

РЕЗЮМЕТА НА ПУБЛИКАЦИИТЕ

на доц. д-р Димчо Захариев Иванов,
представени за участие в конкурс за заемане на академичната длъжност „професор“ по:
област на висшето образование 4. Природни науки, математика и информатика,
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I. Монографии – 4 броя

1. Захариев, Д., Е. Радославова, 2013, Флора на Североизточна България. Том 3. Флора на Шуменски височини, Изд. „Химера”, Шумен, ISBN 978-954-9775-83-9, 444 с.

Флора на Североизточна България е опит да се опише по възможност най-пълно флората на различни географски обекти, намиращи се на територията на едноименния флористичен район. Изданието е замислено като поредица от няколко тома, всеки от които е посветен на отделен географски обект.

Третият том представя флората на Шуменските височини. Флористичното проучване е извършено в периода 1998–2012 г. Описани са 878 вида, отнасящи се към 432 рода и 107 семейства. От тях 832 вида от 403 рода и 98 семейства са спонтанно разпространени. Останалите са горски култури или декоративни. Лечебните растения са 418 вида. Ендемитите са 15 вида – 3 български и 12 балкански. Реликтните растения са 34 вида: 43 терциерни, 2 глациални и 1 постглациален. Описани са 86 вида с природозащитен статут.

В Приложение са включени таблици, даващи подробни сведения за: таксономична структура, фитогеографска структура, биологичен спектър, спектър на биологичните типове, ендемити, реликти, видове с природозащитен статут. Включени са и две карти – на разположението и на границите на Шуменските височини. Данните дават възможност да се направи сравнение с флората на други територии в страната.

2. Захариев, Д., 2015, Флора на Североизточна България. Том 4. Флора на Франгенско плато, Изд. „Химера”, Шумен, ISBN 978-619-7218-03-9, 400 с.

Четвъртият том е посветен на флората на Франгенското плато. Флористичното проучване е извършено в периода 2010–2014 г. Урбанизираните територии (селища, курортни комплекси, вилни зони) не са включени в изследването. В резултат са описани 792 вида, отнасящи се към 394 рода и 91 семейства. От тях 762 вида от 374 рода и 87 семейства са спонтанно разпространени. Останалите са горски култури или декоративни. Всички видове са посочени в азбучните указатели, но в таблиците, характеризиращи флората на платото, са включени само спонтанно разпространените. Видовете, описани в Плана за управление на Природен парк „Златни пясъци”, които не са установени при нашето проучване, приемаме за част от флората на Франгенското плато. Те не са включени в текста и в таблиците от етични съображения. Списъкът на тези видове е публикуван в отделно приложение. Лечебните растения са 376 вида. Ендемитите са 6 вида – 1 български и 5 балкански. Реликтните растения са 36 вида, от които 34 терциерни и 2 глациални. Описани са 58 вида с природозащитен статут. Установени са 20 вида чужди инвазивни растения.

В Приложение са включени таблици, даващи подробни сведения за: таксономична структура, фитогеографска структура, биологичен спектър, спектър на биологичните типове, ендемити, реликти, видове с природозащитен статут. Включени са и две карти

– на разположението и на границите на Франгенското плато. Данните дават възможност да се направи сравнение с флората на други територии в страната.

3. Захариев, Д., 2015, Флора на Североизточна България. Том 5. Флора на Лилякско плато, Изд. „Химера”, Шумен, ISBN 978-619-7218-04-6, 392 с.

Петият том е посветен на флората на Лилякското плато. Флористичното проучване е извършено в периода 2006–2014 г. В резултат са описани 782 вида, отнасящи се към 378 рода и 81 семейства. От тях 769 вида от 370 рода и 77 семейства са спонтанно разпространени. Останалите са горски култури или декоративни. Всички видове са посочени в азбучните указатели, но в таблиците, характеризиращи флората на платото, са включени само спонтанно разпространените. Общият брой видове, които могат да се използват за лечебни цели, е 382. Установени са 4 вида балкански ендемити. Реликтните растения са 31 вида, от които 30 терциерни и 1 глациален. Описани са 38 вида с природозащитен статут. Установени са 20 вида чужди инвазивни растения.

