

## Plant species of conservation concern, preserved in national protected areas in the Eastern Rhodopes floristic region, Bulgaria

Vladimir Trifonov<sup>1\*</sup>, Plamen Stoyanov<sup>2,5</sup>, Gana Gecheva<sup>1,3</sup>, Kiril Vassilev<sup>3</sup> and Vladimir Vladimirov<sup>3,4</sup>

<sup>1</sup> University of Plovdiv “Paisii Hilendarski”, Faculty of Biology, Department of Ecology and Environmental Conservation, 24 Tzar Asen Str., 4000 Plovdiv, Bulgaria

<sup>2</sup> University of Plovdiv “Paisii Hilendarski”, Faculty of Biology, Department of Botany and Biological Education, 24 Tzar Asen Str., 4000 Plovdiv, Bulgaria

<sup>3</sup> Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Bulgaria

<sup>4</sup> Botanical Garden, Bulgarian Academy of Sciences, Sofia, Bulgaria, 2 Gagarin Str., 1113 Sofia, Bulgaria

<sup>5</sup> Medical University of Plovdiv, Faculty of Pharmacy, Department of Bioorganic Chemistry, Vasil Aprilov Str. 15A, 4002 Plovdiv, Bulgaria

\*Corresponding author: vtrifonof@gmail.com

### Abstract

Trifonov, V., Stoyanov, P., Gecheva, G., Vassilev, K. & Vladimirov, V. (2024). Plant species of conservation concern, preserved in national protected areas in the Eastern Rhodopes floristic region, Bulgaria. *Bulg. J. Agric. Sci.*, 30 (Supplement 1), 11–16

The floristic region of Eastern Rhodopes (ER) is situated in Rilo-Rhodopean range, Southeast Bulgaria. In the ER are designated 58 national protected areas (PAs), 19 of them with 31 plant species of conservation significance, as an object of protection. PAs are one of the most important tools for the conservation of biological diversity. It is expected that the introduced protection regimes in each of them lead to the maintenance or improvement of the state of the populations of the target species. For eight species, this is the only floristic region, in which they are found in Bulgaria. Based on the above the present study aims to review the state of the vascular plant species populations of high conservation concern.

The habitats and populations of most of the studied species have not deteriorated since the declaration of the respective protected areas. The main threats are related to habitat deterioration due to changes in ecological conditions (warming, drying), or anthropogenic activities (waste dumping, rock mass mining, reduction/absence of grazing, etc.).

Conclusions and recommendations are made on the status and conservation of the presented plant species. In general, it can be concluded that the protected areas in the Eastern Rhodopes guarantee the protection of plant species of high conservation concern. However, a periodic assessment of the state of their populations and adaptation of the conservation regimes is necessary.

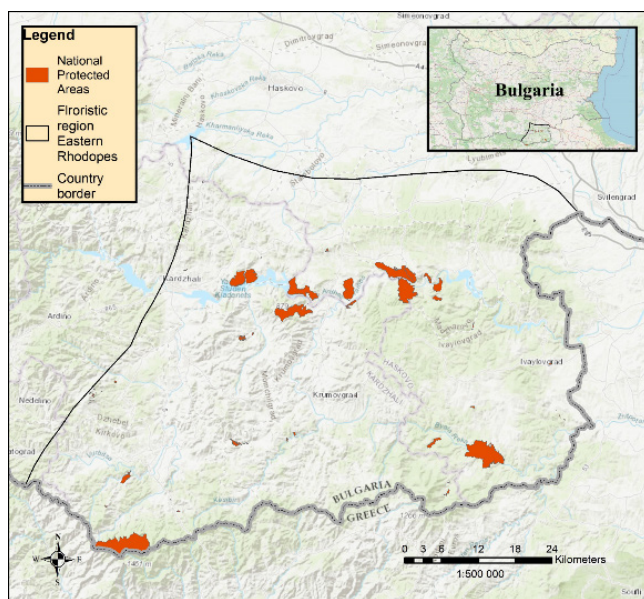
**Keywords:** plant conservation; protected areas; rare plants; monitoring

