ЮБИЛЕЙНА НАУЧНА КОНФЕРЕНЦИЯ ПО ЕКОЛОГИЯ (СБОРНИК С ДОКЛАДИ)
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ANALYSIS OF THE VEGETATION COVERING UNDER THE INFLUENCE OF THE DIFFERENT ABUNDANCE OF *Juniperus sibirica* IN TWO ZONES OF THE CENTRAL BALKAN MOUNTAIN

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Abstract: The composition of the vegetative communities over two zones of the alpine woodless part of the Central Balkan Mountain has been examined. The description of the varieties has been realized in experimental areas with size 16 m^2, chosen according to the different abundance of *Juniperus sibirica Burgsd.* – from 0 to 100%. The analysis carried out showed that the number of registered varieties over terrains abundant in juniper from 0 to 40% is almost the same. In the case of abundance of *J. sibirica* over 50%, and especially over 75%, the varieties composition in the communities decreases almost by half. The high inclination and breaking of the terrains from the one part, and the soil-protective and strengthening role of the juniper bushes from the other part, determines the necessity to limit the invasion over *J. sibirica* up to 40-50%, and not to her complete elimination.

Key words: *Juniperus sibirica* Burgsd., phytogeography, ecology, communities.

INTRODUCTION

The *J. sibirica* communities have been a research subject for many authors. The most probable reason for this is the circumstance that a great part of them take or used to take territories actively used by man mostly for the purposes of stock-breading. This has changed their initial composition to a great extend, these succession processes continuing nowadays too.

According to STEFANOV (1943), BONDEV (1991), VELCHEV (2002), the formations of J. sibirica, located in the sub-alpine woodless area of our mountains have fully derivative origin.

Characterizing the pastures in the mountain zone of the Ribaritsa region, CHERVENYAVSKI & VEZEV (1953) determine the upper wood limit as unconditionally secondary, strongly decreased due to felling, fire and pasture. 11 associations have been determined for the examined area, of which the most dominant variety is *Juni-*

perus nana Willd. According to these authors, the associations of *J. nana* + *Festuca spadicea* L., *J. nana* + *Vaccinium myrtillus* L., *Vaccinium uliginosum* L. + *Cetraria cucullata* L. are important and interesting mainly from the forest-restoration, soil-formation and soil-protection point of view.

By phytocenological characteristics of the frutescent and grass vegetation in the alpine region of the Troyan Balkan Mountain, KOCHEV (1967) expressed the opinion, that the formation of *J. sibirica* has a primary origin. In its composition there are around 79 varieties of high plants, grouped in five associations.

MESHINEV ET ALL. (2000), examining the biological diversity on the territory of the National Park Central Balkan Mountain, point out 73 associations in the *J. sibirica* formation, in which different varieties are subdominants. Due to the scarce availability of data, regarding the historical changes of the vegetative communities in the alpine parts of the Balkan, the authors consider that a part of the alpine frutescent (dominated by Juniperus sibirica) and grass phytocenoses have a primary origin.

VELEV AND APOSTOLOVA (to be published) reveal the successive trends in the communities of *Nardus stricta* L. on the territory of the Central Balkan. The summary of data shows that the associations of Nardetum strictae Grab. 1950 and Bruckenthalio-Juniperetum sibiricae Hfrvat. 1938 emend. Zupančič 1992 represent two different points in the successive process. They are syngenetically linked and can be regarded as originating from one another in the process of degradation and demutation. The lack of exact data makes it difficult to determine the time of the degrading phase. According to these authors, the demutation phase is connected with a period of two or three decades, in which pasture has been reduced or strongly decreased.

With the aim to make a profound examination of the ecological and biological peculiarities of *J. sibirica* in the central part of the Balkan Mountain, descriptions of the vegetative communities were carried out in different project covering of *J. sibirica*, which supplement the available literature data.

