Modern Phytomorphology **5**: 53–61, 2014

MORPHOLOGICAL DIFFERENTIATION OF *ROSA AGRESTIS* SAVI IN THE BUFFER ZONE OF THE LOW TATRAS NATIONAL PARK (SLOVAKIA)

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Abstract. The paper presents morphological diversity within *Rosa agrestis* Savi, species identified among others in the buffer zone and the area of the Low Tatras National Park (Slovakia). This taxon belongs to the polymorphic section *Caninae* DC. em. Christ, and its morphological differentiation particularly relates to the degree of hairiness and glandularity of leaves and the presence or absence of glandules on pedicels. Based on these features four varieties of this species (*R. agrestis* var. *agrestis*, *R. agrestis* var. *albiflora* (Opiz.) Degen, *R. agrestis* var. *gizellae* (Borbás) R. Keller, and *R. agrestis* var. *schulzei*) were distinguished in Europe (Popek 1996). The occurrences of all these varieties were found in the analyzed area.

Key words: *Rosa agrestis*, Rosaceae, morphology, chorology, Low Tatras National Park, Carpathians, Slovakia

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Introduction

Rosa agrestis Savi, a very morphologically differentiated shrub, belongs to section *Caninae* DC. em. Christ. Just as in other species of this section its diversity mainly concerns the intensity of hairiness and the glandularity of leaves, the presence or absence of glands on pedicels, etc. On the basis of these variables, the taxon was divided among such distinct species as: *R. gizellae* Borbás, *R. albiflora* Opiz., *R. denudata* (R. Keller) Klášt. However, as the further comprehensive study of roses *Caninae* section showed, the morphological differences among the species mentioned above concern only the features in question and their variability is of clearly continuous nature (Popek 1996; Zieliński 1985, 1987). Therefore, it is more reasonable to consider them as varieties of *Rosa agrestis* than separate individual species (Popek 1996).

The big variability of morphological features of *R. agrestis*, starting from specimen with completely glabrous leaves till intensively haired ones, has been observed in the territory of Slovakia for a long time. The morphological variability has caused lots of ambiguities in botanical literature, due to the fact that several specimens have been considered sometimes as separate species, while in other time as *R. agrestis* varieties. For example, in the paper of Procházka & Krahulec (1982) *R. schulzei* (R. Keller) Klášt., was treated as an individual species, while according to the new systematic qualification it is classified separately as *R. agrestis* variety (Větvička 1992; Popek 1996, 2007).

Therefore, the goal of this paper is to show the full spectrum of morphological diversity appearing within the species *R. agrestis* and to present its variations on the basis of samples collected in the buffer zone of the Low Tatras National Park.

Material and methods

R. agrestis (syn. *R. albiflora* Opiz, *R. denudata* (R. Keller) Klášt., *R. gizellae* Borbás, *R. sepium* Thuill., *R. schulzei* (R. Keller) Klášt.) is a shrub growing up to 2(-3) m in high.

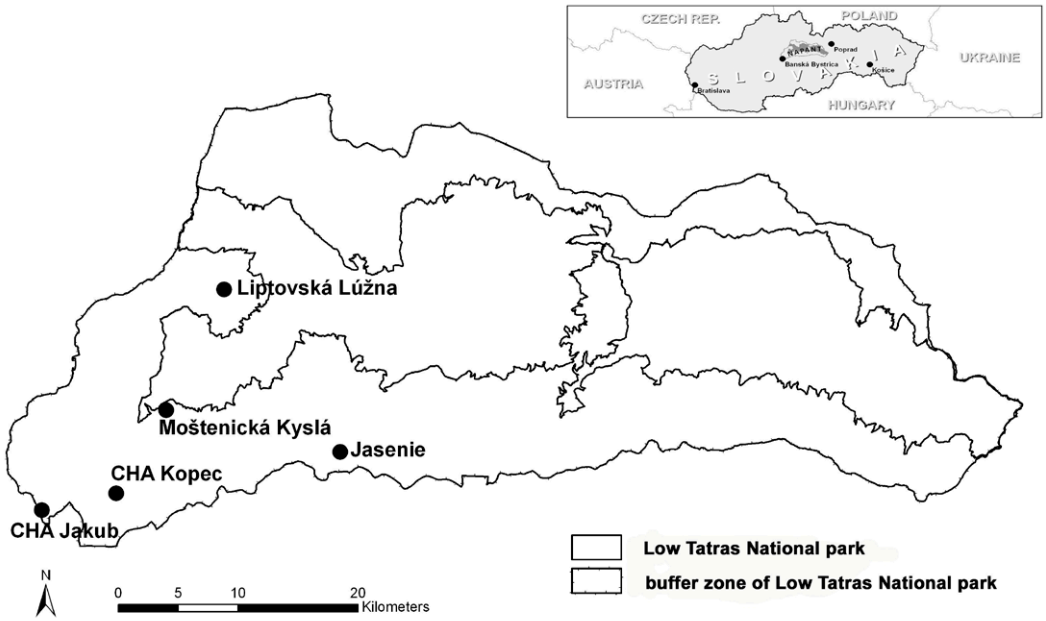

Fig. 1. Localization of the study area.

