

Plants with protection statute, endemics and relicts on Mt Zemenska, West Bulgaria

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Abstract: This article presents data on threatened and protected plants, endemics and relicts from Mt Zemenska. As a result of investigations (2006–2011), 1343 vascular plants have been found. The plants with conservation status account for 5 % (68). Two and a half percent (33) of the species are included in The Red List of the Bulgarian Vascular Plants: 1 Critically Endangered, 8 Endangered, 16 Vulnerable, 2 Near Threatened, 1 Data Deficient, and 5 Least Concern. Fifty-two or 3.9 % of all species are under protection of the Bulgarian Biodiversity Acts. There are three species included in Annex 4 of the Council Directive 92/43/EEC on Conservation of Natural Habitats of Wild Fauna and Flora. One species is included in Annex 1 of the Bern Convention for Conservation of European Wildlife and Natural Habitats. Fifteen or 1.1 % (15) of the species are covered by Annex 2 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Balkan endemics constitute 2.8 % (38). The Bulgarian endemics amount to 0.4 % (5). Tertiary relicts are 1.9 % (26).

Key words: endemics, Mt Zemenska, protected plants, relicts

Introduction

So far there has been no thorough investigation of the flora of Mt Zemenska. Velenovský (1891) had reported chorological data for Mt Zemenska in *Flora Bulgarica*. In Southwest Bulgaria in a Floristic Aspect, Toshev (1902) also gave chorological data for Mt Zemenska. Adamovich (1909, cited after Asenov 2006) named the southern part of the Zemenski Gorge a Mediterranean oasis, because of the many Submediterranean and Mediterranean elements. Urumov provided significant chorological data on Mt Zemenska in his contributions and works (Urumoff 1912, 1913; Urumov 1913, 1917, 1930). In 1935 he published *Flora of the Kustendil District*. In mid-20th century, D. Jordanov and A. Janev used to go on floristic expeditions to Mt Zemenska, but no official articles were

published on their investigations there. Thus mainly chorological data exist on that region: Popov (1975), Dimitrov (1995), Vutov & Dimitrov (2000), Dimitrov & Stojanov (2002), Vasilev (2009), and Asenov (2009a,b, 2010, 2012). Bancheva (2006) has described *Colymbada finazzeri* (Adamović) Holub (*Centaureinae*, *Asteraceae*) from the southwestern slopes of the Mt Zemenska, Struma Valley region.

Mt Zemenska is a low limestone mountain. Its highest peak is Tichak, 1295 m. The mountain constitutes part of the Znepole Floristic Region. A very small area lies in the Struma Valley, at the southeastern foothills which start from river Struma. Mt Zemenska is located in the central part of West Bulgaria and falls within the quadrants FN–30, FN–40, FN–41, FN–49 on the grid map of Bulgaria (Michev 1999). It borders on six rivers: on river Struma in the east, river Dragovishtitsa in

the south, rivers Uineshtitsa, Dobridolska and Sushitska in the west, and river Treklyanska in the north. River Brestnitsa (or rather its dry valley) divides Mt Zemenska on two parts – north and south (Petrov 1986).

Study area lie in the middle mountain – pan geographic zone, west (Kraishtensko-Ichtimanska) part (Stefanov 2002). It is part of the transitional-continental climatic area. In this region annual temperatures are somewhat higher, as compared to the central-continental areas. Winter is softer (Velev 2002). According to the accepted hydrological division of Bulgaria (Jordanova 2002), Mt Zemenska falls into region B II² (with temperate climatic influence, considerable snow cover feeding the rivers, and maximum water flow in May). According to the geobotanical division of Bulgaria, the study area falls into the Holarctic Kingdom, European Deciduous Forest Zone, Illyrian (Balkan) Province, Sofia district, Mt Konyavska – Zemen region (Bondev 2002). The altitude of the investigated region is between 490 m (Struma Valley) and 1295 m (peak Tichak).

The geological base of Mt Zemenska is formed of sediment rocks. The main rock composition of the mountain is of limestones, dolomites and sandstones. The southern slopes are composed of breccias, conglomerates, argillites, and tuffs (Nikolov & Jordanova 1997). The calcareous rock base of Mt Zemenska is its most typical characteristic and a major factor for the existing ecological conditions. The mountain is karst and very dry. There is only one small stream starting at the waterfall Polska Skakavitsa.

