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TWO SPECIES NEWLY DOCUMENTED FOR THE FLORA OF IRAN FROM THE ARASBARAN AREA

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Abstract
Dracocephalum austriacum L. and *Polygonatum verticillatum* (L.) All. are reported as new additions to the flora of Iran, from the Arasbaran area. *Dracocephalum austriacum* is distinguished from other Iranian *Dracocephalum* species by its pubescent anthers and verticillate 5-7 partite leaves. It typically occurs in subalpine to alpine meadows. *Polygonatum verticillatum*, is closely related to *P. sewerzowii* but is distinguished by the rough hairs on the dorsal surface of leaves. It inhabits meadows and transitional zones between meadows and *Quercus* woodlands. Detailed descriptions, photographs, and distribution maps for both species are presented.

Keywords: Arasbaran area; biodiversity; *Dracocephalum*, flora of Iran; new record; *Polygonatum*

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دو گزارش جدید برای فلور ایران از منطقه ارسباران

اسمعیل جارچی: دانشجوی دکتری، گروه علوم گیاهی، دانشکده علوم زیستی، دانشگاه تربیت مدرس، تهران، ایران
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چکیده: دو گونه *Dracocephalum austriacum* و *Polygonatum verticillatum* برای نخستین‌بار از منطقه ارسباران به‌عنوان گزارش هایی جدید برای فلور ایران معرفی می‌گردند. گونه *D. austriacum* با داشتن بساک‌های کرک‌دار و برگ‌های فراهم پنج تا هفت بخشی، به‌راحتی از دیگر گونه‌های این جنس در ایران قابل تشخیص است و معمولاً در چمن‌زارهای آلپی و نیمه‌آلپی می‌روید. گونه دیگر *P. verticillatum*، بیشترین شباهت را با *P. sewerzowii* دارد، اما به‌واسطه‌ی وجود کرک‌های زبر در سطح پشتی برگ از آن متمایز می‌شود. این گونه در چمن‌زارها و نواحی گذر از چمن‌زار به جنگل‌های بلوط رویش دارد. در این پژوهش، شرح کامل، تصاویر و نقشه‌های پراکنش هر دو گونه ارائه شده است.

INTRODUCTION

Arasbaran forests (also known as Qaradagh) are located in the northeast of Iran, within the East Azerbaijan province, covering nearly 14,000 hectares. Although specific boundaries of this region are inconsistently defined, the area encompasses the Arasbaran Biosphere Reserve and the Dizmar Protected Area, which are separated by the Ilganeh Chayi River. These two areas share significant floristic and vegetation similarities. According to the Global Bioclimatic Classification System the region has a Mediterranean pluviseasonal-oceanic bioclimate (Djamali & al. 2011). While the Arasbaran Biosphere Reserve has been extensively studied floristically, the Dizmar Protected Area, the western part, has received little attention (Assadi 1987, 1988; Jalili & al. 2003; Hamzeh'ee 2000, 2018; Hamzeh'ee & al. 2010; Mohammadzadeh & al. 2014; Ghorbanalizadeh & Akhani 2022; Ostadhashemi 2023).

Dracocephalum s.l. (including *Hyssopus* L. and *Lallemantia* Fisch. & C. A. Mey.), which consists of 84-90 species (Chen & al. 2022; POWO 2025; Hassler 1994-2025) is recognized as the second-largest genus in the subtribe Nepetinae (Li & Hedge 1994). This genus has its origins in Central and West Asia, as well as southern Siberia, subsequently dispersing into the Qinghai-Tibetan Plateau (QTP) and neighboring areas during the Pliocene, and it experienced a notable early rapid radiation during the middle to late Miocene (Chen & al. 2022). Including *D. moldavica* L., 16 species of this genus are distributed in Iran, among which 5 are endemic (Rechinger 1982; Esfandiari 1985; Jamzad 2012; Naderifar & al. 2015).

Polygonatum has approximately 80 species (POWO 2025; Hassler 1994-2025). The Northern Hemisphere is home to the majority of them (Wang & al. 2016; Xia & al. 2022). In the early Miocene, this genus diverged from the Himalaya-Hengduan Mountains (HHM). The QTP plateau's ascent has an impact on its diversification. Furthermore, the strengthening of the East Asian winter monsoon and increasingly colder and drier climates followed the mid-Miocene Climatic Optimum (Xia & al. 2022). In Iran, *Polygonatum* species mainly occur in the northern, northwestern, and northeastern regions. *Polygonatum multiflorum* (L.) All., *P. orientalie* Desf., and *P. glaberrimum* K. Koch. are found in the north and northwest, whereas *P. sewerzowii* Regel is restricted to the northeast (Wendelbo 1981; Zare & Amini 2022; Assadi 2023).