Prickles homogeneous, extremely hooked. The leaves are complex, with 5-7 leaflets. Leaflets elliptic, elongate-elliptic or obviate with acute base. Margin of leaf complex-glandular serrate. Leaves glabrous or bilaterally haired, usually profusely glandular on the underside. Bracts narrow, usually glandular on the underside (all or some of). Fruits ovoid or roundish, glabrous or sometimes with a single glands at the base. Sepals pinnate with broad patches, glabrous or glandular on the upper side, usually reflexed falling before fruit reddens. Flowers separated or in multiflorous inflorescences, usually white. Petals, sometimes only in buds, pinkish. Disc conical, narrow orificium and styles of a spray type, glabrous or ± hairy.

Field investigations were carried out in the buffer zone of the Low Tatras National Park in the vegetation seasons 2011-2013. Fruiting short shoots of roses were collected during investigations. The following characteristics were reported: the shape of the prickles, the shape of a disc, hypanthium opening, position of sepals and their durability and also intensity of hairiness and glandularity of leaves and others. In case of the leaves, middle and top parts were taken into consideration, while in case of the prickles the top parts of one-year or two-year-old long shoots, which had already completed the process of growth and their prickles were not changing, were studied. Localities, wherein specimens were collected, were marked on the map (Fig. 1). Geographical coordinates were determined for each record of distinguished varieties. Collected herbarium material was deposited in the herbarium of the Ojców National Park (OPN).

Systematic approach and the nomenclature basing on the work of Popek (1996).

Results

During the course of studies was stated that *R. agrestis* is a rare species in the area of the buffer zone of the Low Tatras National Park. Its occurrence was recorded in four localities, so far. Considering the morphological characteristics of the collected specimens, four varieties of this species were distinguished in the study area. The key to determining these varieties is given below.

Key to the varieties of R. agrestis

1a. Leaflets glabrous or only loosely hairy on the underside on the midrib and lateral veins (sometimes the entire surface of the underside ± hairy), besides, usually densely glandular 2

2a. All pedicels without glands .... var. *agrestis*

2b. All pedicels or only some glandular ... . var. *schulzei* R. Keller

1b. Leaflets distinctly hairy on both sides, often tomentosely haired beneath, besides, usually densely glandular 3

3a. All pedicels without glands ..... var. *albiflora* (Opiz.) Degen

3b. All pedicels or only some glandular ..... var. *gizellae* (Borbás) R. Keller

The occurrence of varieties of R. agrestis in the study area

R. agrestis Savi var. *agrestis* (Fig. 2)

10 records on 3 localities: CHA Jakub, 2011: (N=48°45′59′′, E=19°08′46′′), CHA Kopec, 2011: (N=48°47′00′′, E=19°13′35′′; N=48°47′00′′, E=19°13′35′′; N=48°47′03′′, E=19°13′33′′; N=48°46′59′′, E=19°13′31′′; N=48°46′59′′, E=19°13′30′′; N=48°46′57′′, E=19°13′27′′), Jasenie, 2013: (N=48°49′56′′, E=19°28′31′′; N=48°49′55′′, E=19°28′30′′; N=48°49′51′′, E=19°28′27′′).

R. agrestis Savi var. *albiflora* (Opiz.) Degen (Fig. 3) [syn.: *R. albiflora* Opiz]

3 records on 2 localities: CHA Kopec, 2011: (N=48°47′01′′, E=19°13′35′′; N=48°46′58′′, E=19°13′29′′), Jasenie (N=48°49′22′′, E=19°28′46′′).

R. agrestis Savi var. *gizellae* (Borbás) R. Keller (Fig. 4) [syn.: *R. gizellae* Borbás]

6 records on 2 localities: CHA Jakub, 2011: (N=48°45′59′′, E=19°08′32′′; N=48°45′59′′, E=19°08′36′′), CHA Kopec, 2011: (N=48°47′02′′, E=19°13′35′′; N=48°47′02′′, E=19°13′32′′; N=48°46′58′′, E=19°13′23′′; N=48°46′56′′, E=19°13′24′′).

