Important Species of Plants for Biodiversity Conservation in the North Dobrogean Plateau – Conservation Status

Specii de plante importante pentru conservarea biodiversității în Podișul Nord-dobrogean – Statut de conservare

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Abstract

The changes induced by human activities in the last decades, in the North Dobrogean Plateau site (NDP), request the necessity to re-evaluate the conservation status of the flora and vegetation in this area. The NDP vegetation is part of the steppe unit, consisting of plants resistant to drought. In physical geography, a steppe is an eco-region, in the montage grasslands and shrub lands and temperate grasslands, savannas and shrub lands biomes, characterized by grassland plains without trees apart from those near rivers and lakes. Usually, steppes are characterized by a semi-arid or continental climate. Although these species of plants have developed mechanisms for efficient water management, they are vulnerable to climate change, which tends to increase the humidity deficit and the temperature gap. In addition to this global pressure, the NDP flora it is affected by other human activities, such as overgrazing, improper storage of waste, introduction of invasive species and change of land cover. The re-evaluation of the NDP flora is focused on a number of 74 species, of which seven are on the Annex II of the Habitat Directive (2236 Campanula romanica, 2079 Moehringia jankae, 2253 Centaurea jankae, 2327 Himantoglossum caprinum, 2125 Potentilla emilii-popii, 4067 Echium russicum, 4097 Iris aphylla subsp. hungarica). Four of them were identified in the NDP (Campanula romanica, Moehringia jankae, Himantoglossum caprinum, Potentilla emilii-popii).The other 67 are present on the National Red Lists or were the basis for the declaration of the nature reserves of the NDP. More than 70% of the species were identified in the field, for them were made the distribution maps, were estimated also the population size. The conservation status was established based on the population size, the pressures and threats. With the exception of two species (Lunaria annua and Salvia aethiopis) the other species are represented by optimal populations and are in a favourable (FV) conservation status. In a hierarchy of pressure types the order is as follows: over-grazing, improper storage of waste, introduction of invasive species, change of land cover, the most important being the over-grazing.

Keywords: *steppe vegetation, plant conservation status, Habitat Directive, pressures and threats, management measures*

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Introduction

The word" *steppe*" means an environment consisting of wide temperate prairies, generally with hot dry summers and cold rainy winters. The steppes of the Northern hemisphere are located within continents, between 30° and 50° latitude. In the Southern hemisphere, this biome is less frequent and mostly be found in South America. The climate of the steppe is dry, with hot summers and freezing winters. [1]

As to its climate in Asia, Eastern steppes are very different from the Western ones. In the East, rains do not exceed 60 mm/ year, while Western steppes can receive up to 400 mm/ year. As to temperatures, the average temperature of Eastern Asian steppes is 25°C in summer and –15°C in winter, while in the West the average never exceeds 20°C in summer and 0°C in winter. The lack of trees is due not only to the climate, but also to the large herbivores' intense grazing and sometimes to man's deforestation. The steppe in the world is the temperate prairies are widespread in all continents. They are generally known as steppe but have other names as well, depending on the language of the geographical area where they are. European prairies (*puszta*) extend from Hungary to southern Russia and from there to Mongolia (steppe). In South-America, the steppe is in Peru and Bolivia (*puna*) and Argentina (*pampas*). In South-Africa and Australia, the steppe is called *veldt*, while the great expenses of grass of North America are simply called *prairies*. There are also subtropical steppes in central Spain, Turkey, Nepal and Texas, which are generally the result of destroyed forests. [2]

Eurasian Steppe. The largest temperate grassland in the world is the Eurasian steppe, extending from Hungary to China. It reaches almost one-fifth of the way around the Earth. The Eurasian steppe is so well known; the area is sometimes referred to as just The Steppe.