This study reports *Dracocephalum austriacum* (Lamiaceae) and *Polygonatum verticillatum* (Asparagaceae) in the flora of Iran, in the Arasbaran area. In addition to photographs of these species, we have prepared detailed descriptions and distribution maps.

MATERIALS AND METHODS

On a two-day field trip (10th and 11th June 2025) in northeast Iran, Arasbaran or Qaradagh Forests, we collected two species. One of which was a species of the genus *Dracocephalum*, and the second species was a *Polygonatum*. The specimens were studied, assessed, and identified using relevant references (Rechinger 1982; Edmondson 1982; Jamzad 2012; Schischkin 1954; Knorring 1968; Wendelbo 1981; Mill 1986; Assadi 2023), images from E, LE, L, and P herbaria (acronyms according to Thiers 2016), and the data from the Global Biodiversity Information Facility (GBIF). The voucher specimens are kept at the Herbarium of the Research Institute of Forest and Rangelands (TARI), with duplicates available at the Tehran University Herbarium (TUH).

RESULTS AND DISCUSSION

New records

***Dracocephalum austriacum* L.** (Fig. 1).

Typus: Described from Austria. Type in London (Hb. Linn 746/6, Photo!)

Perennial; stems herbaceous, solitary or few branched, erect, quadrangular, 1-2 mm in diameters, downy-villous, 18-30 cm long; leaves opposite or whorled in middle of stems, sessile or shortly petiolate (1-3 mm), with puberulent petioles, (3) 5-7 partite, with linear or lanceolate lobes, 1-2.5 cm long, 1-2.5 mm wide, shortly subulate-pointed from obtuse apex (with 1 mm aristate), usually with revolute margins, more or less pubescent; floral leaves glabrous or more or less pubescent, entire or 3-partite, linear, acute, aristate (1 mm), 1.5-2 cm long, l-2mm wide; flowers short-pediceled; verticillasters 2-4-flowered, forming a somewhat loose oblong terminal inflorescence; bracts villous-ciliate at margins, trifid, aristate (1 mm); pedicels 2-3 mm, villous ; calyx villous, pale purple, 15 veined, ca. 12-15 mm long, 5-dentate; upper lobe 3-dentate; the middle tooth of upper lip ovate, acute; other teeth linear-lanceolate, acuminate, ciliate in margins and aristate; corolla dark violet, 35-40 mm long, covered with soft hairs; upper lip suberect, ca. 1 cm long; lower lip 3-lobed, nearly equaling the upper; stamen 4, epipetalus, didynamous, 7-8 mm long; filaments glabrous, anthers lanate, 1.8-2.2 mm; style 35-40 mm, stigma bifid 1-1.4 mm; nutlets 2.8 × 2 mm, elliptic, obliquely truncate at the apex, margins with fine longitudinal ribs.

Specimen examined: Iran, East Azerbaijan, Varzeghan, Kerenkan village, 38°43′31″ N, 46°31′34″

