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Morphological variations of *Galanthus elwesii* in Turkey and difficulties on identification

Abstract

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Galanthus L. belongs to the Amaryllidaceae family, consists of 19 species (22 taxa) and it is represented by 12 species (14 taxa) and one hybrid in Turkey. *G. elwesii* has a wide natural distribution and can be found in Bulgaria, northeastern Greece, the eastern Aegean Islands, southern Ukraine and Turkey. Within Turkey, this species has the widest distribution among others and naturally grow in northwestern, western and southern Anatolia: Edirne, Adapazarı, Bolu, Yozgat, Ankara, Eskişehir, Afyon, İzmir, Isparta, Konya, Karaman, Niğde and Antalya provinces. In this study, morphological features of *G. elwesii* has been investigated. Leaf and flower morphology were studied on live material, both in the field and in cultivation, and herbarium specimens.

Introduction

Snowdrops, the genus *Galanthus* (*Amaryllidaceae*), are one of the most instantly recognizable groups of plants. Emerging and blooming at a season when few other flowers are visible. Linnaeus (1735) gave snowdrops their scientific name, calling them *Galanthus*, from the Greek “gala” meaning milk, and “anthos”, flower. In *Species Plantarum* (1753) Linnaeus described the first species, *G. nivalis*, the most familiar and widespread snowdrop in Europe. *Galanthus* L. is a genus of bulbous, petaloid monocotyledons, confined to habitats of Europe, Asia Minor, and Near East (Davis 1999) and is most closely related to *Leucojum* (snowflakes). The genus includes 19 species along with a number of subspecies, varieties, and hybrids (Bishop & al. 2001). The taxonomy of *Galanthus* has undergone many revisions and changes over the last 50 years (Stern 1956; Artjushenko 1969; Davis 1999).

The taxonomy of *Galanthus* in Turkey is also a subject to frequent revisions, changes, and disagreements (Erik & Demirkuş 1986; Brickell 1984; Zeybek 1988; Zeybek & Sauer 1995; Davis & al. 2001). In 1988, 24 taxonomic units of *Galanthus* were suggested to be present in Turkey (Zeybek 1998). In 1995, the number dropped to 20 (Zeybek & Sauer 1995), and the latest work of Bishop & al. (2001) recognizes only 15 taxa (7 of them endemic).

G. elwesii represented by two varieties in Turkey. *G. elwesii* Hook.f. var *elwesii* and *G. elwesii* var. *monostictus* P.D. Sell. *G. elwesii* var. *monostictus* are seen as a rare in the field and is characterized by the solitary apical mark present on each inner perianth segment.

The largest populations of *G. elwesii* var. *elwesii* are found in the Taurus Mountains limestone area, of southern Turkey. In Taurus Mountains range *G. elwesii* var. *elwesii* mostly on mountains between 800-1000 m and up to 1600 m, subalpine pastures. These places are covered by snow during the winter and remain cool in the summer. Northwestern and western populations are associated with broad-leaved, coniferous woodland and scrub.

G. elwesii var. *elwesii* is a very variable, both in the wild and in cultivation. In natural populations variations can be seen; general dimension, width of leaves, length of the flowers, shape and size of the inner perianth markings (Fig. 1).

Materials & Methods

For my investigations I visited a number of localities in Turkey to observe variations in situ. Field studies were carried out during 2003-2009 between March and May based on the average flowering time throughout Turkey. Herbarium specimens are kept and living material was grown at Istanbul University Botanic Garden and Nezahat Gökyiğit Botanic Garden for taxonomic studies. Characteristics which might be lost in herbarium specimens such as leaves colour, vernation, inner perianth segment markings were recorded using a digital camera. The arrangement of photos were prepared using the Adobe Photoshop CS2. The taxonomic identification of *Galanthus* species were carried out according to Brickell (1984), Zeybek and Sauer (1995), Davis (1999), Bishop & al. (2001).

Results

In studying *Galanthus* many authors adopted the following characters: vernation (the arrangement of leaves in bud), leaf colour (glaucous or green) and presence or absence of basal markings on the outer surface of inner perianth segments. In the genus vernation is of primary taxonomic importance but is not easy to determine satisfactorily on herbarium specimens. At maturity the type of vernation can usually be determined by examining the base of the leaves. It should be assessed only on young living plants at or just before flowering at the place where the leaves emerge from the ground. To judge the presence or absence of wax on dry leaves is just impossible. Only the investigation of living plants (on flowering time) can help us to decide the leaf colour.

In many works (on the herbarium sheets), *G. elwesii* has been associated with a number of other species that have two marks on each inner perianth segment, namely *G. gracilis*, *G. plicatus* subsp. *byzantinus* (Baker) D.A. Webb and *G. fosteri* Baker.