### Introduction

Designation of protected areas is one of the most important tools for the conservation of biological diversity. So far, 58 national protected areas (PAs) have been designated in

the ER floristic region (Figure 1), which is situated in the easternmost parts of the Rilo-Rhodopean range, Southeast Bulgaria. These include 1 strict reserve, 2 managed nature reserves, 27 natural monuments and 28 protected sites (Register of PAs, Executive Environmental Agency (ExEA),

2024, web site of MoEW). Nineteen PAs were designated for preserving a total of 31 vascular plant species of conservation significance, covering an area of 5066.29 ha (about 63% of the surface of the PAs in the ER). There are another 19 PAs with different categories, which were established to protect plant species without conservation status such as: *Salvia officinalis*, *Paeonia peregrina*, *Pinus nigra* and *Coryllus colurna* or have an object of protection: “rare and wild growing orchids”, “protected and rare plants”, “forest formations” or “plants preservation” in general.



**Fig. 1. Map of the national protected areas in the floristic region of Eastern Rhodopes**

Vascular plant species in the PAs in ER have been an object of many researches and publications. Stoyanov et al. (1955), reported newly recorded plant species in the area. Gushev et al. (1998a, 1998b) conducted floristic surveys in the ER. Stanev (1994), Uzunov et al. (2000), Pavlova et al. (1997, 2002, 2003, 2004), Petrova et al. (1998, 1999, 2004), Teppner and Karl (2017), Stoyanov and Marinov (2020) and Doumas et al. (2022) provided new chorological information on the flora and species of conservation concern in the region. Vascular plants with conservation status have been investigated by Trifonov (2005), Petrova (2004), Petrova et al. (1998), Petrova & Vladimirov (2009, 2010), Pavlova (2007), Pavlova et al. (2011) and Peev et al. (2015).

This study aims to analyze the conservation status according to national and international designations of vascular plant species of conservation concern in selected PAs of ER,

to assess their current population state, and to identify the main threats and infringements affecting their populations.

## Materials and Methods

Plant species of conservation concern have been selected based on the following two approaches:

1. Review of the orders of declaration of all PAs in ER floristic region, with plant species, object of preservation;

2. Selection of the plant species from these orders, included in the following categories: Legally protected (in Appendix 3 of the Bulgarian Biodiversity Act), Red List of Bulgarian vascular plants (Petrova & Vladimirov 2009), Bulgarian Red Data Book (Peev et al. 2015), international conventions and endemics. To assess the state of populations and threats, field studies were conducted in each of the selected protected areas for the period of 3 years (2022–2024).

The transect method has been applied. Transects were evenly spaced across the PAs and cover the diversity of habitats. The vascular plant monitoring methodology of the National Biodiversity Status Monitoring System of the ExEA (NBSMS, BIOMON: <https://eea.government.bg/bg/bio/nsmb/osnoven-dokument-na-nsmb>) was used, and field forms were filled in to determine the status and threats of populations of target species.

The taxonomic identity of the target species was verified according to Stoyanov et al. (2022) and Jordanov (1963–1979). Adopted Action plans (Delcheva & Bancheva, 2014; Peev & Valyovska, 2015a,b) for some of the species were also used. Information about endemic plant species follows Petrova & Vladimirov (2010). For each species, the international and national conservation status is presented.

The PAs register of the ExEA was used for information on designation orders, prohibition regimes, geographical boundaries, objects of preservation, etc.

## Results and Discussion

Thirty-one vascular plant species (Table 1) of conservation concern are subject to preservation in 19 PAs.

The Red List of Bulgarian vascular plants (Petrova & Vladimirov, 2009) includes 27 of the species, of which: Critically Endangered are 5, Endangered – 7, Vulnerable – 10, Near Threatened – 3, Data Deficient – 1, and Least Concern – 1. Of these species, 15 with the highest categories are included in the *Bulgarian Red Data Book* (Peev et al. 2015).