According to soil division, the study area falls into the Mediterranean Soil District, Balkan-Apennine Subdistrict, Sofia-Kraishte Province (Ninov 1997). A combination of continental climate with Mediterranean influence and the calcareous base rocks and low-mountain relief has led to formation of rendzina soils (humus-carbonate) of the Leprosols Class (Donov 1993). With such soils the hummus horizon is characteristically situated immediately above the primary unconsolidated materials (AC profile). These soils are sandy-clayey up to slightly clayey, dark-grey in colour. The soil is insufficiently humid (dry to fresh), owing to the fast seep-down of water to a great depth. Soil susceptibility to erosion is a serious problem.

This article aims to present data about the threatened and protected plants according to different categories and criteria, endemics and relicts on Mt Zemenska.

Material and methods

Fieldwork was carried out in 2006–2011. Plants were collected from different habitats, different altitudes and expositions. Vouchers stored in the main collection of the Herbarium of the St. Kl. Ohridski Sofia University (SO) and the Herbarium of the Bulgarian Academy of Sciences (SOM) were also used. The collected plants were determined after Jordanov (1963–1979), Velchev (1982–1985), Kožuharov (1992), Kozuharov (1995), and Delipavlov & Cheshmedziev (2003). The authors of the plant names were checked according to Brummitt & Powell (1992). An update of the plant names and synonyms follows The plant list (2012).

The voucher specimens have been stored in the Herbarium of the Sofia University (SO). The conservation status was checked according to CITES (1975), Bern Convention (1979), Biological Diversity Act (2002, 2007), and Petrova & Vladimirov (2009). Distribution, determination and threat status of the *Aubrieta columnae* Guss. ssp. *bulgarica* (Sagorski) Hartvig species were presented by Ančev (2007) and Ančev & Goranova (2009). Determination of species of family *Orobanchaceae* was made by Stoyanov (2005, 2009). Endemics were checked according to Petrova & Velchev (2006) and Petrova & Vladimirov (2010). Relict plants were presented by Kožuharov (1977), Peev & al. (1998), Peev (2001), Gruev & Kuzmanov (2004), and Boža & al. (2005). Data on the total number of vascular plants in Bulgaria (3997 species) were given by Assyov & Petrova (2006).

Results and discussion

The significant plant diversity of Mt Zemenska is determined by the specific combination of carbonate basic rocks, soils, climate, topography, and geographical location. The Valley of River Struma acts as gate for Mediterranean influence from the Aegean Sea. Winter here is softer. There is significant number of Submediterranean and Mediterranean floristic elements. The flora of Mt Zemenska constitutes 33.6% of the vascular flora of Bulgaria. The species with national conservation status according to different categories and criteria on Mt Zemenska account for 5% (68) of the entire plant list (Table 1). They constitute 1.7% of the vascular flora of Bulgaria.

Table 1. Conservation status of the species on Mt Zemenska.

