

FLORA AND VEGETATION OF SLAVYANKA MOUNTAIN

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Abstract

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This paper describes the results of the Slavyanka Mountain vegetation investigation. As a result of it 1661 plant taxa belonging to 576 genera and 105 plant families were recorded. The most numerous representatives found were those of the families: *Asteraceae* (195 taxa), *Fabaceae* (135), *Poaceae* (128), *Lamiaceae* (88), *Brassicaceae* (85) and *Caryophyllaceae* (85). The distribution of taxa according to phytogeographical elements is as follows: Sub Mediterranean (240), Euro-Asian (223), Euro-Mediterranean (175). Sixty nine species of the flora of Slavyanka Mt are included in Red List of vascular plants in Bulgaria.

Key words: vegetation, flora, Slavyanka Mt

Introduction

The first information on the flora and vegetation of Alibotush (Slavyanka) is provided by Stoyanov (1922). He describes the different vegetation zones, which are dominated by coniferous species.

Only in the northwestern part of the mountain there are deciduous forests of oak, deciduous shrubs and small formation of *Castanea sativa* Mill. on limestone. The author describes the typical limestone hazmophytes: *Saxifraga stribrnyi* (Velen.) Podp., *Viola delphinantha* Boiss., *Daphne oleoides* Schreb., *Trachelium rumelianum* Hampe and others. He describes 83 plant species and analyses floral elements of subalpine zone. The author makes a comparison between subalpine vegetation of Belasitza Mt and that of Slavyanka Mt. He also highlights the more southern character of vegetation of Alibotush Mt compared to that of Belasitza Mt. He finds 40 taxa of vascular plants new to the flora of Bulgaria. Stoyanov classifies Slavyanka (Alibotush) as belonging to the type of the Atlantic-Mediterranean Mountains. The author reports a total of 329 species of vascular plants for the mountain.

• Stoyanov (1924) discovers *Malcolmia orsiniana* (Ten.) Ten. in Slavyanka Mt. A new contribution to the flora of Alibotush is published in 1931 according to material collected by A. Dryanovski (Stoyanov, 1931).

- Stefanov and Jordanov (1931) also describe the flora of the mountain.
- Rechingner (1933 b) is the first foreign botanists who writes about the flora of Slavyanka Mt.
- The next one is Degen (1934), who reports 17 taxa of flora of Slavyanka Mt. Then follow the contributions of Dryanovski (1933a, 1934b, 1935, 1936), Drenovsky (1937). The author reports 129 mountain plants, 53 subalpine and 38 alpine species. The contributions of Hermann and Stefanov (1932, 1935) which report new taxa of Alibotush flora follow chronologically.
- Georgiev (1935) describes the geological structure of Alibotush (Slavyanka Mt). Popnikolov (1937) characterizes the lichen flora of Alibotush (Slavyanka Mt).
- Stoyanov (1941) classifies Slavyanka Mt as belonging to the floristic region of Northeastern Macedonia.
- Kitanov (1943) reports two new species of the flora of the mountain. Velchev, Bondev, Ganchev and Kochev (1962) also contribute to the flora of the mountain.
- Penev and Georgiev (1967) study the types of forest in the upper forest-steppe zone of Slavyanka Mt.
- Toshkov (1971) provides data on reserve “Alibotush.”
- Georgiev (1978) describes the primitive metallurgy in Marvashko and the destruction of pine forests in the vicinity Slavyanka Mt (Alibotush) during Ottoman rule.

- Six new species of this floristic region are reported from Kitanov, Koeva-Todorovska and Stoyanov (1983). Kitanov (1986) describes the vegetation of Slavyanka Mt. Two new taxa of the flora of this floristic region reports Delipavlov (1988). Data on the south side of the mountain (in Greek territory) appear in Strid (1986), Strid and Tan (1991). Delipavlov (1990) describes the new for the science species *Pastinaca argyrophylla* Delip.
- New 61 species of vascular plants belonging to this region are contained in the article by Pashaliev and Dimitrov (1995).
- Dimitrov and Gushev (1995) report 5 new taxa for this floristic region.
- Pashaliev (1995) reports two new taxa for the flora of Slavyanka Mt.
- Five new taxa for the flora of Slavyanka Mt are reported by Dimitrov (2002).
- Goranova and Vassilev (2006) report two new species for the flora of the mountain with the aid of the spore-pollen analysis.
- A new species *Sesleria robusta* Schott., Nym. and Kotschi is reported by Velchev and Vassilev (2002).
- A new species for the flora of this region is reported by Hajek, Hajkova and Apostolova (2005).
- Dimitrov (2010) reports 18 new higher plant species.
- Ninety-one Bulgarian and seventeen Balkan endemic species are reported for the flora of Slavyanka Mt by Petrova and Vladimirov (2010).
- Investigations on the vegetation of the mountain are made by Karakiev and Tzonev (2011).
- The ecological and floristic characteristics of *Sideritis scardica* Griseb. populations in Slavyanka Mt are described by Aneva et al. (2013).
- Five guidebooks of Slavyanka Mt. have been published: Kisselov (1968), Pancheliev (1966, 2002, 2005, 2008). Information on the flora of the mountain can be viewed in scientific and popular articles of Dimitrov (1984, 1990 and 1999).

