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UWE RAABE[1], KIT TAN[2], GREGORIS IATROÚ[3], GERT VOLD[2] & GERALD PAROLLY[4]

# *Polygala rausiana (Polygalaceae),* a new species from the northern Peloponnese, Greece

**Abstract**

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*Polygala rausiana* is described as a new species from the western Korinthia and eastern Achaia prefectures (nomoi) in the central northern Peloponnese. It is related to *P. pruinosa* and the recently described *P. peshmenii,* both Turkish taxa differing conspicuously by their indumentum type and carpological characters. The distinguishing characters are illustrated by SEM micrographs. *P. rausiana* occurs in an area with a remarkable number of rare endemic or otherwise notable species.

Additional key words: *Polygala nicaeensis* subsp. *tomentella, Polygala peshmenii, Polygala pruinosa,* taxonomy, endemic, Evrostina, Turkey

## Introduction

At least 15 species and subspecies of the large, almost cosmopolitan genus *Polygala* L. *(Polygalaceae)* are so far known to occur in Greece. Four of them are endemic, viz. *P. subuniflora* Boiss. & Heldr. (Mt Chelmos), *P. crista-galli* Chodat (southern Peloponnese), *P. helenae* Greuter (Kithira) and *P. nicaeensis* subsp. *tomentella* (Boiss.) Chodat (E Sterea Ellas, Evvia) (see Greuter & al. 1989; Greuter & Rechinger 1967; Papanicolaou & Kokkini 1986; Tan w/ Iatroú 2001). *P. nicaeensis* Risso ex W. D. J. Koch in particular is very variable with several different subspecies and certainly in need of further study (see, e.g., Tan w/ Iatroú 2001). The present paper adds another species, which is described here as new to science.

During the past several years, the first author has undertaken an intensive study of the flora in the vicinity of Evrostina (formerly known as Zachuli), an area situated at the border of the northern foothills of Mt Killini and Mt Chelmos in the northern Peloponnese.

Both Killini and Chelmos have long been known as the loci classici of a large number of floristic novelties, including many endemic species, and certain areas have received special attention for considerable periods. This is true, for example, of the Vouraikos gorge, which extends northwest of Chelmos from Kalavrita to Diakopto on the Gulf of Corinth.

In contrast, the flora in the area of Evrostina seems to have been very little studied. It would otherwise be difficult to account for the apparent gaps in the distribution of species as conspicuous and easy to identify as *Asperula arcadiensis* Sims (compare Tan w/ Iatroú 2001). Other noteworthy species in the vicinity of Evrostina include *Pinguicula crystallina* subsp. *hirtiflora* (Ten.) Strid, *Epilobium angustifolium* L. and the Greek endemics *Aristolochia microstoma* Boiss. & Spruner, *Astragalus drupaceus* Orph. ex Boiss., *Campanula asperuloides* (Boiss. & Orph.) Engl., *Cicer graecum* Orph. ex Boiss., *Ebenus sibthorpii* DC., *Gypsophila nana* Chaub. & Bory s.l., *Leucopoa stygia* (H. Scholz & Strid) H. Scholz & Foggi and *Orobanche baumanniorum* Greuter, to name but a few. All endemics have not so far been reported for the area, the other

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Fig. 1. *Polygala rausiana* – holotype specimen at B.

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Fig. 2. *Polygala rausiana* – A: in its natural habitat (Greece, Evrostina); B: prostate plant, in its natural habitat (Greece, Evrostina / Karkara); C: inflorescence (Greece, Evrostina, type locality); D: inflorescence, detail, from the type material (B). – A-B by G. Iatroú, C by Kit Tan, D by J. Meine.

two have not been confirmed since Halácsy (1894). With its many endemics and other rare plants the area of Evrostina is in fact on par with the familiar Vouraikos gorge between Kalavrita and Diakopto. Only the hitherto poor knowledge of the flora of the area may explain how such a conspicuous and attractive species as our *Polygala* could have missed the attention of all botanists.

