

Crepis pannonica, a new report to the flora of Iran

Mahmoud Bidarlord: Research Assistant Prof., Guilan Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Tehran, Iran (m_bidarlord@areeo.ac.ir)

Abstract

Crepis pannonica, a member of the *Asteraceae*, was collected and identified from the Agh-Dagh Protected Area located at Talesh Mountains in Ardabil Province (NW of Iran). This plant is a Caucasian-Pontic element that has extended its distribution from Eastern Europe to Turkmenistan. It primarily grows in humid valleys, woodlands, mountainous steppes and dry grassy slopes, which is distinguished from its related species by its tall stature, inflorescence type, achene size, and capitulum characteristics. Until now, this species had not been officially reported in Iran, and this paper presents its first record in the country. It also provides taxonomic details, color images, habitat characteristics of the species, and further insights into its taxonomy. Based on these findings, *C. pannonica* is potentially classified as Critically Endangered (CR) in the current context of Iran, so that the establishment of this species and the preservation of its existing habitats necessitate specific protective measures.

Keywords: Ardabil province, *Cichorieae*, distribution status, Khalkhal, new record

Crepis pannonica. گزارشی جدید برای فلور ایران

محمود بیدارلرد: استادیار پژوهش بخش تحقیقات جنگل‌ها، مراتع و آبخیزداری، مرکز تحقیقات و آموزش کشاورزی و منابع طبیعی استان گیلان، سازمان تحقیقات، آموزش و ترویج کشاورزی (AREEO)، رشت، ایران (m_bidarlord@areeo.ac.ir)

چکیده

Crepis pannonica (Jacq.) K.Koch. منسوب به کلان‌بینان (*Asteraceae*)، از منطقه حفاظت شده آق‌داغ در استان اردبیل (رشته کوه تالش) واقع در شمال غرب ایران جمع آوری و شناسایی شد. این گیاه در واقع یک عنصر قفقازی-پنتیکی است که پراکنش خود را از شرق اروپا تا ترکمنستان گسترش داده است و عمدتاً در دره‌های مرطوب، جنگل‌ها، استپ‌های کوهستانی و دامنه‌های چمن‌زار خشک رشد می‌کند. این گونه با قد بلند، نوع گل‌آذین، اندازه فندقه و ویژگی‌های کپ از گونه‌های نزدیک خود متمایز می‌شود. این گونه تاکنون به طور رسمی از ایران گزارش نشده است و در این مقاله برای نخستین بار حضور آن در کشور تایید می‌گردد. همچنین، شرح آرایه‌شناسی، تصاویر رنگی، ویژگی‌های زیستگاهی و همچنین نکاتی در مورد تاریخچه آرایه‌شناختی و تمایز گونه با گونه‌های نزدیک آرایه می‌شود. براساس پایش‌های انجام گرفته، تا کنون گیاه *C. pannonica* تنها با دو جمعیت کوچک در ارتفاعات رشته کوه تالش مشاهده شده است، بنابراین در محدوده مرزهای سیاسی کشور گونه‌ای در معرض خطر (CR) محسوب می‌شود، به طوری که استقرار این گونه و پایداری رویشگاه‌های موجود به تدابیر حفاظتی ویژه‌ای نیاز دارد.

واژه‌های کلیدی: استان اردبیل، خلخال، گونه جدید، وضعیت پراکنش، *Cichorieae*

Introduction

Crepis L. belonging to *Asteraceae* by more than 200 species, is the second largest genus in the tribe *Cichorieae* (Badalamenti *et al.* 2022), which is characterized by ligulate florets, two rows of involucre bracts, with the outer row often significantly shorter than the inner row. Receptacle typically naked, occasionally paleate; achenes fusiform, ribbed, homomorphic or, dimorphic, beaked or not; pappus with scabrid-barbellate rays (Enke 2009).

Species of the genus are natively distributed across all continents except Australia, extending from S America to northern Mexico. Currently, the highest species diversity of this genus is found in the Circum-Mediterranean area (Lack 2007). *Crepis* species can grow in different types of habitats ranging from coastal area, swamps, grasslands and meadow, steppe and, forests to alpine zone. Members of this genus play a significant role in ecosystems by promoting

environmental sustainability and enhancing biodiversity. Additionally, some species within this genus have been used in traditional medicine for their health benefits (Badalamenti *et al.* 2022).

