lesní paseky, u příkopu lesní cesty [Klánovice village: Klánovický les Nature Reserve, along a forest road (red-marked tourist path), ca. 0.5 km ESE of the Praha-Klánovice railway station building, ca. 1.5 km S–SSW of the Nanebevzetí Panny Marie church, margin of a forest clearing, along ditch of forest road], 255–260 m a.s.l., 50°05'07,1"N, 14°40'11,3"E, 15 Oct 2019, *Hadinec J., Hlaváček R. & Trunečková L.* (HOMP!); Praha-Klánovice: Klánovický les; v porostech ostružiníků v okrajích duboborového lesa podél protihlukové stěny u žel. trati na žluté značce východně žel. nádraží Praha-Klánovice [Praha-Klánovice village: Klánovický les wood; bramble scrub on the edge of an oak-pine wood along an anti-noise barrier and railway on the yellow-marked tourist path E of Praha-Klánovice railway station, 255 m a.s.l.], 50°05'16,1"N, 14°40'02,3"E, 15 Oct 2019, *Hadinec J., Hlaváček R. & Trunečková L.* (PRC!); Říčany (Praha-východ distr.), along a forest road in the part of the Říčanský les wood called K Srnčímu palouku, about 200 WNW of the Říčanská hájovna gamekeeper's lodge, S margin of the town, 380 m a.s.l., 49°58'33.5"N, 14°40'04.7"E, 19 Oct 2018, *Veľbil J.* (herb. J. Veľbil, 181012!); Praha-Újezd (Hlavní město Praha distr.), light mixed wood in the W part of the Milíčovský les Nature Monument, 290 m a.s.l., 50°01'14.2"N, 14°31'44.0"E, 20 Oct 2021, *Veľbil J.* (herb. J. Veľbil, 211025!).—**64b. Jevanská plošina:** Světlava (Praha-východ distr.), along a forest road near the Říčanská hájovna gamekeeper's lodge 400 m NE of the football field (situated on the N margin of the village), 390 m a.s.l., 49°58'28.8"N, 14°40'12.6"E, 30 Sep 2017, *Veľbil J.* (herb. J. Veľbil, 170942!); Říčany (u Prahy): v okrajích červ. znač. turistické cesty v mladé smrkové výsadbě na SV okraji města [Říčany town (by Prague): along a red-marked tourist path in a young spruce planting on the NE edge of the town, 365 m a.s.l., 49°59'56.0"N, 14°40'59.0"E], 20 Aug 1999, *Hadinec J.* (PRC!).

Taxonomy:—Most of the morphological characters of *Rubus violaceifrons* classify this species as a member of *R. ser. Pallidi*, although it shares a few features with members of *R. ser. Glandulosi* (see the characterizations of these series, for example, in Weber 1995, Zielinski 2004). The classification into *R. ser. Pallidi* is supported by only slightly unequal shapes of stalked glands and almost uniform prickles, without shape transitions between them (particularly on primocane stems), by leaves on primocanes usually 4–5-foliolate (not 3-foliolate as is typical in *R. ser. Glandulosi*) and by sepals usually reflexed after anthesis. On the other hand, the only two characters that this species shares with members of *R. ser. Glandulosi* are a greater density of stalked glands on stems than is usually present in *R. ser. Pallidi* and relatively thin prickles. Moreover, the presence of hairs on primocane stems and the absence of a tomentose indumentum on leaves beneath in *R. violaceifrons* are not in conflict with the characterization of *R. ser. Pallidi*. *Rubus violaceifrons* has leaves almost without hairs above (or these hairs are rare), which is the only character that does not match the delineation of *R. ser. Pallidi* (leaves usually with scattered hairs).

There are three bramble species that are morphologically similar to and sympatric with *Rubus violaceifrons*: *R. scaber* Weihe in Bluff & Gingerhuth (1825: 683), *R. josholubii* (both from *R. ser. Pallidi*) and *R. guentheri* (*R. ser. Glandulosi*). The most similar species to *R. violaceifrons* in most characters of stem indumentum is *R. josholubii*. These two species have quite similarly shaped prickles and stalked glands on stems, but *R. josholubii* clearly differs in having a smaller density of these stalked glands (only 20–30 per 1 cm of stem side length) on primocane stems, which are usually round or obtusely angled (not distinctly angled as in *R. violaceifrons*), with longer (5–7 mm) prickles,

