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STUDY OF OAK FORESTS AND SCRUBS OF HORNBEAM VEGETATION, METALS CONTENT OF TEUCRIUM CHAMEDRYS AND SOILS THE FIRST YEAR AFTER WILDFIRE ON VIDLIC MOUNTAIN

Abstract: *On the Vidlič Mountain in southeastern Serbia in the summer of 2007. the wildfire occured, in which burned beech and oak forests, scrubs of hornbeam, dry pastures and rocky ground vegetation. The influence of wildfire on oak forests and hornbeam the first year after fire was followed. Depending of the speed with wich the fire crossed the soil cover, there was a partial or total destruction of vegetation, plant species and their habitats. In the burned areas, soil was more alcaline in comparison to the non burned areas. Heavy metal content (Pb, Cd, Cu, Zn and Fe) was generaly increased both in the soil and plant species of Teucrium chamaedrys from the burned area, thought bellow the permired limits for each metal.*

Key words: fire, Vidlič, oak forests, scrubs of hornbeam, diversity, soil, heavy metals.

INTRODUCTION

The fire on the Vidlič Mountain was observed 20.07.2007. and lasted for ten days [1]. The cause of the fire is human factor by uncontrolled burning of stubble. In the vicinity of the fire starting point is rocky area, that favors the occurence of fire [2]. The vegetation of forests, rocks, shrubs and meadow formations was burned in the fire. A final consequence of fire was more than 2500 ha of burned low vegetation, scrubland and forests [3]. The fire caused changes in the composition and structure of the different communities and habitats of the species on the Vidlič Mountain.

Chemical characteristics of soil are potentially highly influenced by wild fires and they are of the essential importance for vegetation especially, pH and heavy metals content. Metals uptake by plants is strongly dependant on pH, while if plant has been used by humans disregarding the purpose, increased content of heavy metals may represent risk for human's health. That is the main reason why *Tecrium chamaedrys* was chosen- the plant has been widely used in traditional medicine for treatment of the stomach disorders.

MATERIAL AND METHODS

Field studies and deposition of collected plant material

Field research of the fire effects included thermophilous oak forests shrubbery hornbeam on the Vidlič Mountain in southeastern Serbia after one year. The result of field research was plant material, herbarized, labeled and deposited in the Herbarium of the Department of Biology and Ecology, Faculty of Science and Mathematics, University of Niš: Herbarium moesiacum (HMN).

Determination of plant material

Determination of the collected plant material was performed according to the Josifović et al. [4], Velcev [5] and Javorka [6]. The nomenclature is adjusted according to the Flora Europaea [7,8].

Phytocenological studies

Phytocenological studies of vegetation of oak forests and scrubs of hornbeam were carried out in accordance with the method of Braun-Blanquet [9]. The results of studies conducted on the areas affected by fire are presented in the form of phytocenological table.

Statistical analysis of the data

Analysis of floristic data was performed using classification and average clustering techniques (WPGMA) from the software package Statistica 8.0 [10]. The analyses employed the combined abundance-cover value of each species per plot. We transformed the combined values into numerical scale as proposed by Westhoff and van der Maarel [11].

Diversity

Alpha diversity of species in the community, within the minimum range, is performed in the software package "Flora" [12]. Species richnes (the total number of species) and Simpson's diversity index [13] that includes species evenness were calculated per quadrant for first season after fire.

Determination of pH of the soil

For measuring pH of the soil, 1 g of sample was weighted, and 5 cm^3 of deionized water was added. After 2 hours of mechanical shacking, the samples were centrifuged, and pH was measured in supernatants. The complete procedure was repeated, only instead of deionized water, KCl solution (1 mol/dm^3) was used.Measurement of pH was performed by pH-meter (Hanna instruments, pH 211, Microprocesor pH meter).