Critically Endangered species are: *Adiantum capillus-veneris*, *Cephalanthera epipactoides*, *Eriolobus trilobata*, *Lilium rhodopeum*, and *Orchis provincialis*. Four of

**Table 1. List of vascular plant species, subject to protection in the protected areas in Eastern Rhodopes floristic region**

№	Plant species	Conservation status	Protected area	Notes
1	<i>Adiantum capillus-veneris</i> L.	CR (RL, RDB), LP	PS Nahodishte na Venerin kosam – Kyoshdere (1.5 ha)	Tertiary relict
2	<i>Cephalanthera epipactoides</i> Fisch. & C. A. Mey.	CR (RL, RDB), LP, CITES (Annex II)	PS Likana (3.00 ha)	The only locality in Bulgaria
3	<i>Eriolobus trilobata</i> (Labill. ex Poir.) M. Roem.	CR (RL, RDB), LP	1. PS Nahodishte na tridelnolisten <i>Eriolobus</i> – Livadite (2.22 ha) 2. PS Nahodishte na tridelnolisten <i>Eriolobus</i> – Daneva cheshma (2.00 ha)	The only locality in Bulgaria
4	<i>Lilium rhodopeum</i> Delip.	CR (RL, RDB), LP, Bern convention (annex I)	PS Gyumurdzhinski snezhnik (1926.40 ha)	Balkan endemic
5	<i>Orchis provincialis</i> Balb. ex Lam. & DC.	CR (RL, RDB), LP, CITES (annex II), Bern convention (annex I)	1. PS Nahodishte na provaski salep – Lozengradtsi (7.07 ha) 2. PS Nahodishte na provanski salep – Aprilci (0.56 ha)	The only locality in Bulgaria
6	<i>Juniperus sabina</i> L.	EN (RL, RDB), LP	PS Gyumurdzhinski snezhnik (1926.40 ha)	
7	<i>Taxus baccata</i> L.	EN (RL, RDB), LP	PS Oreshari (55.00 ha)	Tertiary relict
8	<i>Convolvulus boissieri</i> Steud.	EN (RL, RDB), LP	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	The only locality in Bulgaria
9	<i>Galanthus elwesii</i> Hook. f.	EN (RL, RDB), LP	NM Nahodishte na snezhno kokiche – Petkov bair (0.10 ha)	
10	<i>Ilex aquifolium</i> L.	EN (RL, RDB), LP	PS Dolno Chernovishte (469.11 ha)	Tertiary relict
11	<i>Verbascum rupestre</i> (Davidov) I. K. Ferguson	EN (RL, RDB), LP	PS Chernata skala (893.70 ha)	Balkan endemic
12	<i>Verbascum spathulisepalum</i> Greuter & Rech.f.	EN (RL, RDB), LP	1. PS Nahodishte na rodopski lopen – Gorni Yurutsi (24.28 ha) 2. Nahodishte na rodopski lopen – Drangovo (8.08 ha)	The only floristic region in Bulgaria, Balkan endemic
13	<i>Legousia pentagonia</i> (L.) Thell.	VU (RL)	PS Meandrite na Byala reka (1531.98 ha)	The only locality in Bulgaria
14	<i>Acer heldreichii</i> Orph.	VU (RL, RDB), LP	PS Gyumurdzhinski snezhnik (1926.40 ha)	Balkan endemic
15	<i>Anacamptis papilionacea</i> (L.) R. M. Bateman, Pridgeon & M. W. Chase	VU (RL), LP	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	
16	<i>Anthemis rumelica</i> (Velen.) Stoj. & Acht.	VU (RL, RDB), LP	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	Balkan endemic
17	<i>Astragalus thracicus</i> Griseb.	VU (RL, RDB), LP	PS Nahodishte na trakiiski klin – Vodentsi (13.67)	Tertiary relict
18	<i>Carduus thracicus</i> (Velen.) Hayek	VU (RL, RDB), LP	PS Chernata skala (893.70 ha)	Balkan endemic
19	<i>Goniolimon collinum</i> (Griseb.) Boiss.	VU (RL), LP	PS Dolno Chernovishte (469.11 ha)	
20	<i>Saponaria stranjensis</i> Jordanov	VU (RL, RDB) LP	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	Balkan endemic
21	<i>Trachelium rumelianum</i> Hampe	VU (RL, RDB), LP	PS Oreshari (55.00 ha)	Balkan endemic
22	<i>Verbascum roripifolium</i> (Halácsy) I. K. Ferguson	VU (RL)	PS Chernata skala (893.70 ha)	Balkan endemic
23	<i>Lathraea rhodopea</i> Dingler	NT (RL), LP	1. NM Nahodishte na rodopska gorska mayka – Perperek (1.7 ha) 2. PS Oreshari (55.00 ha) 3. PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	Balkan endemic, Tertiary relict
24	<i>Platanus orientalis</i> L.	NT (RL)	PS Meandrite na Byala reka (1531.98 ha)	