MATERIAL AND METHOD

During the vegetation period of 2003, 2006 and 2007, in the Beklemeto locality, as well as east from the Tazha Hut (a part of the territory of the National Park Central Balkan Mountain), terrain research over the vegetative communities were carried out, 10 with different abundance of *J. sibirica* (from 1 to 100%) and 2 without the existence of juniper. The two localities, in which the research was carried out were selected as two of the most easily accessible zones, where the strongly reduced in the last decades pasture could be restored.

Each phytocenological description includes: general ecological data of the described lot, complete list of the variety composition of the community, quantitative evaluations of the abundance and covering. The abundance and covering have been estimated by sight in accordance to the seven-grade combined scale of BRAUN – BLANQUET (1964) and have been presented by Arab numbers after the name of the respective variety. The constancy has been determined under the five-grade scale and has been gives as a Roman number for each variety. The general project covering of the examined lot has also been evaluated by sight. The selection of the description

place has been made in compliance with the requirements for a "representative plot" with size 16 m^2.

The taxonomy and phenology of the varieties have been described in accordance with the decisions offered by DELIPAVLOV *et al.* (1992). The phytogeographical appurtenance of the plants has been determined under STEFANOV (1943). In determining the chorology and floral elements, the Synopsis of the High Flora in Bulgaria (ASYOV & PETROVA ED. 2006) has been taken into consideration. The vital forms have been characterized under GORUYUSHINA (1979).

The descriptions have been concentrated over the upper limit of the forest. The comparative analysis of our descriptions with literature data has been carried out taking into consideration the different abundance of juniper, the exposure and altitude.

RESULTS AND DISCUSSION

According to the analyses carried out, the most widely spread vital form is that of hemicryptophytes – 80.95%. After them come the chamephytes and therophytes. In the cases when *J. sibirica* participates in the described area, the basic biomass is formed by the nanophanerophytes and chamephytes (Table 1). The correlation between the vital forms corresponds to the pointed out by GORUYUSHINA (1979) biological spectrum of frutescent and grass communities in the tundra (Fig. 1). In the

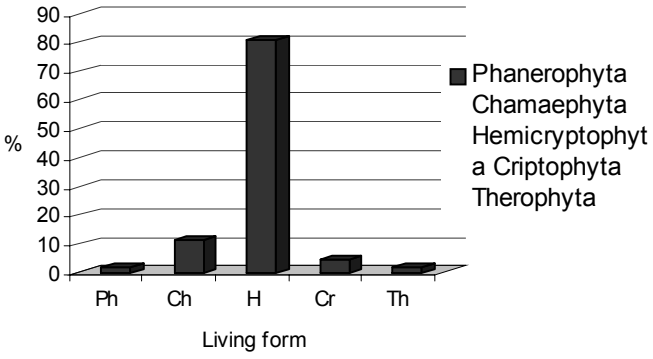

Fig. 1. *Biological spectrum of the species*

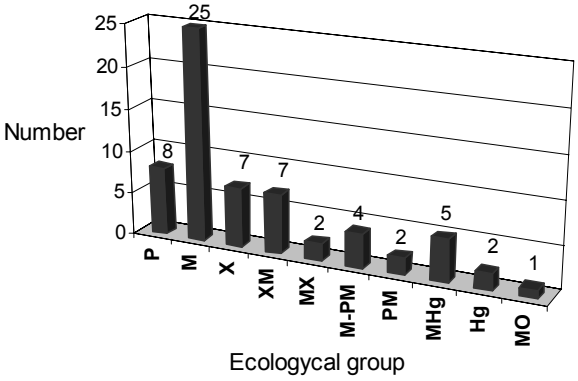

Fig. 2. *Types of species according to damness requirements*

analysis of the biological varieties carried out it was found, that 90% of the plants are perennial. This is a characteristic feature of the alpine pastures (NAYDENOV & VANKOV. 1955). The share of the annual and biennial plants is about 9.5%.

With regard to the dampness requirements of the plants, the biggest share is for the group of mesophytes (38.1%). Most grass plants fall into this group. Psychrophytes present approximately 13%, whereas transitive forms of xeromesophytes and mesoxerophytes comprise about 15% of the plant varieties (Fig. 2).

