



УДК 582.736:581.95(479.24)

New floristic records of *Onobrychis* (Fabaceae) in Azerbaijan

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Keywords: distribution map-diagram, herbarium specimens, population, sainfoin, species distribution.

Summary. New information on the diversity, distribution of species of the genus *Onobrychis* (sainfoin) in Azerbaijan is presented. Expeditionary studies were carried out from 2013 to 2024 and covered 28 populations of different species of *Onobrychis*. Herbarium samples were transferred for storage to the Institute of Genetic Resources of the Ministry of Science and Education of the Republic of Azerbaijan. The distribution of species in the territory of Azerbaijan is given according to the botanical and geographical zoning of E. M. Gurbanov. Species distribution maps were created using the DIVA-GIS program. As a result of our research, two taxa were first recorded in Azerbaijan: *O. arenaria* subsp. *cana* and *O. nemecii*. We also identified new locations for *O. komarovii*, *O. kachetica*, *O. inermis*, and *O. iberica*.

Новые флористические находки *Onobrychis* (Fabaceae) в Азербайджане

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Ключевые слова: гербарные образцы, картосхема распространения, популяция, распространение видов, эспарцет.

Аннотация. Представлены новые сведения о разнообразии, распространении видов рода *Onobrychis* (эспарцет) в Азербайджане. Экспедиционные исследования проводились с 2013 по 2024 гг. и охватили 28 популяций разных видов *Onobrychis*. Гербарные образцы переданы на хранение в Институт генетических ресурсов Министерства науки и образования Азербайджанской Республики. Распространение видов на территории Азербайджана дано по ботанико-географическому районированию Е. М. Гурбанова. Картосхемы распространения видов созданы с использованием программы DIVA-GIS. В результате проведённых исследований в Азербайджане впервые зарегистрированы два таксона – *O. arenaria* subsp. *cana* и *O. nemecii*. Нами выявлены новые местонахождения для *O. komarovii*, *O. kachetica*, *O. inermis* и *O. iberica*.

Introduction

The genus *Onobrychis* Mill. (Fabaceae Lindl., tribe *Hedysareae* DC.) is taxonomically complex, and the number of accepted species varies among different taxonomic sources. Polhill (1981) and Lock (2005) recognized about 170 species, whereas more recent estimates indicate approximately 208–210 accepted species worldwide (Al-Otraqche, 2022; POWO, 2025). These differences mainly reflect ongoing taxonomic revisions, changes in species circumscriptions, and the treatment of synonyms. The genus is mainly distributed across the Irano-Anatolian and Caucasian regions, Southwest Asia, the Mediterranean Basin, and temperate Europe. In Azerbaijan, 24 wild species have been reported (Asgarov, 2016). Several species are economically and ecologically important as forage crops, particularly *O. viciifolia*, *O. arenaria*, and *O. transcaucasica* (Isayev, 2023). *Onobrychis bakuensis* and *O. schuschajensis* are endemic to the Caucasus and Azerbaijan regions (Azizkhanli, 2024).

There are some monographs and research studies on the genus (Sirjaev, 1925; Yildiz, 1999; Azizi et al., 2024). The genus has been extensively studied, notably by Tamamshyan (1954), whose work in “Flora of Azerbaijan” described 22 species, emphasizing subtle observations of variability and critical taxonomic remarks.

In comparison with other forage crops, sainfoin is known for its resilience to poor soil, drought, and cold, making it highly adaptable and productive, even on poorest land (Sakhraoui et al., 2023). Sainfoin enhances soil health by improving structure, boosting nitrogen levels, preventing erosion, and increasing biodiversity within agroecosystems (Erdal, 2023). Ecological contributions of plants make it a valuable asset in mitigating climate change, enhancing soil and water conservation, and potentially serving as a genetic resource for breeding (Karabulut et al., 2023). Wild *Onobrychis* species possess multi-

purpose benefits, including the potential for domestication and genetic resources for breeding, which makes them relevant for ensuring food and forage security (Bulatova et al., 2015; Hari et al., 2023).

Despite their importance, information on the diversity and distribution of *Onobrychis* species in Azerbaijan remains limited (Azizkhanli et al., 2022, 2023). This study aims to document the diversity, distribution, and ecological characteristics of *Onobrychis* taxa, new species records, and revised distribution maps.