Discussion & Conclusion

In the field *G. gracilis* (Fig. 2) is the only species likely to be confused with *G. elwesii* var. *elwesii*. Because they have the same type of marks on the inner perianth segments and the leaves have same range of glaucous coloration. However, these two species can be easily distinguished because the leaves of *G. gracilis* are appanate in vernation whereas *G. elwesii* are supervolute. Furthermore the bulbs of *G. gracilis* are usually globose whereas

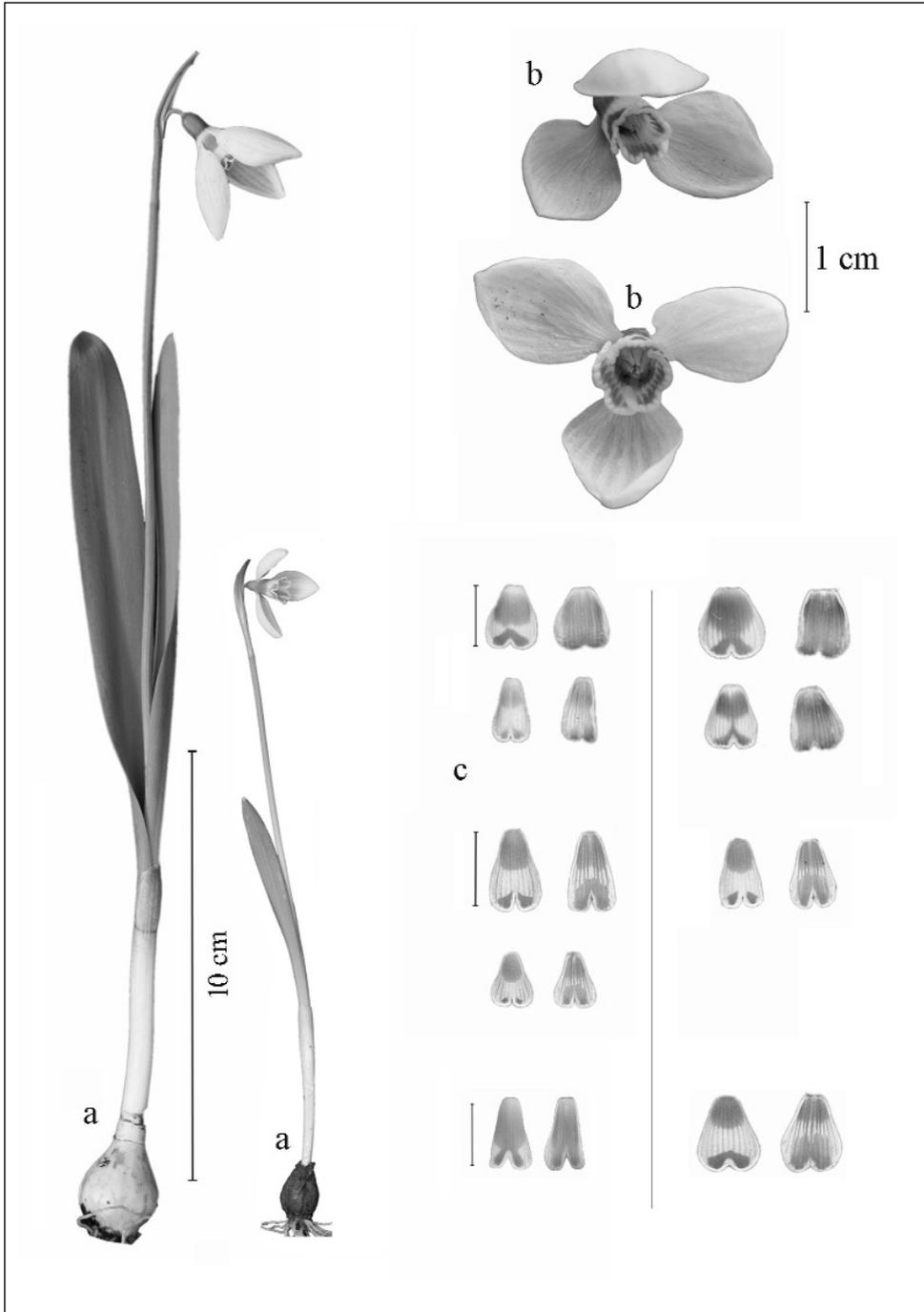


Fig. 1. *Galanthus elwesii* Hook. f. var. *elwesii*: a, habit; b, flowers; c, inner perianth segments: outer surfaces to the left, inner surfaces to the right, scale bar 1 cm.

