

Morphological features of the flower of *Symphoricarpos* species (Caprifoliaceae) introduced to Ukraine

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Abstract

With the help of light and scanning electron microscopy, the features of inflorescences and flowers of six species of the genus *Symphoricarpos* introduced to Ukraine were studied, and the peculiarities of their structure were specified. Morphological peculiarities of the calyx, corolla, stamens, and style, differentiating *S. albus* (including *S. racemosus* and *S. rivularis*), *S. hesperius*, *S. mollis*, *S. occidentalis*, *S. orbiculatus*, and *S. oreophilus* var. *utahensis*, were determined. The obtained data are important for identification of the species and taxonomy of the genus *Symphoricarpos*. In particular, the results of our study showed that flowers of *S. racemosus*, *S. rivularis*, and *S. albus* share common features and this supports their synonymy under the name *S. albus*. Other five *Symphoricarpos* species showed differences in their floral morphology.

Among the important features for identification of *Symphoricarpos* species introduced to Ukraine, which were not mentioned in available literature sources we can list: the number of flowers in the inflorescence, features of pedicels, shape and features of bracts pubescence, shape of calyx teeth and their pubescence, presence or absence of corolla tube convexity, presence of ovoid projection of anther's connective, and size of all the floral elements.

Symphoricarpos oreophilus var. *utahensis* has unique features of floral morphology. Its single flowers located in the axis of the leaves on the pendent pubescent pedicels; the calyx is elongated, fusiform; the corolla is narrowly tubular, without a convex at the base; the stamens are shorter than the corolla tubule or rarely of the same length, with a clear ovoid projection on the apex.

Keywords: *Symphoricarpos*, morphology, inflorescence, flower, diagnostic features

Introduction

The genus *Symphoricarpos* Duhamel includes 9 to 15 species, and belongs to the family Caprifoliaceae Juss. of the order Dipsacales Juss. ex Bercht. & J. Presl (Takhtajan, 1997, 2009). Today numerous molecular-phylogenetic studies are actively performed on different representatives of this order. Thereafter, active discussion regarding the evolution of the reproductive organs of these representatives is ongoing (Bell et al., 2001; Zhang et al., 2003; Theis et al., 2008).

Dipsacales demonstrates the number of evolutionary changes that may be of interest in understanding the morphology of flower in general. The modern representatives of this order have from five (the most common) to three lobes of corolla, and the number of stamens vary from one to ten (most often there are five or four stamens per flower). The ancestor of the recent Caprifoliaceae is still unknown. Modern representatives of the family have funnel-shaped or campanulate flowers with four or five lobes, small calyx, four or five

stamens, elongated style, and capitate or lobed stigma. Probably before that, they were slightly different, and had symmetrical flowers with large calyxes, tubular corollas with five lobes at the apex, five stamens, elongated styles, and capitate stigmas. Among some species of the genus *Symphoricarpos*, the reduction to four lobes of the corolla and four stamens happened. In general, five types of flower shape were suggested for Caprifoliaceae, and the genus *Symphoricarpos* has been classified as those having radially symmetrical flowers (Roels & Smets, 1996; Donoghue et al., 2003; Zhang et al., 2003; Howarth & Donoghue, 2005; Hauser, 2007; Theis et al., 2008).

The genus *Symphoricarpos* includes shrubs with multicolored fruits, and therefore these plants are often used as ornamental. The several species of this genus are widely cultivated in botanical gardens and parks, particularly in Ukraine. The natural area of distribution of the genus spread from North America to Mexico (Leroy & Stinchfield Ferris, 1960; Wood, 1965; Hitchcock & Cronquist, 1973; Evans, 1974; Moss, 1983; Welsh et al., 1987, 1993; Kartesz, 1994; Gilbert, 1995; McWilliams, 2000; Sell & Murrell, 2006). One species is considered endemic to China (Yang et al., 2011).

According to Mosyakin & Fedoronhuk (1999), *S. albus* (L.) S.F. Blake (= *S. racemosus* Michx. and *S. rivularis* Suksdorf.) is widespread in Ukraine as an ornamental plant. While *S. occidentalis* Hook. and *S. orbiculatus* Moench. are rarely applied for landscaping in gardens and parks of Ukraine (Barbarych, 1961). Some other species of the genus (i.e., *S. hesperius* G.N. Jones, *S. mollis* Nutt., *S. oreophilus* Gray) were also introduced to Ukraine, and their specimens are stored at the herbarium of the M.M. Gryshko National Botanical Garden of the NAS of Ukraine.

Due to the wide introduction of *Symphoricarpos* in Ukraine, it is important to study their morphological features in more details, with special emphasis on the structure of their reproductive organs and identify taxonomic diagnostic features. However, the literature provides little information on their morphological features of inflorescence, flower, and fruits of *Symphoricarpos* species, which are represented in some local floras (Leroy & Stinchfield Ferris, 1960; Barbarych, 1961; Welsh et al., 1987, 1993; Gilbert, 1995;

McWilliams, 2000; Sell & Murrell, 2006; Yang, 2011).