В Приложение са включени таблици, даващи подробни сведения за: таксономична структура, фитогеографска структура, биологичен спектър, спектър на биологичните типове, ендемити, реликти, видове с природозащитен статут. Включени са и две карти – на разположението и на границите на Лилякското плато. Данните дават възможност да се направи сравнение с флората на други територии в страната.

4. Захариев, Д., 2017, Флора на Чепън планина, Изд. „Химера”, Шумен, ISBN 978-619-7218-39-8, 399 с., <https://archive.org/details/FloraChepanPlanina>.

Книгата описва флората на Чепън планина. Освен с това име тя е известна още като Драгомански Чепън и Малкия Пирин. Планината е един от дяловете на Западна Стара планина. Настоящото флористично проучване е извършено в периода 2010–2011 г. Целта е да се представи актуална информация относно флористичния състав на висшите растения, срещащи се на територията на Чепън планина. В резултат са описани 787 вида, отнасящи се към 380 рода и 85 семейства. От тях 784 вида от 378 рода и 84 семейства са спонтанно разпространени. Останалите са горски култури. Всички видове са посочени в азбучните указатели, но в таблиците, характеризиращи флората, са включени само спонтанно разпространените. Всички видове, описани от други автори, които не са установени при нашето проучване, приемаме за част от флората на планината. Те не са включени в текста и в таблиците от етични съображения. Списъкът на тези видове е публикуван в отделно приложение. Лечебните растения са 346 вида. Ендемитите са 30 вида – 4 български и 26 балкански. Реликтните растения са 45 вида, от които 35 терциерни, 2 глациални и 8 интерглациални. Описани са 66 вида с природозащитен статут. Установени са 9 вида чужди инвазивни растения.

Богатият набор от азбучни указатели дава възможност за бърз достъп до събраната информация, както и възможност за съпоставяне на флористичните данни за Чепън планина с тези от други обекти.

II. Публикации в реферирани научни издания в чужбина с IF или SJR – 10 броя

1. Natchev, N., D. Jablonski, G. Dashev, T. Koynova, D. Zahariev, N. Tzankov, 2015, A puzzle about *Bombina* sp.: a yellow-bellied specimen of the fire-bellied toad (*Bombina bombina* Linnaeus, 1761) indicates the highest proven habitat of the species in Bulgaria, *Herpetology Notes*, Vol. 8, pp. 379–384 (SJR за 2015: 0.273, H Index 10).

To date, the data published on the occurrence of the fire-bellied toad (*Bombina bombina*) and yellow-bellied toad (*B. variegata*) in the region of the Shumensko plato Natural Park (SE Bulgaria) are controversial. The species are included in the inventory of the protected territory, but none of them has been reported since 1934. In the range of this study we provide

a field survey to investigate whether both *Bombina* species inhabit the park and where they can be located. We selected two study polygons where water basins are available for the toads at least in the spring. During our four year investigation we were able to detect only a single fire-bellied toad. One female specimen was captured in the spring of 2012 and recaptured in 2014. The specimen was found at an altitude of 472 m a.s.l. This is the highest habitat reported for *B. bombina* in Bulgaria.

2. Mihnev, P., D. Zahariev, 2015, E-learning in support to educational field trips – a subject and platform independent curriculum and teacher training model, based on practice, ICERI2015 Proceedings, ISBN: 978-84-608-2657-6/ISSN: 2340-1095, Publisher: IATED, pp. 1314–1324. <http://library.iated.org/view/MIHNEV2015ELE> (Proceedings indexed in Web of Science).