In respect of origin, in the communities examined the European varieties prevail – 42.86%, followed by those of arctic and boreal origin – 23.81%. It is interesting that there is a high percentage (11.1%) of varieties, the origin of which is connected with the Balkan Peninsula (Table 1).

On the grounds of the phytogeografical appurtenance, pointed out by STEFANOV (1943), in the analysis carried out the varieties from the examined territory have been mainly classified to the group of meso and microtermes of the silvoboreal center and to that of termophytres, mesotermes and microtermes in the mountain center, as the plants falling into those two main groups are basically stationary.

In the description of the communities the exposure of the terrain and distribution by height have also been taken into consideration. These two factors play a significant part for the participation of subdominants. For example, *Vaccinium myrtilus L.* has a greater abundance in the phytocenoses of the ridges and slopes with east exposure. *Vaccinium vitis-idaea L.* – in those with west exposure, whereas *Vaccinium uliginosum* L."prefers" the north exposure. *Bruckenthalia spiculifolia* (Salisb.) Reichenb. is more often found in the south, east and west parts. In the lower north and east areas the abundance of *Agrostis cappilaris L., Festuca rubra L.* and *Lerchenfeldia flexuosa* (L.) Schur increases. For *Anthoxanthum odoratum* L. most favourable are the siuth terrains with average altitude. *N. stricta* is not very demanding to the terrain altitude and inclination.

The present research found some differences in the height position of the varieties, compared to the ones stated by KOCHEV (1967). For example, the blueberry was found in lower terrains in communities with *J. sibirica.* The greatest abundance in the phytocenoses of the ridge areas of Beklemeto was registered for *J. sibirica* and *N. stricta.* Differences were also found in the distribution of *A. cappilaris*, which in the lack of *J. sibirica* on terrains with south exposure reaches higher altitude.

Compared to the data stated by MESHINEV ET ALL (2000), the present observations registered a stronger impact of the blueberry, than *J. sibirica*, which unlike the heath-berry and cranberry, is not found in the case of abundance of juniper over 50%.

On the basis of the data, connected with the altitude of distribution of the varieties, the biggest share is for those, who can be regarded as falling in the group of thermophytes – 57.2%, which confirms the information stated by STEFANOV (1943), regarding the vertical distribution of plants on the mountain center. 22.2% of the plants fall in the group of meso and microtermes, which according to STEFANOV (1943) relate to the primary composition of the vegetative covering (Table 1).

The climatic conditions of the researched territory impact the phenology of the plants to a great extent. The greatest share is for those blossoming at the end of spring and the beginning of summer (May, June) and continue their blossoming until the end of summer (August). *Carex caryophyllea* Latourr., *Cerastium umbelatum* L., *Crocus veluchensis* are in blossom early in spring, and the last variety, in greater abundance in grassy phytocenoses forms a spring aspect. The valuable forage plants from the Poaceae family are usually in blossom in May, June, August, until the end of August, September (Table 1).

Table 1. *Complete list of the variety composition of the community of Juniperus siberica Burgssd. By different exposure and abundance of the dominant*