The genus *Crepis* is documented in the Flora Iranica with 28 species (Rechinger 1977), of which eight are endemic or sub-endemic. In contrast, the flora of Iran lists 26 species (Heidarnia 2013). Heidarnia (2013) introduced *C. semnanensis* Heidarnia & Assadi and classified *C. papposissima* Bab. and *C. asadbarensis* Bornm. ex Rech.f. as synonyms of *C. turcomanica* Krasch. However, according to the Plant of the World Online (POWO 2024), Global Biodiversity Information Facility (GBIF 2023), and the Cichorieae Working Group (CWG 2024), each of these species is recognized as independent.

Materials and Methods

During fieldwork for the Flora of Agh-Dagh Protected Area located at Talesh Mountains (NW of Iran), an intriguing specimen of *Crepis* was collected. The specimen was identified using diagnostic keys from various floras, including Boissier (1875), Lamond (1975), Sell (1976), Rechinger (1977), Avetisyan & Oganessian (1995), Czerepanov (2000), and Heidarnia (2013). Additionally, online resources such as the Global Biodiversity Information Facility (GBIF 2023), Plants of the World Online (POWO 2024), and the Cichorieae Working Group (CWG 2024) were consulted for further taxonomic information and distribution data on the studied taxon.

Morphological characteristics were meticulously observed in the field, and subsequently, the collected herbarium material was compared with specimens available in various herbaria: E, JACQ, MHA, and P, as referenced in Thiers (2024). The specimens have been deposited and preserved in the GILAN and IRAN herbaria.

Results

Crepis pannonica (Jacq.) K.Koch, *Linnaea* 23(6): 689 (1851)
≡ *Hieracium pannonicum* Jacq. in *Collectanea* 5: 148 (1797)

Plant perennial, herbaceous, robust. Stem 20–120 cm high, erect, branched only upper part, sparsely to densely setulose with short, rigid, eglandular hairs, usually with stout base, above subglabrous in mature. The basal (lowermost) leaves quite large, 15–30 × 4–6 cm, oblong, spatulate-ovate, gradually narrowed into a very short petiole, spaced coarsely toothed, smooth, and thick with eglandular hairs, apex usually acute, sometimes obtuse to rounded, sometimes ± acute. Cauline leaves several; lower cauline leaves like basal; middle and upper ones, gradually reduced, obovate, elliptical, ovate or lanceolate, all sessile, auriculate, coarsely dentate, acute to acuminate. Inflorescence racemose-paniculate, arching branches and candelabra-like. Capitula numerous, on straight or curved, mostly short and thick peduncles. Involucre cylindro-campanulate, 13–16 × 5–8(10) mm; bracts lanceolate, abaxial faces grayish-arachnoid-hairy to densely grayish-tomentose, adaxial glabrous, obtuse to acute; outer up to 1/3 as long as inner. Receptacle foveolate. Florets yellow, corolla 15–18 mm long; ligules 2 mm wide; corolla tube pubescent above. Style branches yellow. Achene all alike, 5–6 × 0.8–1.2 mm, fusiform, mostly slightly, strongly narrowed at the apex, with 15–20 ribs, muricate, brown; pappus 6–8 mm long (Figs 1 & 2).

Specimens examined: IRAN: Ardabil Province, Agh-Dagh Protected Area, Lerd village, subalpine woodland, wet valley 37°21'47" N, 48°38'02" E, 1970 m, 27.7.2022, M. Bidarlord 11800; Agh-Dagh Protected Area, Lerd village, dry grassy slopes, 37°21'1.33" N, 48°37'4.17" E, 2200 m asl., 25.7.2023, M. Bidarlord 11801, GILAN herbarium.

Phenology: Flowering in late Jun.–Jul. Fruiting in Jul.–Aug.