Determination of metals content in soil

Soil samples were collected in 2008. year, from area of oak forst with hornbeam shrubs near locality Vučje and from burned area in the immediate vicinity.The soil samples ewre firstly dryed on the air, until constant mass was achieved, then they were sieved through the polyethylene sieve, in order to obtain well grained and homogenized samples for analysis. Metals content was determined in bio-available, extractible and total fraction of the soil, after three steps sequential extraction. Soil samples treatment was preformed according to the procedure proposed by Tipping et al. with aim to obtain bioavailable metal fraction [14]. The extractible metal fraction was obtained according to the procedure AAS proposed by Manual [15]. Total metal fraction was obtained using the procedure proposed by Radojević & Bashin [16].

Analysis of the metal content was performed using atomic absorbance spectrophotometer (AAS) Perkin-Elmer M-1100.

Determinaton of metal content in plant material

After grinding, samples of 1 g of plant material was weighted in the glass beakers, portions of 10 cm^3 of concentrated HNO_3 were mizzled and left to stand over nigh. By heating over the wather bath, the volumes were reduced, until red fumes of NO_2 didn't disappear. Samples were cooled, and portions of 4 cm^3 70 % $HClO_4$ were added to each solution. The heating process was repeated, reducing volumes up to a small quantity, and filtered over the filter paper (blue mark) into the volumetric flasks of 25 cm^3 and filled with deonized water up to the mark. In these solutions contecentrations of Cu, Pb, Cd, Fe and Zn were detrmined using AAS Perkin-Elmer M-1100 [15].

RESULTS AND DISCUSION

Burned vegetation of oak forests and scrubs on the Vidlič Mountain

The forests on calcareous terrains are more sensitive to the occurrence of heath caused by fire, because it's carbonate basis (which is mostly presented on the Vidlič Mountain) contributes to faster and greater warming and drying up of ground vegetation [17].

In the first year after fire (2008), six phytocenological plots of the burned oak forests and shrubs were made (Table 1), on the skeletal brown soil of the localities Vučje and Visočki Odorovci, at altitudes of 643-885m, on the southern exposure (S), cover at an inclination 5-40, with the number of species 21-55 and values of Simpson diversity index in the range of 0.951-0.98 (Table 2). In all phytocenological plots, was recorded a total of 142 species and subspecies, of which 7 species within trees and 24 species and subspecies in the shrub layer. Only in one plot are recorded 72 species and subspecies. On the locality of Vučje (plot c) where is preserved layer of trees, and oak forests is only partially burned, is recorded the lowest number of species (23) and on the locality Visočki Odorovci (plot g) the largest number of species (55) was recorded. The average number of species is 38.5. Herbaceous species with the higest presence are: *Orlaya grandiflora, Teucrium chamaedrys, Eryngium campestre, Geranium dissectum, Poa pratensis, Brachypodium pinnatum* and *Sideritis montana.*

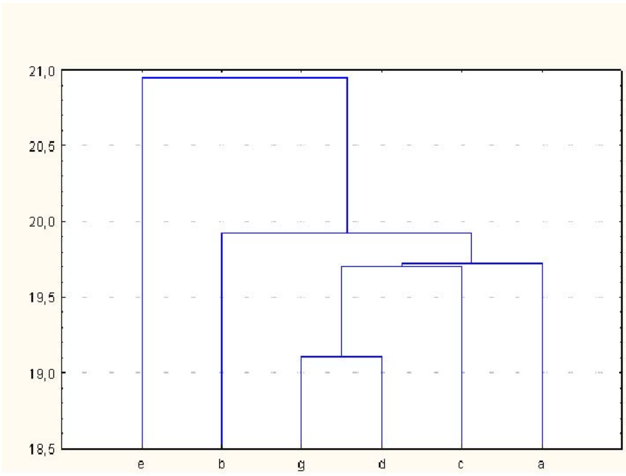

Figure 1. *Cluster analysis of the burned areas of oak forests and shrubs first year after fire*

In figure 1, on a dendrogram grouping of shared plots **d** and **g** can be noticed**.** These two plots are from different and distant localities, but they are both positioned in burned areas of oak forests with approximate sizes of slope and altitude (table 1), which makes them similar in species composition. Plot **e** in the dendrogram clearly stands out from the rest of plots, indicating it's specific species composition, dominated by shrubby species *Prunus tenella*, which is a natural rarity, and it is not recorded in other plots.