R. agrestis Savi var. *schulzei* R. Keller (Fig. 5) [syn.: *R. schulzei* (R. Keller) Klášt.]

11 records on 4 localities: CHA Kopec, 2011: (N=48°46′59′′, E=19°13′41′′; N=48°46′59′′, E=19°13′31′′; N=48°47′01′′, E=19°13′23′′; N=48°46′56′′, E=19°13′25′′), Liptovská Lúžna, 2012: (N=48°56′34′′, E=19°18′28′′; N=48°56′31′′, E=19°18′17′′; N=48°56′30′′, E=19°18′13′′), Jasenie, 2013: (N=48°49′59′′, E=19°28′27′′; N=48°49′51′′, E=19°28′27′′; N=48°49′47′′, E=19°28′34′′), Moštenická Kyslá (Procházka & Krahulec 1982), 1982: (N=48°51′3′′, E=19°16′23′′).

Discussion

Geographically *R. agestis* belongs to the Middle European-Mediterranean element, with an extension towards the Atlantic part of Europe (Zając & Zając 2009). The shrub grows in the area of Central and Southern Europe, the Balkans, Asia Minor and the Caucasus (Zieliński 1987). The highest localities of *R. agrestis* were found in the Alps – up to 2000 m a.s.l. (Popek 2007). *R. agrestis* is not a legally protected plant in the territory of Europe, except the Great Britain, where it has status of a lower-risk species – rare in the country (Online Atlas of British & Irish Flora 2013). In Slovakia it occurs incidentally in the territory of the whole country, but never in big quantities; the highest places of occurrence have been found on 1000 m a.s.l. (Větvička 1992).

As it has already been mentioned, the high variability of morphological forms is characteristic for *R. agrestis.* The intensity of leaves hairiness is one of the main characteristic features important in distinguishing varieties of the rose. As far as typical *R. agrestis* var. *agrestis* and *R. agrestis* var. *schulzei,* are concerned, the leaves are both sides glabrous, some scattered hair may occur only on the midrib and lateral veins. However it is possible, that some specimen of these two variations of roses can have single hair on their upper leaves surface, usually close to the margin or top of the leaf, or the underside of the leaves is ± hairy (Fig. 6). However, the hairiness never covers the whole leaf blade with the same intensity as it is observed in *R. agrestis* var. *albiflora* and *R. agrestis* var. *gizellae.* Two last-mentioned varieties have the hairiness either on both sides or only on the underside of the leaves, sometimes the underside may even be tomentous. The crucial point in differentiating the varieties is the comparison of the leaves hairiness characteristics