Other Steppes. The dry, short grass prairie of North Americas Great Plains is also a steppe. The short grass prairie lies on the western edge of the Great Plains, in the rain shadow of the Rocky Mountains. It extends from the U.S. state of Texas in the south to the province of Saskatchewan, Canada, in the north. [3] The steppe is a biome with herbaceous vegetation. The Western steppes, which are more humid, are extremely rich in species. In the wet areas formed by melted snow, small trees and shrubs grow especially poplars and aspens, which sometimes cluster into small woods. Conversely, in Eastern steppes the vegetation is poorer and without trees. Everywhere the vegetation mainly consists of graminaceous plants, herbs that sometimes can be two meters tall as in the great Chinese "Grass Sea". Some species of pulse vegetables and composites also grow here. In the South-American steppe lives a very rare and exceptional plant: the Titanca (*Puya raimondii*), a typical plant of the *puna*, e.g. the Andean steppe of Peru and Bolivia. It grows 4,000 metres

above sea level and reaches 10 meters tall; it looks like a huge pineapple. It blooms and bears fruit only when old, generally when over one hundred years old. Threatened by breeding and farming, it is rarer than it used to be, and in many areas it seems to be actually disappearing. [2] Why North Dobrogean Plateau (NDP) is such an important area? NDP vegetation is part of the steppe unit (also present in Ukraine and Bulgaria) and of Steppic Bio-geographic Region that it is officially present at the European Union level only in Romania (X). Compared to the entire EU surface the Steppic Region represents less than 1%, more than enough reason to preserve the species and habitats of this region. The NDP represents the protected area with the largest surface of steppe grasslands in the entire Steppic Region within the Natura 2000 network (Figure 1). [4] Therefore, the identification, mapping and evaluation of the conservation status for the characteristic plant species are among the activities of the first importance in order to implement an effective management plan for this protected area.

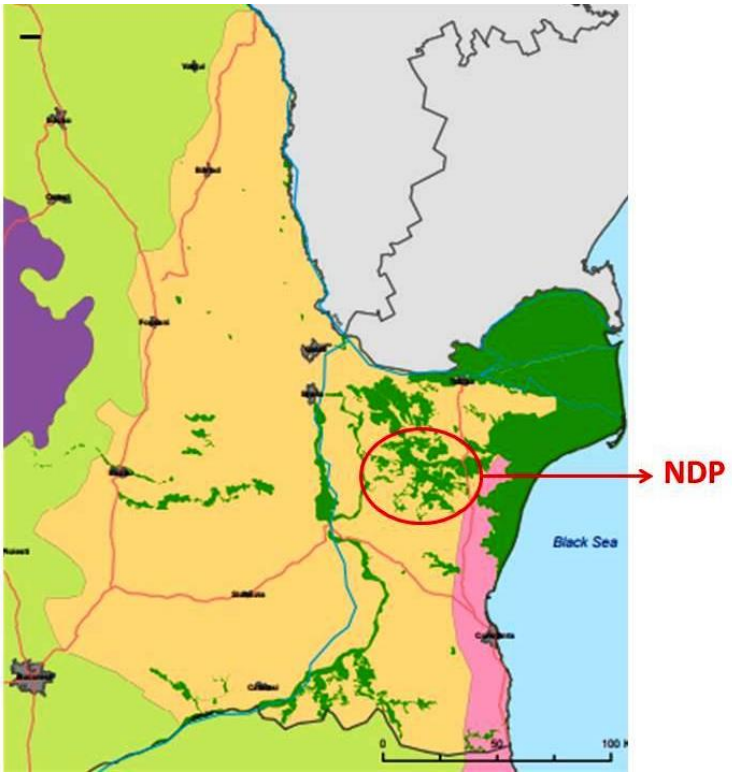


Figure 1. NDP in the bio-geographic “Steppe” region (source: ec.europa.eu)
Fig. 1. PND în regiunea bio-geografică „Stepa” (sursa: ec.europa.eu)

Materials and Methods

The study was conducted between March 2019 and June 2020, and is part of the project “Integrated Management of the North Dobrogean Plateau (MIPoNoDo)” – POIM, cod SMIS 116964. The financial support was provided from EU funds through Large Infrastructure Operational Programme (POIM 2014 – 2020)/ Priority Axis 4 – *Environmental protection by taking measures to preserve biodiversity, air quality monitoring and decontamination of historically contaminated sites*, Specific Objective 4.1 – *Operation for increasing the conservation status of biodiversity and rebuilding damaged ecosystems*.

Aim of the evaluation was the assessment of the conservation status of plant species and non-forest habitats for which were declared protected areas in the study area of the project.