Table 1. *Oak forests and shrubs hornbeam the first year after fire (2008)*

Locality	V u č j e					Visočki Odorovci	level of presence
Altitude (m)	643	650	660	910	907	885	
Exposure	S						
Slope°	5	20	15	30	20	40	
Geological substrate	limestone						
Type of soil	skeletal brown soIl						
Surface of plot (m)	100				50	100	
General coverage of vegetation (%)	80		90	60	100	85	
Height of vegetation (m)	2	1,5	5	5	1,5	0,5	
Diameter of the tree (cm)			8				
Date	20.7.	13.7.	13.7.	20.7.	20.7.	6.7.	
Label of plot	**a**	**b**	**c**	**d**	**e**	**g**	.
Floristic composition:							
Layer of trees:							
Quercus cerris	.	.	1.1	.	.	+.1	II
Carpinus orientalis	.	.	1.2	.	.	.	I
Quercus petraea	.	.	1.1	.	.	.	I
Fraxinus ornus	.	.	1.1	.	.	.	I
Acer hyrcanum	.	.	1.1	.	.	.	I
Pyrus pyraster	.	.	.	+.1	.	.	I
Quercus pubescens	.	.	.	.	.	2.2	I
Shrub layer:							
Rosa canina	+.1	.	.	+.1	+.1	+.1	IV
Acer hyrcanum	+.1	.	+.2	.	.	.	II
Crataegus monogyna	+.1	.	.	1.1	.	.	II
Ononis pusilla	.	+.1	.	+.1	.	.	II
Quercus cerris	.	.	+.1	.	.	2.2	II
Rosa agrestis	.	.	.	+.1	.	+.1	II
Crataegus laevigata	.	.	.	.	+.1	1.1	II
Ulmus mino	+.1	.	.	.	.	.	I
Carpinus orientalis	.	.	1.2	.	.	.	I
Sorbus torminalis	.	.	+.1	.	.	.	I
Quercus petraea	.	.	+.1	.	.	.	I
Fraxinus ornus	.	.	+.2	.	.	.	I
Evonymus latifolius	.	.	.	+.1	.	.	I
Chamaecytisus austriacus	.	.	.	+.1	.	.	I
Rhamnus cathartica	.	.	.	+.1	.	.	I