Species	Biological Diversity Act (2002, 2007)	Petrova & Vladimirov (2009)	CITES (1975)	Directive 92/43/EEC (1992)	Bern Convention (1979)
1	2	3	4	5	6
1. <i>Allium cupani</i> Raf.		VU			
2. <i>Anacamptis pyramidalis</i> (L.) Rich.	Annex 3	VU	Annex 2		
3. <i>Anemone sylvestris</i> L.	Annex 3	NT			
4. <i>Anthyllis aurea</i> Welden	Annex 3	VU			
5. <i>Asphodelus albus</i> Mill.	Annex 4				
6. <i>Astragalus wilmottianus</i> Stoj.	Annex 3	EN			
7. <i>Atropa bella-donna</i> L.		VU			
8. <i>Aubrieta columnae</i> Guss.ssp. <i>bulgarica</i> (Sagorski) Hartvig		EN			
9. <i>Bromus miesiicus</i> Velen.	Annex 2a				Annex 1
10. <i>Cachris alpina</i> M. Bieb.	Annex 3	VU			
11. <i>Campanula versicolor</i> Andrew	Annex 3	EN			
12. <i>Centaurea immanuelis - loewii</i> Degen	Annex 2, 3	EN		Annex 4	
13. <i>C. finazzerii</i> Adamovič	Annex 3	CR			
14. <i>Cephalanthera damassonium</i> (Mill.) Druce			Annex 2		
15. <i>C. rubra</i> (L.) Rchb.			Annex 2		
16. <i>Coeloglossum viride</i> (L.) Hartm.			Annex 2		
17. <i>Crocus olivieri</i> J. Gay	Annex 3, 4				
18. <i>Cr. flavus</i> Weston	Annex 4				
19. <i>Dactylorhiza sambucina</i> (L.) Sóo	Annex 4				
20. <i>Dianthus carthusianorum</i> L.	Annex 3	VU			
21. <i>D. sribrnii</i> L.	Annex 3	VU			
22. <i>Draba lasiocarpa</i> Rochel.		LC			
23. <i>Dryopteris filix-mas</i> (L.) Schott	Annex 4				
24. <i>Echinops banatisum</i> Rochel ex Schrad	Annex 4				
25. <i>E. microcephalus</i> Sm.	Annex 4				
26. <i>E. ritro</i> L.	Annex 4				
27. <i>E. sphaerocephalus</i> L.	Annex 4				
28. <i>Echium russicum</i> J. F. Gmel., Fig. 9	Annex 2, 3	VU		Annex 4	
29. <i>Edraianthus serbicus</i> (A. Kern.) Petrovič, Fig. 4	Annex 3	EN			
30. <i>Epipactis exilis</i> P. Delforge		EN			
31. <i>Fibigia clypeata</i> (L.) Medic.		VU			
32. <i>Fritillaria orientalis</i> Adams.	Annex 3	VU			
33. <i>Gladiolus imbricatus</i> L.	Annex 4				
34. <i>Gymnadenia conopsea</i> (L.) R. Br.			Annex 2		
35. <i>Gypsophylla glomerata</i> Pallas ex Bieb.	Annex 4				
36. <i>Helychrysum arenarium</i> (L.) Moench.	Annex 4				
37. <i>Hesperis sylvestris</i> Crantz	Annex 3	VU			
38. <i>Himantoglossum caprinum</i> (M.Bieb.) Spreng., Fig. 6	Annex 2, 3	VU	Annex 2	Annex 4	Annex 1
39. <i>Hypericum rumeliacum</i> Boiss.		LC			
40. <i>Laserpitium siler</i> L.		LC			
41. <i>Lilium martagon</i> L.	Annex 4				
42. <i>Morina persica</i> L.	Annex 3	NT			
43. <i>Neotia nides-avis</i> (L.) Rchb.			Annex 2		
44. <i>Ophris apifera</i> Huds., Fig. 7	Annex 3	EN	Annex 2		
45. <i>Orchis coriophora</i> L.	Annex 4				
46. <i>O. morio</i> L.	Annex 4		Annex 2		
47. <i>O. pallens</i> L.	Annex 4		Annex 2		
48. <i>O. papilionacea</i> L., Fig. 8	Annex 3, 4	VU	Annex 2		
49. <i>O. purpurea</i> Huds.	Annex 4		Annex 2		

Table 1. Continuation.

1	2	3	4	5	6
50. <i>O. simia</i> L.	Annex 4				
51. <i>O. tridentata</i> Scop.	Annex 4		Annex 2		
52. <i>O. ustulata</i> L.	Annex 4	VU	Annex 2		
53. <i>Paeonia mascula</i> (L.) Mill.	Annex 3	EN			
54. <i>Pulsatilla montana</i> (Hoppe) Rchb.	Annex 4				
55. <i>Salix caprea</i> L.	Annex 4				
56. <i>Scilla bifolia</i> L.	Annex 4				
57. <i>Smiranium perfoliatum</i> L.	Annex 4				
58. <i>Spiranthes spiralis</i> (L.) Chevall.	Annex 3	VU	Annex 2		
59. <i>Stipa capillata</i> L.	Annex 4				
60. <i>S. epilosa</i> Martynovský	Annex 4				
61. <i>S. eriocaulis</i> Borbás	Annex 4				
62. <i>S. pulcherrima</i> C. Coch.	Annex 4				
63. <i>S. tirsia</i> Steven	Annex 4				
64. <i>Thesium lynophyllum</i> L.		DD			
65. <i>Tragopogon balcanicum</i> Velen.		LC			
66. <i>Tulipa urumofii</i> Hayek, Fig. 5	Annex 3	VU			
67. <i>Verbascum humile</i> Janka		LC			
68. <i>Verbascum urumovii</i> Stoj. & Stef.	Annex 3				
A total of 68 species	52	33	15	3	2

Red List of the Bulgarian Vascular Plants: CR – Critically Endangered; EN – Endangered; VU – Vulnerable; NT – Near Threatened; LC – Least Concern.