Distribution and Habitat: *Crepis pannonica* found growing in the northwest regions of Iran (Talesh Mountains). This species thrives in subalpine woodlands, mountainous steppes, and dry grassy slopes that lead to the wet doors valleys,

typically at altitudes ranging 1900–2300 m above sea level. It predominantly grows on the mountain sides, where coexists with various species such as *Crataegus meyeri* Pojark., *Euonymus latifolius* (L.) Mill., *Salix aegyptiaca* Forssk., *Rosa canina* L., *Prunus microcarpa* C.A.Mey., and other associated herbaceous plants, namely, *Inula thapsoides* (Spreng.) Spreng., *Eryngium billardierei* F., *Trisetum flavescens* (L.) P.Beauv., *Centaurea gilanica* Bornm., *Centaurea virgata* Lam., *Thinopyrum intermedium* (Host.) Barkworth & D.R.Dewey, *Galium verum* L., *Sanguisorba minor* Scop., *Vinca herbacea* Waldst. & Kit., *Dactylis glomerata* L., and *Coronilla varia* L. (Fig. 1). This rich biodiversity indicates that, the area provides suitable conditions for growth, including adequate sunlight, moisture, and soil composition. The species is rare and occur in two populations in NW of Iran. Based on IUCN (2019) categories criteria B1 and B2b (i, ii) it can be considered as Critically Endangered (CR) species in Iran political borders.



Fig. 1. Habit and habitat of *Crepis pannonica* in the northwest of Iran.