Prunus tenella	.	.	.	.	3.3	.	I
Malus pumila	.	.	.	.	2.2	.	I
Ononis spinosa	.	.	.	.	1.2	.	I
Prunus spinosa	.	.	.	.	1.1	.	I
Viburnum lantana	.	.	.	.	+.1	.	I
Syringa vulgaris	.	.	.	.	+.1	.	I
Clematis vitalba	.	.	.	.	.	1.1	I
Prunus domestica subsp.*insititia*	.	.	.	.	.	+.1	I
Cornus mas	.	.	.	.	.	+.1	I
Layer of herbaceous plants:							
Orlaya grandiflora	1.1	+.1	.	2.2	+.1	1.2	V
Teucrium chamaedrys	1.1	1.2	.	+.1	+.1	+.1	V
Eryngium campestre	+.1	+.1	.	+.1	+.1	+.1	V
Geranium dissectum	+.1	.	.	1.1	1.1	+.1	IV
Poa pratensis	+.1	.	.	+.1	2.2	+.1	IV
Brachypodium pinnatum	.	+.1	.	3.3	1.1	2.2	IV
Sideritis montana	.	2.2	.	+.1	+.1	+.1	IV
Medicago sativa subsp. *falcata*	.	+.2	.	2.2	1.1	+.1	IV
Althaea hirsuta	.	+.1	.	1.1	1.1	+.1	IV
Bupleurum praealtum	.	.	+.1	+.1	+.1	1.2	IV
Fragaria vesca	2.2	.	.	1.1	.	+.1	III
Crepis setosa	+.1	.	.	+.1	.	+.1	III
Euphorbia cyparissias	.	1.1	.	+.1	+.1	.	III
Allium flavum	.	1.1	.	+.1	+.1	.	III
Carduus candicans	.	+.1	.	+.1	.	+.1	III
Asperula purpurea	.	1.2	.	.	1.1	1.1	III
Helleborus odorus	.	.	1.1	+.1	+.1	.	III
Dactylis glomerata	.	.	1.2	+.1	.	+.1	III
Ononis pusilla	+.1	.	.	+.1	.	.	II
Centaurea calcitrapa	4.4	.	.	.	.	+.1	II
Festuca pratensis	2.2	.	.	.	.	+.1	II
Agrimonia eupatoria	+.1	.	.	.	.	+.1	II
Carex humilis	.	2.2	.	1.1	.	.	II
Convolvulus cantabrica	.	2.2	.	1.1	.	.	II
Helianthemum nummularium	.	+.1	.	1.1	.	.	II
Satureja kitaibelii	.	1.2	.	.	+.1	.	II
Arabis recta	.	+.1	.	.	+.1	.	II
Melica ciliata	.	1.2	.	.	.	+.1	II
Festuca valesiaca	.	+.2	.	.	.	+.1	II
Teucrium montanum	.	+.2	.	.	.	+.1	II
Allium scorodoprasum subsp.*rotundum*	.	+.1	.	.	.	+.1	II
Thlaspi perfoliatum	.	+.1	.	.	.	+.1	II
Coronilla varia	.	+.1	.	.	.	+.1	II
Viola odorata	.	.	+.1	+.1	.	.	II
Vincetoxicum hirundinaria	.	.	+.1	.	.	+.1	II
Acanthus balcanicus	.	.	+.1	.	.	+.1	II
Linaria vulgaris	.	.	.	+.1	+.1	.	II
Verbascum lychnitis	.	.	.	+.1	+.1	.	II
Cuscuta europaea	.	.	.	2.2	.	+.1	II
Galium aparine	.	.	.	2.2	.	+.1	II
Bromus erectus	.	.	.	1.1	.	+.1	II
Lactuca serriola	.	.	.	+.1	.	+.1	II
Crepis foetida subsp. *rhoeadifolia*	.	.	.	+.1	.	+.1	II
Campanula bononiensis	.	.	.	.	+.1	1.1	II

Carduus acanthoides	2.2	.	.	.	.	.	I
Achillea millefolium	1.1	.	.	.	.	.	I
Euphorbia seguierana subsp. *niciciana*	1.1	.	.	.	.	.	I
Chrysopogon gryllus	.	2.2	.	.	.	.	I
Leontodon hispidus	.	1.1	.	.	.	.	I
Carex caryophyllea	.	+.2	.	.	.	.	I
Cruciata glabra	.	.	1.2	.	.	.	I
Festuca heterophylla	.	.	+.2	.	.	.	I
Melica uniflora	.	.	+.2	.	.	.	I
Fallopia convolvulus	.	.	.	1.1	.	.	I
Thalictrum aquilegiifolium	.	.	.	.	1.2	.	I
Vicia lathyroides	.	.	.	.	1.2	.	I
Trifolium pratense	.	.	.	.	1.2	.	I
Viola jordanii	.	.	.	.	1.1	.	I
Torilis japonica	.	.	.	.	.	1.1	I
Lepidium campestre	.	.	.	.	.	1.1	I

In only one plot with the value +.1 were found following plant species :

Plot a: *Trifolium scabrum*, *Achillea pannonica*, *Verbascum speciosum*, *Cirsium arvense*, *Marrubium peregrinum*, *Galium verum*, *Thymus glabrescens* , *Torilis arvensis*;