The investigated area was relatively large (84,875 ha) and included:

a. *four Natura 2000 sites*:
   - ROSCI0201 Podișul Nord Dobrogean
   - ROSPA0091 Pădurea Babadag
   - ROSPA0100 Stepa Casimcea
   - ROSPA0040 Dunărea Veche – Brațul Măcin

b. *17 nature reserves of national interest* from the 22 presents in Dobrogea region (IV.49 Pădurea Babadag-Codru, IV.51 Muchiile Cernei-Iaila, IV.52 Beidaud, IV.53 Valea Mahomencea, IV.54 Dealul Ghiunghiurmez, IV.62 Valea Ostrovului, IV.63 Uspenia, IV.65 Casimcea, IV.66 Colțanii Mari, IV.67 Peceneaga, IV.68 Măgurele, IV.69 Războieni, 2.765 Dealul Bujorului, 2.766 Rezervația de liliac Valea Oilor, 2.767 Rezervația de liliac Fântâna Mare, 2.768 Vârful Secaru and 2.769 Korum Tarla).

c. Five proposed reserves: one recognized locally ("La Monument"-Niculiţel) and four nationally recognized (Dealul Izvorului, Arleanca, Dealul Lung, Coșarul Mare).

The re-evaluation of steppe vegetation was focused on 74 species for which NDP component protected areas were. For these species were made the field visits in order to identify them. The following parameters were estimated for the species identified from the list of 74. Similar with Reporting Guide under Article 17 of the Habitats Directive [5] for each species was collected the following characteristics and parameters:

- Species scientific name
- EUNIS Species code
- Alternative species scientific name
- Population size
- Density per m^2
- Habitat for the species

- Main pressures and threats
- Conservation status
- Conservation measures
- Future prospects
- Spatial distribution maps

To estimate the population size was used the quadrates method. This methodology delivers a complete survey and statistically robust estimates, the average values on surface unit being able to be extrapolate at species habitat level. Population size is the most important parameter for the inventory updated conservation status and robust monitoring data on population trends.

In order to assess the conservation status of species, firstly, we evaluated four parameters (range, population size, habitat for the species and future prospects) separately and secondly, we combined them into an overall assessment. After assessing each of these parameters, we establish the conservation status according to a format with four classes:

- *Favourable* (FV): habitat type or species can be expected to prosper without any change to existing management or policies.
- *Unfavourable-Inadequate* (U1): habitat type or species require a change in management or policy but there is no danger of extinction in the foreseeable future.
- *Unfavourable-Bad* (U2): habitat type or species is in serious danger of becoming extinct (at least regionally).
- *Unknown:* insufficient information available to allow an assessment. [6]

Results

The investigated species constitute a large list, some of this being species listed in Habitat Directive Annex II, IV and V, some are common and some are typical for steppe vegetation (Table 1). In the list are present one species of trees, four shrubs species and 69 herbaceous plants.

From the 74 investigated species, in the field there were identified only 63, of which the most common were the species typical for steppe vegetation like *Campanula romanica*, *Dianthus nardiformis, Thymus zygioides*, *Koeleria lobata*, *Asparagus verticillatus*, *Nectaroscordum siculum* subsp. *bulgaricum*, *Festuca callieri*, *Sempervivum ruthenicum*, or common species like *Muscari neglectum*, *Mercurialis ovata*, *Paeonia peregrina*, *Corydalis solida* (see Table 2 and Figure 2).

Table 1 List of species and subspecies investigated
Tabel 1 Lista speciilor si subsepeciilor investigate

