Acta et Commentationes, Exact and Natural Sciences ISSN: 2537-6284
Volume 19(1), 2025, Pages 150–160 E-ISSN: 2587-3644
CZU: 502.75(478.9) DOI: 10.36120/2587-3644.v19i1.150-160

Vulnerable species of legume family (Fabaceae) for the Red Book of the Republic of Moldova (IVth edition)

Tatiana Izverscaia and Veaceslav Ghendov

Abstract. The article examines vulnerable species from the Fabaceae family evaluated and proposed for inclusion into the IVth edition of the Red Book of the Republic of Moldova. These are 7 threatened with extinction species, assessed according to the IUCN criteria requirements: *Astragalus albidus* Waldst. et Kit. [VU]; A4ce; B2ab(iii), *Astragalus exscapus* L. [VU]; A4ce; B2ab(i,iii,iv,v), *Astragalus ponticus* Pall. [VU]; A4acde; B2ab(i,ii,iii,iv); D2, *Coronilla elegans* Pančić [VU]; A4ce; B2ab(i,ii,iii,iv), *Genista tetragona* Besser [VU]; A4e; B2b(ii,iii, iv), *Lathyrus aureus* (Steven) Brandza [VU]; A2ace+4ace; B2ab(i,ii,iii,iv) and *Onobrychis gracilis* Besser [VU]; A2acde+4acde; B2ab(i,ii,iii,iv). Some information required for compiling the Red Book of the Republic of Moldova (biological and ecological characteristics, habitats, chorological character in the Republic and worldwide, protection measures) is provided for each species.
Keywords: rare species, vascular flora, Fabaceae, Republic of Moldova, Red Book.

Specii vulnerabile din familia Fabaceae pentru Cartea Roşie a Republicii Moldova (ediţia a IV)

Rezumat. În articol sunt prezentate rezultatele studiului asupra speciilor rare din familia Fabaceae evaluate și propuse pentru includere în ediția a IV-a a Cărții Roșii a Republicii Moldova. Acestea sunt 7 specii pe cale de dispariție, evaluate conform cerințelor criteriilor IUCN: *Astragalus albidus* Waldst. et Kit. [VU]; A4ce; B2ab(iii), *Astragalus exscapus* L. [VU]; A4ce; B2ab(i,iii,iv,v), *Astragalus ponticus* Pall. [VU]; A4acde; B2ab(i,ii,iii,iv); D2, *Coronilla elegans* Pančić [VU]; A4ce; B2ab(i,ii,iii,iv), *Genista tetragona* Besser [VU]; A4e; B2b(ii,iii,iv), *Lathyrus aureus* (Steven) Brandza [VU]; A2as+4as; B2ab(i,ii,iii,iv) și *Onobrychis gracilis* Besser [VU]; A2acde+4acde; B2ab(i,ii,iii,iv). Pentru toate speciile sunt furnizate unele informații necesare pentru întocmirea Cărții Roșii a Republicii Moldova (caracteristici biologice și ecologice, habitatul, aspectul corologic în republică și la nivel mondial, măsuri de protecție).
Cuvinte-cheie: specii rare, flora vasculară, Fabaceae, Republica Moldova, Cartea Roșie.

1. Introduction

One of the peculiarities of the flora of the Republic of Moldova is the presence of a large number of rare and endangered species of vascular plants. Rare species of different

categories of rarity currently make up over 30% of the total flora. Species of different categories of rarity are considered under threat of extinction due to the small number of populations and limited distribution in the region [9, 10, 12].