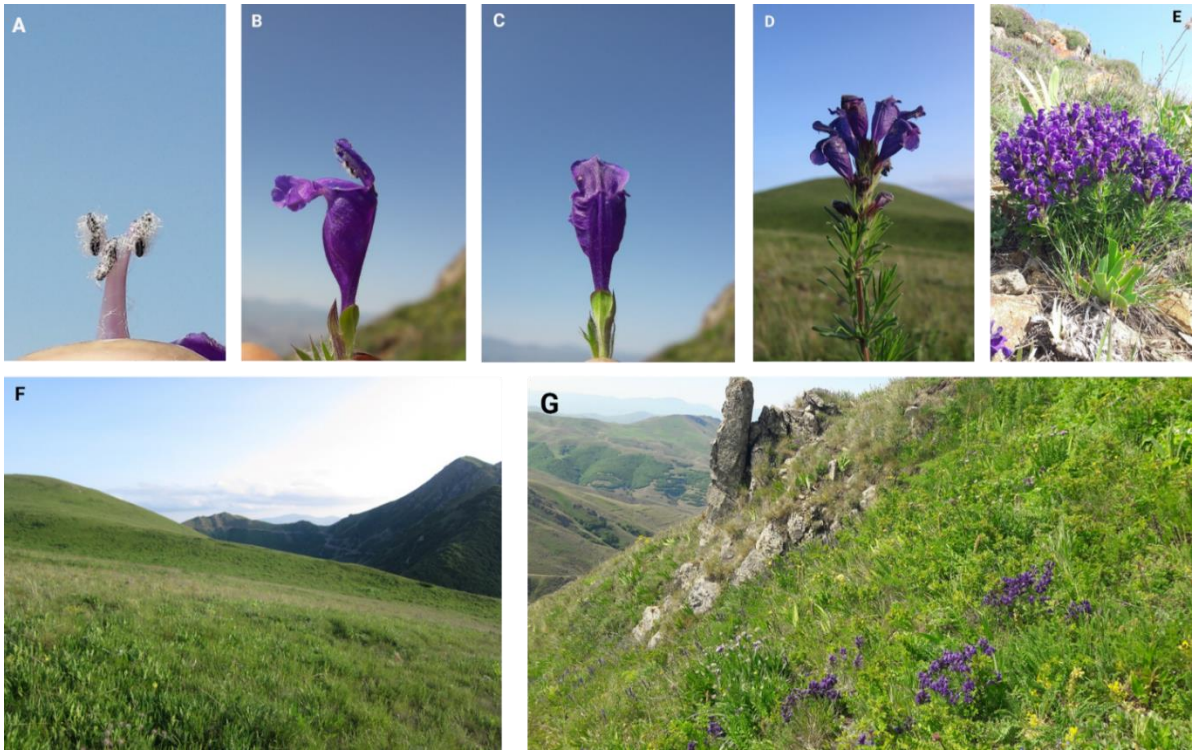

Fig. 1: *Dracocephalum austriacum* L. A, pubescent anthers; B – C, flowers; D, flowering shoot; E-G, habitat (All photos by E. Jarchi).

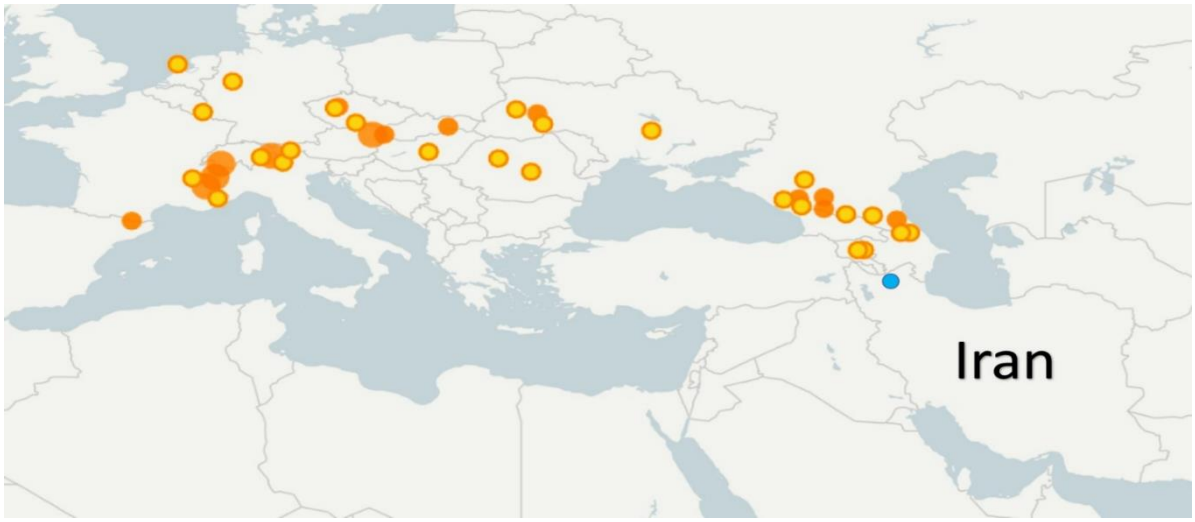

Fig. 2: Global distribution of *Dracocephalum austriacum* based on geo-referenced preserved specimens from GBIF. The record from Iran is highlighted with a blue circle.

E, 2200-2500 m, 10 Jun 2025, Ramezani and Jarchi (TARI-4303).