1 *Achillea clypeolata*
2 *Achillea ochroleuca*
3 *Agropyron cristatum* subsp. *brandzae*
4 *Allium flavum subsp. tauricum*
5 *Allium flavum* ssp. *flavum*
6 *Allium guttatum*
7 *Allium saxatile*
8 *Anacamptis pyramidalis*
9 *Arenaria rigida*
10 *Asparagus verticillatus***
11 *Asphodeline lutea*
12 *Astragalus corniculatus*
13 *Astragalus glaucus*
14 *Asyneuma anthericoides*
15 *Campanula romanica**
16 *Celtis planchoniana*
17 *Centaurea jankae**
18 *Centaurea kanitziana*
19 *Cephalanthera rubra*
20 *Corydalis solida***
21 *Crocus chrysanthus*
22 *Crocus flavus*
23 *Dianthus nardiformis*
24 *Echinops ritro* subsp. *ruthenicus*
25 *Echium russicum**
26 *Festuca callieri*
27 *Fritillaria orientalis*
28 *Gagea bulbifera*
29 *Gagea szovitzii*
30 *Galanthus plicatus*
31 *Galium verticillatum*
32 *Globularia bisnagarica*
33 *Goniolimon collinum*
34 *Gymnospermium altaicum*
35 *Himantoglossum caprinum* *
36 *Iris aphylla ssp. hungarica* *
37 *Koeleria lobata*
38*Lactuca viminea*
39 *Lathyrus pannonicus*
40 *Limodorum abortivum*
41*Lunaria annua ssp. pachyrhiza*
42 *Mercurialis ovata - brei*
43 *Minuartia adenotricha*
44 *Moehringia jankae* *
45 *Muscari neglectum***
46 *Myrrhoides nodosa*
47 *Nectaroscordum siculumssp.bulgaricum*
48 *Neottia nidus-avis*
49 *Ononis pusilla*
50 *Orchis morio***
51 *Ornithogalum amphibolum*
52 *Ornithogalum sibthorpii*
53 *Paeonia peregrina*
54 *Paeonia tenuifolia*
55 *Paliurus spina-christi*
56 *Paronychia cephalotes*
57 *Pimpinella tragium ssp. lithophila*
58 *Piptatherum virescens*
59 *Platanthera chlorantha*
60 *Potentilla emilii-popii* *
61 *Rosa turcica*
62 *Rumex tuberosus*
63 *Salvia aethiopis*
64 *Satureja coerulea*
65 *Scorzonera mollis*
66 *Scutellaria orientalis*
67 *Sempervivum ruthenicum*
68 *Silene compacta*
69 *Spiraea crenata*
70 *Spiraea hypericifolia*
71 *Stachys angustifolia*
72 *Tanacetum millefolium*
73 *Thymus zygioides*
74 *Veratrum nigrum*

* **Natura 2000 species**
****Common species**

Table 2. Identified species and number of the places

Tabel 2. Speciile identificate și numărul de locuri

No.	EUNIS code	Specie name	Number of places where were identified
1	152841	*Achillea clypeolata*	20
2	154011	*Achillea ochroleuca*	7
3	191619	*Agropyron cristatum* subsp. *brandzae*	27
4	189274	*Allium flavum* subsp. *tauricum*	54
5	189279	*Allium guttatum*	10
6	188729	*Allium saxatile*	14
7	189443	*Anacamptis pyramidalis*	11
8	166063	*Arenaria rigida*	11
9	189155	*Asparagus verticillatus*	81
10	188662	*Asphodeline lutea*	20
11	170809	*Astragalus glaucus*	3
12	165320	*Asyneuma anthericoides*	1
13	165090	*Campanula romanica**	370
14	155211	*Centaurea kanitziana*	15
15	189469	*Cephalanthera rubra*	2
16	175472	*Corydalis solida*	44
17	186411	*Crocus chrysanthus*	8
18	186422	*Crocus flavus*	20
19	166540	*Dianthus nardiformis*	122
20	154712	*Echinops ritro* subsp. *ruthenicus*	72
21	158124	*Festuca callieri*	54
22	188620	*Fritillaria orientalis*	11
23	188217	*Gagea bulbifera*	5
24	189035	*Gagea szovitzii*	25
25	185705	*Galanthus plicatus*	14
26	8239	*Globularia bisnagarica*	24
27	189938	*Himantoglossum hircinum*(caprinum)*	4
28	192830	*Koeleria lobata*	105
29	158124	*Lactuca viminea*	2

No.	EUNIS code	Specie name	Number of places where were identified
30	171817	*Lathyrus pannonicus*	4
31	189653	*Limodorum abortivum*	8
32	163959	*Lunaria annua* subsp. *pachyrhiza*	2
33	170023	*Mercurialis ovata*	37
34	166168	*Minuartia adenotricha*	2
35	165858	*Moehringia jankae**	31
36	188976	*Minuartia adenotricha*	41
37	152168	*Myrrhoides nodosa*	15
38	188989	*Nectaroscordum siculum* subsp. *bulgaricum*	77
39	169902	*Ononis pusilla*	2
40	189762	*Orchis morio*	15
41	188175	*Ornithogalum amphibolum*	9
42	188506	*Ornithogalum sibthorpii*	12
43	175419	*Paeonia peregrina*	106
44	178042	*Paliurus spina-christi*	1
45	165869	*Paronychia cephalotes*	8
46	152090	*Pimpinella tragium* subsp. *lithophila*	17
47	193250	*Piptatherum virescens*	8
48	189789	*Platanthera chlorantha*	18
49	179724	*Potentilla emilii-popii**	22
50	189789	*Rosa turcica*	15
51	177467	*Rumex tuberosus*	6
52	173706	*Salvia aethiopis*	10
53	173954	*Satureja coerulea*	4
54	161036	*Scorzonera mollis*	2
55	174855	*Scutellaria orientalis*	9
56	168360	*Sempervivum ruthenicum*	43
57	166283	*Silene compacta*	12
58	179504	*Spiraea crenata*	4
59	174368	*Stachys angustifolia*	13
60	160027	*Tanacetum millefolium*	30
61	174127	*Thymus zygioides*	118
62	188055	*Veratrum nigrum*	25

