Новости систематики высших растений | 2018
Novitates Systematicae Plantarum Vascularium | 49: 87–92
ISSN 0568-5443

Sorbus orbiculata (*Rosaceae*), a new species from Caucasus, North-East Anatolia and North-West Iran

Sorbus orbiculata (*Rosaceae*) — новый вид с Кавказа, из Северо-Восточной Анатолии и Северо-Западного Ирана

E. Tz. Gabrielian

Institute of Botany after A. L. Takhtajyan, National Academy of Sciences of the Republic of Armenia
Department of Taxonomy and Geography of Higher Plants
Acharyana Str., 1, Yerevan, 0040, Republic of Armenia
botany2008@gmail.com

Э. Ц. Габриэлян

Институт ботаники им. А. Л. Тахтаджяна НАН Республики Армения
Отдел систематики и географии высших растений
ул. Ачаряна, 1, Ереван, 0040, Республика Армения
botany2008@gmail.com

https://doi.org/10.31111/novitates/2018.49.87

Abstract. Long-standing observations of plants named by Yu. D. Zinserling (1939) *Sorbus graeca* (Spach) Lodd. ex S. Schauer var. *orbiculata* Zinserl., nom. inval., descr. ross., and later described by us as *S. umbellata* (Desf.) Fritsch var. *orbiculata* Gabrielian (1978), allowed to identify significant additional features to clearly distinguish them from typical plants of *S. graeca*. We propose to consider these plants as an independent species *S. orbiculata* (Gabrielian) Gabrielian, comb. et stat. nov. Distinctive features of this species from *S. graeca*, as well as from other closely related species *S. umbellata* and *S. taurica* Zinserl. are shown.

Keywords: *Sorbus graeca* complex, *S. orbiculata*, Caucasus, North-East Anatolia, North-West Iran, new species, distinctive features, key for determination of closely related species.

Аннотация. Многолетние наблюдения в природе за растениями, названными Ю. Д. Цинзерлингом (Zinserling, 1939) как *Sorbus graeca* (Spach) Lodd. ex S. Schauer var. *orbiculata* Zinserl., nom. inval., descr. ross., а позднее описанными нами как *S. umbellata* (Desf.) Fritsch var. *orbiculata* Gabrielian (1978), позволили выявить существенные дополнительные признаки, четко отличающие их от типичных растений *S. graeca*. Эти растения мы предлагаем рассматривать в ранге самостоятельного вида *S. orbiculata* (Gabrielian) Gabrielian, comb. et stat. nov. Показаны его отличия от *S. graeca*, а также от других близкородственных видов *S. umbellata* и *S. taurica* Zinserl.

Ключевые слова: комплекс *Sorbus graeca*, *S. orbiculata*, Кавказ, Северо-Восточная Анатолия, Северо-Западный Иран, новый вид, отличительные признаки, ключ для определения близкородственных видов.

In the 1952–1955, when I studied for PhD in Leningrad, my teacher, the world famous scientist A. L. Takhtajan proposed to me to do an investigation of the Caucasian species of the genus *Sorbus* L., which was found an extremely complicated group (Gabrielian, 1958a, b). According to Takhtajan it was better to start research of the *Sorbus* from Armenia. He was sure that I should find new species there. Afterwards, I described several species from there. At first several *Sorbus* species in the vicinity of Yerevan were collected and I was well-informed about interesting specimens of *S. graeca* (Spach) Lodd. ex S. Schauer from the vicinity of Kajaran in Zangezur collected by A. B. Schelkovnikov and E. I. Kara-Murza (1900–2500 m, 26 VII 1929 — ERE 21400, ERE 214001, ERE 28481), and by S. G. Tamamschjan (9–10 VIII 1927 — ERE 21405, ERE 28482). At the beautiful Mount Allu were found 5 taxa of *Sorbus* growing together: *S. graeca* var. *graeca* and var. *orbiculata* Zinzerl. (ERE 61760, ERE 59271, ERE 59272), *S. subfusca* (Ledeb. ex Nordm.) Boiss. (ERE 31297, ERE 59332–59338), *S. roopiana* Bordz. (= *S. dualis* Zinserl.) (ERE 31507, ERE 59234, ERE 64950, ERE 64951) and *S. aucuparia* L. (ERE 61700, ERE 61746). Unfortunately, after many years this interesting place disappeared, because Mount Allu contained uranium ore and was fully dug-out. Every time I was in Zangezur near Kajaran, I remembered about these amazing mount, and on 10th October 2002, being there again I collected in the Yaghlu gorge (left bank of river Kajarantz, 2200–2300 m — ERE 166035, ERE 166036) the plants which were named by Yu. D. Zinserling (1939) *S. graeca* var. *orbiculata* Zinserl., nom. inval., descr. ross. because of the mainly orbicular leaves, and described later by us as *S. umbellata* (Desf.) Fritsch var. *orbiculata* Gabrielian (1978). Also I dug up one specimen of this plant, which was planted in the Botanical Garden at Yerevan for study in details during all seasons.