Phenology: The flowering and fruiting seasons are in June to July.

Habitat: Stony slopes, steppe, and subalpine or alpine meadows

General distribution: Central Europe, Russia, Caucasus, Turkey, and Iran (Fig. 2).

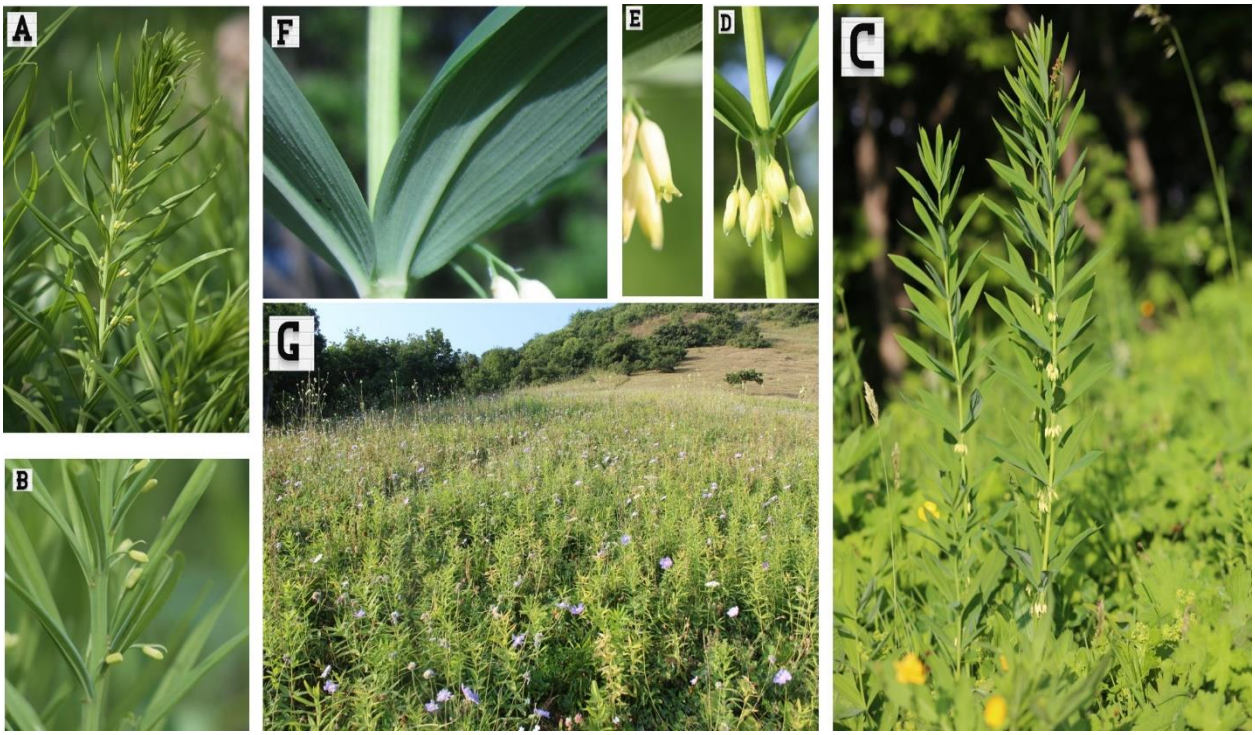

Fig. 3: *Polygonatum sewerzowii* Regel. A, Habit; B, flowers and bracts. *Polygonatum verticillatum* (L.) All. C, Habit; D, pendulous inflorescence; E, flower; F, rough hairs in the dorsal surface of leaves; G, habitat) (All photos by A. Ramezani).