Locality					**Beklemeto**								**Taja**				
Species	Date				4.08. 2003	23.08 2006				4.07. 2003			9.08. 2007				
	Altitude m.				1300	1300	1500	1500	1650	1500	14001500	1650	1641	1642	1641	1644	
	Exsposure				N	N NE	S	N	R	N	SE	R	W	N NE	N	W	
	Slope (^{0})				25	15	30	15	15	25	30	10	25	25	28	25	
	Soil				Middle width, fresh												
GPC%	Treatment moisture	Floristic element	Living form	Altitude Flowering	95	100	95	95	90	97	95	100	60	80	50	90	
Total number species					29	24	31	11	13	22	24	23	13	26	10	17	
Ecological characteristic					Quantity participation												
Juniperus sibirica	P	B	Ph N	1-2IV-V	-	-	+	5	4	3	2б	2б	2б	1	4	1	V
Vaccinium uliginosum	P	B	Ch	2-4VIVIII	2a	+	+	-	-	2б	-	+	1	1	-	-	III
Vaccinium myrtillus	P	B	Ch	1-3VI-VII	+	2a	1	2б	2a	1	2б	1	2б	2б	2a	1	V
Vaccinium vitis-idaea	P	B	Ch	2-3V-VIII	1	+	1	1	+	1	1	+	2a	1	1	2a	V
Bruckenthalia spiculifolia	P	subMed	Ch	2-3VI-IX	2a	-	+	-	-	2a	2б	1	1	2a	+	2a	IV
Rubus idaeus	M	subB	Ch	1-2V-VII	-	-	-	R	-	-	-	-	-	-	-	-	I
Chamaecytisus austriacus	XM	Eur- Med	Ch	1+VI-VIII	-	-	-	-	-	-	+	-	-	+	-	-	I
Genista depressa	M-PM	sub- Med	Ch	1-3VIVIII	+	-	-	-	-	-	+	+	-	+	-	-	III
Nardus stricta	P	Arct- Alp	H	2-3V-VII	1	+	-	-	-	2a	+	2б	+	+	+	1	IV
Agrostis capillaris	PM	B	H	1-3VI-IX	2б	4	4	+	2a	1	+	2a	1	1	+	3	V
Festuca rubra	MHg	B	H	1-2VI-VII	2б	1	1	-	1	1	+	1	1	2a	-	1	V

Constancy

Calamagrostis arundinaceae	M	sub B	H	2-3VI-IX	+	-	-	-	-	-	+	-	-	+	-	-	I
Anthoxanthum odora-tum	M-PM	Eur- As	H	1-3V-VII	1	1	2a	-	-	+	+	+	+	-	+	+	IV
Lerchenfeldia flexuosa	X	B	H	1-3VIVIII	3	1	1	+	1	1	1	2a	2a	1	1	2б	V
Sieglingia decumbens	M	Eur- Med	H	1-2VIVIII	-	-	-	-	-	+	R	+	-	-	-	-	II
Poa media	PM	Carp- Bal	H	1-3VII-IX	-	+	-	-	-	-	-	-	-	-	-	-	I
Avenula versicolor	X	Alp-Carp- Bal	H	2-3VII-IX	-	-	-	-	-	-	-	-	-	+	-	-	I
Carex kitaibeliana	P	sub Med	H	2-3VIVIII	-	-	-	-	-	-	-	-	-	1	+	-	I
Carex caryophyllea	MX	B	H	1-2II-IV	+	-	-	-	-	1	1	-	+	-	-	-	II
Luzula luzuloides	M	Eur	H	2-3V-VI	+	-	+	-	-	-	+	+	+	2б	1	2a	IV
Luzula sudetica	MHg	Kos	H	3V-VIII	R	+	-	-	-	+	+	-	-	-	-	-	II
Luzula sylvatica	M	Eur	H	2-3V-VI	-	-	-	R	-	-	-	-	-	+	-	-	I
Hieracium pilosella	M	Eur- Med	H	1-2V-IX	+	+	-	-	-	+	+	-	-	+	-	1	III
Leontodon autumnalis	M	Eur- Sib	H	1-3VII-IX	-	+	+	-	-	-	+	-	-	+	-	-	II
Leontodon hispidus	M	Eur- Med	H	1-3VI-IX	+	+	+	-	-	+	-	-	-	-	-	+	III
Achillea millefolium	MX	Eur- Sib	H	1-2V-IX	-	+	+	-	-	-	-	-	-	-	-	-	I
Achillea distans	XM	Alp-Carp- Bal	H	2VII-IX	-	-	-	-	-	-	-	+	-	-	-	-	I
Carduus personata	XM	Eur	H	3VIIVIII	-	-	R	-	-	-	-	-	-	-	-	-	I
Carduus acanthoides	XM	Eur	H	1V-X	-	-	R	-	-	-	-	-	-	-	-	-	I
Antennaria dioica	P	Arct- Alp	H	2-3V-VIII	-	-	-	-	-	-	+	-	-	+	-	-	I
Homogyne alpina	MO	Alp-Carp- Bal	H	2+V-VIII	-	-	-	-	-	+	-	-	-	+	-	-	I
Gnaphalium sylvaticum	M-PM	EUA	H	1+VII-IX	+	-	-	-	-	-	-	-	-	-	-	-	I
Alchemilla flabellata	Hd	Alp- Carp	H	1-3V-VIII	+	1	+	-	-	-	-	-	-	-	-	-	II
Potentilla erecta	XM	sub B	H	2-3VIVIII	+	-	-	-	+	+	+	1	+	+	-	1	IV
Potentilla crantzii	M	Arct- Alp	H	2-3VIVIII	+	+	-	-	-	-	-	-	-	-	-	-	I
Fragaria viridis	M	Eur- Sib	H	1+V-VI	-	-	+	-	-	-	-	-	-	-	-	-	I
Thymus zygioides	X	sub- Med	H	1IV-VIII	+	+	+	-	-	-	+	-	-	+	-	-	III
Thymus vandasii	X	Eur- Med	H	1-3VIVIII	+	-	+	-	-	-	-	-	-	-	-	-	I