Specimens of the following related or similar *Polygala* species were studied in more detail (herbaria indicated in brackets): *P. nicaeensis* (B, MSTR); *P. peshmenii* Eren & al. (AYDN, B, herb. Parolly); *P. pruinosa* subsp. *megaptera* Cullen (AYDN, B, herb. Parolly) and *P. pruinosa* Boiss. subsp. *pruinosa.* (B, herb. Bergmeier, herb. Parolly).

***Polygala rausiana*** U. Raabe, Kit Tan, Iatroú, Vold & Parolly, **sp. nov.**

Holotype: Greece: Nomos Korinthias, Eparchia Korinthias, along road from Rozena to above Evrostina, 38°05'N, 22°24'E, burnt *Pinus halepensis* forest with *Cistus creticus* and *C. salviifolius* dominant, soil pockets in conglomerate rock, 700-800 m, 5.5.2007, *Kit Tan & G. Vold 29210* (B; isotypes: ATH, C, G, LD, MSTR, UPA, WU, herb. Kit Tan, herb. Parolly, herb. Raabe, herb. Sfikas, herb. Strid). – Fig. 1-3, 4A-B.

Habitu chasmophytico *Polygalae pruinosae* et *P. peshmenii* simile, sed a priore pilis longis mollibus (non magnopere curvatis ) verumtamen sub angulo 90° abeuntibus (ut in *P. peshmenii*) essentialiter differt. A *P. pesh-*

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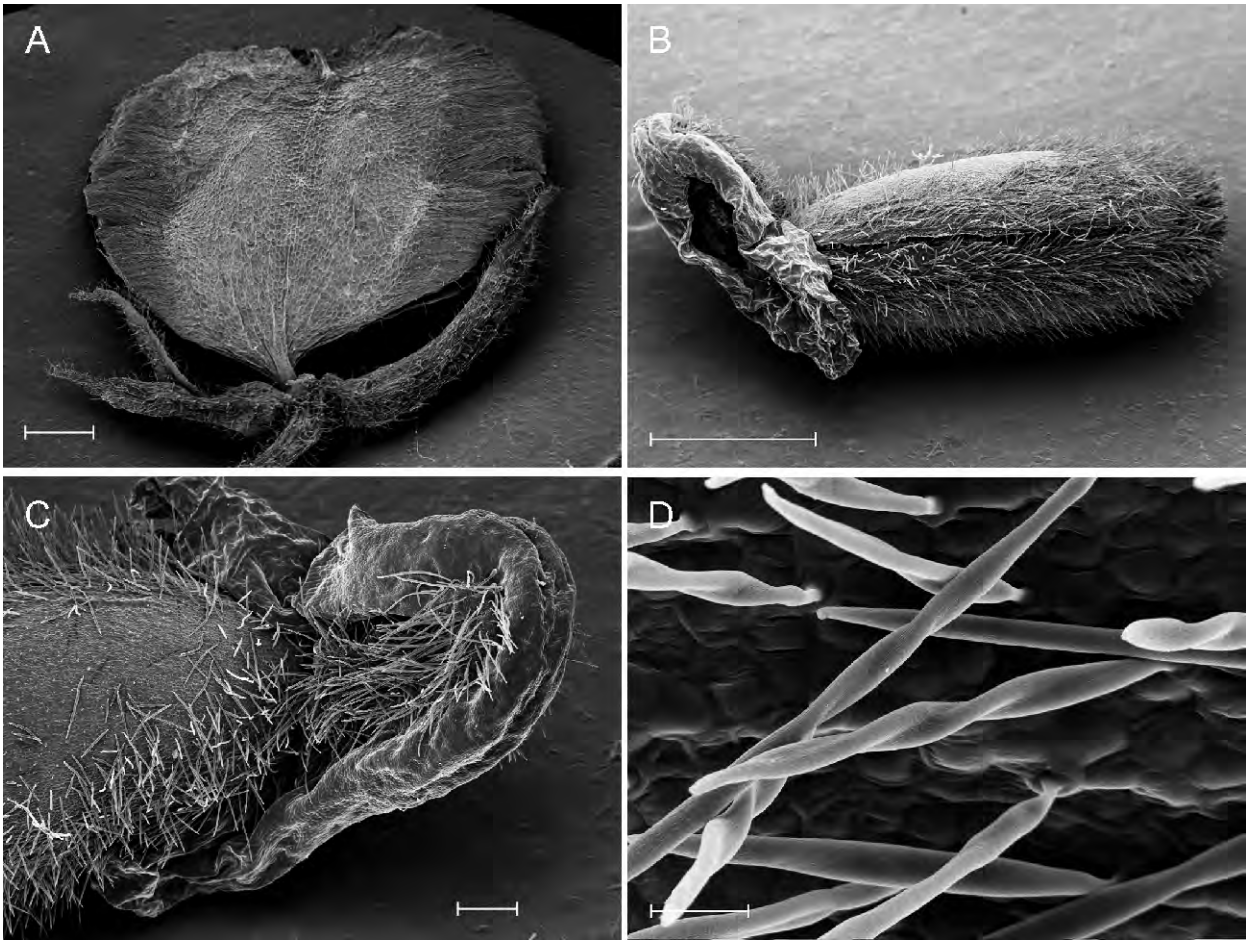