Hence, we decided to clarify the features of the flower of *Symphoricarpos* introduced to Ukraine, and identify additional features, which could be applied in the taxonomy of the genus.

Material and methods

The material from the National Herbarium of the M.G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine (KW) and the Herbarium of the M.M. Gryshko National Botanical Garden of the National Academy of Sciences of Ukraine (KWA) has been used. The citations are provided accordingly to the original text of the labels. The flowers of 18 specimens of six *Symphoricarpos* species listed below were investigated. Macromorphological features were analyzed for all flowers present on the herbarium voucher (in average 3–5 flowers per voucher). For the micromorphological analysis, from 1–2 (*S. hesperius*, *S. mollis*, *S. oreophilus*) to 3–5 flowers were sampled (*S. albus*, *S. occidentalis*, *S. orbiculatus*) depending on the number of available vouchers. Macromorphological features of the flowers were studied using MBS-9 binocular microscope. Floral elements were measured using AxioVision Rel. 4.8 software. For scanning electron microscopy (SEM, JSM-6060 LA) the specimens were fixed on the brass table, then these samples were gold-coated. The descriptions of floral elements follows terminology of Fedorov & Artiushenko (1975) and Zyman et al. (2004, 2011).

Samples examined

***Symphoricarpos albus*:** 1. Chernihiv region, Ichnyansky district, Trostyanets Dendrological Park, arboretum, quarter 29, № 5716, planted in the spring of 1964, 9.VI.1975, Without author (KWA); 2. Academy of Sciences of the Ukrainian SSR, Dendrological park "Sofievka", Cherkasy region, Uman town, 25.IX.1970, Leg. Melnik V.D., Det. Tulupiy G.G. (KWA); 3. Ukraine, Sumy Region, Sumy city, Red Square, 4.VIII.1969, Litvinenko (KW); 4. Ukraine, Khmelnytsky region, Netishin town, 8 Enerhetykiv str., V.2004, 090270, Hubar (KWA); 5. Sumy region, Sumy district, Kianyanytsa village, Kianyansky Arboretum, 16.VIII.1970, Litvinenko (KW); 6. Chernivtsi region, Storozhynets district, Krasnoilsk village, farm [...], bushes at the edge of the beech forest on the slope of Seretel river, 20.VI.1947, Kosic (KW); 7. Herbarium Shevchenko

Chernihiv Pedagogical Universitatus, Chernihiv (Ukraine), Chernihiv city, CHPP Agrobiostation, Arboretum, 08.07.2010, Pototska O.S. (KWAH); 8. USSR, Kiev city, CRBG Academy of Sciences of the Ukrainian SSR, "System of Higher Plants" section, 13.IX.1974, Leg. Smyk G.K., Det. Sarycheva Z.A. (KWAH); 9. USSR, Bila Tserkva city, Alexandria Arboretum, Frumitsetum collection sector, seedlings obtained from the nursery of the Alexandria Arboretum in 1960, 19.VI.1969, Grysyuk (KWAH).

Symphoricarpos hesperius: 1. Herbarium of the Trostyanets Dendrological Park, Academy of Sciences of the Ukrainian SSR. Chernihiv region, Ichnyansky district, Arboretum, quarter 29, № 1554, origin: Tashkent city, 1958, obtained under the name *Symphoricarpos hesperius* G.N. Jones, 9.VI.1975 (KWAH).

Symphoricarpos mollis: 1. Herbarium of the Trostyanets Dendrological Park, Academy of Sciences of the Ukrainian SSR. Chernihiv region, Ichnyansky district, Arboretum, quarter 29, № 1735, origin: Leningrad city, 1958, obtained under the name *Symphoricarpos mollis* Nutt., 9.VI.1975 (KWAH).

Symphoricarpos occidentalis: 1. [Ukraine] Sumy region, Sumy district, Verteyevka village, the park of agricultural college, 18.IV.1970, Litvinenko (KW); 2. USSR, Poltava region, Globinsky district, Ustimovka Dendropark, building № 3, origin unknown, 14.06.1960, Chapinoga (KWAH); 3. Herbarium of the Trostyanets Dendrological Park, Academy of Sciences of the Ukrainian SSR. Chernihiv region, Ichnyansky district, Arboretum, quarter 29, Nr. 2838, the origin is city Voronezh, 1959, obtained under the name *Symphoricarpos occidentalis* Hook., 9.VI.1975 (KWAH); 4. Herbarium of the Trostyanets Dendrological Park, Academy of Sciences of the Ukrainian SSR. Chernihiv region, Ichnyansky district, Arboretum, quarter 29, № 366, the origin is city Dnipropetrovsk, 1958, obtained under the name *Symphoricarpos occidentalis* Hook., 9.VI.1975 (KWAH).

Symphoricarpos oreophilus* var. *utahensis: 1. Plant of Nevada. Humboldt Co.: Pine Forest Range, Lonard Creek drainage. Twp. 43 N., R. 29 E. Elevation about 7,000 feet. Shrub growing in rocks of outcrop. Noel H. Holmgren, James L. Reveal, 1229, July 1, 1964 (KW).