The rarest taxa are included in the Lists of species protected by the state and in the Red Book of the Republic of Moldova. The Red Book is an official document that includes a list of vulnerable, endangered and critically endangered species of plants and animals, as well as general information about their status, condition, habitat, methods of protection, conservation and distribution. Rare species listed in the Red List of the International Union for Conservation of Nature (IUCN) and the European Red List, which are found on the territory of the Republic of Moldova, can be included in the Red Book of the Republic of Moldova, but with the establishment of their status of rarity in the republic. The Red Book includes endemic and relict species, species living on the border of their natural ranges of occurrence, species of particular scientific importance, as well as species whose numbers have decreased due to the influence of anthropogenic factors. The Red Book is published at least once every 10 years [21]. Due to the fact that the IIIrd edition of the Red Book of the Republic of Moldova was published in 2015, research is currently being conducted to identify threatened species for inclusion in the next edition.

2. Materials and Methods

Studies were conducted on rare species of the Fabaceae family, proposed for inclusion into the IVth edition of the Red Book of the Republic of Moldova, presented in the flora of the region. Floristic summaries [5, 8, 11, 14, 15, 16] were studied and herbarium materials stored in the Herbarium of the National Botanical Garden (Institute) and the Herbarium of the State University of Moldova (Chisinau) were critically reviewed.

Rare species of the "vulnerable" category were identified based on their local distribution and the state of populations in the republic. The distribution of vulnerable species is shown on the map of the Republic of Moldova. The following symbols were used to indicate the distribution of species: ○ – growing sites (localities) where species were recorded in the past (before 1974, i.e. 50 years ago or more) and ● – growing sites (localities) where species have been recorded at present (from 1974 to 2024). The general range is indicated according to literature data [1, 2, 3, 6, 11, 19]. The maps of species general range of natural distribution from the Royal Botanic Garden website were used [17].

The nomenclature of vulnerable Fabaceae species is indicated in accordance with modern floristic summaries [1, 2, 3, 6, 11, 17]. Useful properties are given according to

literature sources [20]. The rarity category of species is assessed according to the IUCN categories and criteria [10].

3. Results and Discussions

Within the framework of scientific research of the Laboratory of Natural Flora and Herbarium of the National Botanical Garden (Institute) of the Moldova State University, it was established that the legume family (Fabaceae) in the flora of the region includes 142 species from 34 genera. According to the IUCN criteria, 49 species are assessed as rare. Of these, 13 species are critically endangered (category CR), 9 species are threatened (category EN), 7 species are vulnerable (category VU), 12 species are data deficient (category DD), 1 species is near threatened (category NT), 2 species are under the least threat or least concern (category LC), and 5 species are probably extinct in the region (category RE).

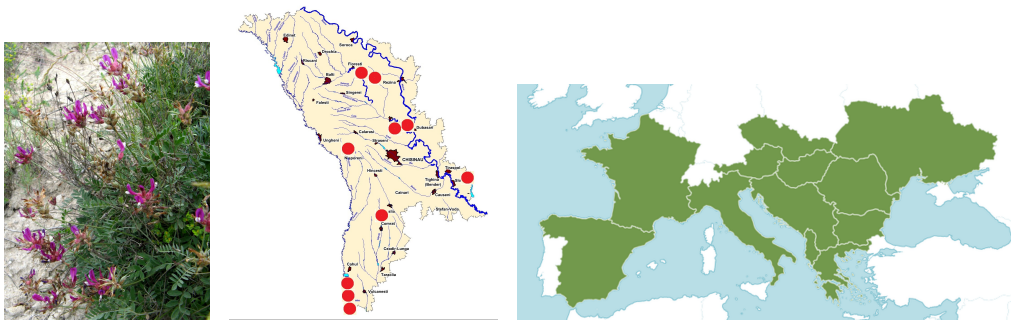
This article presents the results of the study of vulnerable (category VU) species of the Fabaceae family growing in natural plant communities, which are proposed for inclusion into the IVth edition of the Red Book of the Republic of Moldova. These are 2 species already included in the IIIrd edition of the Red Book: *Coronilla elegans* Pančić and *Genista tetragona* Besser, as well as 5 species that we consider appropriate to include in the Red Book for the first time: *Astragalus albidus* Waldst. et Kit., *Astragalus exscapus* L., *Astragalus ponticus* Pall., *Lathyrus aureus* (Steven) Brandza and *Onobrychis gracilis* Besser. The species are listed in alphabetical order, for each the following characteristics are given: Latin, Romanian and Russian names, synonymy, rarity category and criteria, biological and ecological features, distribution maps (local and general), habitats, protection status and useful properties.