Fig. 3. SEM micrographs of *Polygala rausiana* – A: capsule, B: seed, C: strophiole, D: detail of the trichomes of the seed indumentum. – Material: Evrostina, 20.5.2007*, Raabe s.n.* (B). – Scale bars: A-B = 1 mm, C = 200 µm, D = 20 µm.

*menii* differt floribus obscure violaceis, capsulis maioribus latius marginatis et indumento seminum. Differt a *P. nicaeensi* subsp. *tomentellae* e Graecia inter alia petalo superiore gibboso, inflorescentia pauciflora et pilis densioribus.

Suffruticose perennial (2-)10-25 cm tall. *Stems* several to numerous, usually procumbent to erect-ascending, arising from a woody, branched, often prostrate rootstock less than 0.5 cm in diameter; densely greyish pubescent-tomentose with soft hairs at least 0.2 mm long. *Leaves* alternate, simple, exstipulate, increasing markedly in size upwards, green to subglaucous in vivo, greyish pubescent-tomentose on both surfaces, midvein conspicuous beneath on drying; upper and median cauline leaves elliptic-lanceolate, 5-15 × 2-5 mm, acute to acuminate; lower cauline leaves much smaller, elliptic-obovate to spathulate, (1-)2-3.5 × 1-2 mm, obtuse to subacute, often very dense, but not rosulate. *Flowers* zygomorphic, erect-ascending or nodding in usually lax, 2-14(-17)-flowered and c. 1-4 cm long terminal racemes at anthesis, much enlarging in fruit; axillary racemes absent, but often with an axillary branch just below the terminal raceme. *Bracts* magenta-purple, linear-lanceolate, 1-2 mm long, shorter than or as long as the pedicels at anthesis, caducous. *Pedicels* magenta-purple at anthesis, to 5 mm and deflexed in fruit, pubescent-tomentose. *Sepals* 5, free; inner 2 (wings) larger and petaloid, dark magenta-purple, fading in colour soon after anthesis, oblong-elliptic to broadly obovate, 8-10 × 3.5-4 mm, enlarging to 12 × 5 mm in fruit, glabrous or puberulent only towards base or along the entire midvein, venation half open, lateral veins not anastomosing at the margins; the 3 outer sepals smaller, unequal, sepaloid, magenta or green suffused pink at the margins, linear-lanceolate, longest 5-7 × 1.5-2 mm, keeled, acute, pubescent on outer surface, ciliate; upper sepal gibbous at anthesis. *Petals* 3, magenta, glabrous, united proximally into a corolla tube, free distally, the lower petal differing in shape from the 2 upper, c. 8 mm long, equalling or with the crest slightly exceeding the wings; crest 1.5-2 mm long, fimbriate, bluish lilac to magenta, sometimes ± white, drying cream. *Stamens* 8, with filaments united into a tube partially adnate to the corolla tube; anthers stipitate. *Capsule* compressed, broader than the wings, borne on a less than 0.5 mm long gynophore, pale green or sometimes partly magenta-purple, orbicular-obcordate, 7-8 (-10) × 6-6.5(-8) mm including its