Materials and Methods

The transect method has been applied for the investigation of the flora of the studied area. The diversity of vascular plants was researched through systematic collections of materials during the vegetative seasons in 2011–2012. The plant nomenclature follows Kozuharov (1992) and Delipavlov (2011), Flora Reipublicae Popularis Bulgaricae (Jordanov, 1963–1995) and Tutin et al. (1968–1993).

Results and Discussions

Vascular flora of the mountain (without Bryophytes) is presented of 1661 species belonging to 576 genera from 105

families. Taxonomic structure of the flora of this floristic region is as follows in Table 1.

Table 1
Taxonomic structure of the flora of Slavyanka Mountain

Division	Family	Genera	Species
<i>Equisetophyta</i>	1	1	4
<i>Polypodiophyta</i>	9	13	22
<i>Pinophyta</i>	3	5	12
<i>Magnoliophyta</i>	92	557	1623

Flora complex (endemic and relict species) is as follows:

- Local endemic (3 species): *Sedum zollikoferi* F. Herm. et Stef., *Pastinaca argyrophylla* Delip. and *Crepis schachtii* Babcock.
- Balkan endemic (114 species): *Pinus peuce* Griseb., *Viola delphinantha* Boiss., *Sideritis scardica* Griseb., *Centaurea parilica* Stoj. et Stef., *Saxifraga ferdinandi-coburgi* Kell. et Sund., *Saxifraga sibirnyi* (Vel.) Podp., *Saxifraga sempervivum* C. Koch, *Aubrieta intermedia* Heldr. et Orph. ex Boiss., *Malcolmia orsiniana* (Ten.) Ten., *Genista subcapitata* Panc., *Anthyllis aurea* Welden, *Festucopsis sancta* Meld., *Fritillaria drenovskyi* Deg. et Stoj., *Pulsatilla slavyankae* (Zimm.) D. Jord. et Koz., *Viola grisebachiana* Vis., *Viola perinensis* Becker, *Campanula orphanidea* Boiss., *Potentilla apennina* Ten. subsp. *stojanovii* Urum. et Javor-ka, *Onobrychis pindicola* Hausskn., *Abies borisii-regis* Mattf., *Achillea ageratifolia* (Sm.) Boiss., *Achillea chrysocoma* Friv., *Achillea chypeolata* Sm., *Achillea pseudopectinata* Janka, *Alkanna sibirnyi* Velen., *Allium melanatherum* Pancic, *Angelica pancicii* Vandas, *Armeria rumelica* Boiss., *Bromus lacmonicus* Roth, *Campanula jordanovii* Ancev & Kovanda, *Campanula scutellata* Griseb., *Campanula sparsa* Friv., *Campanula velebitica* Borbas, *Carum graecum* Boiss. & Heldr., *Centaurea cuneifolia* Sm., *Centaurea mannagettae* Podp., *Centaurea subciliaris* Boiss. & Heldr., *Centaurea tuberosa* Vis., *Cerastium petricola* Pancic, *Cephalaria flava* (Sm.) Szabo, *Trachelium rumelianum* Hampe, *Cerastium decalvans* Schloss., *Chamaecytisus absinthioides* (Janka) Kuzmanov, *Chondrilla urumoffii* Degen, *Colchicum doerfleri* Halacsy, *Corothismus agniphilus* (Velen.) Klask., *Corothismus rectipilosus* (Adamovic) Skalik, *Crataegus heldreichii* Boiss., *Verbascum pseudonobile* Stoj. et Stef., *Crocus olivieri* J. Gay, *Crocus veluchensis* Herbert, *Tragopogon balcanicum* Velen., *Tragopogon pterodes* Pancic, *Thlaspi belidifolium* Griseb., *Thymus at-*

