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***ALLIUM FUSCUM* WALDST. ET KIT. AND *CHRYSOPOGON GRYLLUS* (L.) TRIN. IN
LANDSCAPE RESERVE „CARBUNA”**

Ghendov Veaceslav, Assoc. Prof., Ph. D. Head of Department of Spontaneous Flora and Herbarium, „Alexandru Ciubotaru” National Botanical Garden (Institute), researcher coordinator, **Belous Ștefan**, trainee scientific researcher, **Izverscaia Tatiana**, doctor of biological sciences, associate professor, researcher coordinator, **Ciocarlan Nina**, doctor of biological sciences, associate professor, researcher coordinator, National Botanic Garden (Institute) „Al. Ciubotaru”, MECC.

This article presents data on newly registered in the Landscape reserve „Cărbuna” two threatened with extinction rare vascular plants: *Chrysopogon gryllus* (L.) Trin. and *Allium fuscum* Waldst. et Kit. The chorological and some populational characteristics are presented and *A. fuscum* is proposed to be included in the next edition of *Red Book of the Republic of Moldova*.

Key words: *Landscape reserve „Cărbuna”, rare plants, Red Book of Republic of Moldova.*

În articol sunt expuse date despre două specii rare, amenințate cu dispariție în Republica Moldova, recent înregistrate în rezervația peisagistică „Cărbuna”: *Chrysopogon gryllus* (L.) Trin. și *Allium fuscum* Waldst. et Kit. Sunt prezentate caracteristicile corologice și unele caracteristici populaționale, iar pentru specia *Allium fuscum* se propune să fie inclusă în următoarea ediție a *Cărții Roșii a Republicii Moldova*.

Cuvinte-cheie: *Rezerva peisagistică „Cărbuna”, plante rare, Cartea Roșie a Republicii Moldova.*

Investigating and protecting the biological and landscape diversity of protected areas as indicator of their condition is an urgent problem in modern anthropogenic stress and global climate change. Especially important are such studies in southern arid forests, where the imposition of a complex of factors determines the exceptional complexity of organizing floristic and phytocenotic diversity - one of the key indicators of the regional specificity of the territory. *In situ* conservation of plant species is generally considered to be the primary approach for conservation as it ensures that species are maintained in their natural environments, allowing evolutionary processes to continue. For some species, which are dependent on complex relationships with other species for their survival it may be the only feasible conservation method [9].

The *in situ* method involves the conservation of species in natural, relatively undisturbed ecosystems; such ecosystems are characteristic of protected natural areas, primarily, nature reserves with a protected regime. They have the ability to conserve all species that are part of plant communities, but nature reserves are extremely important for the conservation of rare, endangered or vulnerable species. Such territories include the „Cărbuna” landscape reserve, which is located in the southern part of the Republic of Moldova and for which sub-Mediterranean floristic element with high biodiversity, which are of limited distribution in the republic.

As a result of the field survey, floristic and chorological studies of the rare vascular flora of the landscape reserve „Cărbuna” two rare species (*Chrysopogon gryllus* (L.) Trin. and *Allium fuscum* Waldst. et Kit.) were detected in the glades of the Eastern white oak woods – 91AA Habitat type. The estimation of the threatened status of these two species is made according to the IUCN Red List Categories and Criteria [5, 6], national legislation of Republic of Moldova [7,

11]. The designation of Habitat type was made according to NATURA 2000 on the basis of scientific criteria defined in Annex III of the Directive [4].

***Chrysopogon gryllus* (L.) Trin. (=Andropogon gryllus L.) (Fam. Poaceae (=Gramineae).**

Status. Vulnerable species [VU]. A1ac+4ace; B2ab (I, II, III, IV, V); D2.

Distribution. În the Republic of Moldova it is spread in central and southern districts: vill. Milești (Nisporeni); Călărași, Vărzărești Noi, Păulești (Călărași); Bucovăț, Lozova, Sireți, Strășeni, Cobâlca (Strășeni); Bălceana, Cărpineni, Hâncești, Buțeni, Sărata-Mereșeni, Fundul Galbenei (Hâncești); Răzeni (Ialoveni); Bulboaca (Anenii Noi); Zloți, Ialpuș (Cimișlia); Baimaclia (Cantemir); Baurci-Moldoveni, Andrușul de Sus, Chioselia Mica (Cahul); Bugeac, Dezghingea, Vulcănești; Ciumai (Taraclia). In the republic the species is located at the northern limit of its natural distributional area. Outside the country it has been registered in Central Europe (north-east), Ukraine, the Caucasus, the Mediterranean region, Asia Minor and Iran [1, 11, 12].



Fig. 1. Habitat. Glades and forest edges of the White oak (*Quercus pubescens* Willd.) woods.

Quantitative aspect. It grows in small groups on an area of circa 0,5 hectare. The subpopulations consist of specimens of different ages; plants are characterized by vitality and fructifying ability. In 1960-70s, the species often played the edifying role, in then much better represented east mediterranean (subtropical) steppic communities, but unfortunately, nowadays these communities is very seldom encountered [3].