Materials and Methods

“Flora of the Caucasus”, “Sainfoin of Caucasus”, “Flora of the USSR” (Grossheim, 1926, 1948, 1952), “Flora of Azerbaijan” (Tamamshyan, 1954), and “The plant world of Azerbaijan” (Asgarov, 2016) were used as primary taxonomic references. Identification of the specimens was performed using the regional (Tamamshyan, 1954), and other related floras (Takhtajan, 1962; Hedge, 1970; Khinibidze, 1981; Rechinger, 1984). Herbarium specimens preserved at the Institute of Botany of Ministry of Science and Education Republic of Azerbaijan (BAK) and Tbilisi Botanical Garden (TBI) were examined. Nomenclature was verified according to “Plants of the World Online” (POWO. URL: <https://powo.science.kew.org/>).

Expeditions between 2013 and 2024 covered regions of Azerbaijan on 8 routes. Specimens and seed samples were collected from 28 populations. Voucher specimens were deposited at the Institute of Genetic Resources (abbreviated name AGRI). In preparing species distribution maps, the botanical-geographical zoning system of E. M. Gurbanov (2024) was used: Greater Caucasus (I), Lesser Caucasus (II), Kur-Araz lowland (III), Zuvand (IV), Absheron (V), and Nakhchivan (VI).

To record the coordinates was used a GPS device. Distribution maps were generated using DIVA-GIS 7.3.0.1 (Figs. 2, 3).

New taxa for the flora of Azerbaijan

Onobrychis arenaria subsp. *cana* (Boiss.) Hayek: “Goy-gol distr., to the W of Goy-gol distr., elev. from Yeni Zod village, 1191 m. 40°28'20.3"N, 46°20'29.1"E. 27 VIII 2020. Kh. Azizkhanli, KA-AZ 61” (Fig. 1C). – Raceme axis equals to leaves or longer than leaves. Calyx teeth surface glabrous, margin short pilose. Corolla 8–9 mm long, pink. Standard shorter than keel or equal. Wing 4 mm long. Raceme 2–4 cm long during blossom. Legume orbicular,

short dense pilose, 5 mm long. Crest 3–4 triangular toothed. Although *O. armena* Boiss. et A. Huet is currently treated as a synonym of *O. arenaria* subsp. *cana* (IPNI, 2026), the occurrence of this taxon in the Caucasus has long been controversial. Grossheim (1948) considered its presence in the Caucasus to be possible; however, Khinibidze (1956, 1960) rejected this view and concluded that the distribution of the species does not extend beyond the northern regions of Asia Minor. Later, Menitsky (2001) supported Khinibidze’s opinion, stating



Fig. 1. New taxa for Azerbaijan flora: A – plant of *Onobrychis nemecii* Širj. in natural habitat; B – herbarium specimen of *O. nemecii* Širj.; C – herbarium specimen of *O. arenaria* subsp. *cana* (Boiss.) Hayek.