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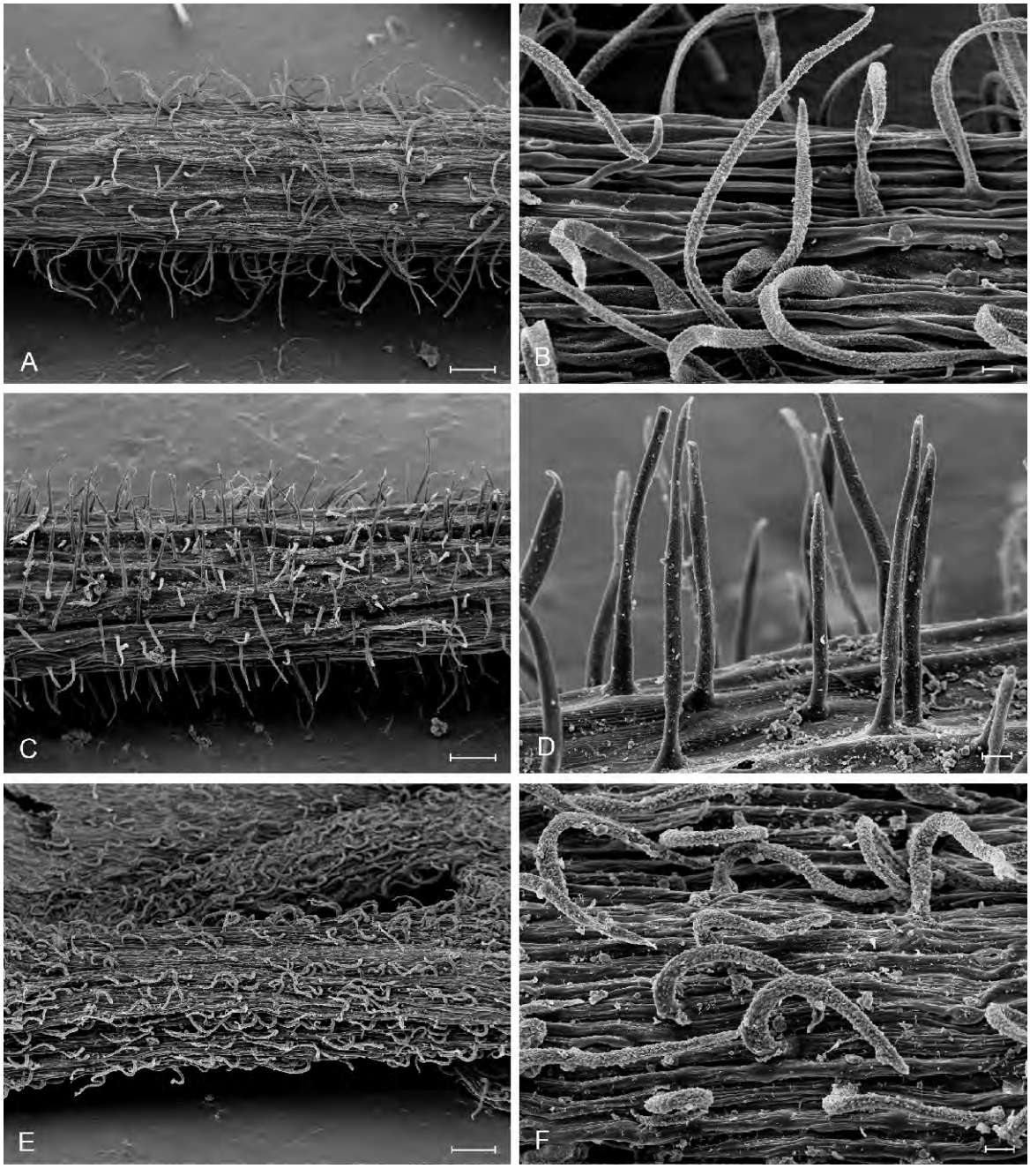



Fig. 4. SEM micrographs of the indumentum of *Polygala rausiana* (A, B) and related species (C-F) – A-B: *P. rausiana;* C-D: *P. peshmenii;* E-F: *P. pruinosa* subsp. *pruinosa.* – Material: *P. rausiana* (type locality, 29.5.2007, *Raabe s.n.,* B); *P. peshmenii* (*Eren 36/06,* B); *P. pruinosa* subsp. *pruinosa* (Turkey, Yumru Da**ğ**ı, 3.7.1992, *Parolly s.n.,* B). – Scale bars: A, C, E = 200 µm, B, D, F = 20 µm.