The not yet identified species were: *Astragalus corniculatus, Astragalus ponticus, Celtis planchoniana, Centaurea jankae*, Echium russicum*, Galium verticillatum, Goniolimon collinum, Gymnospermium altaicum, Iris aphylla* subsp. *hungarica, Neottia nidus-avis, Paeonia tenuifolia, Spiraea crenata.*

For the species present in Annex II of Habitats Directive (*Echium russicum, Iris aphylla* subsp. *hungarica,* and *Centaurea jankae*) that have not yet been identified, following explanations are possible: a) in European Checklist [6], *Pontechium maculatum* subsp. *maculatum* is resident name and *Echium russicum* is a synonim; b) the pedo-climatic conditions are not favourable for typical habitats for *Iris aphylla* subsp. *hungarica*, and *Centaurea jankae. Paeonia tenuifolia* is present outside of project area in proximity of Izvoarele village and *Gymnospermium altaicum* is present in Măcin Mountains National Park areas, adjacent to NDP.

The variability of the size of population is relatively high, starting at 0.25 individuals/ m^2 to 36 individuals/ m^2, and there is no direct correlation between the size of individuals and their spatial density.

To provide new information about *Astragalus corniculatus, Astragalus ponticus, Celtis planchoniana* and *Spiraea crenata* the study will continue in 2020. With the exception of two species (*Lunaria annua* and *Salvia aethiopis*) the other species are represented by optimal populations and are in a favourable (FV) conservation status.

In a hierarchy of pressure types, the order is as follows: over-grazing, improper storage of waste, introduction of invasive species, change of land cover, the most important being the over-grazing. Most of the species have the typical habitat 62C0* Ponto-Sarmatic steppes, following by a mixed between 8230 Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii and 62C0* Ponto-Sarmatic steppes (Table 3). The habitat 62C0* Ponto-Sarmatic steppes, is dominant in 12 natural reserves and 8230 Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii in three. More of half of areas present in natural reserves is covered by 62C0* Ponto-Sarmatic steppes that it is in Unfavourable - Bad (U2) conserved status.

For the 62 species was made the spatial map. The maps are necessary for the monitoring system of the conservation status and for the geographical position of species populations. An example is the map for *Silene compacta,* present in Figure 3, species represented by one population situated in Secaru Peak.