Limitation factors. Extreme conditions at the limits of the spreading area; isolated populations; reduced specific habitats; grazing.

Biological and ecological characteristics. A perennial, hemicryptophyte plant. Blooms in May-June and fructifies in July-August. The species propagates by seeds and vegetatively. A xerophyllous species. The plant is decorative and forage.

Cultivation. Grows in ex-situ conditions in the steppe sector of the „Alexandru Ciubotaru” National Botanic Garden (Institute).

Protection status. The species is protected by law, included in *The Red Book of the Republic of Moldova* (ed. III). Territorially protected in the landscape reserves „Valea Adâncă”, „Pădurea Hâncești” and „Cărbuna”, in the Natural Reserve of Medicinal Plants „Seliște”, in the area with steppe vegetation in the south of Bugeac (VIII Ciumai) [11].

Protection measures. Respecting the protection regime in the growing sites, taken under the protection of the state; increasing the number of these sites; monitoring the status of subpopulations within the state protected areas; multiplication of the species in *ex-situ* conditions and its repatriation in natural habitats.

***Allium fuscum* Waldst. et Kit. (Fam. Alliaceae)**

Status. Critically Endangered species [CR]. A4ce; B2ab(I, II, III, IV); D2.

Distribution. În the Republic of Moldova it is met in the vicinity of railway station Zloți (Cimișlia) and village Vadul lui Isac (Cahul). In the republic the species is situated at the east limit of its natural distributional area. Outside the country it has been registered in Central Europe countries [2, 8, 10].

Habitat. Sunny slopes; steppe meadows, eroded and steep; in the glades of the forests with white oak [2].

Quantitative aspect. Species grows in very small isolated groups. The largest subpopulation occupies an area of about 0.5 ha, with abundance 1-2. The subpopulations are stable, represented by individuals of different ages, the density of plants reaching up to 2-5 mature plants per 1 m² [2].

Limitation factors. Extreme conditions at the limits of the distributional area; intensive grazing; the ruderalization of the steppes.

Biological and ecological characteristics. A perennial plant, geophyte. Blooms in July and fructifies in August. Propagates by seeds. A xerophyllous steppic species. The plant is decorative.

Cultivation. Unsuccessful attempts were made to grow in *ex-situ* conditions in the medicinal plants sector of the „Alexandru Ciubotaru” National Botanic Garden (Institute).



Fig. 2. Protection status. Territorially protected in the landscape reserve „Cărbuna”.

Protection measures. Respecting the protection regime and close monitoring of the „Cărbuna” subpopulation; increasing the number of known sites; multiplication of the species in *ex-situ* conditions and its repatriation in natural habitats. Inclusion in the List of species protected by the state and in *The Red Book of the Republic of Moldova* (ed. IV).

This critically endangered species was registered in a Habitat of Eastern white oak woods. The Azonal white-oak dominated woods with a submediterranean flora, occupying thermic oases within the sub-continental *Quercion* and *Carpinion* zones [4]. They are characterized by *Quercus pubescens* Willd. woods of the Black Sea plains. The oaks are accompanied by *Carpinus orientalis* Mill., *Fraxinus excelsior* L., *Acer campestre* L. or *Tilia tomentosa* Moench and by sub-Mediterranean floral elements, such as: *Chrysopogon gryllus* (L.) Trin. *Chrysaspis aurea* (Poll.) Greene, *Ferulago galbanifera* (Mill.) Koch, *Gagea paczoskii* (Zapal.) Ghrossh., *Gagea villosa* (Bieb.) Duby, *Coronaria coriacea* (Moench) Schischk. et Gorschk., *Galium mollugo* L., *Galium octonarium* (Klok.) Soo, *Cotinus coggygria* Scop., *Crataegus monogyna* Jacq., *Scorzonera cana* (C.A.Mey.) O.Hoffm., *Silene bupleuroides* L., *Cruciata laevipes* Opiz, *Dianthus armeria* L., *Dianthus carthusianorum* L., *Erysimum*

cuspidatum (Bieb.) DC., *Falcaria vulgaris* Bernh., *Galatella linosyris* (L.) Reichenb. fil., *Hieracium pilosella* L., *Inula conyza* DC., *Leopoldia comosa* (L.) Parl., *Ranunculus illyricus* L., *Salvia nemorosa* L., *Salvia verticillata* L., *Stachys recta* L., *Teucrium chamaedrys* L. etc.

On the basis of estimated conservation status according to IUCN Red List Categories and Criteria [5, 6] we propose *A. fuscum* [CR A4ce; B2ab (I, II, III, IV); D2] to be included in the next edition of *Red Book of the Republic of Moldova* and in the List of vascular plants protected by national law. The two species are met in the Priority habitat type 91AA (Eastern white oak woods) which is in danger of disappearance.

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