Plot b: *Asperula cynanchica*, *Linaria genistifolia* subsp. *sofiana*, *Muscari neglectum*, *Coronilla scorpioides*, *Euphorbia falcata*, *Crucianella angustifolia*, *Cerastium brachypetalum*, *Campanula trichocalycina*, *Ajuga chamaepitys*, *Bromus commutatus*, *Dichanthium ischaemum*, *Agropyron cristatum*, *Thesium arvense*;

Plot c: *Glechoma hirsuta*, *Lathyrus venetus*, *Festuca ovina*;

Plot d: *Crupina vulgaris*, *Digitalis lanata*, *Tamus communis*, *Daucus carota*, *Viola tricolor*, *Lapsana communis*;

Plot e: *Nigella arvensis*, *Cuscuta approximata*, *Trifolium alpestre*, *Camelina rumelica*, *Vicia sativa*, *Trifolium badium* Schreber, *Thymus pannonicus*, *Stellaria media*, *Vicia tetrasperma*, *Petrorhagia prolifera*, *Allium sphaerocephalon*., *Potentilla recta*, *Hypericum perforatum* L., *Artemisia alba*;

Plot g: *Myosotis arvensis*, *Himantoglossum hircinum*, *Calystegia sepium*, *Clinopodium vulgare*, *Viola alba*, *Centaurium erythraea*, *Geum urbanum*, *Veronica austriaca* subsp. *austriaca*, *Ornithogalum pyrenaicum*, *Stachys germanica*, *Sonchus asper*, *Poa angustifolia.*

Table 2 shows mathematical values of alpha diversity of burned areas first year after the fire (2008). It can be seen that the diversity is lowest in plot **c**, which was taken at the place where the oak forest was partially burned and the layer of trees preserved and restored quickly. More open or less concluded community, in which the floor of trees and shrubs was conserved in a small extent, preserved higest index of diversity (plot **g**), from the locality Visočki Odorovci, which is made at the place where the oak forest was completely burned. All other plots have medium values and were made in places where scrub of hornbeam was burned (plots **a, b, d, e**).

Considering the correlation between the burned areas of oak forests and shrubs hornbeam, it may be observed that plots made at high altitudes and higher slopes, have larger total number of species and diversity, and vice versa (Table 2).

Table 2. *Orographic data, species richness and alpha diversity by Whitaker (1972) of burned areas, first year after fire (2008)*

Plot	Altitude (m)	Slope(°)	Species richness	Diversity
a	643	5	26	0.951
b	650	20	38	0.970
c	660	15	23	0.955
d	910	30	44	0.973
e	907	20	45	0.974
g	885	40	55	0.980

pH of Soil

At the site of the plant species *Teucrium chamaedrys*, occuring with the highest level of presence (V) in the floor of herbaceous plants, pH value of the soil was determined and compared with the nearest soil pH from the non burned area (Table 3.).

Obtained soil pH from non burned area, after treatment with deionized water are lower than pH of soil from burned area. After the wild fire, acidic compounds from the organic fraction of soil were destroyed and it has contributed to the increase of pH of fire-affected soils.

A relatively simple method to determine whether the soil particles neutral, positively or negatively charged is a measurement of the soil pH in 1 M KCl solution and in deionized water. The difference obtained in this way is referred as ΔpH and is calculated by the following formula:

$$\Delta pH = pH_{H2O} - pH_{KCl}$$

Table 3. *pH values of soil at site of plant species Teucrium chamaedrys: (NB)-non burned and (B)-burned, after treatment with deonized water and 1M KCl solution*

	pH (H_2O)		pH (KCl)	
	NB	B	NB	B
Teucrium chamaedrys	7.24	7.38	6,78	6,83
ΔpH	0.14		0.05	

Changes in pH (ΔpH) for soils from both burned and non burned areas have positive (0.55 and 0.46, respectively), indicating presence of negatively charged colloidal soil particles. It is noticeable increase of soil pH at the burned in comparison with non burned areas.

Content of heavy metals in soil and plant species *Teucrium chamaedrys*

The content of heavy metals Cu, Pb, Cd, Zn and Fe in underground and above-ground parts of plants collected from the burned and non burned areas of oak forests with hornbeam shrubs was determined by AAS method after mineralization, and then calculated the average content of each metal in the whole plant.