The species protected under the Biological Diversity Act (2002, 2007) are total 3.9 % (52). The category Protected (Annex 3) includes 44.23 % (23) of them. The category Under Protection and Controlled Use (Annex 4) comprises 30 species. Annex 2 (protection of species habitats according to the Directive 92/43/EEC (1992) covers tree species. Annex 2a (protection of species within protected areas under the Law on Protected Territories) covers one species. Five species are included in two categories (Fig. 1).

The Red List of the Bulgarian Vascular Plants comprises 2.5 % (33) of the plants: 0.01 % (1) Critically Endangered (CR), 0.6 % (8) Endangered (EN), 1.2 % (16) Vulnerable (VU), 0.14 % (2) Near Threatened (NT), 0.01 % (1) Data Deficient (DD), and 0.4 % (5) Least Concern (LC) (Fig. 2). They account for 4.1 % of all plants (801 species) included in the Red List (Petrova & Vladimirov 2009).

The species protected by the Directive 92/43/EEC (1992) constitute 0.22 % (3). The species protected by Bern Convention (1979, Annex 1) amount to 0.14 % (2). The species protected by CITES (1975) account for 1.1 % (15).

The species with highest conservation value fall into more than one category. Such are 67.6 % (46) of all plants with a conservation status. *Himantoglossum caprinum* (M.Bieb.) Spreng. is covered by four protected

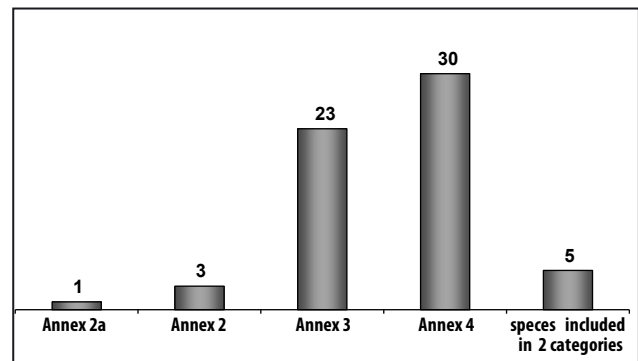


Fig. 1. Proportions (in numbers) of the categories protected plants from BDA (2002, 2007) – total 52 species. Red List of the Bulgarian Vascular Plants: CR – Critically Endangered; EN – Endangered; VU – Vulnerable; NT – Near Threatened; LC – Least Concern.

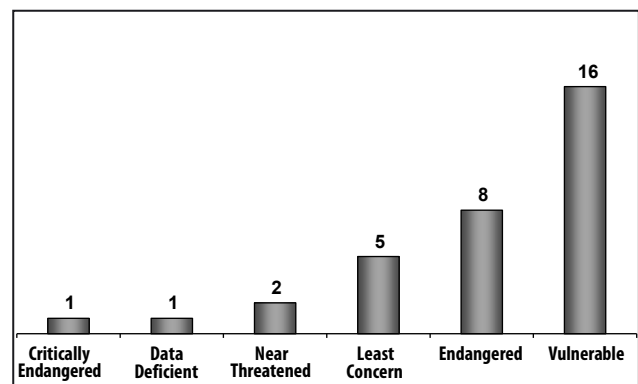


Fig. 2. Proportions (in numbers) of different categories threatened plants from Red list of Bulgarian vascular plants.



Fig. 4. *Edraianthus serbicus* Petrovič.



Fig. 5. *Tulipa urumoffii* Hayek.



Fig. 6. *Himantoglossum caprinum* (M.Bieb.) Spreng.