Symphoricarpos orbiculatus: 1. Herbarium of the Trostyanets Dendrological Park, Academy of Sciences of the Ukrainian SSR, Chernihiv region, Ichnyansky district, Arboretum, quarter 43, № 2977, the origin is city Minsk, 1958, 17.VI.1975 (KWAH); 2. Academy of Sciences of the USSR, Sofiyivka Dendropark, Cherkasy region, Uman city, Sofiyivka, Grekov Yar, 8 VIII 1970, Leg. Melnik V.D., Det. Tulupiy G.G. (KWAH); 3. [Herbarium of Lugansk Taras Shevchenko National Pedagogical University] Lugansk city, ALNDS Dendropark, 24.06.2006, Philimonova (KWAH).

Symphoricarpos racemosus: 1. Société Française, 1921. Exsicc. Ch. Duffour. Côte-d'or: Flavigny. Plante américaine cultivée et naturalisée. 20 juin 1921, 3791 G.Desplantes(KW); 2. [Russia] Voronezh province, Valuysky district, gardens [Sl. Uralov], 18.VII.1915, Kotov (KW); 3. [*Symphoricarpos racemosa* Michx.] USSR, Zakarpattia region, Uzhgorod, State Fruit Nursery, 22.VII.1947, ex. Botanical Garden of the Academy of Sciences of the USSR, Det. Sokolovsky (KWAH); 4. [*Symphoricarpos racemosa* Michx.] USSR, Zakarpattia region, Rakhiv, VII.1947, ex.

Botanical Garden of the Academy of Sciences of the Ukrainian SSR, Det. Sokolovsky (KWAH).

Symphoricarpos rivularis: 1. [Herbarium of Luhansk the Taras Shevchenko National Pedagogical University] Luhansk city, territory of LNPU campus, 18.07.2006, Philimonova (KWAH).

Results and discussion

Flowers of *Symphoricarpos* are actinomorphic, symmetrical, and small (about 10 mm long), with short ribbed pedicels (*S. albus*, *S. orbiculatus*, *S. racemosus*, *S. rivularis*) or pedicels without ribs (*S. hesperius*, *S. mollis*), grouped in short racemes, located in the axils of the upper leaves on the apical or lateral branches. At the base of the ovary of each flower of all studied species there are two opposite, small (0.5–1.5 mm long), ovate or triangular bracteoles, which are coalescent at the base (in *S. oreophilus* var. *utahensis* bracteoles are free), pubescent along the edges, or glabrous (*S. hesperius*, *S. mollis*, and *S. occidentalis*) (Tables 1 & 2).

The calyx is fused, subspherical (*S. albus*), obovoid (*S. hesperius*, *S. occidentalis*), oval (*S. mollis*, *S. orbiculatus*, *S. racemosus*, *S. rivularis*), or fusiform (*S. oreophilus* var. *utahensis*). On the apex of the calyx there are (4–) 5 small (0.5–1.0 mm long), triangular or ovoid teeth, which are glabrous (*S. hesperius*, *S. mollis*, *S. occidentalis*, and *S. racemosus*), or slightly pubescent at the edges (*S. albus*, *S. oreophilus* var. *utahensis*, *S. rivularis*). *S. orbiculatus* also has a bundle of hairs at the apex of the calyx teeth (Fig. 1; Tables 1 & 2).

The corolla is 5–8 mm long on average, spine-lobed, with a straight campanulate tube and a bend. The tube is convex at the base on one side (crescentshape in *S. hesperius*), glabrous outside, pubescent, with ribbon-like hairs inside. The bend of the corolla of the studied species is 3–6 mm in diameter and divided into five oval (broadly oval) or ovoid (narrowly ovoid) lobes. The apices of the lobes are orbicular (*S. hesperius*, *S. mollis*, *S. orbiculatus*), obtuse (*S. albus*, *S. oreophilus* var. *utahensis*), or acute (*S. racemosus*, *S. rivularis*) (Figs. 2 & 3; Tables 1 & 2).

There are (4–) 5 stamens with thin filaments and ellipsoidal anthers attached to the filaments in the middle; the length of the anthers is 1.0–1.5 mm. The stamens in most