Поступила в редакцию | *Submitted: 20.08.2018* *Принята к публикации* | *Accepted: 21.12.2018*

Sorbus is taxonomically one of the most complicated genera in the *Rosaceae* family. While studying the representatives of such a difficult genus, previous authors usually based their work on the shape of the leaves without taking into consideration the amplitude of their variation. The leaf shape of *Sorbus* varies according to the ecological conditions, the phases of vegetation, abundance of snowfall, freezing of the shoots, etc. Therefore it is necessary to use besides the leaves some more constant characteristics such as morphological, anatomical structure of flowers, fruits, wood and etc. Comparative anatomical studies of the wood, tests of fruit anatomy for starch, tannin, suberin content in the cells and the degree of sclerenchymatization have revealed some new constant characters to distinguish *S. graeca* var. *graeca* and var. *orbiculata*. These features, as well as anatomy, shape, size and colour of lenticels and their distribution on the fruit surface showed that they are very important in delimiting separate species — *S. graeca* and *S. orbiculata*. When examining *S. orbiculata* in nature, numerous diversities were observed on the same shrub or branch. The leaves gathered in early spring differ very much in shape, texture and pubescence from mature leaves. The leaves of branches with fruits are absolutely other than leaves of totally vegetative shoots. If these two branches are mounted on the same sheet, this can often cause misunderstanding and be determined as two different species (Gabrielian, 1958a, b).

All the above allowed me to introduce *S. umbellata* var. *orbiculata* as an independent species.

Sorbus orbiculata (Gabrielian) Gabrielian, comb. et stat. nov. ≡ *S. umbellata* (Desf.) Fritsch var. *orbiculata* Gabrielian, 1978, Ryabiny (*Sorbus* L.) Zapadnoi Azii i Gimalayev: 175.

— *S. graeca* (Spach) Lodd. ex S. Schauer (cum auct. comb. Hedl.) var. *orbiculata* Zinserl. 1939, Fl. URSS, 9: 398, tab. 26, *10*, nom. inval., sine descr. lat. — *S. cretica* (Lindl.) Fritsch et Rech. f. *orbiculata* Kárpáti, 1960, Feddes Repert. 62, 2–3: 171, nom. inval., sine typo. — *S. graeca* var. *orbiculata* Gabrielian, 1961, Notes Roy. Bot. Gard. Edinburgh, 23: 491, nom. inval., sine descr. lat., sine typo. — *S. umbellata* var. *orbiculata* Gabrielian, 1972, Fl. Turkey, 4: 155, nom. inval., sine descr. lat., sine typo.

Shrub 2–4 m tall. Bark brown-reddish, with numerous white round lenticels. Buds 8–11 mm long, acute, sticky, green, with red border. Leaves of fruiting shoots 9–11 cm long, orbicular, rarely suborbicular or widely elliptic, slightly lobate, at margins with irregular small more or less obtuse brown-pointed denticles; beneath with greyish-white, not tightly accumbent pubescence, above glabrous, more or less glossy; leaves of vegetative shoots in the beginning of the flowering very variable in shape and size. Petioles pubescent. Veins 7–8(9)-paired. Inflorescence compound-corymbose, strongly short-branched in upper part. Calyx lobes 4–5 mm long, triangular, lanate. Flowers 18–20 mm diam., petals obovate, unguiculate, 2–3 mm remote from each other; anthers creamy-white. Gynoecium hemisyncarpous, ovary semiinferior, with 2 free stylodia, bilocular. Fruits globose, 13–15(17) mm diam., red, densely covered by round whitish lenticels. Seeds 8–9 mm long, elliptic-triangled, dark brown. Fl. V–VI, fr. IX–X. — Fig. 1, 2.



Fig. 1. Inflorescence of *Sorbus orbiculata*.

Holotype (Fig. 3): "Арм. ССР [Arm. SSR], Zangezur, Kadjaran, m. Allu ex adverso pag. Schabadin, in decliviis boreali-occidentalis, 2300 m, 26 VIII 1952, E. Gabrielian" (ERE: barcode ERE0001153 (on the label: ERE 59270); isotypes — E00010853 (ERE 61765), ERE0001156 (ERE 59269), ERE0001157 (ERE 66330), ERE0001155 (ERE 66331), LE).