Fig. 7. *Ophris apifera* Huds.

categories. *Anacamptis pyramidalis* (L.), *Centaurea immanuelis - loewii* Degen., *Echium russicum* J.F. Gmel., *Ophris apifera* Huds., *Orchis papilionaceae* L., *O. ustulata* L., *Spiranthes spiralis* (L.) Chevall. are included in tree protected categories. Two protected categories cover *Centaurea finazzerii* Adamovič, *Dianthus stribrnii* L., *Edrianrhys serbicus* (A.Kern.) Petrovič, *Fritillaria orientalis* Adams., *Hesperis silvestris* L., *Morina perscica* L., *Paeonia mascula* (L.) Mill., *Tulipa urumoffii* Hayek, *Orchis purpurea* Huds., and *O. tridentata* Scop.

Endemic plants in Bulgaria are distributed irregularly. There are more endemics in the mountains, because the mountains have served as refuges of Tertiary (and Glacial) relicts and because human activities are on a smaller scale there. Mt Zemenska is one of the speciation centres in the Kraishte – Mt Konyavska Biogeographical Region (Asenov 2006). According to Kožuharov (1977), the entire Znepole Floristic Region is one of the speciation centres in the Bakan Phytogeographical Province. It includes endemic plants as a result of the hybrid contacts of Cen-



Fig. 8. *Ophris papilionaceae* L.



Fig. 9. *Echium russicum* J. F. Gmel.

tral European, West Asian and Mediterranean elements. The endemic plants are localized mainly on the slopes of low mountains.

The endemic plants (Balkan and Bulgarian) on Mt Zemenska account for 3.2% (43) of all species from the list. They constitute 1.1% of the vascular flora of Bulgaria. A high percent of the Balkan endemic plants coincide with the data on endemism in the Illyrian (Balkan) Geobotanical Province presented by Bondev (2002).

According to Petrova & Vladimirov (2010), the Balkan endemic plants in Bulgaria account for 6.75% (270 species) of the Bulgarian flora. The Znepole Floristic Region contains 24.8% (67) of all Balkan endemic plants in Bulgaria. They constitute 16% of the Bulgarian flora. Balkan endemics on Mt Zemenska claim 2.8% (38) of the plant list, or 0.95% of the Bulgarian flora. Seven endemics fall into different categories of the Red List of the Bulgarian Vascular Plants (Petrova & Vladimirov 2009), six are protected by the Biological Diversity Act (2002, 2007), and one species is protected by the Directive 92/43/EEC (1992). According to these data, 56.7% of all Balkan endemics from the Znepole Floristic Region are represented on Mt Zemenska (Table 2).

According to Petrova & Velchev (2006), Bulgarian endemics constitute 4.35% (174 plants) of the Bulgarian flora. Of these, 6.3% (11) are represented in the

Znepole region. Bulgarian endemic plants on Mt Zemenska constitute 0.4% (5) of the plant list. This makes 2.9% of the Bulgarian endemics in the Bulgarian flora and 4.5% of all Bulgarian endemics in the Znepole region. Three species are covered by the *Red List of the Bulgarian Vascular Plants*. Another three fall under Biological Diversity Act (2202, 2007). One species is protected by the Bern Convention (1979) (Table 3).

Tertiary relict plants are the oldest relict plants in the Bulgarian flora. They are autochthonous, systematically isolated species or have floristic links with remote regions and fragmented areas (Asenov 2006). The Tertiary relicts on Mt Zemenska account for 1.9% (26) of all species (Table 4.). The proportion of species with conservation status, endemics and relicts is shown on Fig. 3.

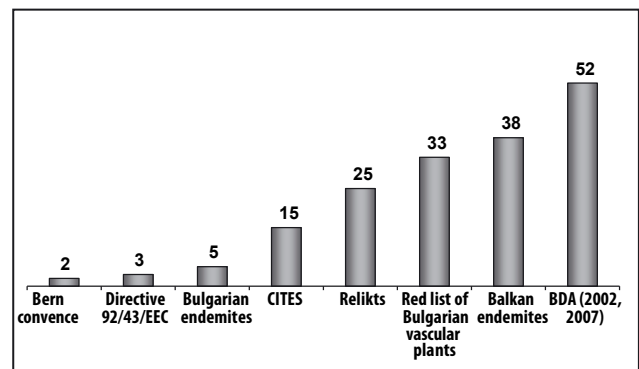


Fig. 3. Proportions (in numbers) of species with conservation status, endemites and relicts on Mt. Zemenska.