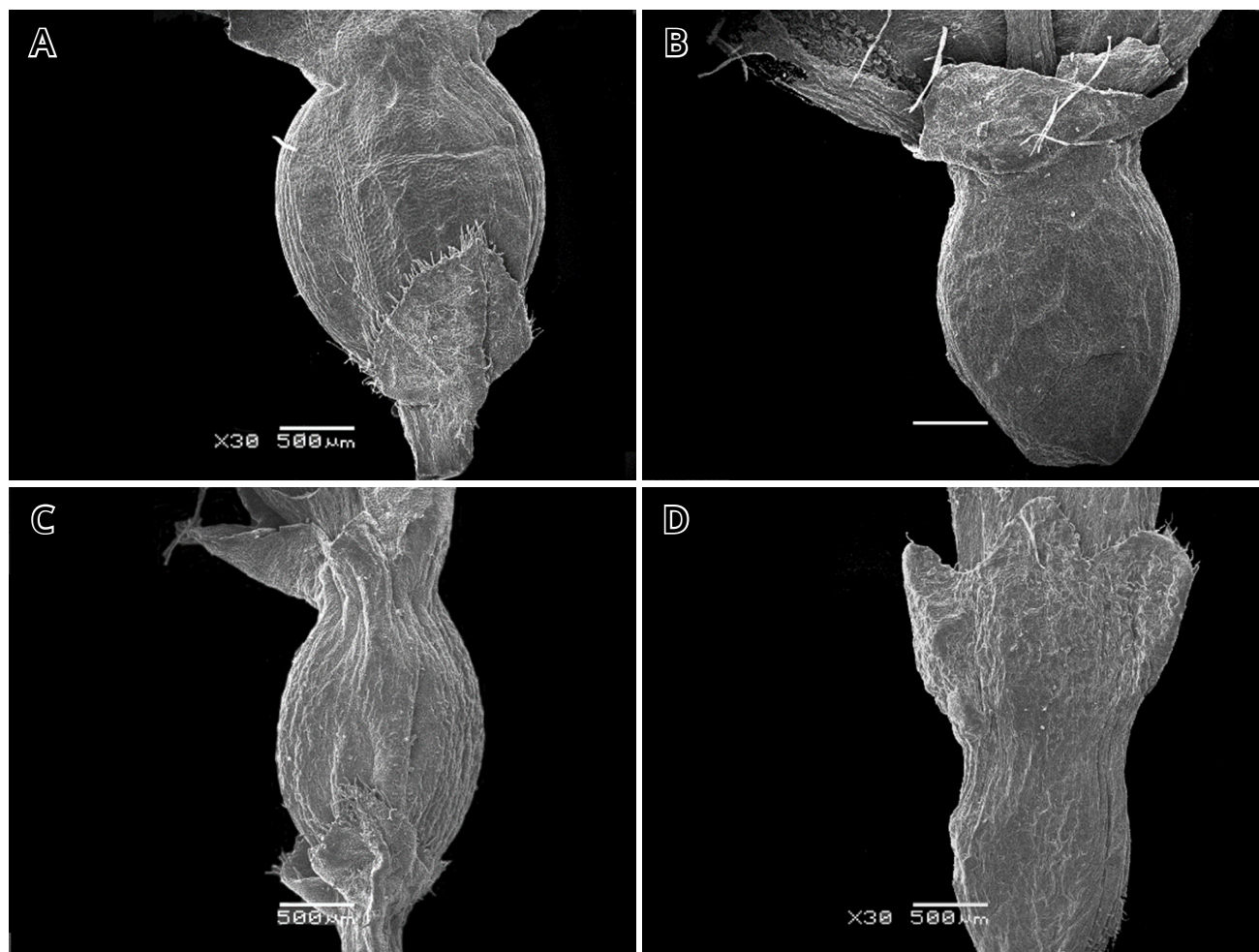


Figure 1. Shape of the calyx (SEM): **A** – *Symphoricarpos albus* (subspherical); **B** – *S. hesperius* (obovoid); **C** – *S. orbiculatus* (oval); **D** – *S. oreophilus* var. *utahensis* (spindle-shaped).

of the studied species are located in the tube of corolla; they are mostly equal in length or slightly longer than the corolla. However, *S. occidentalis* have stamens longer than the corolla, while the stamens of *S. oreophilus* var. *utahensis* are shorter than the corolla. We noted that the stamens of the studied *Symphoricarpos* species have an ovoid projection of the connective above the anthers; the length of this projection is about 0.5 mm (Fig. 4). The presence of such projections has been recently reported for *Linnaea borealis* L. (Tsybaliuk et al., 2018).

The pistil has a thin style, which is usually shorter than the corolla. However, in *S. occidentalis* column is longer than the corolla, and in *S. racemosus* it is equal to the corolla. In all the investigated species, the stigma is capitate, about 0.5 mm in diameter (Tables 1 & 2).

The results of our study showed that *S. racemosus* and *S. rivularis*, which are

considered phylogenetically close to *S. albus* (Leroy & Stinchfield Ferris, 1960; Hitchcock & Cronquist, 1973; Evans, 1974; Moss, 1983; Gilbert, 1995; McWilliams, 2000) share many common features of floral organization. This, in particular, supports their synonymy under the name *S. albus* (Gilbert, 1995).

Two close species (*S. orbiculatus* and *S. occidentalis*) showed some differences in their floral morphology. In particular, *S. orbiculatus* have short pedicels, whereas in *S. occidentalis* the flowers are sessile. *S. orbiculatus* bracteoles are sparsely pubescent, with small subulate hairs along the edges, while *S. occidentalis* bracteoles are glabrous. Each teeth of calyx in *S. orbiculatus* have a bundle of subulate hairs at the apex, whereas in *S. occidentalis* they are glabrous. The corolla lobes of *S. orbiculatus* are oval, with rounded apices, equal to 1/3 of the corolla length; these lobes in *S. occidentalis* are broadly oval, with acute apices, equal to

Table 1. Quantitative features of *Symphoricarpos* flower.