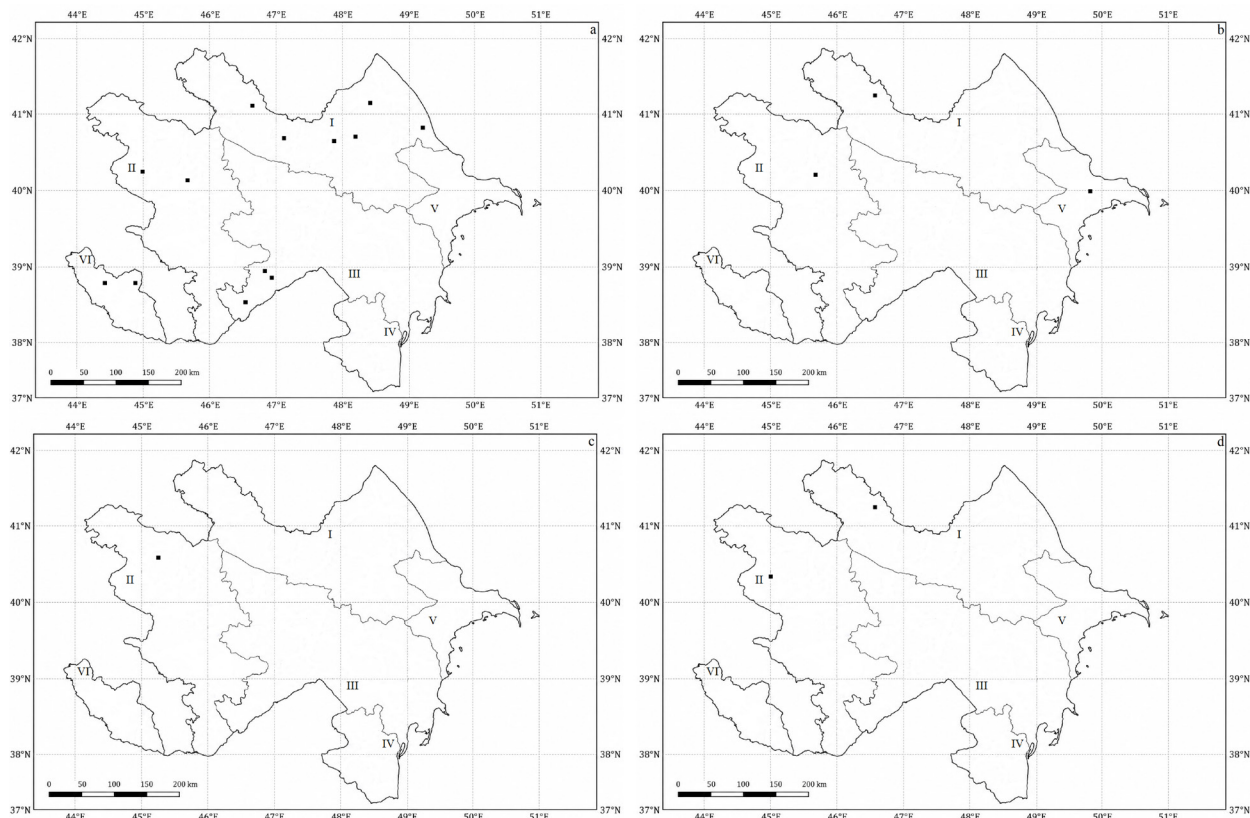


Fig. 2. Map-scheme of the distribution of *Onobrychis* species in the territory of Azerbaijan: a – *O. iberica* Grossh.; b – *O. inermis* Steven; c – *O. nemecii* Širj.; d – *O. kachetica* Boiss. et Buhse. Botanical-geographical regions according to Gurbanov: Greater Caucasus (I), Lesser Caucasus (II), Kur-Araz lowland (III), Zuvand (IV), Absheron (V), and Nakhchivan (VI).

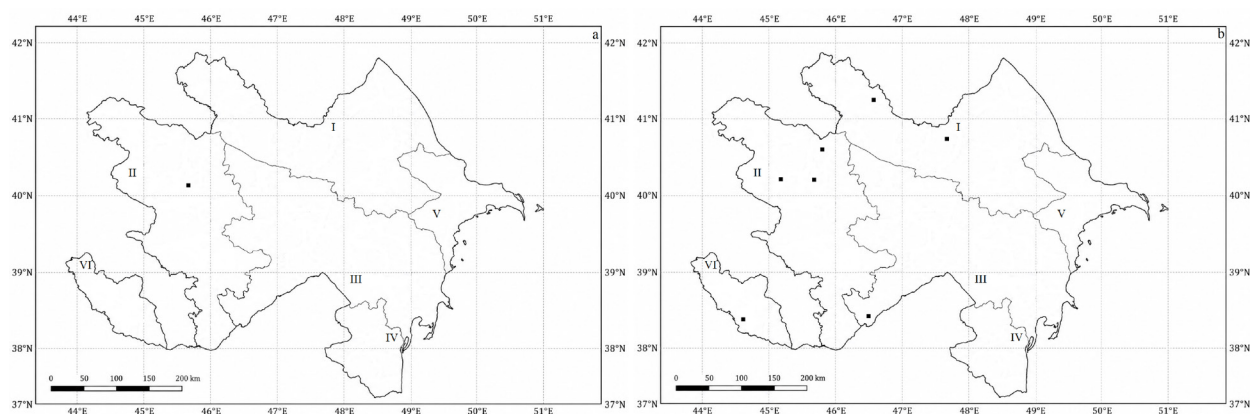


Fig. 3. Map-scheme of the distribution of *Onobrychis* species in the territory of Azerbaijan: a – *O. arenaria* subsp. *cana* (Boiss.) Hayek; b – *O. komarovii* Grossh. Botanical-geographical regions according to Gurbanov: Greater Caucasus (I), Lesser Caucasus (II), Kur-Araz lowland (III), Zuvand (IV), Absheron (V), and Nakhchivan (VI).

that the inclusion of *O. armena*, together with several other Anatolian taxa, in the flora of the Caucasus is not sufficiently supported by available evidence. Nevertheless, Takhtajan (1962) reported *O. arenaria* from the flora of Armenia, and herbarium records available through the Senckenberg SESAM database also include specimens identified as *O. arenaria* from Armenia (SESAM, 2025). Distributed in

Turkey, Transcaucasus (Hedge, 1970). Described from Turkish Armenia (Grossheim, 1948).