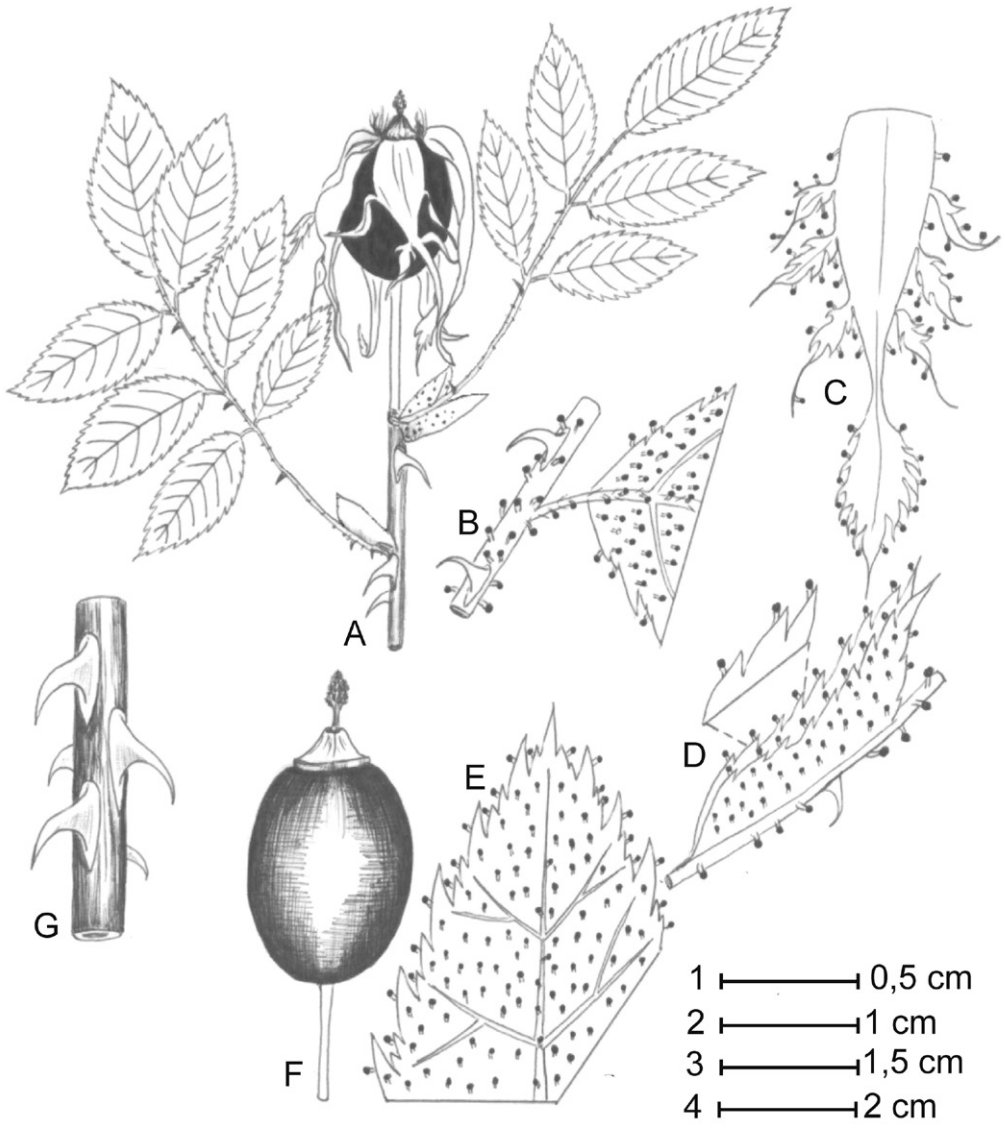

Fig. 2. *Rosa agrestis* Savi var. *agrestis*: **A** – part of fruiting short shoot; **B** – part of axis of leaf; **C** – sepal; **D** – stipule; **E** – part of leaf (underside); **F** – fruit; **G** – part of long shoot. Scales: **1** – C, D, E; **2** – B; **3** – F; **4** – A, G.

and the glandularity of flower pedicels (Fig. 7). However, sometimes it might be quite difficult to distinguish the variety, as the variability of discussed characteristic features within the same species is fully continuous and the transitions between the distinguished varieties are smooth. Moreover inflorescences with glandular pedicels and the glabrous ones might grow on the same bush. Therefore, samples collected for the examination from a single bush, should involve several shoots.

The samples of *R. agrestis* collected during the field studies are not only varied because of the hairiness density, but also because of diverse degree of the glandular intensity on the leaves underside. The glandularity differs from very