Features	Species							
	<i>S. albus</i>	<i>S. racemosus</i>	<i>S. rivularis</i>	<i>S. occidentalis</i>	<i>S. orbiculatus</i>	<i>S. hesperius</i>	<i>S. mollis</i>	<i>S. oreophilus</i> var. <i>utahensis</i>
Number of flowers per inflorescence, pcs.	3-10	3-4	3-5	3-5	3-10	(2) 3	2-3	single flower
Pedicel length, mm	1.0-2.0	1.0-2.0	1.0	flowers are sessile	1.0	1.0	1.0	2.0-4.0
Flower length, mm	5.0-6.0 (10.0)	10.0	10.0	10.0-12.0	10.0	10.0	10.0	10.0-13.0
Size of bracteoles, mm	1.5 × 1.5	0.8-1.5 × 1.0	0.5-1.0 × 0.5-0.75	0.5 × 0.5	0.5 × 0.5	1.0 × 0.75	1.0 × 0.75	0.5-1.5 × 0.5-1.0
Calyx teeth length, mm	0.5-0.8	0.5-0.8	0.6-1.0	0.5	0.5	(0.75) 1.0	0.5 (0.75)	0.8-1.0
Corolla length, mm	3.0-6.0 (8.0)	3.0-6.0	5.0-7.0	5.0-7.0	3.0-4.0 (5.0)	5.0-7.0	3.0 (5.0)	6.0-8.0
Corolla bend diameter, mm	5.0-6.0 (8.0)	3.0-5.0	5.0-7.0	4.0-6.0	5.0-6.0	5.0-6.0	4.0-5.0	2.0-4.0
Corolla lobe size, mm	2.0-3.0 × 1.5	1.5-2.0 × 1.5	2.0 × 1.5	2.5-3.0 × 2.0	0.5-1.5 × 1.5	2.0-3.0 × 2.0	2.0-3.0 × 1.5	3.0 × 2.0
Stamens length, mm	2.0-3.0 (4.0)	4.0-5.0	4.0-5.0	6.0-8.0	4.0-5.0	5.0	3.0 (5.0)	5.0-6.0
Anther length, µm	1497.80 (1454.62-1529.20)	1352.90 (1314.50-1399.30)	1232.50 (1230.60-1235.50)	1124.40 (1015.45-1233.43)	1236.70 (1067.70-1363.54)	1463.57 (1388.09-1514.97)	1258.80 (1208.89-1355.74)	1512.10 (1502.40-1521.80)
Projection of connective length, µm	58.65 (41.55-85.83)	47.90 (43.00-58.89)	68.10 (51.90-79.10)	51.90 (48.30-55.03)	57.80 (53.95-61.30)	46.70 (40.80-55.82)	68.10 (57.99-79.61)	65.30 (61.60-67.30)
Style length, mm	2.0-3.0	3.0-5.0	2.0-3.0	5.0-7.0 (8.0)	1.0-2.0 (3.0)	2.0	3.0 (4.0)	2.0-4.0

Table 2. Qualitative features of *Symphoricarpos* flower.

Features	Species							
	<i>S. albus</i>	<i>S. racemosus</i>	<i>S. rivularis</i>	<i>S. occidentalis</i>	<i>S. orbiculatus</i>	<i>S. hesperius</i>	<i>S. mollis</i>	<i>S. oreophilus</i> var. <i>utahensis</i>
Pedicel	short, ribbed	short, ribbed	short, ribbed	flowers sessile	short, ribbed	short, no ribbed	short, no ribbed	short, ribbed, pendent
Bracteoles shape	ovoid	ovoid	ovoid	triangular	ovoid	triangular	obovoid or triangular	ovoid or triangular
Bracteoles Pubescence	slightly pubescent at the edges	slightly pubescent at the edges	slightly pubescent at the edges	glabrous	slightly pubescent at the edges	glabrous	glabrous	slightly pubescent at the edges
Calyx shape	subspherical	ovoid	ovoid	obovoid	ovoid	obovoid	ovoid	spindle-shaped
Calyx teeth shape	ovoid	triangular	triangular or ovoid	triangular	ovoid	triangular	ovoid	triangular
Calyx teeth pubescence	slightly pubescent at the edges	slightly pubescent at the edges	slightly pubescent at the edges	glabrous	brush of hairs at the apex	glabrous	glabrous	slightly pubescent at the edges
Corolla shape	campanulate	broadly campanulate	campanulate	broadly campanulate	broadly campanulate	broadly campanulate	campanulate	narrow tube
Corolla tube shape	convex at the base on one side	convex at the base on one side	convex at the base on one side	convex at the base on one side	convex at the base on one side	convex at the base on one side and the moon curved	convex at the base on one side	without convex at the base
Corolla lobe shape	suborbicular, with obtuse apex	ovoid, with acute apex	narrow ovoid, with acute apex	broadly ovoid, with acute apex	oval with orbicular apex	broadly oval with orbicular apex	oval with orbicular apex	oval with obtuse apex
Stamens length	equal to the corolla	equal or slightly higher to the corolla	equal or slightly higher to the corolla	higher than the corolla	equal or slightly higher to the corolla	equal to the corolla	equal to the corolla	shorter than the corolla
Stamen filament pubescence	glabrous	glabrous	glabrous	glabrous	pubescent	glabrous	pubescent	glabrous
Style length	shorter than the corolla	equal to the corolla	shorter than the corolla	higher than the corolla	shorter than the corolla	shorter than the corolla	shorter than the corolla	shorter than the corolla