ticus Celak., *Thymus comptus* Friv., *Dianthus gracilis* Sm., *Dianthus moesiacus* Vis. et Pancic, *Crucianella graeca* Boiss., *Trifolium trichopterum* Pancic, *Veronica rhodopea* (Velen.) Degen ex Stoj. & Stef., *Trifolium velenovskyi* Vandas, *Digitalis viridiflora* Lindl., *Erysimum comatum* Pancic, *Erysimum crassistylum* C. Presl., *Erysimum drenowskyi* Degen, *Erysimum pirinicum* Ancev & Polatschek, *Festuca penzesii* (Acht.) Markgr.-Dann., *Festuca pirinica* Horv. ex Markgr.-Dann., *Festuca thracica* (Acht.) Markgr.-Dann., *Fritillaria gussichiae* (Degen & Dorfl.) Rix, *Galium aegaeum* (Stoj. & Kitanov) Ancev, *Galium procurens* Ehrend., *Genista rumelica* Velen., *Goniolimon dalmaticum* (C. Presl.) Rchb. fil., *Haplophyllum balcanicum* Vandas, *Heracleum verticillatum* Pancic, *Herniaria nigrimontium* Herm., *Herniaria olympica* J. Gay, *Herniaria parnassica* Heldr. & Sart. ex Boiss., *Hieracium nipholasium* T. Georg. & Zahn, *Hieracium pannosum* Boiss., *Hypericum rumelicum* Boiss., *Inula aschersoniana* Janka, *Iris suaveolens* Boiss. & Reut., *Knautia ambigua* (Friv.) Boiss. & Orph., *Knautia macedonica* Griseb., *Lathraea rhodopea* Dingl., *Linum elegans* Sprun. ex Boiss., *Melampyrum scardicum* Wettst., *Micromeria dalmatica* Benth., *Minuartia bosniaca* (Beck.) K. Maly, *Minuartia rhodopaea* (Degen) Kozuharov & Kuzm., *Moenchia graeca* Boiss. & Heldr., *Onobrychis degenii* Dorfl., *Onosma rhodopaea* Velen., *Pastinaca hirsuta* Pancic, *Polygala carniolica* A. Kern., *Polygala rhodopea* (Velen.) Janch., *Potentilla regis-borisii* Stoj., *Rhamnus rhodopeus* Velen., *Saxifraga sancta* Griseb., *Scabiosa triniifolia* Friv., *Scabiosa webbiana* D. Don, *Sedum tuberiferum* Soj. & Stef., *Sempervivum ciliosum* Craib., *Sempervivum leucanthum* Pancic, *Silene gigantea* L., *Silene frivaldszkyaana* Hampe, *Senecio macedonicus* Griseb., *Sesleria korabensis* (Kumm. & Jav.) Deyl., *Sesleria latifolia* (Adamovic) Degen, *Silene fabarioides* Hausskn.

- Bulgarian endemic (9 species): *Alkanna stojanovii* Kozuharov, *Anthemis rumelica* (Velen.) Stoj. et Acht., *Thymelaea bulgarica* Cheskm., *Erysimum velcevii* Urum., *Erysimum slavjankae* Ancev & Polatschek, *Heracleum angustisectum* (Stoj. & Acht.) Peev, *Scrophularia bulgarica* (Stoj.) Peev, *Sedum kostovii* Stef., *Silene stojanovii* Panov.

The spectrum of families participating with the greatest number of species in the flora of Slavyanka Mt is as shown in Table 2 and Figure 1.

Genera in Slavyanka Mt are presented in Table 3. Genera with the greatest number of species in the flora of Slavyanka Mt are presented in Figure 2.

Fourteen species of vascular plants are found only in the floristic region of Slavyanka Mt – *Goniolimon dalmaticum* (C. Presl.) Rchb.f., *Haplophyllum balcanicum* (L.) Mill., *Herniaria olympica* J. Gay, *Herniaria parnassica* Heldr. &

Table 2

The spectrum of families participating in the flora of Slavyanka Mountain

DICOTYLEDONAE

Family	Genera	Species
<i>Asteraceae</i>	60	195
<i>Fabaceae</i>	25	135
<i>Lamiaceae</i>	27	88
<i>Brassicaceae</i>	37	85
<i>Caryophyllaceae</i>	24	85
<i>Scrophulariaceae</i>	16	77
<i>Rosaceae</i>	18	70
<i>Apiaceae</i>	46	64
<i>Boraginaceae</i>	15	44
<i>Ranunculaceae</i>	14	44
<i>Rubiaceae</i>	7	27
<i>Crassulaceae</i>	4	25
<i>Chenopodiaceae</i>	4	22
<i>Campanulaceae</i>	5	21
<i>Polygonaceae</i>	4	18
<i>Violaceae</i>	1	16
<i>Dipsacaceae</i>	4	17
<i>Euphorbiaceae</i>	3	15
<i>Papaveraceae</i>	5	13
<i>Saxifragaceae</i>	3	13
<i>Valerianaceae</i>	2	12
<i>Primulaceae</i>	5	11
<i>Hypericaceae</i>	1	11
<i>Fagaceae</i>	3	11
<i>Solanaceae</i>	5	10
<i>Salicaceae</i>	2	10
<i>Malvaceae</i>	6	9
<i>Polygalaceae</i>	1	8
<i>Gentianaceae</i>	3	7
<i>Linaceae</i>	2	7
<i>Plantaginaceae</i>	1	7

MONOCOTYLEDONAE

Family	Genera	Species
<i>Poaceae</i>	54	128
<i>Liliaceae</i>	19	60
<i>Cyperaceae</i>	10	47
<i>Orchidaceae</i>	18	38
<i>Iridaceae</i>	3	17
<i>Amaryllidaceae</i>	2	3
<i>Lemnaceae</i>	2	3
<i>Alismataceae</i>	1	2
<i>Typhaceae</i>	1	3
<i>Butomaceae</i>	1	1
<i>Smilacaceae</i>	1	1
<i>Sparganiaceae</i>	1	1
<i>Zannichelliaceae</i>	1	1