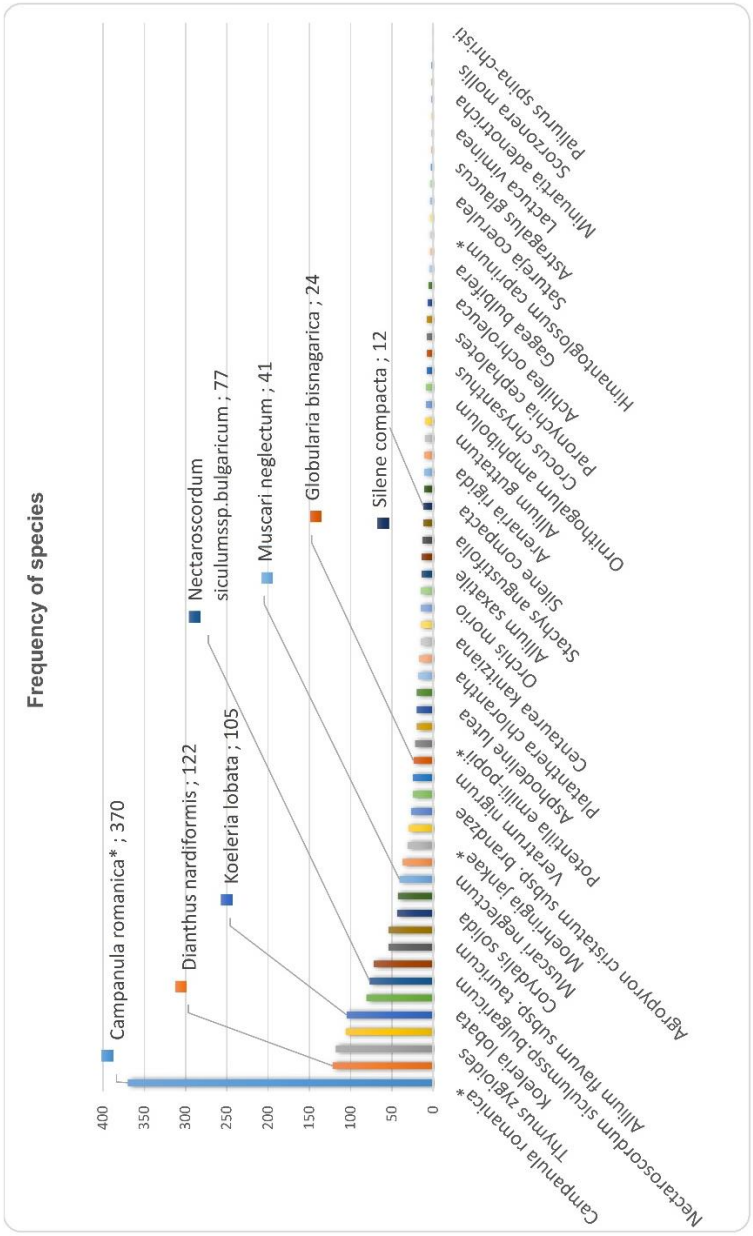


Figure 2. Frequency of the identified plant species in NDP
Fig. 2. Frecvența speciilor de plante identificate în PND