Table 4 shows the contents of heavy metals in underground and above-ground organs of plant *Teucrium chamaedrys* and in soil from burned and non burned areas.

In the soil affected by wild fire in the habitat of plant species *Teucrium chamaedrys*, Cu content is slightly lower than in soil from non burned area, while in the plant, from burned area Cu content was almost three times higher in comparison to non burned area.

The bioavailability of metals from soil to plants is determined by soil characteristics, forms in which metal is present in soil, and especially by the interaction between the soil and plants. Bioaccumulation factor can be defined as ratio of the amount of heavy metals in airal and underground part of the observed plant species [18]. Bioaccumulation factor represents the ratio of transfer soil-plant, and can be calculated as ratio of metal concentration in the plant and the total concentration of metal in the soil.

Table 4. *Content of heavy metals in underground and above-ground parts of plant species Teucrium chamaedrys and in soil from non burned (NB) and burned (B) area (mean ± standard deviation)*

Teucrium chamaedrys	Cu	Pb	Cd	Zn	Fe
Soil (NB)	26.73±0.23	40.61±0.31	0*	68.75±0.28	21661.09±5.24
Above-ground (NB)	1.76±0.09	1.97±0.07	1.04±0.21	32.85±0.21	157.36±1.15
Underground (NB)	0*	0*	1.14±0.16	19.40±0.25	249.00±2.14
Whole plant (NB)	**0.88±0.05**	**0.99±0.42**	**1.09±0.18**	**26.13**±0.19	**203.18±1.65**
Soil (B)	24.70±0.08	114.93±0.17	5.64±0.14	76.01±0.32	11086.43±4.32
Above-ground (B)	2.24±0.11	1.90±0.08	1.80±0.14	48.40±0.48	177.16±1.63
Under-ground (B)	2.75±0.23	3.85±0.17	1.40±0.17	35.25±0.38	519.12±1.28
Whole plant (B)	**2.50±0.17**	**2.88±0.13**	**1.60±0.15**	**41.83±0.26**	**348.14±1.46**

*concentration (in ppm) bellow detection limit of AAS

Coefficient of transport of heavy metals from underground to above-ground part of the plant can be calculated from the ratio of the total amount of metals in the plant and the total amount of metal from the corresponding soil where the plant grows, to determine the mobility and bioavailability observed metals from the soil [19].

Table 5. *Values of bioaccumulation factors of heavy metals for plant species Teucrium chamaedrys from non burned (NB) and burned (B) area of oak forest with hornbeam schrubs*

	NB	B
Cu	0.033	0.101
Pb	0.024	0.025
Cd	1.091	0.284
Zn	0.380	0.550
Fe	0.009	0.031

Bioaccumulation factors and koeficient of transfer soil-plant for plant species *Teucrium chamaedrys* are presented in Table 5.

Plant species *Teucrium chamaedrys* from the burned area has the bioaccumulation factor for zinc greater than 0.5, which indicates its tolerance to increasing concentrations of zinc.

The interaction of plants with heavy metals can be viewed through the transfer coefficient of the heavy metal between the underground and above-ground parts of the plant. It is calculated as the ratio of the concentration of heavy metals in aboveground and underground part of the observed plant species [18]. Calculated values for Cu, Pb, Cd, Zn, Fe of plant species *Teucrium chamaedrys* from non burned (NB) and burned (B) area are presented in Table 6.