Affinity. The diagnostic features distinguishing *S. orbiculata* from closely related species of *S. graeca* complex are given below in the key for identification (p. 91), and the differences from the most closely related *S. graeca* are presented in the Table.

S. orbiculata differs from *S. graeca* also by diploid chromosome number 2n = 34 (Armenia, near Vanadzor (Kirovakan, Dimatz), 7 VI 1975, Gabrielian and Jankun — ERE 59280), whereas *S. graeca* has a tetraploid (4x) chromosome number 2n = 68 (Jankun, Gabrielian, 1979: 20). But by mistake of A. Jankun it was cited as *S. umbellata* var. *cretica*.

Habitat. Rocky slopes, oak forests, upper limits of forests, shrubbery, on limestones; 1400–2500 m.

Distribution. Republic of Abkhazia (vicinity of Ritsa Lake); Georgia (Javakheti); Republic of Armenia: Upper Akhuryan, Aragats, Lori, Ijevan, Aparan, Sevan, Gegham, Yerevan, Darelegis, Zangezur and Meghri



Fig. 2. Fruits of *Sorbus orbiculata*.

Table. Diagnostic characters of *Sorbus orbiculata* and *S. graeca*

Character	*Sorbus orbiculata*	*Sorbus graeca*
Shrub or tree	shrub 2–4 m tall	tree 7–10 m tall
Bark	brown-reddish, with many whitish lenticels	grey-reddish, lenticels almost absent
Buds	8–11 mm long, acute, sticky, green, with red border	4–7 mm long, obtuse, not sticky, brown
Leaves of fruiting shoots	9–11 cm long, round, rarely widely elliptic, slightly lobate	5–8 cm long, obovate, cuneate, not lobate
Leaves of vegetative shoots	strongly various in size and shape	the same as on fruiting shoots
Leaf margin	irregularly denticulate with small more or less obtuse brown-pointed teeth	regularly dentate with large sharp teeth
Leaves above	more or less glossy	glossy
Pubescence beneath the leaves	greyish-white, not tightly accumbent	white, tightly accumbent
Veins	7–8(9) pairs	6–7(8) pairs
Inflorescence	compound-corymbose, strongly short-branched in upper part	corymbose
Calyx lobes	4–5 mm long, triangular, lanate	2–3 mm long, narrowly triangular, lanate
Flowers	18–20 mm diam., petals obovate, unguiculate, remote from each other	15–16 mm diam., petals oval, not unguiculate, adjoined each other
Fruits	13–15(17) mm diam., globose, red, densely covered with round lenticels	8–9 mm diam., ellipsoid or round, red, without or with several unnoticeable lenticels
Seeds	8–9 mm long, elliptic-triangle, dark brown	6–7 mm long, narrowly elliptic, light brown



Fig. 3. Holotype of *Sorbus orbiculata* (ERE0001153).

floristic regions; Nagorno-Karabakh Republic; Republic of Azerbaijan: Talysh, Nakhchivan Autonomous Republic; Turkey: North-East Anatolia; North-West Iran.

In consummation I want to reproduce the drawing from the "Flora of Armenia" (1958, vol. 3: tab. 83) made by a remarkable artist Z. V. Kobyletskaya which clearly demonsrtrates the distinctions between the two taxa (Fig. 4). The upper branch with specific leaves and compound-corymbose inflorescence is *S. orbiculata* and the lower branch is typical *S. graeca* with quite other leaves and corymbose inflorescence.

The nomenclature of *S. graeca* and *S. umbellata* (= *Crataegus umbellata* Desf.) is very difficult. It is also complicated by inclusion of two distinct elements in Desfontain's original *Crataegus umbellata*. The neotype of *C. umbellata* designated by J. J. Aldasoro et al. (2004: 105) is the element which is also referable to *S. flabellifolia*, the type of which is not designated. One of the Desfontain's elemets is referable to *S. graeca*, a synonym of *S. umbellata* var. *cretica* (Lindl.) C. K. Schneid. (R. D. Meikle, in litt.) (Gabrielian, 1961, 1972, 1978). In that time I had not seen yet the holotype of *S. cretica* (Lindl.) Fritsch. However R. D. Meikle and P. H. Davis advised me to recognize *S. graeca* as a synonym of *S. cretica*. But afterwards when I had seen in Cambridge the sample collected by J. Lindley from Crete and arranged the left branch on the sheet as the lectotype of *S. cretica*, I realized that it differs from a typical *S. graeca*. Now I prefer to consider them as two different species. Considering that it would be helpful to recognize the taxa of complicated *Sorbus graeca* complex I present a very short key for their identification.