Table 1. Continued

25	<i>Scandix australis</i> L.	NT (RL)	PS Chernata skala (893.70 ha)	
26	<i>Cleome ornithopodioides</i> L.	DD (RL), LP	PS Meandrite na Byala reka (1531.98 ha)	
27	<i>Haberlea rhodopensis</i> Friv.	LC (RL), LP, Bern convention Annex I	NM Nahodishte na rodopski silivryak – Rabovo (0.50 ha)	Balkan endemic, Relict
28	<i>Aethionema rhodopaeum</i> D. Pavlova	no status	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	Balkan endemic
29	<i>Asplenium cuneifolium</i> Viv.	no status, LP	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	
30	<i>Fritillaria pontica</i> Wahlenb.	no status, LP	PS Chernata skala (893.70 ha)	
31	<i>Onosma kittaniae</i> Strid ex Stefanović, Kit Tan & Iatrou (= <i>Onosma pavlovae</i> Petrova & Kit Tan)	no status	PS Ultrabazichni skali s pionerna trevna rastitelnost (125.12 ha)	Balkan endemic

[Threat categories: **CR** – Critically Endangered, **EN** – Endangered, **VU** – Vulnerable, **NT** – Near Threatened, **DD** – Data Deficient, **LC** – Least Concern; **RL** – Red List of Bulgarian vascular plants; **RDB** – Red Data Book of the Republic of Bulgaria, vol. 1 Plants and fungi; **LP** – legal protection, i.e. listed in Appendix 3 of the Bulgarian Biodiversity Act; Categories of PAs – **NM** – Natural monument, **PS** – Protected site].

the species except *Adiantum capillus-veneris* have the only locality in the ER for Bulgaria. All species are rare in the region, usually with single or few localities, and populations comprising a dozen to a few hundred specimens or occupying just a few dozens of square meters. The extreme case is *E. trilobata*, which is represented by only two trees in poor phytosanitary condition.

Endangered species are: *Juniperus sabina*, *Taxus baccata*, *Convolvulus boissieri*, *Galanthus elwesii*, *Ilex aquifolium*, *Verbascum rupestre*, and *V. spathulisepalum*. Most species are rather rare in the region, usually with single or few localities, and populations comprising a dozen to a few hundred specimens. *Juniperus sabina* is represented with a single locality and just several shrubs occupying a small area at the Bulgarian-Greek border.

Vulnerable species are: *Acer heldreichii*, *Anacamptis papilionacea*, *Anthemis rumelica*, *Astragalus thracicus*, *Carduus thracicus*, *Goniolimon collinum*, *Legousia pentagonia*, *Saponaria stranjensis*, *Trachelium rumelianum*, and *Verbascum roripifolium*. Most of the species are represented with a few to many localities and populations with a good number of individuals. Exceptions are *L. pentagonia* and *S. stranjensis*, which are represented by just a few localities with a small number of individuals.

Twenty-five species in the PAs of ER are legally protected according to the Bulgarian Biodiversity Act (2002). Balkan endemics are 13: *Acer heldreichii*, *Aethionema rhodopaeum*, *Anthemis rumelica*, *Carduus thracicus*, *Haberlea rhodopensis*, *Lathraea rhodopea*, *Lilium rhodopeum*, *Onosma kittaniae*, *Saponaria stranjensis*, *Trachelium rumelianum*, *Verbascum roripifolium*, *V. rupestre*, and *V. spathulisepalum*.

Species with the only occurrence in Bulgaria in ER floristic region are eight: *Aethionema rhodopaeum*, *Ceph-*

*alanthera epipactoides*, *Convolvulus boissieri*, *Eriolobus trilobata*, *Legousia pentagonia*, *Onosma kittaniae*, *Orchis provincialis*, and *Verbascum spathulisepalum*. This group contains some of the most endangered plant species in the country, since the Bulgarian populations are at the margin of their general distribution areas.