Table 2. List of the Balkan endemic plants on Mt Zemenska.

1. *Anthyllis aurea* Welden ex Host. (SO 106 351) BDA, VU
2. *Astragalus wilmotianus* Stoj. (SO 106 406) BDA, VU
3. *Achillea ageratifolia* (Sibth. & Sm.) Benth. & Hook.f. (SO 106 446)
4. *A. clypeolata* Sibth. & Sm. (SO 106 447)
5. *A. pseudopectinata* Janca (SO 106 448)
6. *Centaurea chrysolepis* Vis. (SO 104 310)
7. *C. finazeri* Adamovič (SOM 159 048), BDA, CR
8. *C. immanuelis-loewii* Degen (SO 105 706), BDA, Directive 92/43/EEC, EN
9. *Cephalaria flava* (Sm.) Szabó (106 608)
10. *Chamaecytisus calcareous* (Velen.) Kuzmanov (SO 106 450)
11. *Chamaecytisus jankae* (Velen.) Rothm. (SO 106 955)
12. *Corothamnus agnipilos* (Velen.) Klásk. (SO 106 896)
13. *Crucianella graeca* Boiss. (SO 106 454)
14. *Dianthus moesiacus* Vis. & Pančić (SO 106 441)
15. *D. pelviformis* Heuff. (SO 106 440)
16. *D. stenopetalus* Griseb. (SO 196 492)
17. *D. stribrnyi* Velen. (SO 106 276), BDA, VU
18. *D. tristis* Velen. (SO 106 188)
19. *Edraianthus serbicus* Petrovič (SO 106 178), BDA, EN, Fig. 4
20. *Festuca oviniformis* Vetter (SOM 166 619)
21. *Festuca thracica* (Acht.) Markgr.-Dann. (SO 106 978)
22. *Genista subcapitata* Pančić (SO 106 451)
23. *Hieracium heteroginum* (Froel.) Gutermann (SO 106 449)
24. *Hieracium neodivergens* Gottschl. (SO 106 438)
25. *Minuartia bosniaca* (Beck) K.Maly (SO 106 442)
26. *Orobancha serbica* G.Beck & Petrovič (SO 102 034)
27. *Pastinaca hirsuta* Pančić (SO 106 445)
28. *Sesleria latifolia* (Adamovič) Degen (SO 106 404)
29. *Silene fabarioides* Hausskn. (SO 106 443)
30. *S. frivaldszkyana* Hampe (SO 106 444)
31. *Scabiosa triniifolia* Friv. (SO 105 491)
32. *Stachis serbica* Pančić (SO 86 057)
33. *Stachys plumosa* Griseb. (SO 106 453)
34. *Thymus longidentatus* (Degen & Urum.) Ronniger. (SO 106 254)
35. *Trifolium trichopterum* Pančić (SO 106 452)
36. *T. velenovsky* Vandas (SO 106 439)
37. *Verbascum humile* Janka (SO 105 769), LC
38. *Viola aetholica* Boiss. & Heldr. (SO 106 456)

Legend: The bold type indicates that the species are protected under one or more of the following acts: Biological Diversity Act (2002, 2007), Bern Convention (1979), Directive 92/43/EEC (1992), or the *Red List of the Bulgarian Vascular Plants* (Petrova & Vladimirov 2009) (EN – Endangered, LC – Least Concern, VU – Vulnerable).

Table 3. List of the Bulgarian endemic plants on Mt Zemenska.

1. *Bromus moesiacus* Velen. (SO 106 766), BDA, Bern Convention, NT
2. *Jurinea bulgarica* Velen. (SO 106 458)
3. *Medicago bondevii* Kožuharov (SOM 164 526)
4. *Tulipa urumoffii* Hayek (SO 106 403) BDA, VU, Fig. 5
5. *Verbascum urumoffii* Stoj. & Acht. (SO 106 773), BDA

Legend: The bold type indicates that the species are protected under one or more of the following acts: BDA – Biological Diversity Act (2002, 2007), Bern Convention (1979), or the *Red List of Bulgarian Vascular Plants* (Petrova & Vladimirov 2009) (NT – Near Threatened, VU – Vulnerable).

Table 4. List of the Tertiary relict plants.