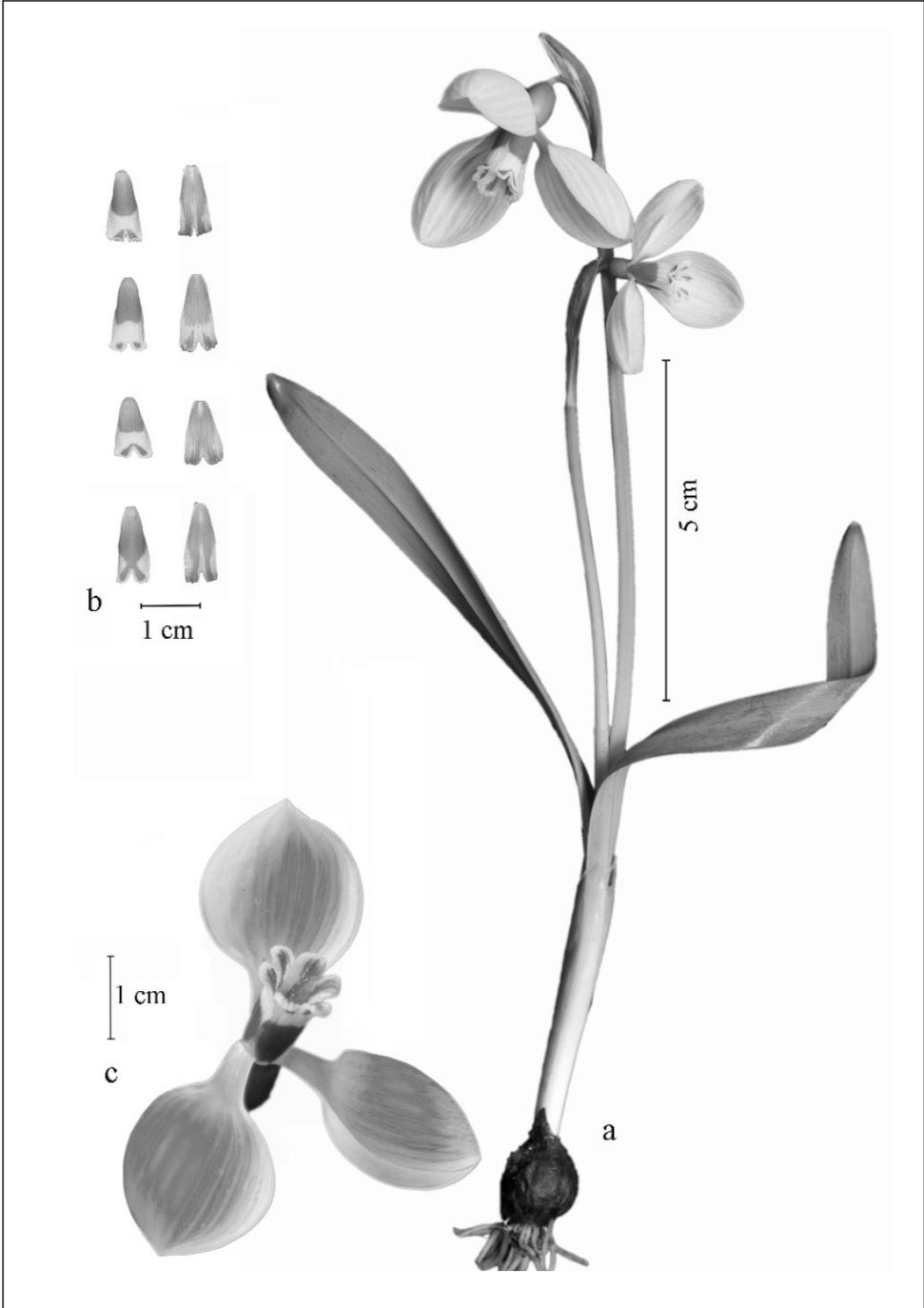


Fig. 2. *Galanthus gracilis* Čelak.: a, habit; b, inner perianth segments: outer surfaces to the left, inner surfaces to the right; c, flower, flared inner perianth segments are shown.

G. elwesii are ovoid. In *G. gracilis* the apex of inner perianth segment (Fig. 2c) is usually curled back (flared), whereas in *G. elwesii* it is more or less straight (Fig. 1b).

Typification of *G. elwesii* has been problematic. In his study (1997) Davis proposed conserving the name of *Galanthus elwesii* and choosing a new type. The new type suggested in this study was the sample collected at Giaour mountain (North part of Amanos mountain). Studies on the type specimen at Kew clearly shows the important, distinguishing features of both with *G. elwesii* and *G. fosteri*: supervolute vernation, apikal and basal green mark on the inner perianth segment. However, it is impossible to make a definitive conclusion on leaf color of the species. Collection of *Galanthus* species from Osmaniye, Hatay, Gaziantep (Amanos mountain) only one single species, *G. fosteri* Baker, has been identified. Therefore, selected example of this type by Davis is thought to be *G. fosteri*. Taking everything into account the obvious conclusion to be drawn is that *G. elwesii* requires a new type specimen.

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