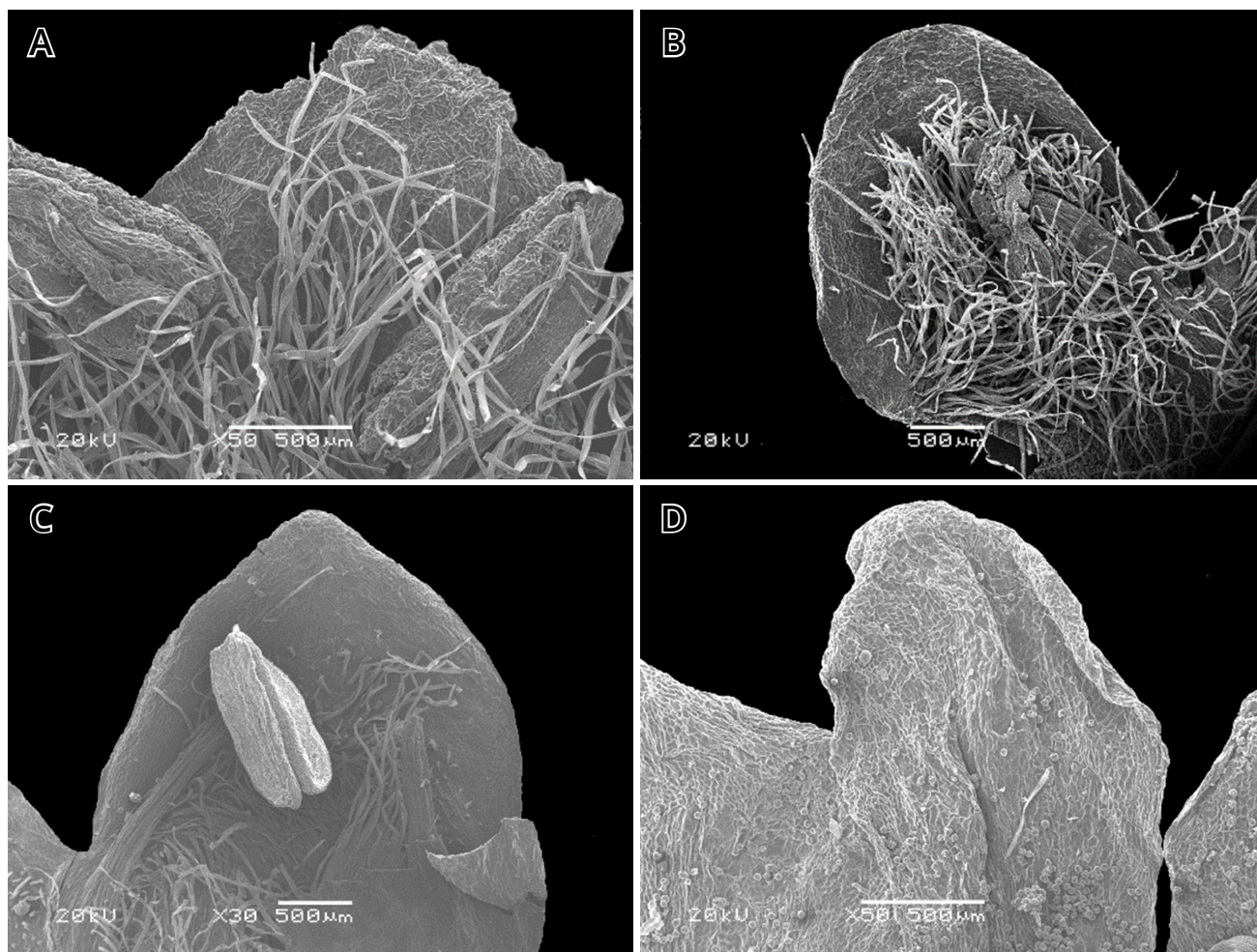


Figure 2. Lobes of the corolla (SEM): **A** – *Symphoricarpos albus* (suborbicular, with obtuse apex); **B** – *S. mollis* (oval, with orbicular apex); **C** – *S. occidentalis* (broadly oval, with acute apex); **D** – *S. oreophilus* var. *utahensis* (oval, with obtuse apex).

1/2 of the corolla length. We noted that the stamens and style exceed the corolla in length exclusively in *S. occidentalis*, hence it can be a diagnostic feature of this species (Tables 1 & 2).