Onobrychis nemecii Širj.: “Shamkir distr., to the E of Shamkir distr., elev. from Yasamal road, 941 m. 40°48′56.1″N, 45°57′39.4″E. 27 VI 2013. Kh. Azizkhanli, KA-AZ 33” (Fig. 1A, B). – Khintibidze considers *O. nemecii* to be a sparsely pubescent form of *O. transcaucasica* that does not have its

own distribution range, the degree of pubescence of which varies somewhat (Khinthibidze, 1960). A highly doubtful species, probably not distinct from *O. altissima* (Grossheim, 1948). According to our observations, the pods of the collected species *O. nemecii* are glabrous and unarmed. Distributed in Georgia (Khinthibidze, 1981). Described from Chamluk-chan in Georgia (Grossheim, 1948).

New distribution localities of *Onobrychis* species in Azerbaijan

Onobrychis iberica Grossh.: “Shahbuz distr., to the SE of Nakhchivan town, elev. from Bichanak village, 2228 m. 39°32′14.1″N, 45°48′01.7″E. 1 VII 2021. Kh. Azizkhanli, KA-AZ 37”; “Kangarli distr., to the SE of Nakhchivan town, elev. from Chalkhangala village, 1934 m. 39°30′04.1″N, 45°14′58.2″E. 30 VI 2021. Kh. Azizkhanli, KA-AZ 38”; “Fuzuli distr., to the E of Fuzuli distr., elev. from Fuzuli-Khojavand road, 462 m. 39°41′39.2″N, 47°09′22.3″E. 23 V 2024. Kh. Azizkhanli, KA-AZ 39”. – Standard bicoloured, inside two oval yellowish-white spot on pink background. Distributed in Samur-Devachi plain, Greater Caucasus, Kura plain, Lesser Caucasus, Sheki (Grossheim, 1952; Tamamshyan, 1954), Dagestan, Armenia, Georgia (Grossheim, 1948; Takhtajan, 1962; Khinthibidze, 1981).

Onobrychis inermis Steven: “Sheki distr., to the SW of Sheki distr., elev. from Bash Goy nuk village, 888 m. 41°20′55.2″N, 47°06′01.2″E. 12 VII 2013. Kh. Azizkhanli, KA-AZ 35”; “Goy-gol distr., to the SE of Goy-gol distr., elev. from Togana village,

1144 m. 40°27′18.2″N, 46°20′40.5″E. 27 VIII 2020. Kh. Azizkhanli, KA-AZ 34”. – Legume 4–6 mm long. Corolla 7–9 mm long. Wing 2 mm long. Standard shorter than keel. Distributed in Absheron, Khirdalan (BAK), Russia, Georgia, Ukraine (Grossheim, 1948; Khinthibidze, 1981; GBIF, 2026).

Onobrychis kachetica Boiss. et Buhse: “Gadabay distr., to the SE of Gadabay distr., elev. from Slavyanka village, 1420 m. 40°39′36.6″N, 45°47′55.9″E. 4 VII 2022. Kh. Azizkhanli, KA-AZ 32”. – Stem loosely white pilose. Bract up to 5 mm. Corolla 15–17 mm long. Wing is sharp. Legume density loosely pilose. Edge cavity narrow. Distributed in Sheki (Grossheim, 1952), Georgia (Khinthibidze, 1981).

Onobrychis komarovii Grossh.: “Kangarli distr., to the SE of Nakhchivan town, elev. from Chalkhangala village, 1833 m. 39°30′04.1″N, 45°14′58.2″E. 30 VI 2021. Kh. Azizkhanli, KA-AZ 31”. – Annual plant with thin stem. Raceme with less flower. Legume 7–10 mm diameter. Distributed in Lesser Caucasus, Eastern Caucasus, Sheki and Garabagh region (Grossheim, 1952; Tamamshyan, 1954), Georgia, Armenia (Khinthibidze, 1981; GBIF, 2026).

Conclusion

In this study, based on herbarium specimens, expeditionary and literary materials, new distribution areas of four species, and maps of their distribution has been updated, enhancing understanding of the flora of Azerbaijan. Two species were recorded for the first time in the flora of Azerbaijan.

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