Relicts are six: *Adiantum capillus-veneris*, *Astragalus thracicus*, *Eriolobus trilobata*, *Ilex aquifolium*, *Lathraea rhodopea*, and *Taxus baccata*. There are four species without a threat category, according to the national Red List: *Aethionema rhodopaeum*, *Asplenium cuneifolium*, *Onosma kittaniae*, and *Fritillaria pontica*. Two of these taxa – *A. rhodopaeum* and *O. kittaniae*, have been recently described as a new to science species and their conservation status has not been assessed yet. Two species – *Orchis provincialis* and *Galanthus elwesii* are included in CITES II. In Bern convention are listed two species: *Haberlea rhodopensis* and *O. provincialis*.

The review of the PAs which comprise the species of conservation concern listed in Table 1 can be summarized as follows:

1. In the floristic region of ER, 19 PAs have been declared for the conservation of these 31 species of vascular plants with conservation significance;

2. The total area of the above 19 PAs is 63% of the area of all PAs in the ER;

3. Of 31 species of conservation concern, 25 are protected under the Biodiversity Act out of a total of 104 in the floristic region of ER;

4. Endemic plant species are 13 out of 98 in the ER;

5. The total number of species included in the Red Data Book of the Republic of Bulgaria is 18 out of 93 species in the ER;

6. The total number of species included in the Red List of Bulgarian vascular plants is 27 out of 101 in the ER.

The surface of PAs with plant species of conservation concern, represents more than half of the total area of PAs in the floristic region. A significant number of species of conservation importance are included in the orders for designation of the PAs.

The absence of all target species from the designation orders as conservation objects does not imply that they do not occur in the relevant PAs. Further surveys are needed to identify all rare plant species in the PAs to include them in the conservation designations. Literature and field surveys are also needed to investigate all species of conservation concern in the ER to assess which of the localities not included in the PAs should be the subject of proposals for new designations of PAs.

The analysis of the data from the field studies and completed field forms shows the following summary results:

1. The populations of the target species within the PAs are in good general condition, density and abundance. The only exception is *Eriolobus trilobata*, which is represented by only 2 individuals in poor phytosanitary condition;

2. The main threats can be grouped as follows: a) abiotic: river bank sliding, riverbed displacement; b). climatic: prolonged periods of drought and high temperatures leading to desiccation and suppression of plant development; c). ecological: overgrowth of shrubs and trees due to lack of grazing, and competition from other plant species; d). anthropogenic: mining, waste dumping, logging of single trees.

Despite the identified threats and infringements, no significant deterioration of the habitats nor decline of the populations of the species of conservation concern in the PAs were observed during the monitoring period.

## Conclusions

The protection regimes introduced by the designation orders in each of the PAs provide an important contribution to the conservation and maintenance of the populations of the target species. No infringements leading to deterioration of the populations of the plant species, subject to conservation since the designation of the respective PAs have been identified.

The main threats are related to habitat degradation due to changes in ecological conditions (warming, drying) or anthropogenic activities (waste dumping, mining, reduction/lack of grazing, etc.).

Populations of most studied species have not declined since the declaration of the respective protected areas. In general, it can be concluded that the protected areas in the

Eastern Rhodopes floristic region guarantee the protection of plant species of high conservation concern. However, a periodic assessment of the state of their populations and adaptation of the conservation regimes is necessary.

The following recommendations can be made:

1. The management of the PAs should be a state priority, together with an expert and financial enforcement of the Regional Inspectorates of Environment and Waters;

2. Legally requiring the management institutions to control the implementation of regimes in protected areas will have a clear positive effect. This could be ensured by regular monitoring (under the methodology of ExEA) and annual inspections of the protected areas' regimes and status;

3. Ensuring the maintenance of the natural state of the plant species' habitats and localities in the PAs;

4. In order to prevent unwanted anthropogenic activities, boundary marking and information boards have to be permanently maintained in good condition.

## Acknowledgment

The research was supported by the NPD-Plovdiv University "Paisii Hilendarski", Grant No MUPD23-BF-008.