Table 6. *Coeficients of transfer (CT) for Cu, Pb, Cd, Zn, Fe in plant Teucrium chamaedrys, from non burned (NB) and burned (B) area*

	Cu	Pb	Cd	Zn	Fe
Above-ground (NB)	1.76±0.09	1.97±0.07	1.04±0.21	32.85±0.21	157.36±1.15
Underground (NB)	0*	0*	1.14±0.16	19.40±0.25	249.00±2.14
CT (NB)	**0**	**0**	**0.91**	**0.59**	**1.69**
Above-ground (NB)	2.24±0.11	1.90±0.08	1.80±0.14	48.40±0.48	177.16±1.63
Underground (NB)	2.75±0.23	3.85±0.17	1.40±0.17	35.25±0.38	519.12±1.28
CT (NB)	**0.82**	**0.49**	**1.28**	**1.39**	**0.34**

*concentration (in ppm) bellow detection limit of AAS

In soil from the burned habitat of the examined plant, as well as in the plant itself, Pb content was higher than in soil and plant from non burned habitats. In plant species from burned area, Pb was determined in the aboveground part, while in the underground part it was present in concentrations below detection limit. In plant material form burned area a higher content of Pb was determined in the underground than in above ground part. In soil from burned area Cd was found in conecentration of 6 ppm, while in the soil from non burned areas it was bellow detection limit of the method. Plants from burned area contained somewhat more Cd from plants from non burned area. In soil from burned area higher amounts of Zn were registreted. The above ground part of the plant contained greater amount of Zn, than underground part, and total content of Zn was higher in case on burned area.

The content of Fe is higher both in soil and plant from burned area, in comparison to non burned area. In under ground parts of tested plant from both areas, the Fe content was higher.

CONCLUSIONS

Recovering of vegetation of oak forests and shrubs hornbeam the first year after fire depends on degree to which the number of species has been destroyed, or whether it is burned partially or completely.

The smallest diversity is at the place where the oak forest was partially burned, so it is maintained layer of three and fast restored. On the other side, the highest diversity index was recorded in the place where the oak forest was completely burned.

In general, soil from all burned sites, showed increased values, i.e. it become more alcaline. The similar findings are also in cas eof the tested metals- their concentrations were higher in the soil from burned areas, indicating potential risk that fire can provoke. In our case, both burned and non burned localities are in area with low pollution and non of the metal's concentration exceeds average value of each metal in the Earth crust. Content of each metal in analyzed plant may vary, which is caused by tendency of the plant to accumulate metal species in underground and above ground part.

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BIOGRAPHY

Marija Marković was born in Pirot 11.11.1970. and acquired following degrees at the Faculty of Sciences and Mathematics, University of Kragujevac (graduate biologist 1993., Master of Biology 2006. and PhD of biological sciences 2013). The areas of her research are ecology and environmental protection, botany and phytochemistry.
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ISTRAŽIVANjE VEGETACIJE HRASTOVIH ŠUMA I ŠIBLjAKA GRABIĆA, SADRŽAJ TEŠKIH METALA U BILjCI PODUBICI I U ZEMLjIŠTU PRVE GODINE NAKON POŽARA NA PLANINI VIDLIČ

Marković Marija, Stankov Jovanović Vesna, Mitić Violeta, Stamenković Slaviša, Ilić Marija, Pešić Dušica

Apstrakt: *Na planini Vidlič u jugoistočnoj Srbiji u leto 2007. godine došlo je do požara u kome je gorela vegetacija bukovih i hrastovih šuma, šibljaka grabića, suvih pašnjaka i kamenjara. U ovom radu sagledan je uticaj požara na vegetaciju hrastovih šuma i šibljaka grabića prve godine nakon požara. U zavisnosti od toga kojom je brzinom požar prešao preko zemljišnog pokrivača, došlo je do delimičnog ili potpunog uništenja vegetacije, odnosno biljnih vrsta i njihovih staništa. Na opožarenom staništu se pokazalo da je zemljište alkalnije u poređenju sa neopžarenim zemljištem. Sadržaj teških metala (Pb, Cd, Cu, Zn i Fe) je uglavnom povećan u zemljištu i biljnoj vrsti podubici - Teucrium chamaedrys na požarištu, ali ne prelazi dozvoljene granice koncentracije u zemljinoj kori za svaki metal posebno.*

Ključne reči: požar, Vidlič, hrastove šume, šibljak grabića, diverzitet, zemljište, teški metali.

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