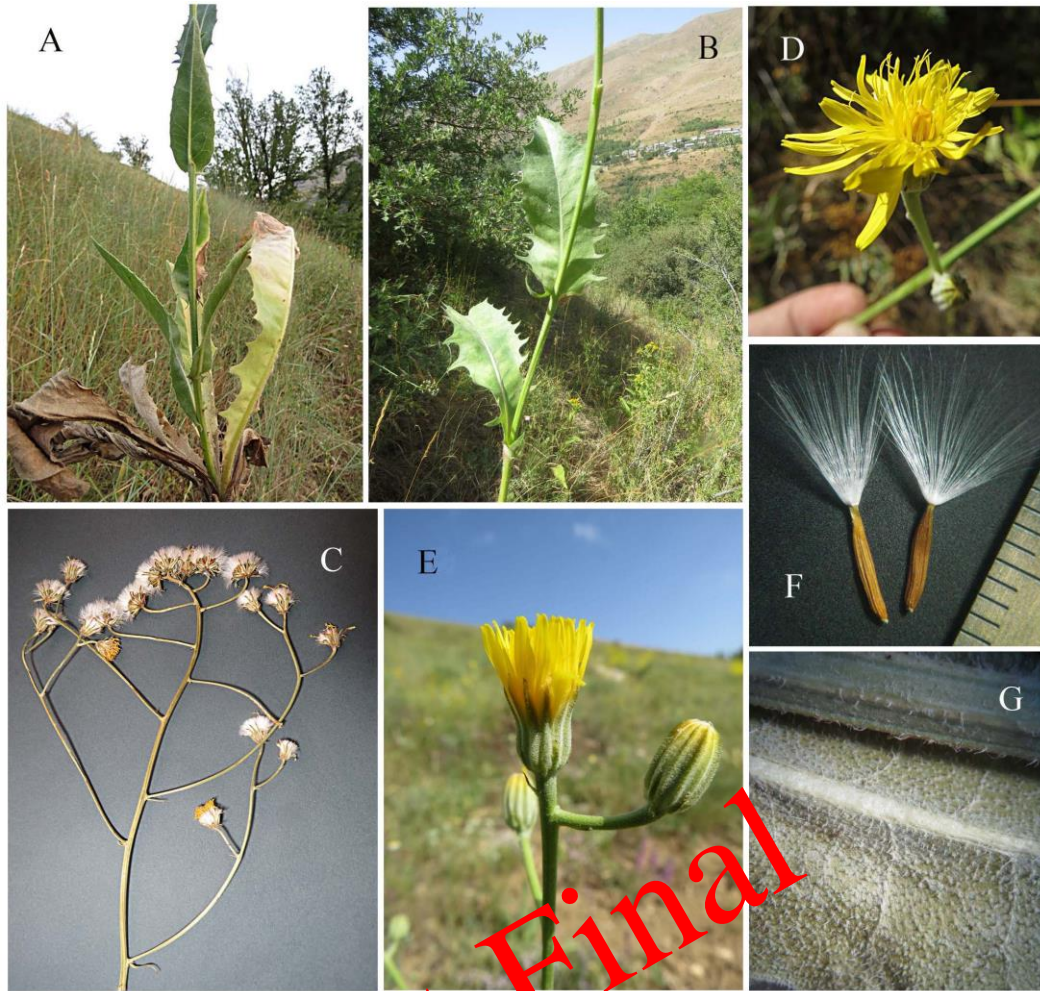


Fig. 2. *Crepis pannonica*, A. Basal to middle stem leaves, B. Stem leaves, C. Inflorescence, D. Ligulate flower in the capitulum, E. Capitula and bracts, F. Achenes, G. Leaf and stem indumentum.

Discussion

Crepis pannonica was first described from Hungary under the name, *Hieracium pannonicum* Jacquin. Then, it was transferred to the genus *Crepis* by K.Koch (1851). Currently, this taxa is accepted with this name and two subspecies (Dimitrova *et al.* 2003). This species is classified within *C. sect. Berinia* (Brign.) Babç, which is the largest among the 27 sections defined by Babcock (1947). However, this situation is also not supported by molecular data (Enke 2009). It's related Iranian species are *C. asadbarensis* Bornm. ex Rech.f., *C. ciliata* K. Koch, *C. khorassanica* Boiss., *C. straussii* Bornm., and *C. turcomanica* Krasch. (Reschinger 1977).

C. pannonica has been mentioned as phytogeographical element by Lamond (1975) and Avetisyan & Oganessian (1995) from northwest of Iran. Boissier (1875) reported this species under the name *C. rigida* Waldst. & Kit. from Asadbar region in Elburz Mountains, Iran (mentioned its basionym as *Hieracium pannonicum*). Bornmüller (1937) introduced *C. asadbarensis* to Germany and noted its differences from previously confused species, although he did not provide a Latin description (Reschinger 1977). Reschinger (*l.c.*) described this plant in the conventional form in Flora Iranica and mentioned that, *C. asadbarensis* is notably distinct from its closest relative, *C. pannonica* (Table 1 & Fig. 3) and characterized by its growth, inflorescence arching branches that are not candelabra-like. Additionally, it features narrow leaves that taper towards the base, larger flower heads, and longer achenes (Rechinger *l.c.*). So far, this species has not been officially reported from Iran, especially by Rechinger (*l.c.*) and Heidarnia (2013). Therefore, here its existence is confirmed in Iran.



Fig. 3. Herbarium specimen of *Crepis pannonica* in GILAN Herbarium (left) and *C. asadbarensis*, JACQ Digital Herbaria B1000941881 (right).

This robust perennial species have a relatively distribution in Austria to Turkamania (POWO 2023), where centers of its distribution is Caucasus mountain. In other words *C. pannonica* is a Caucasian-Pontic-South-Sarmatian-Pannonian element (Dimitrova *et al.* 2003, Somlyay 2010). This species grows in steppe, dry grassy slopes, in the introduced area Pannonian plain, which associates with alliance *Festuco-rupicolae* (Stevanović 1999). Its habitat in Iran is similar to the reported in other regions.

Table 1. Comparison of diagnostic characters between *Crepis pannonica*, *C. asadbarensis*, and *C. turcomanica*

Character	<i>C. pannonica</i>	<i>C. asadbarensis</i>	<i>C. turcomanica</i>
Plant height	(40)60–120 cm	30–35 cm	20–40 cm
Indumentum	Sparsely setulose with eglandular hairs	Glandular-pubescent	Glandular-pubescent
Basal (lowermost) leaves	15–30 × 4–6 cm	6–10 × 1.5–3 cm	8–15 × 0.8–1.5 cm
Stem leaves	Numerous	Few	Few
Inflorescence	Racemose-paniculate, many branched, candelabra-like	Corymboso-pauciramosa, few-branched, not candelabra-like	Corymboso-pauciramosa, few-branched, not candelabra-like
Involucre length	Light green, 11–15 mm	Dark green, 13 mm	Dark green, 13–17 mm
Outer bracts/Inner bracts	Up to 1/3 the inner length, few	1/2–3/4 of the inner length, 10	1/2–3/4 of the inner length, 5–10
Achene	5–6 mm	8–9 mm	6–7 mm
Pappus length	7–8 mm	9 mm	7–10 mm