Astragalus albidus Waldst. et Kit. (=*A. vesicarius* auct., non L., *A. vesicarius* L. subsp. *vesicarius* Chater, *A. vesicarius* L. subsp. *albidus* (Waldst. et Kit.) Br.-Bl.) **– Coșaci alburiu –** Астрагал беловатый. Vulnerable species [VU]; A4ce; B2ab(iii).

Perennial, subshrub (Figure 1 (a)) blooms in April-June and reproduces by seeds. In the Republic of Moldova, it is found in the north-east of the country (Florești and Sîngerei districts), in the central part (Nisporeni, Orhei), and in the south-east (Slobozia), and south (Comrat and Cahul) (Figure 1 (b)). Outside the country, it is widespread in Central (center and south-east) and Eastern (south-west) Europe, the Mediterranean region (Figure 1 (c)).

Steppe xerophyte, common in the steppe habitats, on steppe and limestone slopes, among shrubs. It grows in small groups of 10-20 specimens, with an abundance of 1 (2) or solitarily. In the Republic of Moldova, it is protected by the state (category IV) [13]. It is protected in the "Orheiul Vechi" National Park, the "Bugeac" Medicinal Plant

Nature Reserve, the “Andriașeuca Nouă” steppe vegetation area, and the geological and paleontological natural monument “Outcrops near the village of Văleni”. Species is included in the Red Book of Ukraine as a vulnerable species [22]. The plant can be used in landscaping, and is a good honey plant.

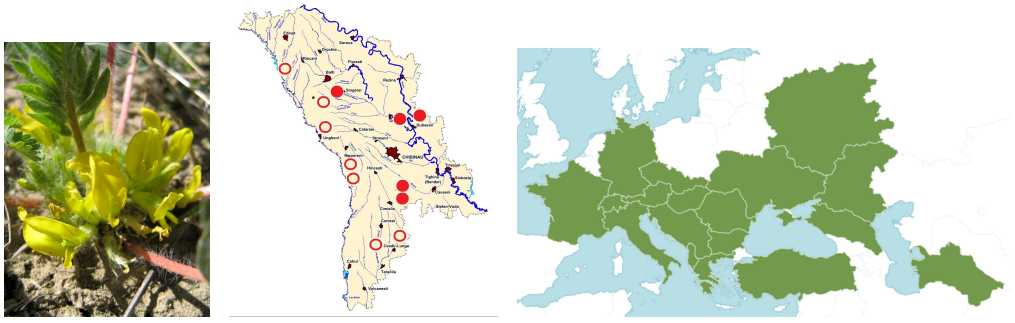


(a) (b) (c)

Figure 1. *Astragalus albidus* Waldst. et Kit.: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

Astragalus exscapus L. (=*A. exscapus* L. subsp. *exscapus*) **– Coșaci acaul –** Астрагал бесстебельный. Vulnerable species [VU]; A4ce; B2ab(i,iii,iv,v).

Perennial, chamaephyte (Figure 2 (a)). It blooms in April-May and reproduces by seeds. Reliably recorded in the northwestern (Rîșcani, Fălești, Sîngerei, Ungheni districts), central (Orhei, Hîncești, Dubăsari) and southern district (Cimișlia, Comrat, Ceadîr-Lunga, Căușeni) (Figure 2 (b)).