1. *Acer campestre* L. (SO 106 780)
2. *A. hyrcanum* Fisch & C.A.Mey (SO 106 497)
3. *A. pseudoplatanus* L. (SO 106 835)
4. *Carpinus betulus* L. (SO 107 131)
5. *C. orientalis* Mill. (SO 107 140)
6. *Corylus avellana* L. (SO 107 202)
7. *Cotinus coggygria* Scop. (SO 106 994)
8. *Fraxinus excelsior* L. (SO 107 246)
9. *Hedera helix* L. (SO 107 025)
10. *Juniperus communis* L. (SO 105 070)
11. *J. oxycedrus* L. (SO 106 492)
12. *Morina pesica* L. (SO 93 138)
13. *Ostria carpinifolia* Scop. (SO 107 143)
14. *Pinus nigra* J.F.Arnold (SO 105 070)
15. *Populus nigra* L. (SO 107 384)
16. *P. tremula* L. (SO 106 811)
17. *Pteridium aquilinum* (L.) Kuhn. (SO 106 993)
18. *Quercus cerris* L. (SO 106 987)
19. *Q. dalechampii* Ten. (SO 107 191)
20. *Salix alba* L. (SO 107 350)
21. *S. caprea* L. (SO 106 782)
22. *S. fragilis* L. (SO 107 343)
23. *S. purpurea* L. (SO 107 361)
24. *S. triandra* L. (SO 107 347)
25. *Sorbus aria* (L.) Crantz (SO 106 796)
26. *Viburnum lantana* L. (SO 105 482)

Conclusions

As a result of the investigations on Mt Zemenska, a total of 68 plants with a conservation status were found. They account for 1.7 % of the Bulgarian flora. Five different documents on environment conservation and the latest acts and categories along these lines apply to them. The Balkan and Bulgarian endemic plants in the Bulgarian flora are also presented by their latest lists. Thus some plants which were in the past Bulgarian endemics are now Balkan endemics. For example, *Hieracium divergens* Naeg. & Peter. was a Bulgarian endemic. Now, after a revision (*Hieracium neodivergens* Gottschl.), it is Balkan endemic plant. Some other plants, which were Balkan endemics in the past, presently are not. For example, *Campanula versicolor* Andrews.

The percentage of species protected under the Biological Diversity Act (2002, 2007) is 3.9 % (52) of all species in the list. Of these, 1.7 % (23) are included into Annex 3 (category Protected). Under the *Red List of the Bulgarian Vascular Plants*

(Petrova & Vladimirov 2009) fall 2.5 % (33) of the plants: 0.01 % (1) Critically Endangered (CR), 0.6 % (8) Endangered (EN), 1.2 % (16) Vulnerable (VU), 0.14 % (2) Near Threatened (NT), 0.01 % (1) Data Deficient (DD), and 0.4 % (5) Least Concern (LC). Species protected by CITES (1975) account for 1.1 % (15).

Endemic plants amount to 3.2 % (43). Of these, Balkan endemics account for 2.8 % (38) and Bulgarian endemics for 0.4 % (5). This fact testifies to the original and natural character of the plants. Appearance and existence of endemic elements is related to the specific calcareous habitats. Tertiary relict plants constitute 1.9 % (26) of the plant list of Mt Zemenska. No Glacial relicts have been found. The reason apparently is the low altitude of Mt Zemenska (1295 m.). The collected data on endemics, relicts, threatened and protected plants show us how valuable and vulnerable the flora is.

In the past (some 70 years ago), the mountain ridge was used for agriculture. The collected stones from the grassy terrains, old dirt roads, and large terraced areas stand evidence to that. No agricultural activities are carried out presently there. There is a limestone quarry at the eastern foothills of the mountain, in the area of Zemen town, a military base on top of the highest peak – Tichak, and an asphalt road from Zemen to Tichak (8 km). Presently, Mt Zemenska is a wild place, with significant plant diversity. However, big antennas were mounted on the ridges and new dirt roads were made in the recent years. The *Fagus sylvatica* forests were subjected to intensive felling and their area has decreased.

The significant number of threatened and protected species, of Balkan and Bulgarian endemic plants, as well as of relicts, leads to conclusion that Mt Zemenska is very important for the Bulgarian plant diversity. It also prompted the assumption that local protected area should be created in order to preserve this valuable plant diversity for posterity.

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