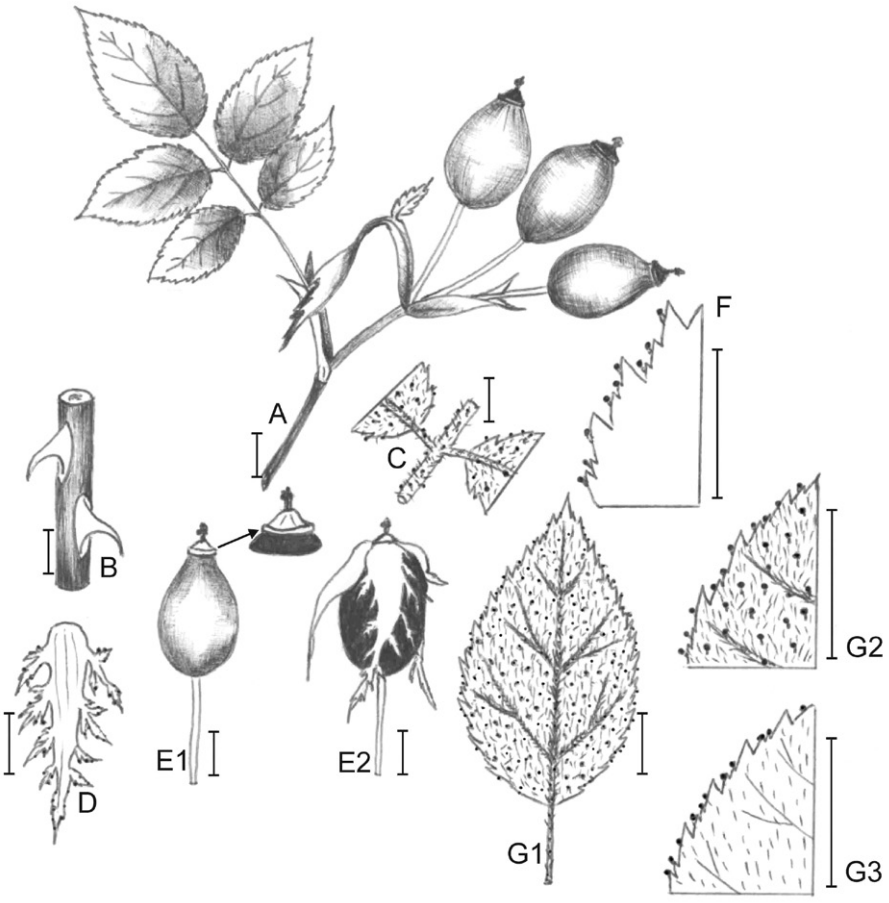

Fig. 3. *Rosa agrestis* Savi var. *albiflora* (Opiz.) Degen: **A** – part of fruiting short shoot; **B** – part of long shoot; **C** – part of axis of leaf; **D** – sepal; **E1, E2** – fruits; **F** – leaf margin; **G1** – leaf (underside); **G2** – part of leaf (underside); **G3** – part of leaf (upper side). Scale: 1 cm.

intensive in some specimens to hardly little in others; sometimes the leaves underside are nearly glabrous. The variability of these attributes has already been reported by Zieliński (1985). The researcher noticed that while not in blossom, the specimen with glabrous, not glandular leaves were hardly to distinguish from the very common *R. canina.* There are: white color of flowers, glabrous or ± glabrous, sparse pistils, and heavily feathered glandular sepals calyx which differ *R. agrestis* from *R. canina* (Zieliński 1987).

The morphological variability of *R. agrestis* is estimated as significantly well recognized in Europe. In contrast, distribution of species and varieties distinguished in the territory of Slovakia requires further examinations. Therefore the above considerations constitute contribution to the continuation of rodological research in that region.

Acknowledgements

The study was financially supported by the Science Grant Agency of the Ministry of Education of the Slovak Republic and Slovak Academy of Sciences (VEGA 2/0099/13).