## References

- Biological Diversity Act.** (2002). *State Gazzette*, 77, 09.08.2002 (Bg).
- Delcheva, M. & Bancheva, S.** (2014). Action plan for conservation of the plant species *Astracantha thracica* (Griseb.) Podl. in Bulgaria 2014 – 2023 (Bg). Retrieved from <https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastitenni-vidove/planove-za-dejstvie/>.
- Doumas, P., Goula, K. & Constantinidis, T.** (2022). Thirty-two new and noteworthy floristic records from north-eastern Greece. *Biodiversity Data Journal*, 10, e81817. <https://doi.org/10.3897/BDJ.10.e81817>.
- Executive Environmental Agency (ExEA).** (2024). Register of the protected areas and sites in Bulgaria (Bg). <https://eea.government.bg/zpo/bg>.
- Gushev, Ch., Uzunov, D., Denchev, C. & Apostolov, K.** (1998a). Floristic studies of the reserve "Valchi dol" (the Eastern Rhodopes Mts.). In: *Proceedings Scientific Papers Jubilee Scientific Conference with international participation "70th Anniversary of the Forest Research Institute"*, 6-7 October 1998 (Stoikov, H., ed.) Sofia, II, 168-173.
- Gushev, Ch., Uzunov, D., Denchev, C. & Apostolov, K.** (1998b). New chronological data on vascular plants in the Eastern Rhodopes. *Phytologia Balcanica*, 4(1-2), 187-195.
- Jordanov, D.** (ed.). (1963–1979). *Flora Reipublicae Popularis Bulgaricae*. Vols 1-7. Aedibus Acad. Sci. Bulgaricae, Serdicae (Bg).
- Pavlova, D.** (2007). Endemics and rare plants growing on serpentines in the Rhodopes mountains (Bulgaria). In: *Zbornik na*