The presence of Caucasian element (Bidarlord & Nejad Falatoury 2020, Bidarlord & Lyskov 2022) in the eastern part of Agh-Dagh south of Ardabil province merits attention, potentially reflecting the region's historical connections. It reflects the widespread distribution of such relict species in the past. Additionally, the occurrence of Hyrcanian elements can be attributed to the region's proximity to the Hyrcanian forests and its linkage through the Sefid-Rood Valley.

The Talesh Mountain range boasts a high level of species richness. It serves as a vital link between the Alborz and Caucasus Mountains and has benefited from the diverse flora of both regions. Additionally, many species have evolved and been introduced in this area such as, *Ornithogalum boissieri* Bidarlord & F.Ghahrem., and *Hedysarum persicum* Bidarlord, F.Ghahrem. & Mozaff. (Bidarlord *et al.* 2015, Bidarlord & Ghahremaninejad 2016).

Key to the *Crepis* sect. *Berinia* (Brign.) Babc species of Iran

- 1. Receptacle naked 2
- Receptacle paleaceous *C. straussii*
- 2. Plant tall, 60–120 cm. Stem leaves numerous 3
- Plant tall, up to 50 cm. Stem leaves few 4
- 3. Inflorescence branched candelabra-like. Inner involucre bracts glabrous on the inside *C. pannonica*
- Inflorescence branched not candelabra-like. Inner involucre bracts pubescent on the inside *C. ciliata*
- 4. Leaves toothed backwards *C. khorassanica*
- Leaves toothed upwards 5
- 5. Basal and lower cauline leaves 0.8–1.5 cm wide, oblanceolate *C. turcomanica*
- Basal and lower cauline leaves 1.5–3 cm wide, oblong-oblanceolate, or oblanceolate *C. asadbarensis*

Acknowledgments

This study was supported by the Research Institute of Forests and Rangelands, Tehran, Iran (Project No.: 2-58-09-008-980207 entitled: “Floristic study of Agh-Dagh Protected Area”).

References

- Avetisyan, E. & Oganessian M.E. 1995. *Crepis* L. Pp. 199–213. In: Takhtajan, A. (ed.), Flora of Armenia, Vol. 9. Koeltz Scientific Books (In Russian).
- Badalamenti, N., Sottile, F. & Bruno, M. 2022. Ethnobotany, phytochemistry, biological, and nutritional properties of genus *Crepis*, a review. *Plants* 11(4): 519. DOI: 10.3390/plants11040519.
- Bidarlord, M. & Ghahremaninejad, F. 2016. *Ornithogalum boissieri* (Asparagaceae), a new species from the Talesh Mountains, Iran. *Annales Botanici Fennici* 53: 69–72. DOI: 10.5735/085.053.02.
- Bidarlord, M., Ghahremaninejad, F. & Mozaffarian, V. 2015. *Hedysarum persicum* (Hedysareae, Leguminosae), a new species from Talesh Mountains, Iran. *Phytotaxa* 234(3): 294–298. DOI: 10.11646/phytotaxa.234.3.11.
- Bidarlord, M. & Lyskov, D. 2022. *Cnidiocarpa physospermifolia*, a new record for the flora of Iran. *Rostaniha* 23(2): 293–299. DOI: 10.22092/BOT.J.IRAN.2022.360477.1330.
- Bidarlord, M. & Nejad Falatoury, A. 2020. Investigating the situation of *Nonea echioides* in the flora of Iran. *Iranian Journal Botany* 26(1): 22–28. Tehran. DOI: 10.22092/ijb.2020.127101.1251.
- Babcock, E.B. 1947. The genus *Crepis*. I. Taxonomy, Phylogeny, Distribution and Evolution of *Crepis*. University of California Publication 21: 1–197.
- Boissier, E. 1875. *Flora Orientalis* Vol. 3. Basel & Genève, Apud H. Georg. Pp. 831–857.