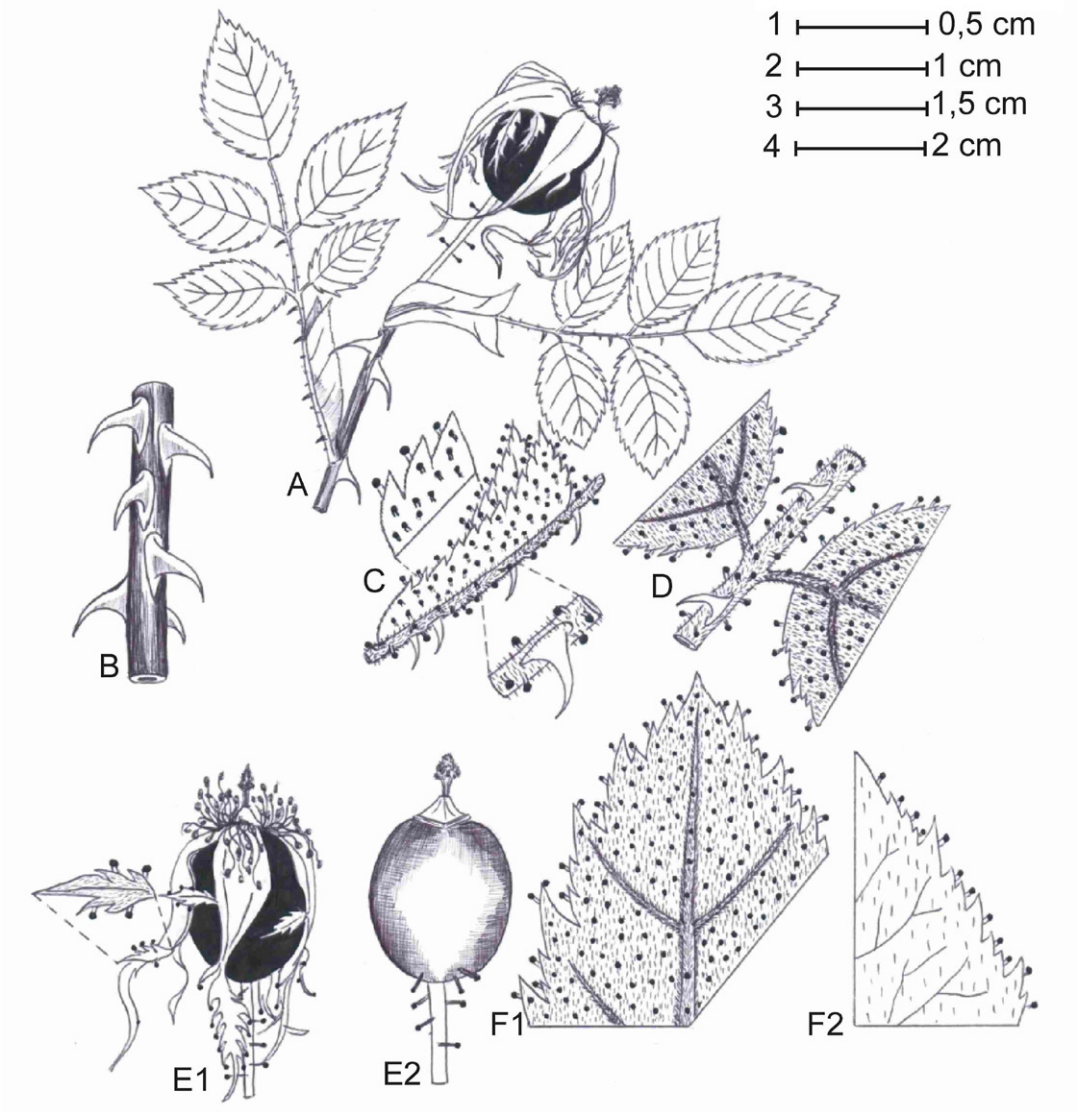

Fig. 4. *Rosa agrestis* Savi var. *gizellae* (Borbás) R. Keller: **A** – part of fruiting short shoot; **B** – part of long shoot; **C** – stipule; **D** – part of axis of leaf; **E1, E2** – fruit; **F1** – part of leaf (underside); **F2** – part of leaf (upper side). Scales: **1** – F1, F2; **2** – C, D; **3** – E1, E2; **4** – A, B.

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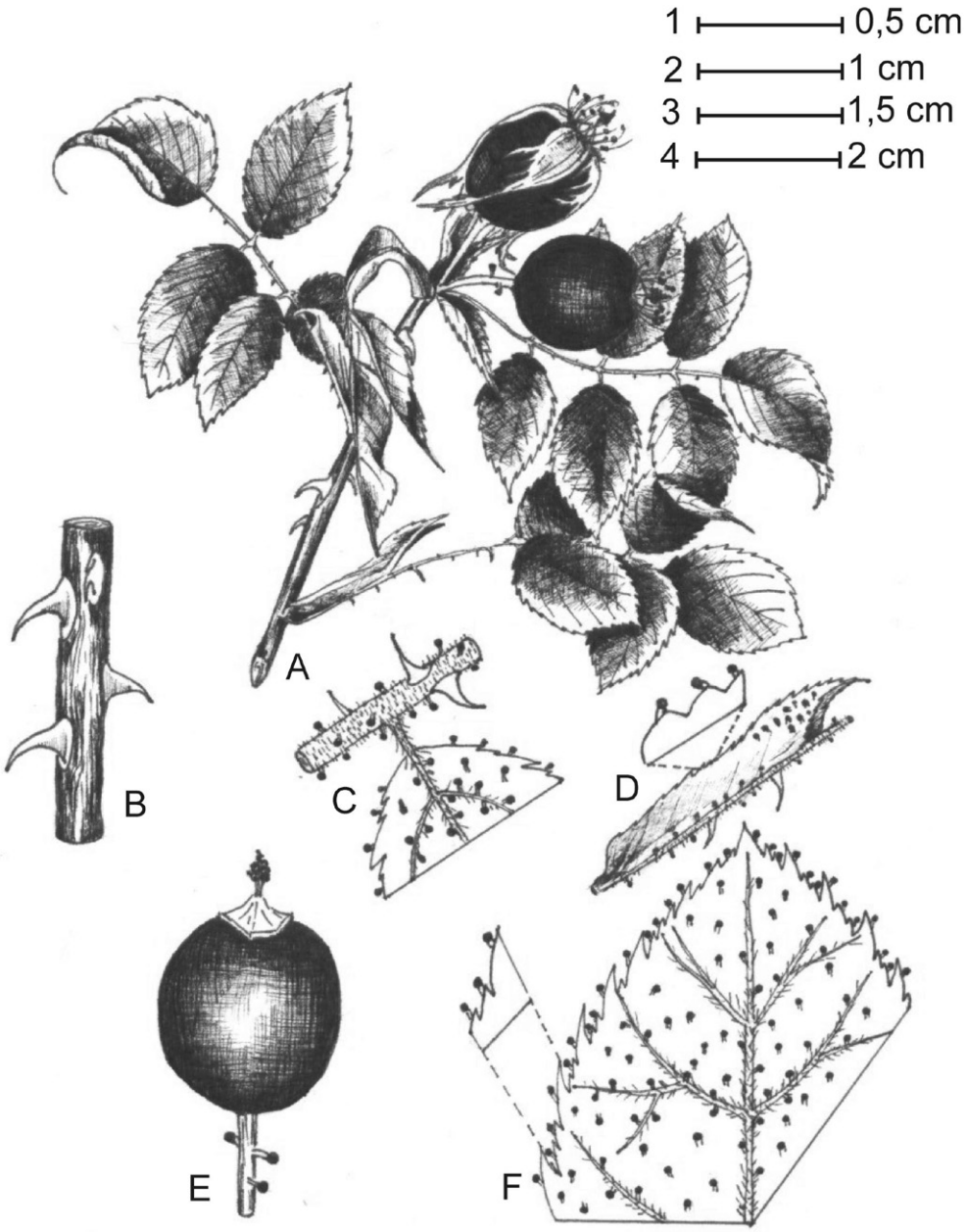