Lotus corniculatus	M	Eur- Med	H	1-2+V-IX	-	1	+	-	-	-	-	-	-	-	-	-	I
Trifolium repens	M	Eur- Sib	H	1-3V-X	-	R	-	-	-	-	-	-	-	-	-	-	I
Trifolium pratense	M	sub B	H	1-2V-VII	-	-	+	-	-	-	-	-	-	-	-	-	I
Hypericum perforatum	M	Kos	H	1-2V-VIII	+	-	+	-	+	-	+	-	-	-	-	-	II
Hypericum maculatum	M	B	H	-2VI-VII	+	-	+	+	2a	-	-	+	-	-	-	+	III
Cruciata glabra	M	s Med CAs	H	1-3VI-IX	-	-	+	+	+	+	-	+	-	-	-	+	III
Galium verum	X	Eur- As	H	1-2V-X	-	-	R	-	-	-	-	-	-	-	-	-	I
Veronica officinalis	XM	Eur- Sib	H	1-2V-VIII	-	-	-	-	+	-	-	+	-	+	-	-	II
Veronica chamaedrys	M	Eur- As	H	1-2IV-VII	-	+	+	-	-	-	-	+	-	-	-	-	II
Viola tricolor	M	Eur- As	Th	1-2V-IX	+	-	-	-	-	-	-	+	-	-	-	-	I
Stellaria graminea	M	Eur- As	H	1-2V-VIII	+	+	-	-	+	-	-	+	-	-	-	-	II
Cerastium umbelatum	M	Eur-As	Th	1III-IV	-	-	R	-	-	-	-	-	-	-	-	-	I
Sclerantus perennis	X	Eur- Med	H	-1V-IX	-	-	-	-	-	-	+	-	-	-	-	-	I
Ranunculus montanus	MHg		H	2VI-VIII	1	+	+	-	-	-	+	+	-	-	-	-	III
Ranunculus repens	Mhg	sub Med	H	1-2V-VIII	-	-	R	-	-	-	-	-	-	-	-	-	I
Campanula velebitica	M	Bal	H	1-3VIVIII	+	R	+	-	R	1	-	-	-	+	-	-	III
Geranium robertianum	M	sub B	Th	1-2V-X	-	-	-	+	-	-	-	-	-	-	-	-	I
Crocus veluchensis	M	Bal	Cr G	2-3III-VI	+	-	-	-	-	+	-	-	-	-	-	-	I
Rumex acetosella	PM	Eur-sub Med	H	1-3V-VII	-	-	-	-	-	-	+	-	-	-	-	-	I
Urtica dioica	XM	B	H	1-2V-IX	-	-	-	1	-	-	-	-	-	-	-	-	I
Plantago lanceolata	M	Kos	H	1-2V-IX	-	+	+	-	-	-	-	-	-	-	-	-	I
Meum mutellina	MHg	Alp- Carp- Bal	H	2+VI-VIII	-	-	+	-	-	-	-	-	-	-	-	-	I
Gentiana cruciata	M	Eur- Sib	H	1-2VIVIII	-	-	-	-	-	-	-	-	-	R	-	-	I
Knautia arvensis	X	Eur- Sib	H	1-2V-X	-	-	-	-	-	-	-	-	-	+	-	-	I
Oenanthe silaifolia	Hd	Eur- Med	H	1-2VI-VII	-	-	-	-	-	-	-	+	-	-	-	-	I