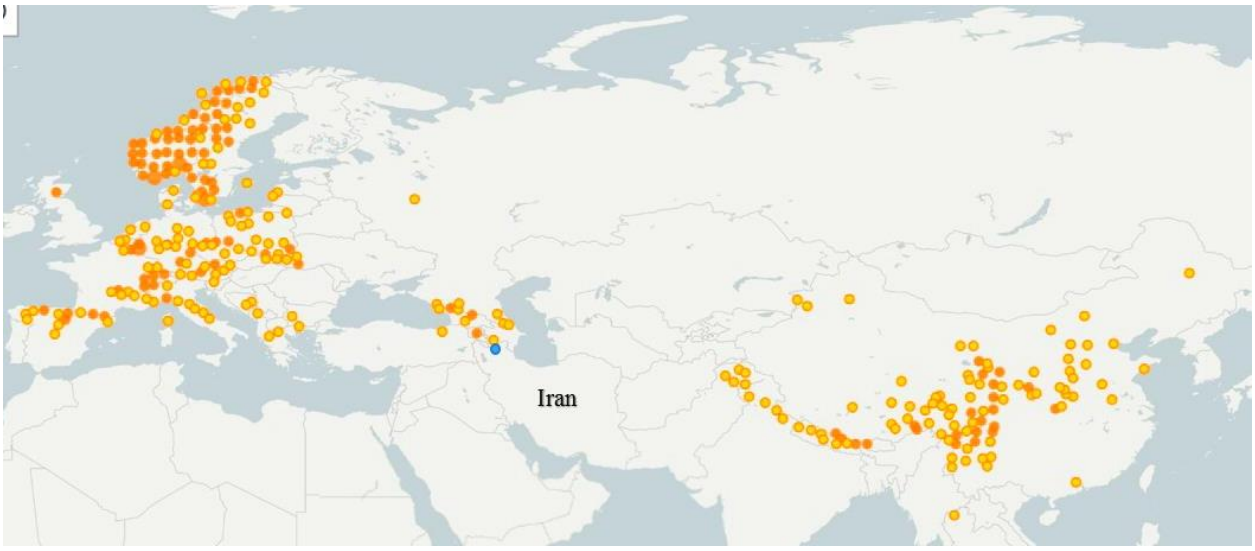

Fig. 4. Global distribution of *Polygonatum verticillatum*, based on geo-referenced preserved specimens from GBIF. The record from Iran is highlighted with a blue circle.

Notes

The genus *Dracocephalum* is taxonomically divided into three subgenera, primarily based on anther characteristics (pubescent vs. glabrous) and stamen exertion (exserted from the corolla or not). Among these, the subgenus *Ruyschiana* (Mill.) Briq. is characterized by pubescent anthers, erect leafy stems, and verticillate leaves in the inflorescence (Schischkin, 1954). This subgenus includes *D. austriacum*, *D. ruyschiana* L., and *D. argunense* Fisch. ex Rchb.,

which show distinct geographical distributions. *D. argunense* is restricted to East Asia, while *D. ruyschiana* occurs above 40° N in Eurasia. In contrast, *D. austriacum* shows a disjunct distribution, occurring in two completely separate regions: Central Europe and the Caucasus, which are separated by the Mediterranean Sea and surrounding lowlands. The representatives of subgenus *Ruyschiana* have not previously been reported from Iran. *Dracocephalum austriacum* is easily distinguished from other Iranian *Dracocephalum* species by its pubescent anthers, linear 3–5-lobed leaves with revolute margins, and verticillate leaves in the upper stem and inflorescence. We observed two populations of *D. austriacum*, separated by approximately 3 km. Owing to the protected status of the area, both populations exhibited suitable biological and ecological conditions. The estimated population density was about 2–3 individuals per 5 square meters.

Polygonatum verticillatum (L.) All., Fl. Pedem. 1: 131 (1785) (Fig. 3).

Typus: N. Europe (Hb. linn. 436/2, photo!).

Perennial, 30-60 cm tall, erect, green, rhizomatous; stem 3-6 mm in diameter, angled, glabrous or minutely puberulent, with 8-14 joint, distance of joints in 2/3 downwards of stem 4-7 cm, the first joint leafless or with scars; the first and usually half of the second joint spotted; leaves in whorls of 3-8 (Iranian specimens 4), sessile, lanceolate to linear-lanceolate, acuminate, 7 -17 cm long, 8-16 mm broad, glabrous above, with 17-25 vein, minutely ciliate on veins beneath (except main vein), at the margin ciliate; peduncles glabrous, 12-16 mm, axillary, with (1) 2-3 (4) pendulous flowers; flowers on the lower three to four nodes of the segments; flowers not scented; perianth 7-12 × 2.5-3 mm, tubular-campanulate, white, 5 lobed, lobes pale green, lobes 3×1 mm, ± contracted in middle; the teeth pubescent at the tips within; bract membranous, white, 1-2 mm; stamens 5, epipetalous; filament 1-2 mm; anther 5, pubescent, yellow, 2 × 0.5 mm; style 2-3 mm, glabrous.