(a) (b) (c)

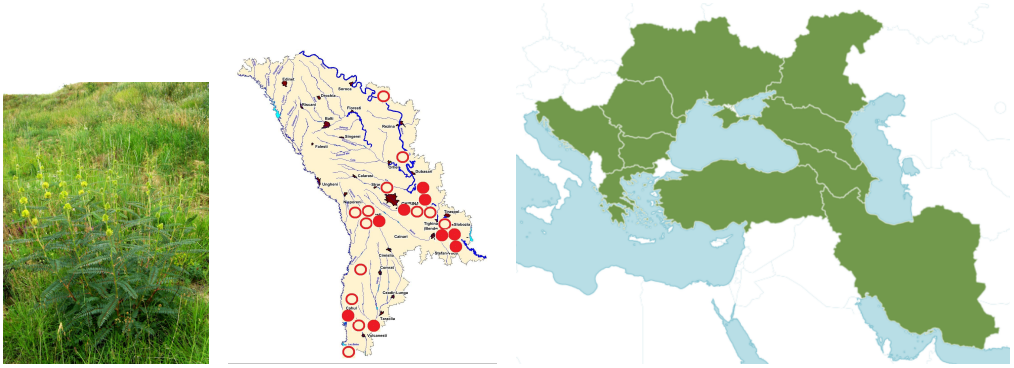
Figure 2. *Astragalus exscapus* L.: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

The range of distribution is disjunctive, it includes Central and Eastern (centre and south) Europe, Crimea, the Mediterranean region, the North Caucasus, Asia Minor and Central Asia (Turkmenistan) (Figure 2 (c)).

Steppe xerophyte. It is confined to steppe and limestone slopes. It grows solitarily or in small groups with an abundance of 1 (2). In the Republic of Moldova, no specific protection measures have been taken for this taxon. It is protected only territorially in the scientific reserve "Iagorlîc", in the typical steppe vegetation area "Plot of the Bălți Steppe" and in the "Trebujeni" landscape reserve. It is included in the Red Book of Ukraine as a rare species [22]. The plant is decorative and a good honey plant.

Astragalus ponticus Pall. **– Coșaci pontic –** Астрагал понтийский. Vulnerable species [VU]; A4acde; B2ab(i,ii,iii,iv); D2.

Perennial, hemicryptophyte (Figure 3 (a)). It blooms in May-June and reproduces by seeds. In the Republic of Moldova, it is widespread in the Prut and Dniester river basins, in the central, eastern parts and in the south of the country (Hîncești, Strășeni, Anenii Noi, Cimișlia, Leova, Comrat, Ceadîr-Lunga, Căușeni, Orhei, Camenca, Dubăsari, Cahul) (Figure 3 (b)). Outside the country, it is found in Central (Romania) and Eastern (southern) Europe, Crimea, the Balkan Peninsula, the Caucasus, Asia Minor and Iran (Figure 3 (c)).



(a) (b) (c)

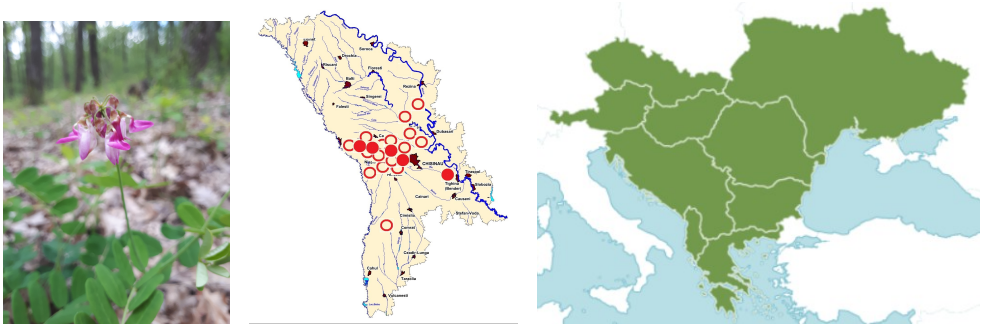
Figure 3. *Astragalus ponticus* Pall.: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

Steppe xerophyte. It grows in clearings and edges of white oak groves, steppe and limestone slopes. It forms groups with abundance 2 (3). In the Republic of Moldova, no measures have been taken by the state to protect it. Territorial protection is carried out in the Ramsar site "Lower Dniester" (No. 1316 in the Ramsar List) [18], the natural reserve of medicinal plants "Sărata Galbenă". It is included in the Red Book of Ukraine

as a vulnerable species [22]. The plant can be used in landscaping, and is a good honey plant.