Life forms:Ph(N) – Phanerophyta(Nanophanerophyta); Ch – Chamaephyta; H – Hemicryptophyta; Th – Therophyta; Cr(G) – Criptophyta (Geophyta). Treatment of moisture: Hg- hygrophytes; MX- mesoxerophytes; P-psychrophytes MO- mesooxylophytes; M-mesophytes; PM-psychro mesophytes; X-xerophytes; XM- xeromezophytes.

The different abundance of the juniper has a greater importance for the changes of the variety composition. In the project covering of the dominant from 0 to 50% in the described communities, a relatively high diversity has been observed and the exposure and altitude have a bigger influence over its fluctuations, rather than the project covering of the juniper. In case of lack of *J. sibirica* on the examined territory, communities are developed, in which different grass plants are edificators, most often *A. capillaris, L. flexuosa, F. rubra,* i.e. the quantitative participation of the economically valuable wheat grasses is increased. It is characteristic for the ordinary red top grass and *L. flexuosa*, that in the availability of juniper between 75 and 100%, they continue to be present in the composition of the grass mass. With evaluation 3 for the abundance of *J. sibirica*, the registered varieties are 22, and for the terrains with no availability of juniper clumps, they reach 24-29.

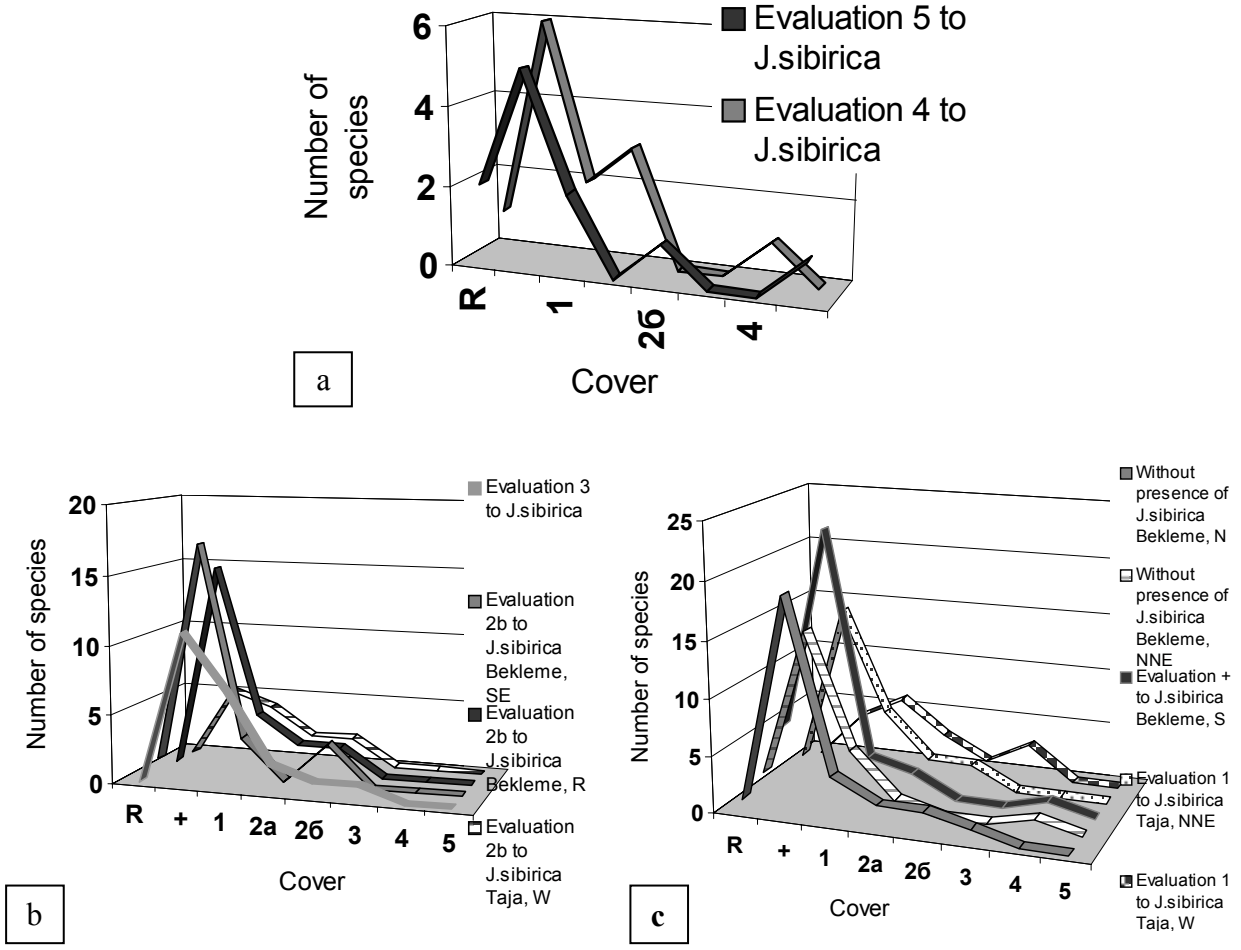

Fig. 3. *Quantitative participation of species by different abundanse of the J,sibirica a)Abundanse above 50% ; b) Abundanse from13 to 50%; c) Abundanse under 12%.*

Taking into consideration the strong inclination and brokenness of the terrains from the one part, as well as the soil-protecting and supporting role of the juniper bushes from the other part, it would have been advisable that *J. sibirica* is not completely eliminated and its invasion to be limited to about 40-50% covering. In the case of abundance of *J. sibirica* over 50%, and especially over 75%, the varieties composition in the communities decreases almost by half. In evaluation 4, the num-