1.5-2.5 mm wide unequal marginal wing. *Seeds* one per locule or one locule abortive, golden-brown, oblong, 3.5-4 × 1.2 mm, shortly and silky-sericeous, with stiff, flattened, often twisted hairs, glabrescent on upper and lower face; strophiole creamy white, 3-lobed, c. 1/3 of the seed.

*Flowering period.* — Late April to end of May.

*Eponymy.* — The plant is named in honour of Dr Thomas Raus, friend and colleague at the Botanic Garden and Botanical Museum Berlin-Dahlem. We are glad to dedicate to him this new species on the occasion of his 60th birthday. Thomas Raus has been working intensively for many years on the flora of Greece and of Turkey as well. He not only encouraged the first author to study the flora of Greece, but also provided him with considerable support at the initial stages of his work.

*Distribution, site ecology and threats.* — The new species is a Greek endemic and seems to be confined to a small region in the central northern Peloponnese (Fig.

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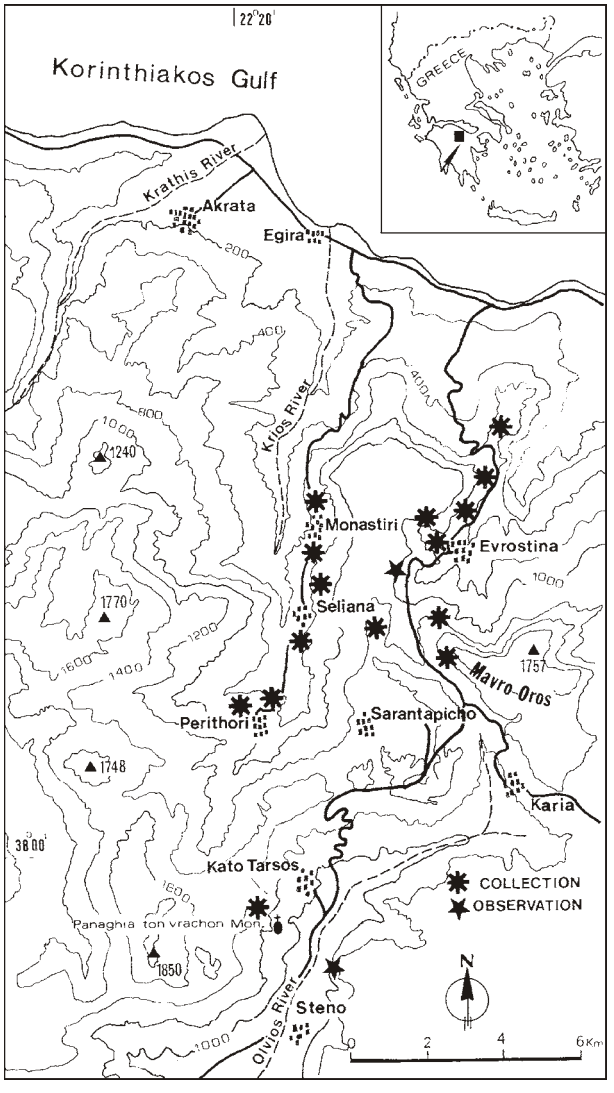



Fig. 5. Distribution of *Polygala rausiana* (by G. Iatroú).

5). Within its currently known range, *Polygala rausiana* does not appear to be rare, particularly around Evrostina and between Monastiri and Perithori.