Fig. 5. *Rosa agrestis* Savi var. *schulzei* R. Keller: **A** – part of fruiting short shoot; **B** – part of long shoot; **C** – part of axis of leaf; **D** – stipule; **E** – fruit; **F** – part of leaf (underside). Scales: **1** – F; **2** – D; **3** – E; **4** – A, B, C.

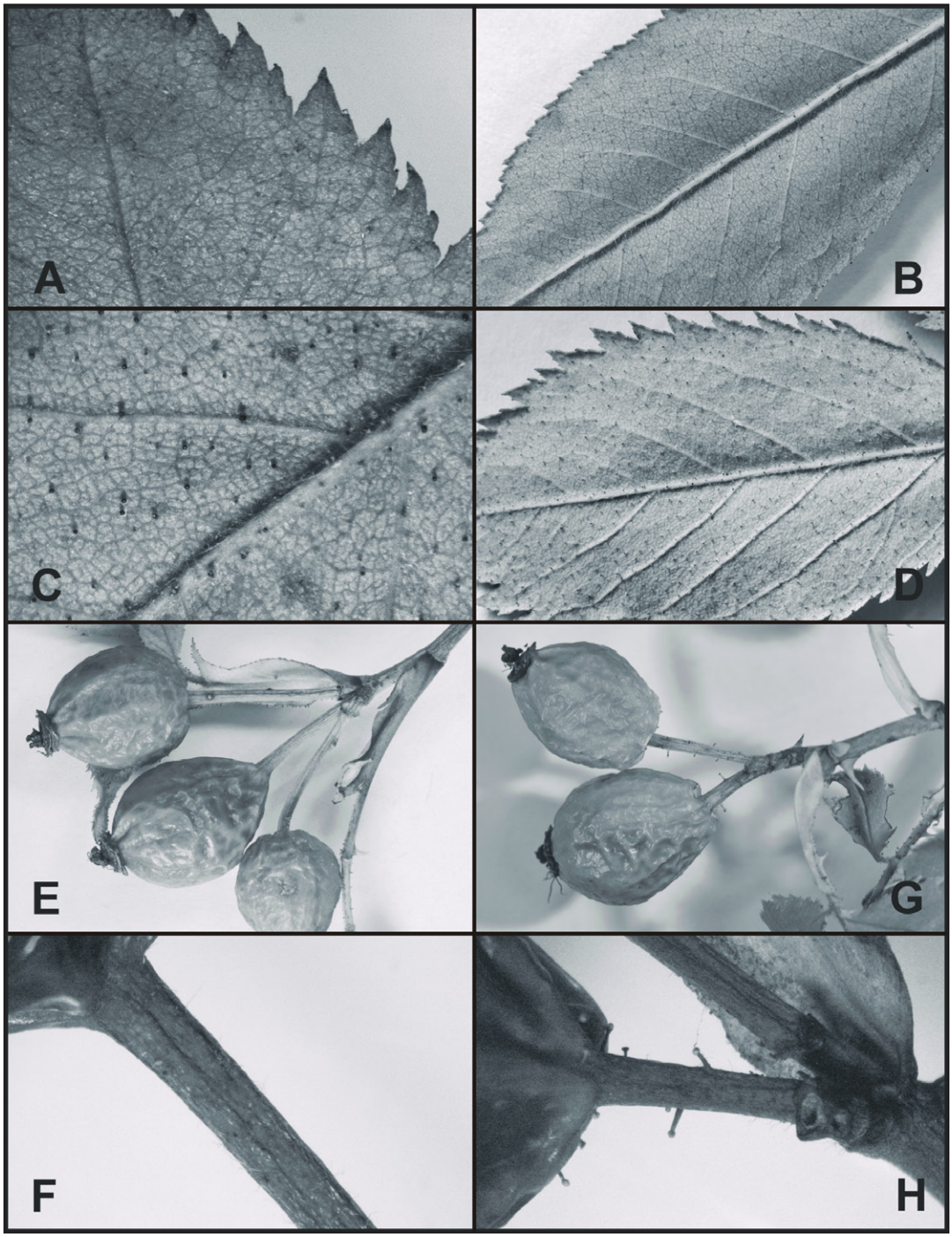

Fig. 6. Leaves and pedicel of *Rosa agrestis* Savi var. *agrestis* and *R. agrestis* Savi var. *schulzei* R. Keller: **A** – part of leaf (upper side); **B-D** – part of leaves (underside); **E-F** – pedicels of *R. agrestis* var. *agrestis*; **G-H** – pedicels of *R. agrestis* var. *schulzei*.