leaves with scattered hairs above (10–30 per cm² of leaf surface) and longer sepals (7–12 mm), which mostly embrace the fruits. Similar to *R. violaceifrons* in the shape of leaves is *R. scaber*; however, the latter is easily identifiable based on its different shape of prickles (distinctly more declining and usually also more curved), shorter stalked glands (only up to 0.6 mm long) on primocane stems, leaves with numerous hairs above (20–100 hairs per 1 cm² of leaf surface) and styles yellowish-green (not reddish as in *R. violaceifrons*); *R. scaber* most often has only 3-foliolate primocane leaves whereas those of *R. violaceifrons* are usually 4–5-foliolate. *Rubus violaceifrons* somewhat resembles stouter individuals of *R. guentheri*, mainly in the intensity of the red-violet colouration of its stalked glands and styles in open flowers as well as the shape of the terminal leaflet. However, *R. guentheri* has thinner and prostrate primocane stems which are usually round, without or with sparse hairs only; it also differs in mostly having only 3-foliolate primocane leaves with scattered hairs above (10–40 hairs per 1 cm² of leaf surface), not hairy to the touch beneath, sepals often embracing the fruits, and stamens shorter than styles. For detailed comparison see Table 1.

TABLE 1. Summary of quantitative and qualitative characters of the most similar species with *Rubus violaceifrons*.

Features	<i>R. violaceifrons</i>	<i>R. josholubii</i>	<i>R. scaber</i>	<i>R. guentheri</i>
Quantity of stalked glands per 1 cm length of side of primocane stems	numerous	20–30	more than 20	numerous
Number of hairs per 1 cm length of side of primocane stems	ca. 50	20–40	2–10 (–25)	2–10 (–25)
Number of prickles per 5 cm length of primocane stems	(9–) 11–20 (–28)	6–10 (–14)	8–12 (–20)	more than (10–) 15
Length of prickles on primocane stems (mm)	(2–) 2.5–4 (–4.5)	5–6 (–7)	2.5–3.0 (–4.5)	2–3 (–4)
Shape of prickles on primocane stems	quite slender, straight to only very slightly curved, slightly declining	quite slender, straight to slightly curved, declining	quite slender to almost thick (in lower half), partly slightly curved, strongly declining	slender, straight to only very slightly curved, slightly declining
Width of the base of prickles on primocane stems (mm)	(2.0–) 2.3–3.3 (–3.7)	4–5 (–6)	2.5–3.5 (–4)	(1.7–) 2.1–3.3
Number of leaflets of primocane leaves	(3–) 4–5	5	3 (4–5)	3 (4–5)
Shape of terminal leaflet of primocane leaves	obovate, broadly obovate to suborbicular	elliptic to ovate	broadly elliptic to broadly obovate	narrowly to broadly elliptic or ovate to obovate
Indumentum/number of hairs per 1 cm² of primocanes leaves above	glabrous or with few hairs (near margins)	(5–) 20–30	(10–) 30–100	20–40
Colour and indumentum of primocane leaves beneath	green or slightly greyish, distinctly hairy to the touch, almost without stellate hairs	green, distinctly hairy to the touch, without stellate hairs	green, indistinctly hairy to the touch, without stellate hairs	green, sparsely hairy, indistinctly hairy to the touch, without stellate hairs
Length of stamens/styles	stamens longer than styles	stamens longer than styles	stamens longer than styles	stamens shorter than styles
Colour of styles	dark red-violet	usually reddish at the base or all	greenish	red at least at the base