It grows at altitudes from c. 600 to 1400 m in stony or rocky places in an area characterised by rocky conglomerates. The prevailing vegetation is forest composed of *Pinus halepensis* Mill. or *P. nigra* var. *caramanica* (Bosc ex Loudon) Rehder and sometimes *Abies cephalonica* Loudon at higher elevations. Especially around Evrostina, such areas were burnt to a large extent in 1998, which possibly has favoured *Polygala rausiana*. Now the forests are recovering slowly, some areas are re-afforested. In this area, the species also grows on roadside embankments (especially along the road from Evrostina to Feneos and from Evrostina to Rozena). Otherwise it apparently prefers open, sunny sites, as a result of the local conditions (rocky places) or patterns of grazing. As facultative scree-restrainer, *P. rausiana* can colonise moderately instable slopes and withstands there burial by mobile substrate to a certain extent.

Typical species associated with *P. rausiana* include, e.g., *Alkanna tinctoria* (L.) Tausch, *Anthyllis hermanniae* L., *Cistus incanus* L., *Ebenus sibthorpii, Fumana arabica* (L.) Spach, *F. thymifolia* (L.) Webb, *Gagea graeca* (L.) A. Terracc., *Helianthemum hymettium* Boiss. & Heldr., *Orchis quadripunctata* Ten., *Sarcopoterium spinosum* (L.) Spach, *Scorzonera crocifolia* Sm., *Silene gigantea* (L.) L. and *Steptoramphus tuberosus* (Jacq.) Grossh.

*Polygala rausiana* does not seem to be under threat in its natural habitat.

*Additional material seen.* — GREECE: NOMOS KORINTHIAS: Eparchia Korinthias, along road from Rozena to above Evrostina (type locality), 29.5.2007, *Kit Tan & Vold s.n.* (seeds); D. Evrostinis, above Rozena N of road to Evrostina (Psili Rachi), c. 700 m, 14.5.2008, *Raabe s.n.* (B, MSTR, herb. Raabe); ibid., Evrostina, along the road from Evrostina to Feneos above Evrostina, c. 850 m, 20.5. 2005, *Raabe s.n.* (B, MSTR, W, herb. Kit Tan, herb. Parolly, herb. Raabe); ibid., rocks above the way Evrostina - Monastiri above Evrostina, c. 950 m, 19.5. 2006, *Raabe s.n.* (B, herb. Raabe); ibid., northern side of Mavro oros above Evrostina, c. 1200 m, 17.5.2007, *Raabe s.n.* (B, JE, MSTR, herb. Raabe); ibid., 22.5.2007, *Raabe s.n.* (B, herb. Raabe); ibid., S Karkara, NW of church of Profitis Ilias, c. 1400 m, 25.5.2007, *Raabe s.n.* (B, MSTR, herb. Raabe); Evrostina, above the road from Rozena to Evrostina before the Panaghia Kataphigion Monastery, 18. & 19.5.2006, *obs. Raabe;* ibid., road from Evrostina to Rozena, 4. & 6.5.2004, *obs. Raabe;* ibid., along the road from Evrostina to Feneos above Evrostina, 2.5.2008, *obs. Raabe & Raus;* ibid., 10.3. 2008 & 28.10.2008, *obs. Kit Tan & Vold;* Karkara, above the road from Evrostina to Feneos, 17. & 19.5. 2006, *obs. Raabe;* D. Xilokastrou, Karia, Mavro oros, above the road from Evrostina to Feneos in opposite of Korakofolia, c. 1400 m, 8.5.2007, *Raabe s.n.* (MSTR, herb. Raabe); D. Feneou, Kato Tarsos, rocks SW of the village, c. 1100 m, 17.5.2006, *Raabe & Iatroú s.n.* (B, herb. Raabe); ibid., 2.5.2008, *obs. Raabe & Raus;* ibid., Steno, Likos NE of Steno, 8.5.2007, *obs. Raabe*. — NOMOS ACHAIAS: D. Aigeiras [Egiras], Perithori, hill NW of the village with *Astragalus drupaceus,* 990 m, 18.5.2007, *Raabe s.n.* (B, MSTR, W, herb. Raabe); ibid., road from Perithori to Seliana, bifurcation of the way to Aghii Apostoli Monastery, with *Astragalus drupaceus*, c. 800 m, 18.5.2007, *Raabe s.n.* (B, MSTR, herb. Raabe); ibid., Seliana, above road to Aghii Apostoli Monastery, c. 850 m, 8.5.2008, *Raabe s.n.* (B, herb. Raabe); ibid., Seliana, above road to Kolokithianika, c. 750 m, 8.5. 2008, *Raabe s.n.* (B, MSTR, W, herb. Raabe); ibid., Monastiri, Aghia Paraskevi above road to Kolokithianika, c. 700 m, 8.5.2008, *Raabe s.n.* (B, MSTR, herb. Parolly, herb. Raabe); ibid., N Monastiri, near cemetery, c. 700 m, 3.5.2008 *Raabe s.n.* (B, herb. Raabe).