- trudovi posveten na akademik Kiril Micevski. Collection of Papers Devoted to Academician Kiril Micevski*, 157-170. UDK: 581.9.063.7(497.2:23).
- Pavlova, D., Dimitrov, D. & Kožuharova, E.** (2004). Flora of the serpentine complexes in Eastern Rhodopes (Bulgaria). In: *Biodiversity of Bulgaria. 2. Biodiversity of Eastern Rhodopes (Bulgaria and Greece)* (Beron, P. & Popov, A., eds.). *Pensoft & Nat. Mus. Natur. Hist.*, Sofia, 111-121.
- Pavlova, D., Kozuharov, S., Dimitrov, D. & Kozuharova, E.** (1997). New chorological data and critical notes for the flora of the Eastern Rhodopes Mts. *OT Sistematič Botanič Dergisi*, 4(1), 3-8.
- Pavlova, D., Kozuharova, E. & Dimitrov, D.** (2002). New chorological data for the Flora of the East Rhodopes Mts. *Ann. Univ. Sofia Fac. Biol.*, 90(2), 79-85.
- Pavlova, D., Kožuharova, E. & Dimitrov, D.** (2003). A floristic catalogue of serpentine areas in the Eastern Rhodope Mountains (Bulgaria). *Polish Botanical Journal*, 48(1), 21-41.
- Pavlova, D., Nedelcheva, A. & Nikolov, N.** (2011). Plants of conservation importance from serpentinite site in Eastern Rhodopes. In: Proc. VII Natl. Conf. Bot. (Petrova, A., ed.), 29-30.09.2011, Sofia. *Bulg. Bot. Soc.*, 461-470 (Bg).
- Peev, D., Petrova, A., Anchev, M., Temniskova, D., Denchev, C. M., Ganeva, A., Gussev, Ch. & Vladimirov, V.** (eds). (2015). Red Data Book of the Republic of Bulgaria, 1. Plants and Fungi. – Sofia (Bg).
- Peev, D. & Valyovska, N.** (2015a). Action plan for the conservation of the plant species *Eriolobus trilobata* M. J. Roem. in Bulgaria 2015 – 2024 (Bg). Retrieved from <https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastiteni-vidove/planove-za-dejstvie/>.
- Peev, D. & Valyovska, N.** (2015b). Action plan for the species *Orchis provincialis* – Provence Orchid. 2015-2024. (Bg). Retrieved from: <https://www.moew.government.bg/bg/priroda/biologichno-raznoobrazie/zastiteni-vidove/planove-za-dejstvie/>.
- Petrova, A.** (2004). Flora of the Eastern Rhodopes (Bulgaria) and its conservation significance. In: *Biodiversity of Bulgaria. 2. Biodiversity of Eastern Rhodopes (Bulgaria and Greece)* (Beron, P. & Popov, A., eds.). *Pensoft & Nat. Mus. Natur. Hist.*, Sofia, 53-118.
- Petrova, A., Gerasimova, I., Vassilev, R. & Gerasimov, G.** (1998). One locality of *Taxus baccata*, *Adiantum capillis-veneris* and other relict and rare plant species in the Eastern Rhodopes. – In: *Proceed. Jubilee Scien. Conf. "70th Anniv. Forest Research Inst."*, Sofia, 2, 158-161 (Bg).
- Petrova, A., Gerasimova, I. & Vassilev, R.** (1998). Contribution to the flora of the Eastern Rhodopes. *Historia naturalis bulgarica*, 9, 115-127 (Bg).
- Petrova, A., Gerasimova, I. & Venkova, R.** (1999). New data on the flora of the Eastern Rhodopes. *Historia naturalis bulgarica*, 10, 117-123 (Bg).
- Petrova, A., Vassilev, R., Christov, Ch. & Gerasimova, I.** (2004). New data and notes on the flora of the Eastern Rhodopes (Bulgaria). In: *Biodiversity of Bulgaria. 2. Biodiversity of Eastern Rhodopes (Bulgaria and Greece)* (Beron, P. & Popov, A., eds.). *Pensoft & Nat. Mus. Natur. Hist.*, Sofia, 131-138.
- Petrova, A. & Vladimirov, V.** (eds). (2009). Red List of Bulgarian vascular plants. *Phytologia Balcanica*, 15(1), 63-94.
- Petrova, A. & Vladimirov, V.** 2010. Balkan endemics in the Bulgarian flora. *Phytologia Balcanica*, 16(2), 293-311.
- Stanev, S.** (1994). Several new plants for the flora of the Eastern Rhodopes and the southern Black Sea coast. *Proceedings of the Museums in Southern Bulgaria*, 20, 9-11 (Bg).
- Stoyanov, K., Raycheva, Ts. & Cheschmedzhiev, I.** (2022). Key to the native and foreign vascular plants in Bulgaria. Interactive extended and supplemented edition. *Academic Publishing House of the Agrarian University* (Bg).
- Stoyanov, N., Kitanov, B. & Velchev, V.** (1955). Floristic materials from the Eastern Rhodopes. *Mitteilungen des Botanischen Instituts*, 6, 111-117 (Bg).
- Stoyanov, S. & Marinov, Y.** (2020). Reports 66–70. In: New floristic records in the Balkans: 43 (Vladimirov, V., Aybeke, M. & Tan, K. (comp.)). *Phytologia Balcanica*, 26(3), 550–554.
- Teppner, H. & Karl, R.** (2017). *Onosma kittanae* (Boraginaceae-Lithospermeae). *Mitteilungen des Naturwissenschaftlichen Vereines für Steiermark*, 147, 77–97.
- Trifonov, V.** (2005). State of the population of *Orchis provincialis* Balbis in the Eastern Rodopi Mts. In: *Biodiversity, ecosystems, global changes. 1-st National Scientific Conference in Ecology* (Chipev, N. & Bogoev, V., eds). Sofia, Petekson, 161–166 (Bg).
- Uzunov, D., Gussev, Ch. & Apostolov, K.** (2000). Chorological data for some plant species with conservation value in the Eastern Rhodopes Mt. (South-East Bulgaria), 47-55. Proceeding of 6th Symposium on Flora of the Southeastern Serbia, Sokobanja. Web site of the Ministry of Environment and Waters (MOEW): <https://www.moew.government.bg/bg/priroda/zastiteni-teritorii/planove-za-upravlennie-na-zastiteni-teritorii-vlezli-v-sila/rezervati-i-poddurjani-rezervati/>.

Received: October, 09, 2024; Approved: November, 07, 2024; Published: December, 2024