ber of varieties is almost equal to those with evaluation 5, but their quantitative participation is considerably higher. In the abundance of over 75%, the variety composition is limited to plants of predominantly boreal origin, belonging to the group of chamephytes and hemicryptophytes. It is characteristic for the low bushes of the Ericaceae family, that *V. myrtilus* and *V. vitis-idaea* are present in all descriptions. *V. uliginosum* and *B. spiculifolia* have not been registered in the project covering of the juniper over 50%. *N. stricta* also shows similar sensitivity to the increased abundance of *J. sibirica*. In juniper abundance of over 75%, most of the varieties have covering and abundance up to 10-12%. Only one variety *(V. myrtillus*) has abundance over 13% (Fig. 3a). In the localities, where J. sibirica has covering of 50-75%, the number of varieties with abundance over 5% increases, but again the greatest share is for those with covering under 1% (Fig. 3b). In lower covering by the juniper (i.e. evaluations 26,3), the number of plants with covering over 13% increases. In the examined lots without the existence or with individual representatives if juniper, the quantitative participation of the grass varieties increases (Fig. 3c). The increase in the diversity of the varieties in the localities without juniper is due namely to plants represented by one or two specimens, or have abundance of less than 1%.

More than half (54%) of the plants registered in the different descriptions, show low constancy, i.e. they are found just on one or two of the examined lots. Just about 14.29% of the plants show higher constancy of over 75%. According to KOCHEV (1967), the highest constancy in the case of availability of the juniper over 50%, is shown by *V. vitis-idaea,* while according to MESHINEV ET ALL (2000) this is *V. myrtilus*. Several varieties are determined as the most constant in all examined lots of the present research – *V. myrtilus, V. vitis-idaea, A. capillaris, L. flexuosa* (Table 1).

CONCLUSIONS

The dominating vital form in the communities of Juniperus sibirica is that of hemicryptophytes and chamephytes, with mostly perennial plants referring to them. With regard to the dampness requirements of the plants, the mesophytes and psychrophytes prevail, whereas in respect of temperature, the greatest share is for the termophytres, meso and microtermes, the irradiation of which comes from the silvoboreal and mountain center of distribution.