The following differences for other two similar species (*S. hesperius* and *S. mollis*) were found. The flowers of *S. hesperius* are with triangular calyx teeth, broadly bell-shaped, and with a longer corolla; the tube of the corolla is crescent-shaped at the base; the filaments of stamens are glabrous. The calyx teeth of *S. mollis* flowers are deltoid; the corolla is campanulate and shorter; the stamen filaments pubescent by ribbon-like hairs.

Symphoricarpos oreophilus var. *utahensis* presents a peculiar floral morphology that distinguishes it from all the other studied representatives of the genus *Symphoricarpos*. It has solitary flowers on long (2–4 mm against 1 mm in other studied species) pendent pedicels, which are densely pubescent by

simple bristly and glandular hairs. Other species have numerous flowers organized in racemes and placed on erect, glabrous pedicels. The calyx of *S. oreophilus* var. *utahensis* is elongated and spindle-shaped, unlikely to other species. Its corolla is narrow-tubular, 2–4 mm in diameter and is much shorter than the tube. The tube is not convex at the base. The stamens are shorter or rarely of the same size as the corolla (Tables 1 & 2).

Conclusions

The micro- and macromorphological peculiarities of the flowers of six *Symphoricarpos* species introduced to Ukraine were specified. The morphological features of the calyx, corolla, stamens and style allowing distinguishing *S. albus*, *S. hesperius*, *S. mollis*, *S. occidentalis*, *S. orbiculatus*, and

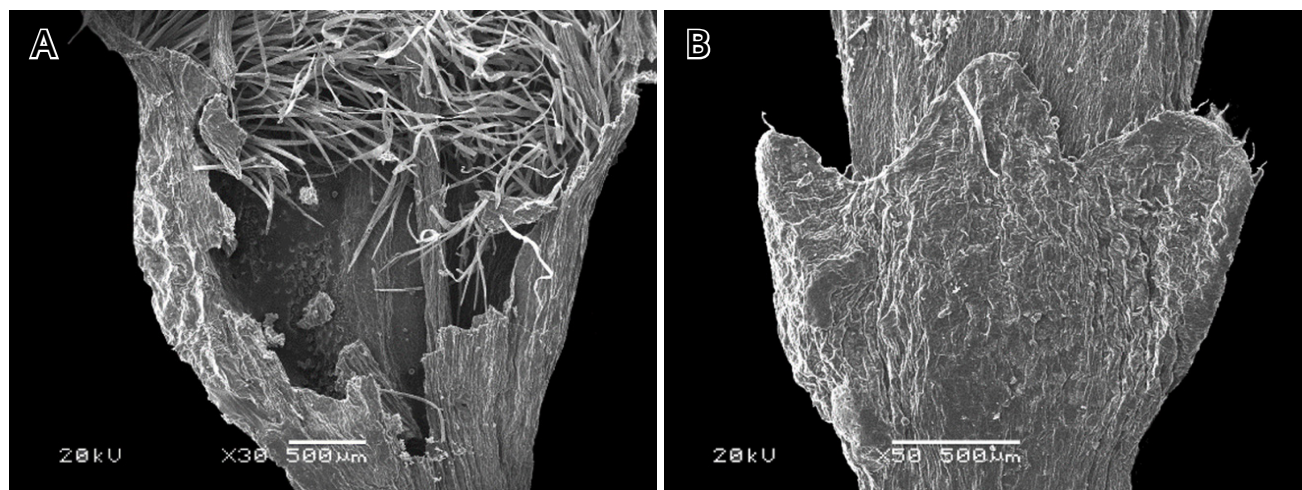


Figure 3. Base of a corolla tube (SEM): **A** – *Symphoricarpos albus* (convex at the base of one side); **B** – *S. oreophilus* var. *utahensis* (symmetrical, without convexity).