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*Affinities.* — The new *Polygala* was first noticed in the area of Evrostina in 2004. Based on the colour of the flowers and the indumentum, it was unmistakable, but nevertheless proved difficult to identify. The distinct indumentum (Fig. 2C, 4A-B) first suggested its possible identity with *P. nicaeensis* subsp. *tomentella,* which is known from Attika, but specimens of this taxon have, among other features, more flowers per raceme (on average 15-30 vs. 2-14) and longer gynophores (0.7-1.5 mm vs. < 0.5 mm) compared to our species. Boissier (1843) described *P. pruinosa,* from the current territories of Greece and Turkey, which initially recalled the previously mentioned taxon. However, ten years later, he re-defined the description of *P. pruinosa* to accommodate only the Turkish populations (this assignment is valid still today), while the Greek plants were described as a new taxon, *P. nicaeensis* var. *tomentella* Boiss. (≡ *P. nicaeensis* subsp. *tomentella,* Boissier 1853).

*Polygala pruinosa* is so far not reported from Europe and not included in Flora Europaea (McNeill 1968). Among its characteristic features is the gibbous upper sepal, which is not shown by *P. nicaeensis,* but shared by *P. rausiana* of the northern Peloponnese (see Fig. 2D). A careful comparison revealed further fitting characters between *P. pruinosa* and our plant, such as the stipitate anthers, the relatively few-flowered racemes (in comparison with *P. nicaeensis*), the asymmetrically winged fruits, and leaves generally increasing markedly in size upwards. Currently, two morphologically and ecologically quite distinct subspecies of *P. pruinosa* are accepted from Turkey (subsp. *megaptera* Cullen, subsp. *pruinosa;* for details see Cullen 1965). Although matching in overall appearance, the plants of the northern Peloponnese are readily told apart from the extremely polymorphic *P. pruinosa* by the indumentum of the latter, consisting of typically curved hairs only (Fig. 4E-F).

*Polygala rausiana* resembles in many respects the recently described *P. peshmenii* Eren & al. from Turkey, a very rare and local endemic chasmophyte of limestone rocks of the Western Taurus (Eren & al. 2008). However, *P. peshmenii* displays reddish pink flowers, on average larger leaves (to 22 × 7 mm), a denser indumentum of shorter and more slender, stiff hairs, spreading at a right angle (Fig. 4C-D), and very clear carpological characters. The capsule of *P. rausiana* (Fig. 3A) is with c. 7-10 × 6-8 mm and the fairly wide marginal wing of 1.5-2.5 mm considerably larger than the one of *P. peshmenii* (6-6.5 × 4 mm, wing 0.5 mm). The seeds of both species are silky-sericeous, but different in indumentum density and trichome length (the hairs of *P. peshmenii* are 2-2.5× longer than in *P. rausiana*). In *P. rausiana,* the seed coat indumentum appears to be patchily glabrescent (Fig. 3B). The strophiole (Fig. 3C), too, is much smaller in *P. peshmenii.*

Compared to the other East Mediterranean taxa discussed, *Polygala helenae,* described from the island of Kithira (Greuter & Rechinger 1967), stands already apart, differing in its indumentum, flower and leaf characters, e.g., the stems sparsely pubescent with short curved hairs, the very shortly pedicellate, bluish lilac flowers in a dense inflorescence not elongating in fruit and the leaves revolute at margin.

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