Of the floral elements, the greatest share is for the plants of European and boreal origin, with relatively high percentage of the varieties originating from the Balkan Peninsula.

The altitude and the exposure of the terrain play a significant role in the distribution of the asectional varieties.

In abundance of the dominant (*J. sibirica*) of up to 50-60%, the variety composition of the association does not undergo significant changes and allows the effective usage of the areas as pastures. The higher density of the bush clumps of juniper leads to the strong decrease in the diversity of varieties, and especially of those with forage value, that is, the consequences are not favourable from the safety of nature and economic point of view.

REFERENCES

ASYOV B., A. PETROVA, D. Dimitrov, R.Vasilev. 2006. Conspectus of the Bulgarian Vascular Flora. ASYOV B., A. PETROVA. (Eds.): Distribution maps and floristic elements. Third revised and enlarged edition. BBF, Sofia, 453 p.

BONDEV I. 1991. Vegetation in Bulgaria, Map in scale 1: 600 000 with explanatory notes. Univ. Publis. House "Kl. Ohridski", Sofia, 432 p.

BRAUN–BLANQUET. 1964. Pflanzensoziologie. Aufl. Wien – New York, 219 p.

CHERNYAVSKI P., L. VEZEV. 1953. To the Characteristics of Pastures in the Mountain Zone of the Ribaritsa Region. - Sci. Work. Centr. Sci. Res. Inst. of Forestry, 1: 171-234.

DELIPAVLOV D., M. POPOVA, I. KOVATHEV, D. TERSIISCI, I. CESMEDZIEV, D. GRAMATICAV. 1992. Guide to plants in Bulgaria. Zenizdat, Sofia, 501 p.

GORUYUSHINA T. 1979. Ecology of Plants. Hig. School, Moscow, 352 p.

KOCHEV HR. 1967. Bush and Grass Vegetation in the Alpine Region of the Troyan Balkan Mountain. Bull.Inst. Bot., Sofia, XVII: 5-30

MESHINEV T., I. APOSTOLOVA, E. KACHAUNOVA, V. VELCEV, A. POPOV. 2000. Flora and plant communities. – In: Meshinev T., A. Popov (Eds.): High mountain treeless zone of the Central Balkan national park. Biological diversity and problems of its conservation. Sofia, BSBCP, pp. 1-350.

MORTON F. 1964. Aus dem Leben des Zwergwacholders. - Natur und Museum, 94(10): 371 – 375.

NAYDENOV I., I. VANKOV. 1955. Meadows and Pastures. Zemizdat, Sofia, 192 p.

STEFANOV B. 1943. Phytogeografical Elements of Bulgaria. Compt. Rend. Acad. Bulg. Sci., 39: 1-501.

VELEV N., I. APOSTOLOVA. 2007. Successional changes of Nardus stricta communities in the Central Balkan Range. (In press)

VELCHEV B. 2002. Types of vegetation. In Geography of Bulgaria. Physical geography. Social and economic geography – BAS, Sofia: 324 – 331.

АНАЛИЗ НА РАСТИТЕЛНАТА ПОКРИВКА ПОД ВЛИЯНИЕ ОТ РАЗЛИЧНО ОБИЛИЕ НА *Juniperus sibirica* ВЪРХУ ДВЕ ЗОНИ ОТ ЦЕНТРАЛНА СТАРА ПЛАНИНА

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Изследван е състава на растителните съобщества върху две зони от високопланинската безлесна част на Централна Стара Планина. Направеният анализ показва, че броят на регистрираните видове върху терени с обилие на хвойна от 0 до 40% е почти еднакъв. При обилие на сибирската хвойна над 50 и особено над 75% видовият състав в съобществата намалява наполовина. Силната наклоненост и пресеченост на терените от една страна, както и почвозащитната и укрепителна роля на хвойновите храсти от друга определя необходимостта от ограничаване на инвазията на *J. sibirica* до 40-50%, а не до тоталното и отстраняване.