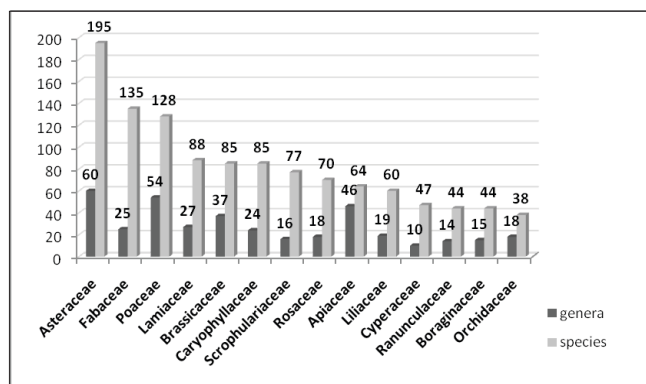


Fig. 1. The species-richest families in Slavyanka Mountain

Table 3
Genera in Slavyanka Mountain

<i>Carex</i>	34	<i>Potentilla</i>	14
<i>Trifolium</i>	29	<i>Chenopodium</i>	13
<i>Veronica</i>	25	<i>Myosotis</i>	12
<i>Ranunculus</i>	22	<i>Geranium</i>	12
<i>Centaurea</i>	22	<i>Allium</i>	12
<i>Silene</i>	20	<i>Poa</i>	11
<i>Vicia</i>	20	<i>Euphorbia</i>	11
<i>Hieracium</i>	18	<i>Hypericum</i>	11
<i>Sedum</i>	17	<i>Saxifraga</i>	11
<i>Lathyrus</i>	16	<i>Anthemis</i>	10
<i>Viola</i>	16	<i>Orchis</i>	10
<i>Rosa</i>	15	<i>Festuca</i>	10
<i>Verbascum</i>	15	<i>Salvia</i>	10
<i>Campanula</i>	15	<i>Thymus</i>	10
<i>Galium</i>	15	<i>Alyssum</i>	10
<i>Bromus</i>	14	<i>Minuartia</i>	9

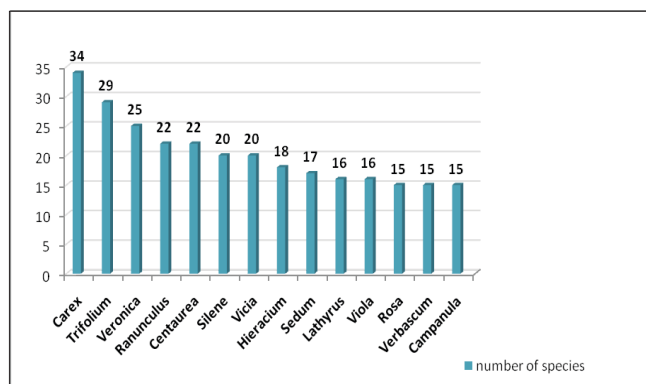


Fig. 2. The species-richest genera in Slavyanka Mountain

Sart. ex Boiss., *Minuartia velutina* (Boiss. & Orph.) Graebn., *Pastinaca argyrophylla* Delip., *Rhamnus alpinus* L., *Sedum magellense* Ten., *Sedum zollikoferi* F. Herm. & Stef., *Viola delphinantha* Boiss., *Paronychia rechingeri* Chaudhuri, *Centaurea subciliaris* Boiss. & Heldr., *Dianthus drenowskyanus* Rech.f., *Dianthus simulans* Stoj. & Stef. Four species of that group are with category of critically endangered species: *Goniolimon dalmaticum*, *Haplophyllum balcanicum*, *Viola delphinantha*, *Dianthus drenowskyanus*. *Dianthus simulans* is a vulnerable species.

Distribution of species according to phytogeographical elements (Table 4, Figure 3):

Sixty nine species of the flora of Slavyanka Mt are included in Red List of vascular plants in Bulgaria (Petrova and Vladimirov, 2009): 9 of them are critically endangered, 23 are endangered, 31 are vulnerable and 6 species are near threatened (Figure 4).