- Cerepanov, S.K. 2000. *Crepis* L. Pp. 594–699. In: Bobrov, E.G. & Cvelev, N.N. (eds), Compositae triba Cichorieae-Flora SSSR 29. Moskva & Leningrad: Nauka. (English translation by B.R. Sharam: Flora of the USSR, Washington D.C., Smithsonian Institute Libraries.
- Compositae Working Group (CWG) 2024. Global Compositae Database. *Crepis pannonica* (Jacq.) K.Koch. Accessed at: <https://www.compositae.org/gcd/aphia.php?p=taxdetails&id=1100266> on 2024-11-10.
- Dimitrova, D., Fischer, M.A. & Kästner, A. 2003. *Crepis pannonica* (Asteraceae-Lactuceae): karyology, growth-form, phytogeography, occurrence and habitats in Austria; including subsp. *blavii* comb. et stat. nov. *Neilreichia* 2: 107–130.
- Enke, N. 2009. Contributions towards a revised infrageneric classification of *Crepis* L. (Cichorieae, Compositae). *Willdenowia* 39(2): 229–245. DOI: 10.3372/wi.39.39202.
- Global Biodiversity Information Facility (GBIF) 2023. *Crepis pannonica* (Jacq.) K.Koch in GBIF Backbone Taxonomy. Checklist dataset. DOI.org/10.15468/39omei accessed via GBIF.org on 2024-11-11.
- Heidarnia, N. 2013. *Crepis* L. Pp. 19–73. In: Assadi, M., Maassoumi, A.A., Mozafarian, V. & Safavi, S.R. (eds), Flora of Iran (Asteraceae, Tribe Cichorieae), No. 77. Research Institute of Forests and Rangelands Press. Tehran, Iran.
- JACQ 2024. Digital Herbaria. Available at: <https://herbarium.univie.ac.at/database/search.php>.
- IUCN 2019. Guidelines for Using the IUCN Red List Categories and Criteria, Version 14. Prepared by the Standards and Petitions Committee. IUCN, Gland, Switzerland; Cambridge, United Kingdom. Available at: <http://www.iucnredlist.org/documents/RedListGuidelines>.
- Lack, H.W. 2007. *Crepis* L., P. 184. In: Kubitzki, K. (ed.), The Families and Genera of Vascular Plants Vol. 8. Springer, Berlin, Heidelberg.
- Lack, H.W. 2007. Tribe Cichorieae Lam. & DC. Pp. 180–199. In: Kadereit, J.W. & Jeffrey, C. (eds), The Families and Genera of Vascular Plants, Asterales Vol. 8. Springer.
- Lamond J.M. 1975. *Crepis* L. Pp. 814–843. In: Davis, P.H. (ed.), Flora of Turkey and the East Aegean Islands Vol. 5. Edinburgh: University Press.
- Koch, K. 1851. Beiträge zu einer Flora des Orients. *Linnaea* 23: 577–713.
- Plants of the World Online (POWO) 2024. *Crepis* L. in Royal Botanic Gardens, Kew. Available at: <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:30000264-2>.
- Rechinger, K.H. 1977. *Crepis* L. Pp. 298–338. In: Rechinger, K.H. (ed.), Flora Iranica Vol. 122. Graz, Akademische Druck- und Verlagsanstalt.
- Sell, P.D. 1976. *Crepis* L. Pp. 344–357. In: Tutin T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. (eds), Flora Europaea Vol. 4. Cambridge.
- Somlyay, L. 2010. Distribution of *Crepis pannonica* in Hungary. *Studia Botanica Hungarica* 41: 113–128.
- Stevanović, V. 1999. Crvena knjiga flore Srbije 1. Isčezli i krajnje ugroženi taksoni-Ministarstvo za životnu sredinu republike Srbije, Beograd 380–382.
- Thiers, B. 2024. Index Herbariorum: A Global Directory of Public Herbaria and Associated Staff. New York Botanical Garden's Virtual Herbarium. Available at: <http://sweetgum.nybg.org/science/ih>.