Specimen examined: Iran, East Azerbaijan, Varzeghan, Kerenkan village, 38°43′46″ N, 46°31′30″ E, 2100-2200 m, 10 Jun 2025, Ramezani and Jarchi (TARI-4302).

Phenology: The flowering and fruiting seasons are in June to July.

Habitat: inhabits meadows and meadows-*Quercus* ecotones

General distribution: Europe (except the Mediterranean area), Caucasus, Turkey, Iran, the Himalaya Mountains, and E. Afghanistan (Fig. 4).

Notes

This species exhibits a unique and disjunct distribution pattern occurring in the three separate regions: Central Europe, the Caucasus, and the Himalayan Mountains (POWO 2025, GBIF.org 2025). Central Europe is separated from the Caucasus by the Mediterranean Sea and the surrounding lowlands. The Caucasus is also separated from the Himalayas by the Caspian Sea and its surrounding lowlands, the Alborz Mountain Range, and the hot, dry regions of the Irano-Turanian region, which are primarily located in Iran, Afghanistan, and Turkmenistan.

Among Iranian *Polygonatum* species, *P. verticillatum* has verticillate, narrowly linear leaves similar to those of *P. sewerezovii*. However, *P. verticillatum* can be distinguished by its pubescent anthers (vs. glandular), smaller bracts (1–2 mm vs. 6–10 mm), and rough hairs on the lower surface of the leaves (vs. glabrous leaves).

The habitat of *P. verticillatum* includes meadows and ecotone areas that transition from meadows to *Quercus* forests. This species occurs at higher densities in meadows than in ecotone areas and forms well-established communities, likely facilitated by its rhizomatous growth.

REFERENCES

Assadi, M. 1987: Plants of Arasbaran Protected Area, NW. Iran (Part I). -Iran. J. Bot. 3(2): 129–175.

Assadi, M. 1988: Plants of Arasbaran Protected Area, NW Iran (part II). -Iran. J. Bot. 4 (1): 1–59.

Assadi, M. 2023: Convallariaceae, *Polygonatum*. In M. Assadi (Ed.). Flora of Iran no. 173: 1-11. -Research Institute of Forests & Rangelands. Tehran.

Chen, Y.P., Turdimatovich T.O., Nuraliev M.S., Lazarevi, P.T., Drew, B., & Xiang, CL. 2022: Phylogeny and biogeography of the northern temperate genus *Dracocephalum* s. l. (Lamiaceae). - Cladistics 38: 429-451. https://doi.org/10.1111/cla.12502

Djamali, M., Akhani, H., Khoshravesh, R., Andrieu-ponel, V., Ponel, P. & Brewer, S. 2011: Application of the Global Bioclimatic Classification to Iran: implications for understanding the modern vegetation and biogeography. -Ecologia Mediterranea 37(1): 90-114. https://doi:10.3406/ecmed.2011.1350

Edmondson, J.R. 1982: Labiatae, *Dracocephalum*. In: Davis, P.H. (ed.). Flora of Turkey and the eastern Aegean Islands, Vol. 7: 289-290. Edinburgh University Press, Edinburgh.

Esfandiari, E. 1985: *Dracocephalum oligadenium* (Labiatae), a distinct species. -Iran J. Bot. 3(1): 75–76.

Hamzehee, B. 2000: Some new and noteworthy plant records from Iran. -Iran. J. Bot. 8(2): 271–277.

GBIF.org. 2025: GBIF Occurrence Data for *Polygonatum verticillatum* (L.) All. and *Dracocephalum austriacum* L. Global Biodiversity Information Facility. Available at: (https://www.gbif.org/occurrence/map?taxon_key=2770004&taxon_key=3903269) [Accessed 15 October 2025].

Ghorbanalizadeh, A. & Akhani, H. 2022: Plant diversity of Hyrcanian relict forests: An annotated checklist, chorology. -Plant diversity 44: 39-69. https://doi.org/10.1016/j.pld.2021.07.005

Hamzehee, B. 2018: Plant associations of Arasbaran lowlands and its conservation significance. -Iranian Journal of Forest and Range Protection Research 16(2): 190-206. https://doi.org/10.22092/IJFRPR.2019.118691

Hamzeh'ee, B., Safavi, S.R., Asri, Y. & Jalili, A. 2010: Floristic analysis and a preliminary vegetation description of Arasbaran Biosphere Reserve, NW Iran. -Rostaniha 11(1): 1-16

Hassler, M. (1994-2024): World Plants. Synonymic Checklist and Distribution of the World Flora. Version 25.07; last update July 5th, 2025. www.worldplants.de. Last accessed 21/07/2025.