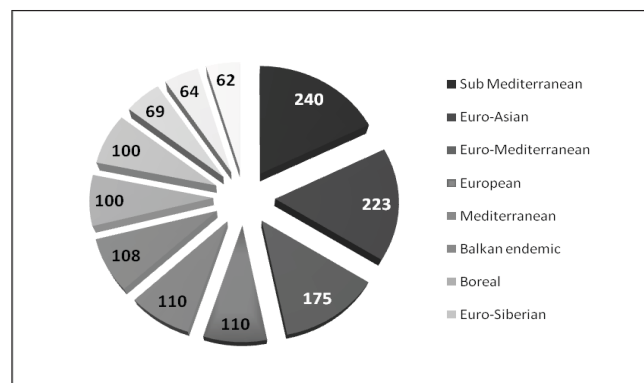


Fig. 3. Chorological range in Slavyanka Mountain

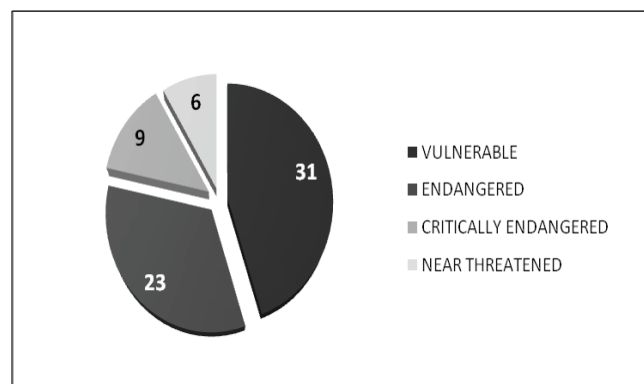


Fig. 4. Number of protected species

Table 4
Distribution of species according to phytogeographical elements

1. Sub Mediterranean	240 (14.4%)	28. Pontic-Central Asian	5 (0.30%)
2. Euro-Asian	223 (13.4%)	29. Pontic-Balkan	4 (0.20%)
3. Euro-Mediterranean	175 (10.5%)	30. Mediterraneo-Asian	4 (0.20%)
4. European	110 (6.60%)	31. Sub Mediterraneo-Asian	3 (0.18%)
5. Mediterranean	110 (6.60%)	32. Pontic-Siberian	3 (0.18%)
6. Balkan endemic	108 (6.50%)	33. South American	3 (0.18%)
7. Boreal	100 (6.02%)	34. Euro-Mediterrano-Central Asian	3 (0.18%)
8. Euro-Siberian	100 (6.02%)	35. Adventive	3 (0.18%)
9. Sub Boreal	69 (4.15%)	36. South Siberian	3 (0.18%)
10. Cosmopolitan	64 (3.80%)	37. South Pontic	2 (0.12%)
11. Pontic-Mediterranean	62 (3.70%)	38. Central American	2 (0.12%)
12. Balkan-Anatolian	23 (1.30%)	39. SubMediterrano-Anatolian	2 (0.12%)
13. Euro-SubMediterranean	23 (1.26%)	40. Euro-North American	2 (0.12%)
14. Apenino-Balkan	16 (0.96%)	41. Balkan-Central Asian	1 (0.06%)
15. Pontic	16 (0.96%)	42. Pontic-Panono-Balkan	1 (0.06%)
16. Mediterraneo-Central Asian	14 (0.80%)	43. Mediterraneo-Anatolian	1 (0.06%)
17. Euro-Orientalo-Turanian	12 (0.70%)	44. Balkan-Dacic-Anatolian	1 (0.06%)
18. Balkan-Dacian	11 (0.66%)	45. Euro-Anatolian	1 (0.06%)
19. Sub-Pontic	10 (0.60%)	46. Alpo-Carpato-Anatolian	1 (0.06%)
20. SubMediterrano-Asian	9 (0.54%)	47. Asian	1 (0.06%)
21. Pontic-Submediterranean	7 (0.42%)	48. Pontic-Asian	1 (0.06%)
22. Arctic-alpine	6 (0.36%)	49. Euro-West Asian	1 (0.06%)
23. Alpine-Carpathian-Balkan	6 (0.36%)	50. Mediterraneo-Chinese	1 (0.06%)
24. North American	6 (0.36%)	51. Mediterraneo-North American	1 (0.06%)
25. Mediterraneo-Oriental-Turanian	5 (0.30%)	52. SubMediterrano-Siberian	1 (0.06%)
26. Euro- Central Asian	5 (0.30%)	53. Mediterraneo-Atlantic	1 (0.06%)
27. Alpine-Carpathian	5 (0.30%)		

Critically endangered (CR):

Adiantum capillus-veneris L., *Crepis schachtii* Babcock, *Fritillaria drenovskyi* Deg. & Stoj., *Goniolimon dalmaticum* (C. Presl.) Rechb.f., *Haplophyllum balcanicum* Vandas, *Lathyrus saxatilis* (Vent.) Vis., *Minuartia stojanovii* (Kitan.) Koz. et Kuzm., *Sedum magellense* Ten., *Sedum zollikoferi* F. Herm. & Stef.