1. Leaves light green above, densely appressed white-tomentose beneath; teeth large, subobtuse, broad at base, 10–15 on each side, veins 5–7(8)-paired ..... 2.
+ Leaves dark green above, loosely and rather thinly tomentose beneath; teeth irregular, small, acute, 20–35 on each side, veins 7–8(9)-paired ..... 3.
2. Leaves small, orbicular, broadly ovate or elliptic-obovate, base and apex usually rounded ..... *S. umbellata*.
+ Leaves bigger, obovate to subrhombic, acuminate, base cuneate ..... *S. taurica* Zinserl.
3. Leaves various in size and shape, those on fruiting-shoots with rounded base, and weakly lobate margins. Inflorescence compound-corymbose, shortly branched in upper part. Fruit fully covered by light lenticels .... *S. orbiculata*.
+ Leaves of fruiting and vegetative shoots are similar, with more or less cuneate base and never lobate on margin. Inflorescence corymbose. Fruit without or with several inconspicuous lenticels ..... *S. graeca*.



Fig. 4. The drawing from «Flora of Armenia» (1958, vol. 3: tab. 83, by Z. V. Kobyletskaya): upper branch — *Sorbus orbiculata*, lower branch — *S. graeca*.

References

Aldasoro J. J., Aedo C., Garmendia F. M., de la Hoz F. P., Navarro C. 2004. Revision of *Sorbus* subgenera *Aria* and *Torminaria* (Rosaceae — *Maloideae*) // Systematic Botany Monographs. Vol. 69. P. 1–148. https://doi.org/10.2307/25027918

Gabrielian E. Tz. 1958a. Kavkazskiye predstaviteli roda *Sorbus* L. [Caucasian representatives of genus *Sorbus* L.] // Acta Inst. Bot. Acad. Sci. SSR Armeniae. Vol. 11. P. 73–141. [In Russian] (Габриэлян Э. Ц. 1958. Кавказские представители рода *Sorbus* L. // Труды Ботан. ин-та АН АрмССР. Т. 11. С. 73–141).

Gabrielian E. Tz. 1958b. Rod *Sorbus* L., ryabina [Genus *Sorbus* L., Rowan] // Flora Armenii [Flora of Armenia] / A. L. Takhtajan (ed.-in-chief). Vol. 3. Yerevan: Acad. Nauk Arm. SSR. P. 256–285. [In Russian] (Габриэлян Э. Ц. 1958. Род *Sorbus* L., рябина // Флора Армении / А. Л. Тахтаджян (ред.). Т. 3. Ереван: Изд-во АН Арм. ССР. С. 256–285).

Gabrielian E. Tz. 1961. The genus *Sorbus* L. in Turkey // Notes Roy. Bot. Gard. Edinb. Vol. 23, № 4. P. 483–496.

Gabrielian E. Tz. 1972. *Sorbus* L. // Flora of Turkey. Vol. 4. Edinburgh: University Press. P. 147–156.

Gabrielian E. Tz. 1978. Ryabiny (*Sorbus* L.) Zapadnoi Azii i Gimalayev [Rowans (*Sorbus* L.) of Western Asia and Himalayas]. Yerevan: Acad. Nauk Arm. SSR. 264 p. + 62 tab. [In Russian with English abstract] (Габриэлян Э. Ц. 1978. Рябины (*Sorbus* L.) Западной Азии и Гималаев. Ереван: Изд-во АН Арм. ССР. 264 с., 62. табл.).

Jankun A., Gabrielian E. 1979. Karyology of the representatives of the genus *Sorbus* L. distributed in Armenian SSR (Kariologia przedstawicieli rodzaju *Sorbus* L. z terenu Armeńskiej SZRR) // 4th Ogólnopolska Konferencja Cytogenetyczna. Gdańsk. P. 20. [In Polish].

Zinserling Yu. D. 1939. Rod Ryabina — *Sorbus* L.: podrod *Hahnia* Medik. [Genus Rowan — *Sorbus* L.: subgenus *Hahnia* Medik.] // Flora URSS / V. L. Komarov (ed.-in-chief). T. 9 / S. V. Juzepczuk (ed.). Leningrad: Acad. Sci. URSS. P. 387–401. [In Russian] (Цинзерлинг Ю. Д. 1939. Род Рябина — *Sorbus* L.: подрод *Hahnia* Medik. // Флора СССР / гл. ред. В. Л. Комаров. Т. 9 / ред. С. В. Юзепчук. Л.: Изд-во АН СССР. С. 387–401).