Jalili, A., Hamzeh'ee, B. & Asri, Y. 2003: Soil seed bank in Arasbaran protected area of Iran and their significance for conservation management. -Biol. Cons. 109: 425–431. https://doi.org/10.1016/S0006-3207(02)00170-2

Jamzad, Z. 2012: *Dracocephalum* L. In: Assadi, & al. (eds.). Flora of Iran, No. 76: 424-444. –Research Institute of Forests and Rangelands Press. Tehran.

Knorring O.E. 1968: Liliiflorae and Microsperme, *Polygonatum*. In: Komarov, V.L. (ed.). Flora of USSR, No. IV: 349-356. –Moscow, Leningrad

Li, H.W. & Hedge, I.C., 1994: Lamiaceae. In: Wu, C.Y., Raven, P.H. (eds.). Flora of China, No. 17: 125-134. -Science Press, Missouri Botanical Garden Press. St. Louis, MO, Beijing.

Mill, R.R. 1984: Monocotyledones, *Polygonatum*. In: Davis, P.H. (ed.). Flora of Turkey and the East Aegean Islands, No. 8: 81-84. -Edinburgh University Press, Edinburgh.

Mohammadzadeh, A., Basiry, R., Torahi, A.A., Dadashian, R. & Elahuan, M. 2014: Evaluation of biodiversity of plant species in Arasbaran area using non-parametric measures with respect to topographic factor of slope: a case study of aquiferous land of Ilgina and Kaleibar rivers. -Journal of Plant Research (Iranian Journal of Biology) 27(4): 728-741

Naderifar, M., Sonboli, A. & Gholipour, A. 2015: Pollen morphology of Iranian *Dracocephalum* L. (Lamiaceae) and its taxonomic significance. -Bangladesh J. Plant Taxon. 22(2): 99-110. https://doi.org/10.3329/BJPT.V22I2.26071

Ostadhashemi, R., Akhavan, R. & Abedi, A. 2023: Assessing and classification of tree species diversity in the Arasbaran forests of Iran. -Forest Research and Development 10(1): 39-56. https://doi.org/10.30466/JFRD.2023.54950.1696

POWO (2025). "Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; https://powo.science.kew.org/ Retrieved 21 July 2025."

Rechinger, K.H. 1982: Labiatae, *Dracocephalum* In: Rechinger, K.H. (ed.). Flora Iranica, No. 150: 218-230. – Graz, Akademische Druck–u. Verlagsanstalt, Austria.

Schischkin, B.K. 1954: Labiatae, *Dracocephalum*. In: Schischkin, B.K. (ed.). Flora USSR. Vol. 20: 295-318. Moscow, Leningrad.

Wang, J.J., Yang, Y.P., Sun, H., Wen, J., Deng, T., Nie, Z.L. & Meng, Y. 2016: The Biogeographic South-North Divide of *Polygonatum* (Asparagaceae Tribe Polygonateae) within Eastern Asia and Its Recent Dispersals in the Northern Hemisphere. -PLoS ONE 11(11): e0166134. https://doi.org/10.1371/journal.pone.0166134

Wendelbo, P. 1981: Liliaceae II, *Polygonatum*. In: Rechinger, K.H. (ed.). Flora Iranica, No. 165: 178-182. – Graz, Akademische Druck- und Verlagsanstalt, Austria.

Xia, M.Q., Liu, Y., Liu, J.J., Chen, D.H., Shi, Y., Chen, Z.X., Chen, D., Jin, R., Chen, H, Zhu, S, Li, P, Si, J. & Qiu, Y.X. 2022: Out of the Himalaya-Hengduan Mountains: phylogenomics, biogeography and diversification of *Polygonatum* Mill. (Asparagaceae) in the Northern Hemisphere. Molecular Phylogenetics and Evolution, 169, Article 107431. https://doi.org/10.1016/j.ympev.2022.107431

Zare, H, & Amini, T. 2022: New record of *Polygonatum multiflorum* in Hyrcanian forests, north of Iran. -Feddes Repertorium. 133(2): 148-151. https://doi.org/10.1002/fedr.202100021