Endangered (EN):

Alkanna stojanovii Kozuharov, *Anthemis sancti-johannis* Turrill, *Arabis collina* Ten., *Bromus parilicus* Petrova, Kozuharov & Ehrend., *Centaurea mannagettae* Podp., *Centaurea parilica* Stoj. & Stef., *Colchicum doerfleri* Halacsy, *Erysimum slavjankae* Ancev & Polatschek, *Galanthus elwesii* Hook. f., *Galanthus nivalis* L., *Galium aegaeum* (Stoj. & Kitanov) Ancev, *Galium demissum* Boiss., *Linum elegans* Spruner ex Boiss., *Onosma rhodopaea* Velen., *Pulsatilla slavjankae*

(Zimm.) Jordanov & Kozuharov, *Quercus coccifera* L., *Reichardia picroides* (L.) Roch., *Rhamnus alpinus* L., *Serapias vomeracea* (Burm.) Briq., *Sideritis scardica* Griseb., *Thymelaea bulgarica* Cheskm., *Verbascum pseudonobile* Stoj. & Stef.

Vulnerable (VU):

Alchemilla erythropoda Juz., *Anacamptis pyramidalis* (L.) Rich., *Anchusa velenovskyi* (Gusul.) Stoj., *Anthyllis aurea* Welden, *Arctostaphylos uva-ursi* (L.) Spreng., *Barbarea bracteosa* Guss., *Cachrys alpina* M. Bieb., *Campanula jordanovii* Ancev & Kovanda, *Chondrilla urumoffii* Degen, *Crataegus orientalis* Pall. ex M. Bieb., *Echium russicum* J. F. Gmel., *Erysimum comatum* Pancic, *Festuca pirinica* Horv. ex Markgr.-Dann., *Festuca thracica* (Acht.) Markgr.-Dann., *Fritillaria orientalis* Adams, *Goniolimon tataricum* (L.) Boiss., *Hesperis sylvestris* Cranz, *Himanthoglossum capri-*

num (M. Bieb.) Spreng., *Huetia cynapioides* (Guss.) P.W. Ball, *Iberis saxatilis* L., *Limodorum abortivum* (L.) Schwarz, *Ophrys cornuta* Steven., *Ophrys mammosa* Desf., *Saxifraga ferdinandi-coburgi* Kellner & Sund., *Sedum kostovii* Stef., *Silene cretica* L., *Spiranthes spiralis* (L.) Chevall., *Trachelium rumelianum* Hampe, *Verbascum roripifolium* (Halacsy) K. Ferguson, *Veronica rhodopaea* (Velen.) Degen ex Stoj. & Stef.

Near threatened (NT):

Alkanna stribnyi Velen., *Anagallis minima* (L.) Krause, *Fritillaria gussichiae* (Deg. & Dorfl.) Rix., *Lathraea rhodopea* Dingl., *Onobrychis degenii* Dorfl., *Pinus peuce* Griseb.

The species need to be included in Red List of vascular plants in Bulgaria and in the Directive 92/43 EEC are: *Festucopsis sancta* (Janka) Melderis, *Trigonella spicata* Sm. and *Viola delphinantha* Boiss.

3 species are protected by the Bern Convention: *Fritillaria drenovskyi* Deg. & Stoj., *Fritillaria gussichiae* (Deg. & Dorfl.) Rix. and *Himanthoglossum caprinum* (M. Bieb.) Spreng. 33 species are protected by the Biodiversity Law.

30 species are part of the group CITES:

Anacamptis pyramidalis (L.) Rich., *Cephalanthera damasonium* (Mull.) Druce, *Cephalanthera longifolia* (L.) Fritsch, *Coeloglossum viride* (L.) Hartm., *Coralorrhiza trifida* Chatel, *Dactylorhiza cordigera* (Fries) Soo, *Dactylorhiza incarnata* (L.) Soo, *Dactylorhiza saccifera* (Brough) Soo, *Dactylorhiza sambucina* (L.) Soo, *Epipactis helleborine* (L.) Crantz, *Epipactis palustris* (L.) Crantz, *Gymnadenia conopsea* (L.) R. Br., *Himanthoglossum caprinum* (M. Bieb.) Spreng., *Limodorum abortivum* (L.) Schwarz, *Listera ovata* (L.) R. Br., *Neottia nidus-avis* (L.) Rich., *Ophrys cornuta* Steven., *Orchis coriophora* L., *Orchis elegans* Heuff., *Orchis morio* L., *Orchis ovalis* P. W. Schmidt ex Mayer, *Orchis pallescens* L., *Orchis purpurea* Huds., *Orchis simia* Lam., *Orchis tridentata* Scop., *Orchis ustulata* L., *Platanthera bifolia* (L.) Rich., *Platanthera chlorantha* (Custer) Rchb., *Pseudorchis albida* (L.) A. & D. Love, *Spiranthes spiralis* (L.) Chevall.

The biological spectrum of the studied flora by the life forms shows a predominance of perennial herbaceous species which are 987 (59.3%), followed by the annual 366 (20.1%), 94 shrub species (5.5%), annual to biennial - 73 (4.3%), biennial - 52 (3.1%), 35 trees (2.1%), biennial to perennial herbaceous - 23 (1.9%), annual to perennial herbaceous 13 (0.77%), shrubs to trees 12 (0.71%) and perennial herbaceous to shrubs 4 (0.23%).