Coronilla elegans Pančić (= *C. latifolia* (Hazsl.) Jav., *Securigera elegans* (Pančić) Lassen) **– Coronişte elegantă –** Вязель изящный. Vulnerable species [VU]; A4ce; B2ab(i,ii,iii,iv).

Perennial, hemicryptophyte (Figure 4 (a)). It blooms in June-July and bears fruit in August. It reproduces by seeds. Reliable localities of growth are recorded in the central part (Orhei, Ungheni, Nisporeni, Călărași, Strășeni, Criuleni, Ialoveni, Hîncești, Anenii Noi, Cantemir) (Figure 4 (b)). In the region, it grows on the southern border of its natural range of distribution. Outside the country, it is known in Central (center and southeast) and Eastern (southwest) Europe and on the Balkan Peninsula (Figure 4 (c)). Tertiary relic. Forest xeromesophyte. It grows in clearings and edges of fresh oak groves of common oak, occasionally with an admixture of beech. It forms groups of 4-5 (10) specimens. The total number of specimens does not exceed several hundred and continues to decrease.



(a) (b) (c)

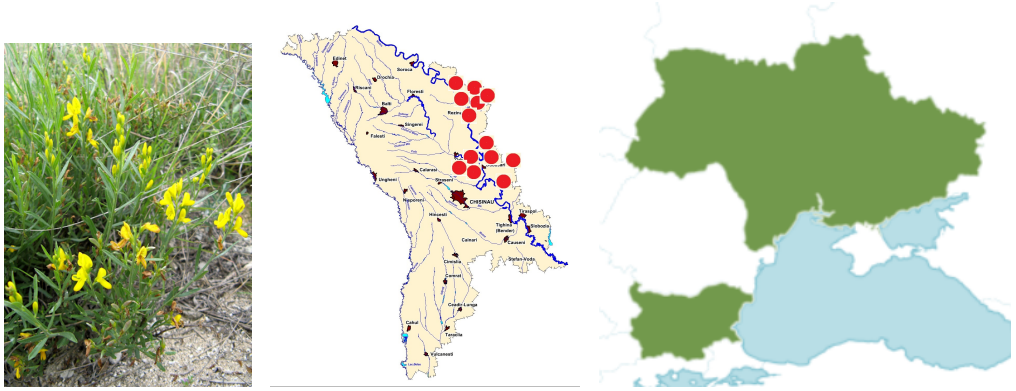
Figure 4. *Coronilla elegans* Pančić: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

In Moldova it is protected by the state (category IV) [13]. It is included in the Red Book of the Republic of Moldova (editions 2 and 3) as a vulnerable species. It is protected territorially in the scientific reserve "Codru", landscape reserves "Codrii Tigeci" and "Cărbuna". It is included in the Red Book of Ukraine as a vulnerable species [22]. The plant could be considered as good honey plant.

Genista tetragona Besser (= *Genista tinctoria* auct. non L.) **– Drobişor tetramuchiat –** Дрок четырёхгранный. Vulnerable species [VU]; A4e; B2b(ii,iii,iv).

Small shrub (Figure 5 (a)). It blooms in April-May and reproduces by seeds. In the Republic it is found in the north-eastern part, in the basin of the Dniester River and

its tributaries (Camenca, Rîbnița, Dubăsari, Criuleni, Grigoriopol and Orhei districts) (Figure 5 (b)). Outside the country it has been recorded in the vicinity of the village of Artirovka (Ukraine) and in the north of the Balkan Peninsula (Bulgaria) (Figure 5 (c)) [19, 22]. Tertiary relict. Petrophytic xerophyte, calciphyte. It grows as part of petrophytic communities on Sarmatian limestones on the slopes of the steep banks of the Dniester River and its tributaries. In places of growth, the abundance of the species is 2-3, the