Table 3. Typical species habitat

Tabel 3. Habitate tipice speciilor

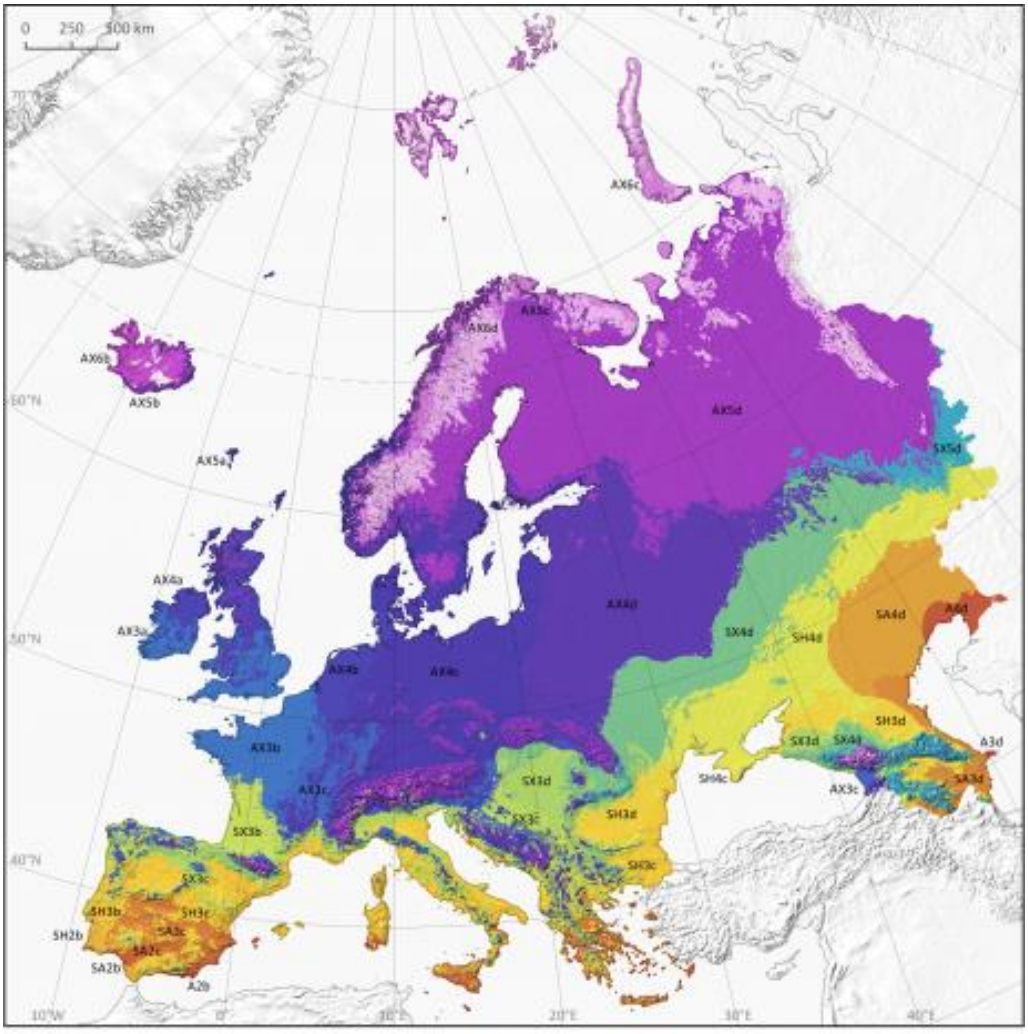
No.	Species	Habitats
1	*Achillea clypeolata*	
2	*Achillea ochroleuca*	
3	*Allium guttatum*	
4	*Allium saxatile*	
5	*Arenaria rigida*	
6	*Celtis glabrata*	
7	*Ornithogalum amphibolum*	62C0* Ponto-Sarmatic steppes
8	*Piptatherum virescens*	8230 Siliceous rock with pioneer
9	*Paliurus spina-christi*	vegetation of the Sedo-
10	*Potentilla emilii-popii**	Scleranthion or of the Sedo albi-
11	*Paronychia cephalotes*	Veronicion dillenii
12	*Scorzonera mollis*	
13	*Silene compacta*	
14	*Thymus zygioides*	
15	*Agropyron cristatum*	
16	subsp.*brandzae*	
17	*Allium flavum* subsp*. tauricum*	
18	*Asphodeline lutea*	
19	*Astragalus corniculatus*	
20	*Astragalus glaucus*	
21	*Astragalus ponticus*	
22	*Asyneuma anthericoides*	62C0* Ponto-Sarmatic steppes
23	*Centaurea jankae*	
24	*Crocus chrysanthus*	
25	*Crocus flavus*	
26	*Echinops ruthenicus*	
27	*Echium russicum*	
28	*Festuca callieri*	
29	*Gagea bulbifera*	
30	*Gagea szovitsii*	
31	*Globularia bisnagarica*	
32	*Koelaria lobata*	
33	*Lathyrus pannonicus*	
34	*Ononis pusilla*	
35	*Orchis morio*	
36	*Paeonia tenuifolia*	
37	*Rumex tuberosus*	
38	*Salvia aethiopis*	
39	*Satureja coerulea*	
40	*Scutellaria orientalis*	
41	*Scutellaria orientalis*	
42	*Stachys angustifolia*	
	Tanacetum millefolium	

43 44 45 46 47 48 49 50	*Anacamptis pyramidalis* *Fritillaria orientalis* *Himantoglossum hircinum (caprinum)** *Iris aphylla* subsp. *hungarica* *Limodorum abortivum* *Ornithogalum sibthorpii* *Paeonia peregrina* *Rosa turcica*	62C0* Ponto-Sarmatic steppes 40C0 Ponto-Sarmatic deciduous thickets
51 52 53 54	*Asparagus verticillatus* *Lactuca viminea* *Spiraea crenata* *Spiraea hypericifolia (*cultivated species*)*	8230 Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii 40C0 Ponto-Sarmatic deciduous thickets
55 56 57 58 59 60 61 61	*Campanula romanica** *Centaurea kanitziana* *Dianthus nardiformis* *Galium verticillatum* *Gymnospermium altaicum* *Moehringia jankae** *Pimpinella tragium* subsp. *lithophila* *Sempervivum ruthenicum*	8230 Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii
62 63 64 65 66 67	*Cephalanthera rubra* *Goniolimon collinum* *Lunaria annua* subsp. *pachyrhiza* *Minuartia adenotricha* *Myrrhoides nodosa* *Platanthera chlorantha*	91X0 Dobrogean beech forests 91Y0 Dacian oak and hornbeam forests 40C0 Ponto-Sarmatic deciduous thickets
68 69 70	*Corydalis solida* subsp. *slivenensis* *Nectaroscordum siculum* subsp. *bulgaricum* *Veratrum nigrum*	91Y0 Dacian oak and hornbeam forests
71 72 73 74	*Galanthus plicatus* *Mercurialis ovata* *Muscari neglectum* *Neottia nidus-avis*	91X0 Dobrogean beech forests 91Y0 Dacian oak and hornbeam forests