It is made transect from Parilski dol that ends at the foot of Mount Golyam Tsarev Vrah and provides an opportunity to get an idea of the flora and vegetation of Slavyanka Mt, starting at 550 m and ending at 1650 m a.s.l. The composition

of the the forest is dominated by deciduous species: *Carpinus orientalis* Mill., *Ostrya carpinifolia* Scop., *Corylus avellana* L., *Fraxinus ornus* L., *Salix purpurea* L., *Sorbus aucuparia* L., *Sorbus aria* (L.) Crantz, *Rhamnus catharticus* L., *Rosa turcica* Rouy, *Rhamnus alpinus* L., *Rosa pendulina* L., *Acer hyrcanum* Fisch. & C.A. Mey., *Acer pseudoplatanus* L., *Salix caprea* L., *Cotinus coggygria* Scop., *Lonicera xylosteum* L., *Coronilla emerus* L., *Fagus sylvatica* L., *Clematis vitalba* L., *Chamaecytisus absinthioides* (Janka) Kuzmanov, *Coroanthus agnipilus* (Velen.) Klask., *Chamaecytisus ciliatus* (Wahlenb.) Rothm., *Daphne oleoides* Schreb., *Daphne mezereum* L., *Rubus idaeus* L., *Viburnum lantana* L. Coniferous tree and shrub species involved: *Pinus nigra* Arnold, *Juniperus sibirica* Burgsd., *Juniperus oxycedrus* L., *Abies alba* Mill., *Taxus baccata* L., *Pinus heldreichii* Christ.

Herbaceous species that participating in the forest undergrowth are: *Epipactis helleborine* (L.) Crantz, *Gentiana cruciata* L., *Digitalis viridiflora* Lindl., *Geranium macrorrhizum* L., *Coronilla varia* L., *Primula veris* L., *Brachypodium sylvaticum* (Huds.) P. Beauv., *Cerinthe minor* L., *Nepeta nuda* L., *Mentha spicata* L., *Sambucus ebulus* L., *Origanum vulgare* L., *Carlina vulgaris* L., *Laserpitium siler* L., *Orthilia secunda* (L.) House, *Luzula sylvatica* (Hudson) Gaudin, *Salvia glutinosa* L., *Geum urbanum* L., *Mycelis muralis* (L.) Dumort., *Poa nemoralis* L., *Astragalus depressus* L., *Asyneuma limonifolium* (L.) Janch., *Elymus caninus* (L.) L., *Prunella laciniata* (L.) L., *Potentilla pedata* Willd., *Fragaria vesca* L., *Lilium martagon* L., *Hieracium racemosum* x *pannosum*, *Campanula rapunculus* L., *Euphrasia salisburgensis* Funck, *Anthericum liliago* L., *Lotus corniculatus* L., *Scabiosa triniifolia* Friv., *Trifolium medium* L., *Cotoneaster nebrodensis* (Guss.) C. Koch, *Astragalus angustifolius* Lam., *Jurinea mollis* (L.) Rchb., *Genista carinalis* Griseb., *Ononis pusilla* L., *Linum hirsutum* L., *Seseli rigidum* Waldst. & Kit., *Trachelium rumelianum* Hampe, *Asarum europaeum* L., *Galium pseudoaristatum* Schur, *Astragalus glycyphyllos* L., *Dorycnium herbaceum* Vill., *Micromeria dalmatica* Benth., *Silene vulgaris* (Moench.) Garcke, *Arabis sagittata* (Bertol.) DC., *Dactylis glomerata* L., *Pimpinella tragium* Vill., *Teucrium chamaedrys* L., *Melica ciliata* L., *Phleum pratense* L., *Digitalis lanata* Ehrh., *Anthyllis aurea* Welden, *Medicago lupulina* L., *Clinopodium vulgare* L., *Solidago virga-aurea* L., *Heraclium sibiricum* L., *Scrophularia bulgarica* (Stoj.) Peev, *Festucopsis sancta* (Janka) Melderis, *Silene flavescent* Waldst. & Kit., *Ajuga laxmannii* (L.) Benth., *Silene waldsteinii* Griseb., *Achillea grandifolia* Friv., *Saponaria bellidifolia* Sm., *Dianthus petraeus* Waldst. & Kit., *Asperula purpurea* (L.) Ehrend., *Cuscuta cesatiana* Bertol., *Convolvulus boissieri* Steud., *Minuartia rhodopaea* (Degen) Kozuharov & Kuzmanov, *Euphorbia barrelieri* Savi, *Iris reichenbachii* Heuff., *Centaurea*



Fig. 5. 1. *Tragopogon balcanicum* Velen.



Fig. 5. 2. *Achillea clypeolata* Sm.



Fig. 5. 3. *Pulsatilla slaviankae* (Cimm.) Jordanov et Kojuharov



Fig. 5. 4. *Digitalis grandiflora* Mill.