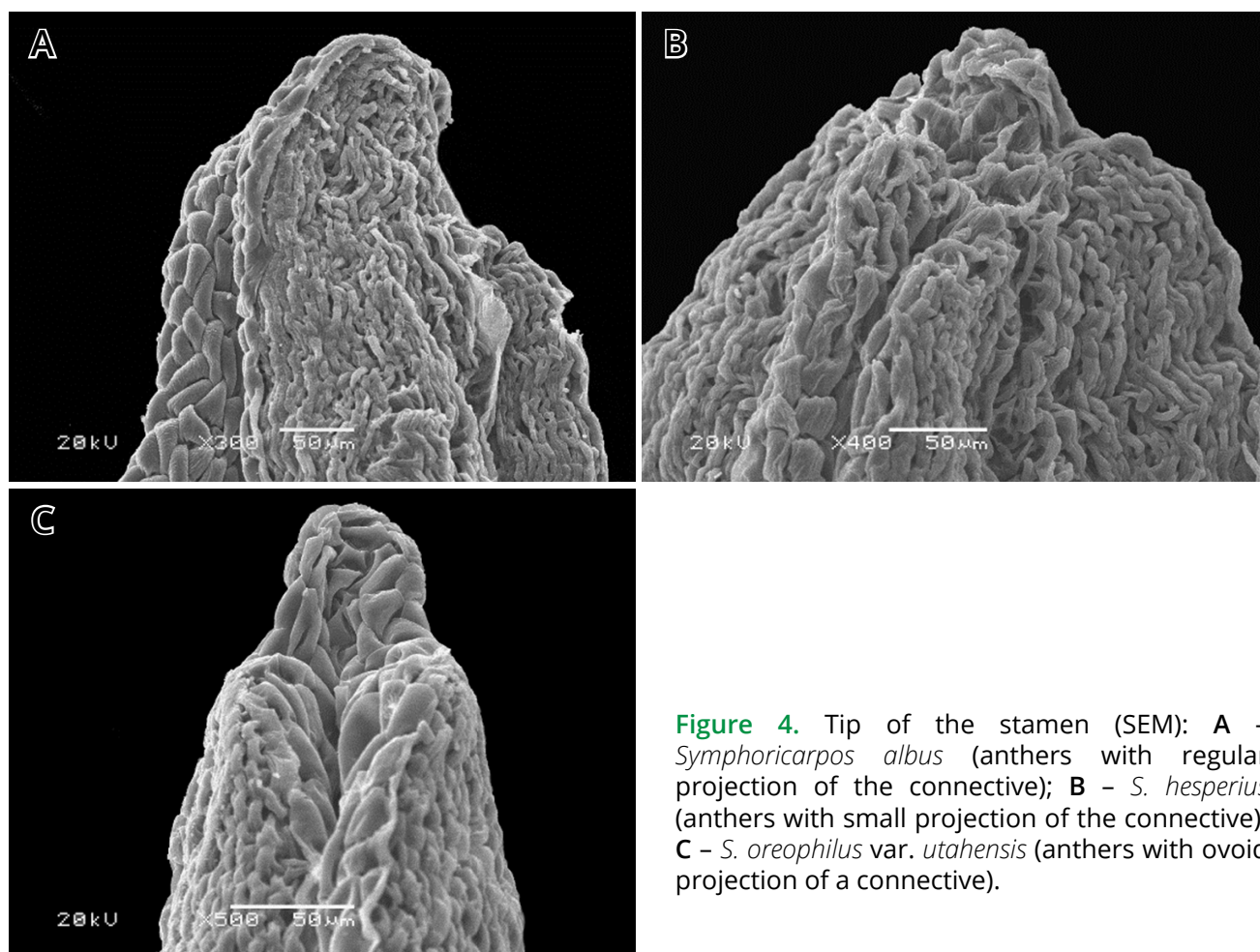


Figure 4. Tip of the stamen (SEM): **A** – *Symphoricarpos albus* (anthers with regular projection of the connective); **B** – *S. hesperius* (anthers with small projection of the connective); **C** – *S. oreophilus* var. *utahensis* (anthers with ovoid projection of a connective).

S. oreophilus var. *utahensis* were emphasized. These features can be suggested as additional diagnostic traits in the taxonomy of the genus *Symphoricarpos*. Finally, the results of our study showed that *S. racemosus*, *S. rivularis*,

and *S. albus* share common morphological features of the flower, what supports their current synonymy under the name *S. albus*.

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Морфологічні особливості квітки видів роду *Symphoricarpos* (Caprifoliaceae), інтродукованих в Україні

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За допомогою світлової та сканувальної електронної мікроскопії вивчено будову суцвіття і квіток шести видів роду *Symphoricarpos*, інтродукованих в Україні. Виявлено морфологічні особливості чашечки, віночка, тичинок і стовпчика маточки, за якими розрізняються квітки видів *S. albus* (включно з *S. racemosus* та *S. rivularis*), *S. hesperius*, *S. mollis*, *S. occidentalis*, *S. orbiculatus* та *S. oreophilus* var. *utahensis*. Отримані дані важливі для ідентифікації видів і таксономії роду *Symphoricarpos*. Зокрема, результати наших досліджень показали, що квітки *S. racemosus*, *S. rivularis* та *S. albus* мають спільні риси будови, що підтверджує доцільність зведення їх у синоніми під назвою *S. albus*. В той час, як інші види роду *Symphoricarpos* демонструють відмінності в будові їх квітки.

Серед ознак відсутніх у доступних літературних джерелах, як додаткові ознаки для ідентифікації інтродукованих в Україну видів роду *Symphoricarpos* ми пропонуємо такі: кількість квіток у суцвітті, особливості морфології квітконіжки, форма й особливості опушення приквіток, форма зубчиків чашечки та наявність чи відсутність їхнього опушення, наявність чи відсутність опуклості трубочки віночка, наявність яйцеподібного виступу в'язальця над пиляками та загальною розміри всіх елементів квітки.

Також слід відмітити, що з-поміж досліджених видів найбільше відрізняється *S. oreophilus* var. *utahensis*, що має поодинокі квітки, розташовані в пазухах листків на пониклих опушених квітконіжках, видовжену веретеноподібну чашечку, вузькотрубчастий, без опуклості при основі віночок, а також коротші за трубочку віночка або, рідше, однакової довжини тичинки з чітким яйцеподібним виступом в'язальця на верхівці.

Ключові слова: *Symphoricarpos*, морфологія, суцвіття, квітка, діагностичні ознаки