(a) (b) (c)

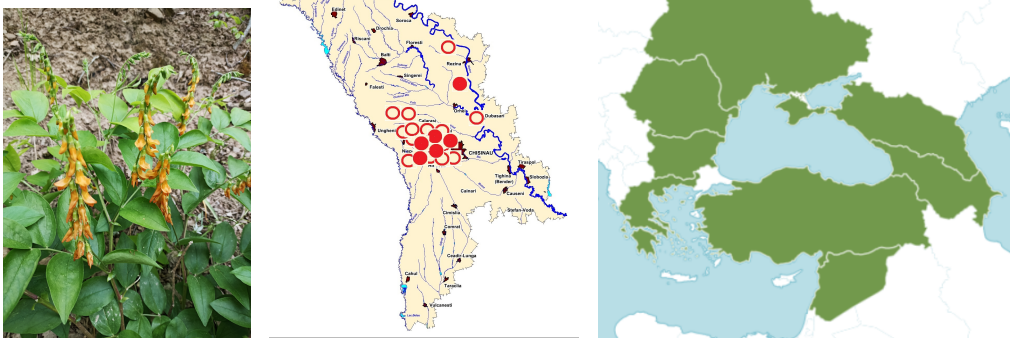
Figure 5. *Genista tetragona* Besser: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

projective cover is 20-30%. The most numerous population of the species has been preserved in the "Iagorlîc" scientific reserve, in which the plants form spots and clusters with an abundance of 3. Under sparse canopy and among shrubs, the growth density is 2-3 specimens per 1 m^2, in open areas up to 6-17 specimens per 1 m^2. It is preserved in *ex situ* conditions in the National Botanical Garden (Institute). In the Republic of Moldova, it is protected by the state (category II) [13] and included in the 2nd and 3rd editions of the Red Book. It is protected territorially in the "Iagorlîc" scientific reserve, the "Trebujeni" landscape reserve, the "Haraba" botanical natural monument. It is included in the Red List of Europe as a vulnerable species (VU – B2ab(iii)) [4]. It is protected by the Berne Convention [7]. The plant is ornamental and can be used in landscaping.

Lathyrus aureus (Steven) Brandza (= *Orobus aureus* Steven) **– Măzăroi auriu –** Чина золотистая. Vulnerable species [VU]; A2ace+4ace; B2ab(i,ii,iii,iv).

Perennial, hemicryptophyte (Figure 6 (a)). It blooms in May-July and eproduces by seeds and vegetatively by underground stolons. Reliable localities of growth are recorded in the center of the country (Orhei, Strășeni, Hîncești and Ialoveni) (Figure 6 (b)). Outside the region, it is found in Central (Romania) and Eastern (Ukraine) Europe, Crimea, the

Balkan Peninsula (east), the Caucasus, Asia Minor (Figure 6 (c)). Tertiary relic. Forest mesophyte. It grows under sparse canopy, in forest clearings and forest edges. It forms groups of several specimens or in spots, less often grows scattered, or solitarily. In the Republic of Moldova no measures have been taken by the state for its protection. It is protected territorially in the scientific reserves "Plaiul Fagului" and "Codru", the landscape reserve "Pohrebeni", the forest nature reserve "Logănești" and others. The plant is decorative, it can be used in landscaping, as honey plant.



(a) (b) (c)

Figure 6. *Lathyrus aureus* (Steven) Brandza: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

Onobrychis gracilis Besser **– Sparcetă gracilă –** Эспарцет грациозный, э. изящный. Vulnerable species [VU]; A2acde+4acde; B2ab(i,ii,iii,iv).