Fig. 5. 5. *Myosotis suaveolens* Waldst. et Kit.



Fig. 5. 6. *Colchicum doerfleri* Halacsy



Fig. 5. 7. *Iris reichenbachii* Heufel



Fig. 5. 8. *Anemone pavonina* Lam.



Fig. 5. 9. *Achillea ageratifolia* (Sibth. et Sm.) Boiss.



Fig. 5. 10. *Adonis flammnea* Jacq.



Fig. 5. 11. *Linum elegans* Spruner et Boiss.



Fig. 5. 12. *Hypericum cerastoides* Robson

Fig. 5. Flowers of Slavyanka

parilica Stoj. & Stef., *Alyssoides bulgarica* (Sagorski) Asenov, *Tanacetum vulgare* L., *Alyssum reiserii* Velen., *Cerastium arvense* L., *Chondrilla urumoffii* Degen, *Teucrium montanum* L., *Galium aegaeum* (Stoj. & Kitanov) Ancev, *Delphinium fissum* Waldst. & Kit., *Arenaria serpyllifolia* L., *Geranium robertianum* L., *Viola delphinantha* Boiss., *Sempervivum leucanthum* Pancic, *Allium melanantherum* Pancic, *Achillea ageratifolia* (Sm.) Boiss., *Saxifraga sempervivum* C. Koch, *Saxifraga sibirnyi* (Velen.) Podp., *Draba lasiocarpa* Rochel, *Ceterach officinarum* DC., *Sideritis scardica* Griseb., *Chenopodium bonus-henricus* L., *Urtica dioica* L., *Senecio nemorensis* L., *Rumex alpinus* L., *Bromus parilicus* Petrova, Kozuharov & Ehrend., *Arabis collina* Ten., *Asplenium ruta-muraria* L., *Allium flavum* L., *Campanula trachelium* L., *Carum graecum* Boiss. & Heldr., *Thalictrum minus* L., *Veronica urticifolia* Jacq., *Scutellaria alpina* L., *Cuscuta approximata* Bab., *Calamagrostis arundinacea* (L.) Roth, *Asplenium trichomanes* L., *Viola montana* L., *Arabis turrata* L., *Stachys recta* L., *Convallaria majalis* L., *Doronicum columnae* Ten., *Agrimonia eupatoria* L., *Bromus ramosus* Huds., *Valeriana officinalis* L., *Dactylorhiza cordigera* (Fries) Soo, *Listera ovata* (L.) R. Br., *Stachys alpina* L., *Silene ciliata* Pourret, *Globularia cordifolia* L., *Dianthus aridus* Griseb. ex Janka, *Micromeria cristata* (Hampe) Griseb., *Astrantia major* L., *Aegopodium podagraria* L., *Allium moschatum* L., *Dryopteris filix-mas* (L.) Schott, *Lunaria rediviva* L., *Parietaria officinalis* L., *Actaea spicata* L., *Sedum dasyphyllum* L., *Malcolmia orsiniana* (Ten.) Ten., *Stachys sylvatica* L., *Silene radicata* Boiss. & Heldr., *Geranium sanguineum* L., *Chrysopogon gryllus* (L.) Trin., *Chaerophyllum aureum* L., *Erysimum diffusum* Ehrh., *Rhinanthus rumelicus* Velen., *Hieracium divergens* Naeg. & Peter and *Asperula aristata* L.

The forest of *Pinus heldreichii* forms a separate belt from 1500 m to 2100 m a.s.l.

Alpine meadow on the western slope of Mount Gotzev Vrah, above the Lake Suhoto ezero has the following composition:

Carex kitaibeliana Degen ex Bech., *Festuca penzesii* (Acht.) Markgr.-Dann., *Saxifraga sempervivum* C. Koch, *Pedicularis orthantha* Griseb., *Paronychia kapela* (Hacq.) A. Kern., *Gentiana verna* L., *Onobrychis pindicola* Hausskn., *Galium anisophyllum* Vill., *Campanula orphanidea* Boiss., *Anthyllis vulneraria* L., *Festuca valida* (Uechtr.) Penzes, *Carex curvula* All., *Arctostaphylos uva-ursi* (L.) Spreng., *Anthyllis montana* L., *Achillea ageratifolia* (Sm.) Boiss., *Meum athamanticum* Jacq., *Sedum atratum* L., *Saxifraga ferdinandi-coburgi* Kellerer & Sund., *Pedicularis verticillata* L., *Viola perinensis* Becker, *Dianthus microlepis* Boiss., *Cetraria islandica*, *Gymnadenia conopsea* (L.) R. Br., *Androsace villosa* L., *Plantago argentea* Chaix.

Conclusion

These results show the high conservation value of the flora in the studied area. The flora is mainly composed of Sub Mediterranean, Euro-Asian and Euro-Mediterranean geoelements. This is due to the combination of southern latitude, climatic conditions (intensive light, air temperature and low humidity), variable relief and limestone rock base.

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