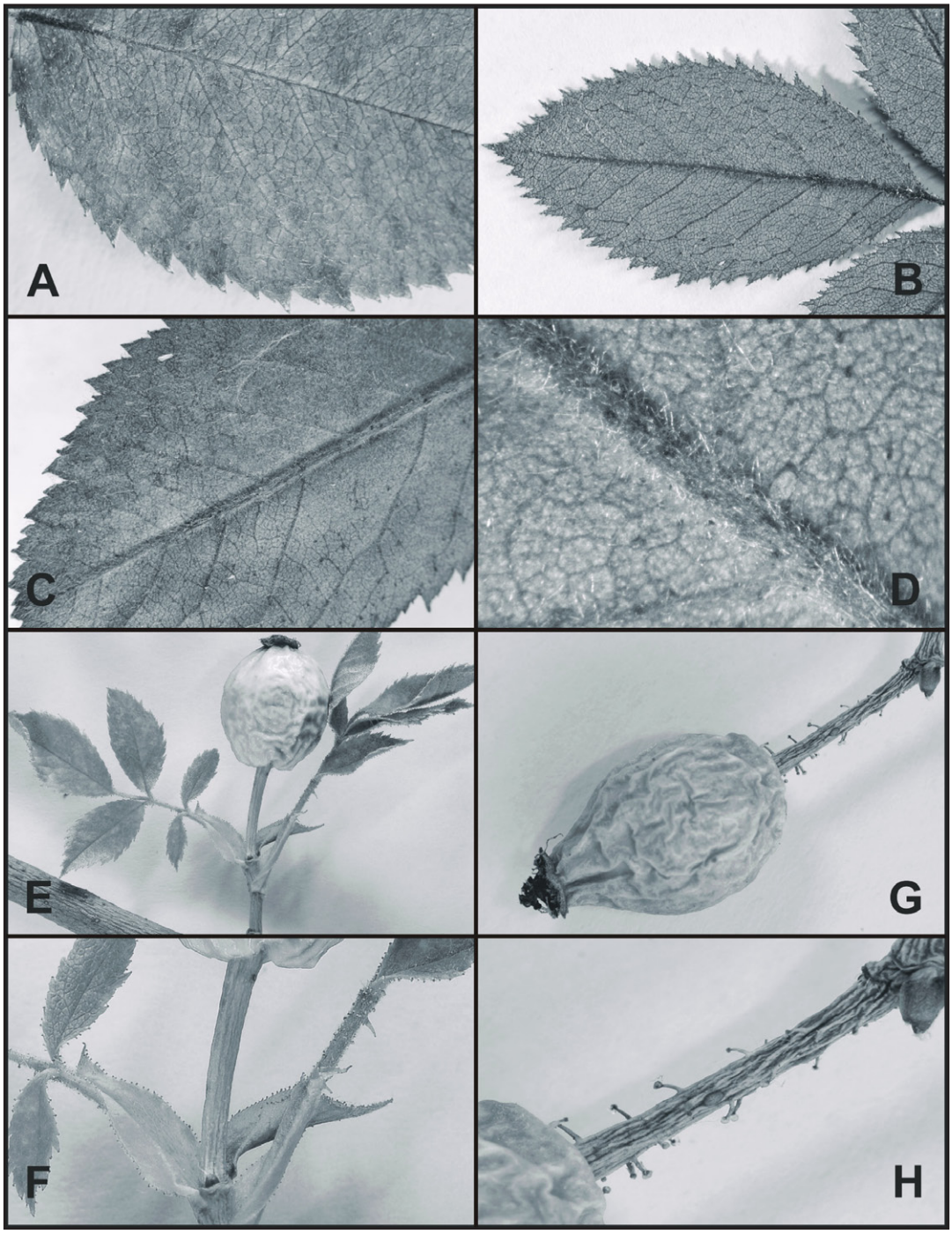

Fig. 7. Leaves and pedicel of *Rosa agrestis* Savi var. *albiflora* (Opiz.) Degen and *R. agrestis* Savi var. *gizellae* (Borbás) R. Keller: **A** – part of leaf (upper side); **B-D** – part of leaves (underside); **E-F** – pedicels of *R. agrestis* var. *albiflora*,; **G-H** – pedicels of *R. agrestis* var. *gizellae*.