Perennial, hemicryptophyte (Figure 7 (a)). It blooms in May-July and reproduces by seeds. Found in the central regions (Hîncești), south-eastern (Slobozia) and the southern part (Comrat, Taraclia, Cahul, Vulcănești) (Figure 7 (b)). Outside the country species was recorded in Central (Romania) and Eastern (Ukraine) Europe, Crimea, the Balkan Peninsula, Asia Minor (Figure 7 (c)). Steppe xerophyte. It grows on steppe slopes, forest clearings, among shrubs. It forms small groups of several specimens in abundance of 1-2 or is encountered solitarily. In the Republic of Moldova, no measures for its protection have been taken. It is protected territorially in the natural reserve of medicinal plants "Bugeac", in the steppe vegetation areas "Bugeac", "Dezghingea", "Ciumai" and "Andriașevca Nouă". The plant possesses ornamental properties, and can be used as honey plant.

(a) (b) (c)

Figure 7. *Onobrychis gracilis* Besser: (a) plant appearance; (b) distribution in the Republic of Moldova; (c) worldwide occurrence.

4. Conclusions

As a result of study on the spontaneous vascular plant species from Fabaceae family we propose to include 4 vulnerable species from the Fabaceae family in the List of Species Protected by Law in the Republic of Moldova: *Astragalus exscapus* L., *A. ponticus* Pall., *Lathyrus aureus* (Steven) Brandza and *Onobrychis gracilis* Besser.

In order to protect and take further conservational measures, we consider worthwhile and necessary to include 7 Fabaceae species into the 4th edition of the Red Book of the Republic of Moldova: *Astragalus albidus* Waldst. et Kit. [VU]; A4ce; B2ab(iii), *A. exscapus* L. [VU]; A4ce; B2ab(i,iii,iv,v), *A. ponticus* Pall. [VU]; A4acde; B2ab(i,ii,iii,iv); D2, *Coronilla elegans* Pančić [VU]; A4ce; B2ab(i,ii,iii,iv), *Genista tetragona* Besser [VU]; A4e; B2b(ii,iii,iv), *Lathyrus aureus* (Steven) Brandza [VU]; A2ace+4ace; B2ab(i,ii,iii,iv) and *Onobrychis gracilis* Besser [VU]; A2acde+4acde; B2ab(i,ii,iii,iv).

Acknowledgements

The study was carried out within the research projects:

(1) subprogramme entitled: "Research and ex situ, in situ conservation of the plant diversity of the Republic of Moldova" (subprogramme code – 010101), funded by the Ministry of Education and Research of the Republic of Moldova.

(2) "Assessment of the state of plant, fungi and animal species, development of the list of species with rarity status and the algorithm for presentation in the 4th edition of the Red Book of the Republic of Moldova", funded by the National Office for the Implementation of Environmental Projects and co-financing by the Moldova State University, according to the financing Contract No. 01-23p-096/03-05-2024 from 27.02.2024.

References

[1] BALL, P.W. Coronilla L. *Flora Europaea*. Cambridge University Press, 1968, vol. II, pp. 182–184. ISBN 978-0521066624.

[2] BALL, P.W. Lathyrus L. *Flora Europaea*. Cambridge University Press, 1968, vol. II, pp. 136–143. ISBN 978-0521066624.

[3] BALL, P.W. Onobrychis Mill. *Flora Europaea*. Cambridge University Press, 1968, vol. II, pp. 187–191. ISBN 978-0521066624.

[4] BILZ, M., KELL, S.P., MAXTED, N., LANDSDOWN, R.V. *European Red List of Vascular Plants*. Luxembourg: Publications Office of European Union, 2011.

[5] *Cartea Roşie a Republicii Moldova*. Ed. III. Chişinău: Ştiinţa, 2015, 492 p. ISBN 978-9975-67-998-5.

[6] CHATER, A.O. Astragalus L. *Flora Europaea*. Cambridge University Press, 1968, vol. II, pp. 108–124.

[7] *Convention on the Conservation of European Wildlife and Natural Habitats*. Bern, Switzerland, 1979. Disponibil: http://conventions.coe.int/Treaty/EN/Treaties/Html/104.htm (vizitat 10.01.2025).