Figure 3. Spatial map of *Silene compacta*
Fig. 3. Harta spațială pentru specia Silene compacta

Discussions

According to pytho-climatic units map (BOTTI, 2018), Romania, Ukraine and Bulgaria are part of 5H3c and 5H3d sub-humid units that means Romania from climatically point of view is not in semi-arid units typical of steppe (Figure 4). The assessment of plant list and vegetation studies elaborated by BRÂNDZĂ (1898), PETRESCU (2004, 2007) reveal that the Dobrogea area is part of steppic biome from the species composition point of view. Dobrogean vegetation list is very similar with the list of Russian steppe vegetation presented by BOONMAN and MIKHALEV (2005). Also, from a climatic point of view, Dobrogea belongs to a semi-arid climate, the multiannual precipitation falling in the range of 350-400 mm/ year. This discrepancy with the phyto-climatic map is explained by the fact that the surfaces covered with steppe vegetation and with a semi-arid climate are too small to be marked on the map whose resolution is too small to highlight these areas.



KEY TO PHYTOCLIMATIC UNITS

Aridity	A - Arid			SA - Semiarid			SH - Subhumid			SX - Subxeric				AX - Axeric				
Heat	2. Hot	3. Temp.	4. Cool	2. Hot	3. Temp.	4. Cool	2. Hot	3. Temp.	4. Cool	3. Temp.	4. Cool	5. Cold	6. Very cold	3. Temp.	4. Cool	5. Cold	6. Very cold	7. Nival
Continentality a. Hyperoc.										SX3a				AX3a	AX4a	AX5a	AX6a	AX7a
b. Oceanic	A2b			SA2b	SA3b		SH2b	SH3b	SH4b	SX3b	SX4b	SX5b		AX3b	AX4b	AX5b	AX6b	AX7b
c. Suboc.				SA2c	SA3c	SA4c	SH2c	SH3c	SH4c	SX3c	SX4c	SX5c	SX6c	AX3c	AX4c	AX5c	AX6c	AX7c
d. Contin.		A3d	A4d		SA3d	SA4d		SH3d	SH4d	SX3d	SX4d	SX5d	SX6d	AX3d	AX4d	AX5d	AX6d	AX7d

Figure 4. Phyto-climatic Units Map (after BOTTI, 2018)
Fig. 4. Harta unităților fito-climatice (după BOTTI, 2018)

Conclusions

From the pedo-climatic and vegetation structure point of view, the NDP area is part of the Steppic biome. The surface of NDP (84,875 ha) is a very small area in comparison with phyto-climatic units, one of the reason why it could not be mapped. The re-evaluation of steppe vegetation was focused on 74 species for which has been declared the NDP protected area. More than 80% of the species were identified in the field, for them were made the distribution maps, were estimated also the population size. With the exception of two species (*Lunaria annua* and *Salvia aethiopis*) the other species are represented by optimal populations and are in a favourable (FV) conservation status.

Although the surface area covered by 62C0* Ponto-Sarmatic steppes habitat in Favourable (FV) conservation status is reduced, it is sufficient to host the populations of steppe typical species like *Festuca callieri* and *Thymus zygioides*. Populations of this species are abundant and in favourable conservation status. The species of community interest *Himantoglossum caprinum (hircinum)* is represented here by small populations.

The habitat 8230 Sedo-Scleranthion of the Sedo albi-Veronicion dillenii present at large scale in reserves like Vârful Secaru is in Favourable (FV) conservation status and host three important species of community interest: *Campanula romanica*, *Moehringia jankae* and *Potentilla emilii-popii.* The populations of these three species are also in favourable conservation status.

The data and information collected will be included in the integrated management plan of the NDP protected areas. There will be elaborated a realistical monitoring system of the conservation status of habitats and species based on this data and information. In the management plan, will be established the conservation measures and will be estimated the costs for their implementation. In the Gantt chart of the management plan will be found the timing of these measures. One of most important measures is to reduce the impact of animal grazing.

The alternative solutions that could reduce the overgrazing, because overgrazing is the most important pressure on the vegetation, are:

a) Reducing the number of sheep, goats, cows and horses;
b) Improving the quality of the meadows by sowing with native species and fertilizing with manure for grasslands outside NDP;
c) Keeping the animals in the stable during the winter;
d) Elimination of invasive wood species from grasslands.

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