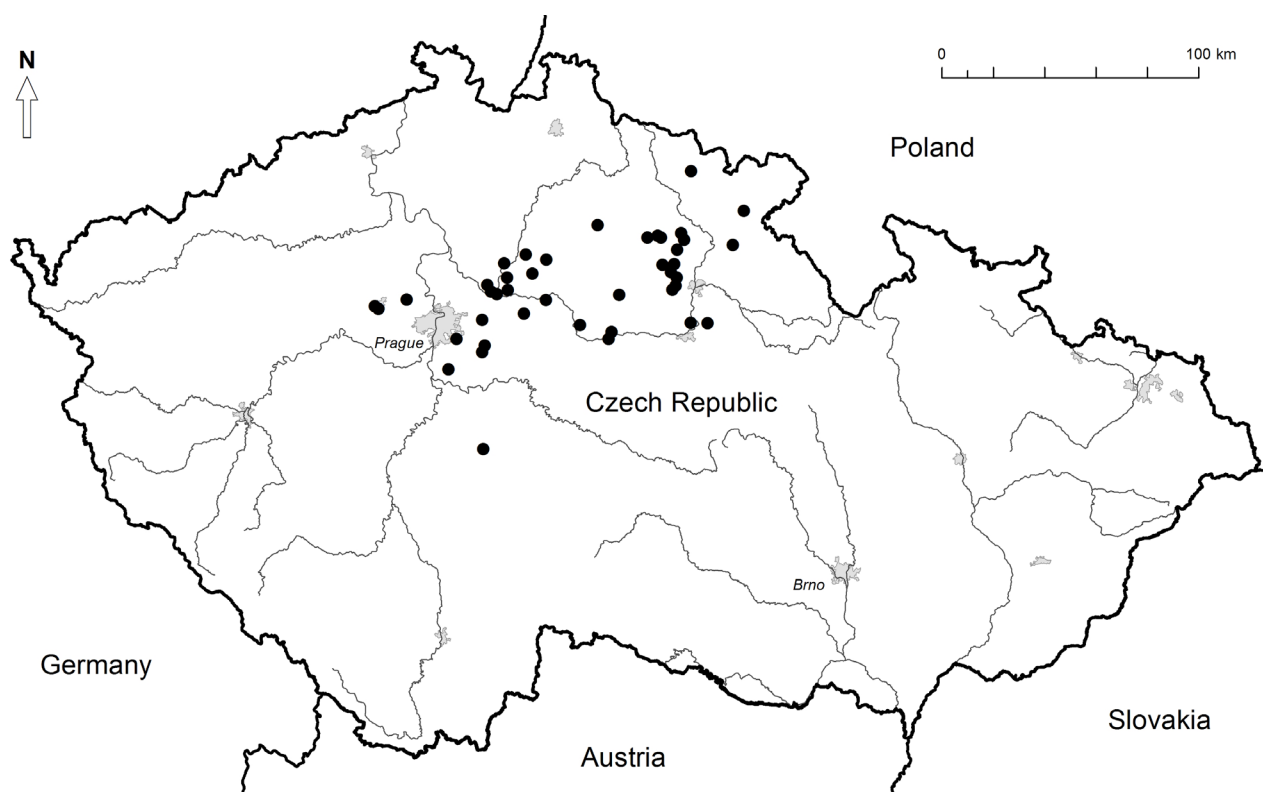


FIGURE 5. Map of distribution of *Rubus violaceifrons*. The source data of the map: ČÚZK (2021).

Determination key for identifying members of the *Rubus* ser. *Pallidi* occurring in the Czech Republic

- 1a Primocane stems glabrous (exceptionally with solitary hairs) *R. holzfussii* **Scrib.**
- 1b Primocane stems sparsely to densely hairy 2
- 2a Prickles on primocane stems strongly declining, usually only 2.5–3 mm long; hairs 2–10(–25) on 1 cm length of primocane stem side; primocane leaves 3(–5)-foliolate. *R. scaber* **Weihe**
- 2b Prickles on primocane stems patent to (usually slightly) declining, usually longer; hairs more than 20 (to very numerous) on 1 cm length of primocane stem side; primocane leaves (3–)5-foliolate 3
- 3a Terminal leaflet of primocane leaves most often elongated, with almost parallel sides, with distinctly cordate base of its lamina (also lateral leaflets usually with cordate base), with acuminate apex 20–25(–30) mm long, usually periodically (double) serrate, with relatively short petiolule (as long as 20–30% of its lamina length); primocane stems distinctly whitish glaucous (pruinous). .
..... *R. posnaniensis* **Scrib.**
- 3b Combination of shapes of primocane leaves different; primocane stems not distinctly whitish glaucous, on sunny side often suffused with dark violet-brown (vinaceous) 4
- 4a Terminal leaflet of primocane leaves very often distinctly convex; tip of inflorescence (infructescence) slightly nodding. –
..... *R. siemianicensis* (**Scrib.**) **Scrib.**
- 4b Terminal leaflet of primocane leaves flat; inflorescence (young infructescence) straight 5
- 5a Primocane stems with less than 15(–20) stalked glands on 1 cm length of stem side, densely hairy (usually with more than 50 hairs on 1 cm length of stem side); terminal leaflet of primocane leaves with short petiolule (as long as 20–25% of its lamina length), regularly grossly serrate. *R. chaerophylloides* **Scrib.**
- 5b Primocane stems with more than (15–)20 stalked glands on 1 cm length of stem side, with scattered hairs; terminal leaflet of primocane leaves with longer petiolule (as long as 25–38% of its lamina length), indistinctly periodically (double) and more finely serrate 6
- 6a Primocane stems round to obtusely angled, with 6–10(–14) prickles per 5 cm of stem length, prickles 5–6(–7) mm long, and with 20–30 stalked glands per 1 cm length of stem side; primocane leaves with scattered hairs above (20–40 per 1 cm² of leaf surface); sepals often embracing collective fruit; styles greenish or reddish. – Apex of terminal leaflets usually 15–25 mm long
..... *R. josholubii* **H.E.Weber**
- 6b Primocane stems usually distinctly angled, with 11–20(–28) prickles per 5 cm of stem length, prickles (2–)2.5–4(–4.5) long, and with distinctly more (numerous) stalked glands; primocane leaves glabrous above or with few hairs near margins; sepals usually reflexed after anthesis; styles red-violet. – Apex of terminal leaflets usually 12–17 mm long
..... *R. violaceifrons* **P. Havlíček, Trávn. et Velebil**

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