[8] GHEIDEMAN, T., CANTEMIR, V. Coronilla elegans Panč. *Cartea Roşie a Republicii Moldova*. Ediţia II, Chişinău: Ştiinţa, 2001, p. 41. ISBN 9975-67-169-1.

[9] GHENDOV, V., IZVERSCAIA, T., SHABANOVA, G. Pre-identified Red List of vascular plants in the flora of Republic of Moldova. *Journal of Botany*, 2012, vol. IV, nr. 1(5), pp. 41–52. ISSN 1857-2367.

[10] IUCN Standards and Petitions Subcommittee. 2010. Guidelines for Using the IUCN Red List Categories and Criteria. Version 8.1. Prepared by the Standards and Petitions Subcommittee in March 2010. Disponibil: http://intranet.iucn.org/webfiles/doc/SSC/RedList/RedListGuidelines.pdf (vizitat 10.01.2025).

[11] IZVERSCAIA, T. Fabaceae Lindley. *Flora Basarabiei: (plantele superioare spontane)*: [în 6 vol.]. Chişinău: Universul, 2020, vol. III, pp. 388–594. ISBN 978-9975-47-192-3.

[12] IZVERSCAIA, T., GHENDOV, V. Threatened with regional extinction vascular plants recommended for state protection in the Republic of Moldova. *Mediul ambiant*, 2014, vol. 76, no. 4, pp. 1–3. ISSN 1810-9551.

[13] *Legislaţia ecologică a Republicii Moldova (1996-1998)*. Chişinău: Societatea Ecologică BIOTICA, 1999, 233 p. ISBN 9975-923-75-5.

[14] NICOLAEVA, L. Genista tetragona Bess. *Cartea Roşie a Republicii Moldova*. Ediţia II, Chişinău: Ştiinţa, 2001, p. 42. ISBN 9975-67-169-1.

[15] PÎNZARU, P., NEGRU, A., IZVERSCHII, T. *Taxoni rari din flora Republicii Moldova*. Chişinău, 2002, 148 p.

[16] PÎNZARU, P. *Plante rare de stâncării din Republica Moldova*. Chişinău: S.n., 2020 (Tipogr. UPS "Ion Creangă"), 330 p.

[17] *Plants of the World online*. Kew Science. Disponibil: http://www.plantsoftheworldonline.org/ (vizitat 10.01.2025).

[18] *Planul de management pentru zona Ramsar „Nistrul de Jos"*. Andreev, A., Anikeev, E., Arnaut, P. și al. Chișinău, 2017, 365 p. Disponibil: http://biotica-moldova.org/library/Plan%20managerial%20Nistrul%20de%20Jos.pdf (vizitat 10.01.2025).

[19] STOYANOV, S. Genista tetragona (Fabaceae) in the Bulgarian flora. *Phytologia Balcanica*. Sofia, 2014, vol. 20, no. 2-3, pp. 159–170. ISSN 1310-7771.

[20] ДИКОРАСТУЩИЕ полезные растения России. Отв. ред. БУДАНЦЕВ, А.Л., ЛЕСИОВСКАЯ, Е.Е. СПб.: Изд-во СПХФА, 2001, 663 с. ISBN 5-8085-0124-5.

[21] ЗАКОН № 325 от 15-12-2005 о Красной книге Республики Молдова. Доступен на сайте https://www.legis.md/cautare/getResults?doc_id=130540&lang=ru (vizitat 10.01.2025).

[22] ЧЕРВОНА книга України. Рослинний свит / ред. Я.П. ДІДУХА. Київ: Глобалконсалтинг, 2009, 912 с. ISBN 978-966-97059-0-7.

Received: May 02, 2025 *Accepted: July 21, 2025*

(Tatiana Izverscaia, Veaceslav Ghendov) "Al. Ciubotaru" National Botanical Garden (Institute), Moldova State University, Chisinau, Republic of Moldova

E-mail address: t_izverskaya@mail.ru, veaceslav.ghendov@gb.usm.md