The paper provides a common framework curriculum model for conducting e-learning enriched field trips, and for training teachers and university lecturers in integrating e-learning to support their practice of conducting field trips. Here “e-learning” is considered as a system of integrated or connected information and communication technology (ICT) tools, where the communication, learning materials and activities are mainly conducted or mediated through World Wide Web.

The main goal of the paper is to help teacher trainers and teachers in enriching and maximising the learning advantages brought to learners by the field trips, through the integration of e-learning in the processes of field trip preparation, implementation, and follow-up.

The paper is based on the authors’ experience in several European ICT projects, among which - a biodiversity identification training project, and an inquiry-based learning project, on their experience in applying the proposed framework curriculum model in teacher training courses and e-learning courses with university students, as well as on teaching e-learning design to university students and teachers.

3. Zahariev, D., 2017, Flora of Chepan Mountain (Western Bulgaria), International Journal of Advanced Research 5 (7): 1301–1312, doi: 10.21474/IJAR01/4841 (SJIF 3a 2016: 6.118).

Chepan Mountain is located in Western Bulgaria. It is part of Balkan Mountains on the territory of Balkan Peninsula in Southern Europe. As a result of this study in Chepan Mountain on the territory of only 25 km² were found 784 species of wild vascular plants from 378 genera and 84 families. Such amazing biodiversity can be found in Southern Europe only. The floristic analysis indicates that the most of the families and the genera are represented by a small number of inferior taxa. The hemicryptophytes dominate among the life forms with 53.32%. The biological types are represented mainly by perennial herbaceous plants (59.57%). In the flora of the Mountain there are 49 floristic elements. The most of the species are European-Asiatic floristic elements (14.54%), followed by European-Mediterranean floristic elements (13.78%) and subMediterranean floristic elements (13.52%). Among the vascular plants, there are 26 Balkan endemic species, 4 Bulgarian endemic species and 26 relic species. The species with protection statute are 66 species. The anthropophytes among the vascular plants are 390 species (49.74%). The information about invasive alien plants species in the mountain is published for the first time.

4. Zahariev, D., 2017, *Juniperus communis* formations on heaths or calcareous grassland – a new habitat in the Danubian plain (Bulgaria), International Journal of Advanced Research 5 (7): 2316–2323, doi:10.21474/IJAR01/4979 (SJIF 3a 2016: 6.118).

The natural habitat 5130 *Juniperus communis* formations on heaths or calcareous grassland was established for the first time in the Danube Plain (Northern Bulgaria). The

habitat was found near the northern borders of the Shumen Plateau (The eastern part of the Danubian Plain in Republic of Bulgaria). So far such habitats have been discovered in the southern, western and central parts of Bulgaria. The presence of the habitat on the Shumen Plateau can be seen as an isolated example in comparison to its typical distribution in other areas. The new habitat is characterized by a rich composition of species typical for similar habitats. The locality differs from previously described localities of the habitat by its lower altitude, northwest-facing, small slope and low density of the phytocoenose of *J. communis*. The habitat was located within the Shumen Plateau Protected Area (BG0000382) and the Shumen Plateau Natural Park. The conservation status of the habitat in the protected area was assessed.

5. **Zahariev, D., L. Taneva, 2017, New locality of *Ophrys insectifera* L. in Bulgaria, International Journal of Scientific Engineering and Applied Science 3 (8): 114–120 (SJIF 2016: 4.214).**

Ophrys insectifera L. is an European endemic species. This is the second rarest species of the genus *Ophrys* L. (Orchidaceae) in Bulgaria after *Ophrys reinholdii* Spruner ex Boiss. It is included in the Red Data Book of Bulgaria in category of "Critically Endangered" due to the small number of populations (only five known until now) and their small numbers (only 46 known individuals in the whole country). In May 2015 we found a new locality of the species in Dragoevska Mountain, southwest of Dragoevo village, Veliki Preslav Municipality. This is the first locality of species for North Bulgaria. All previously known locality are located in Southwestern Bulgaria. We found the species in the lowest altitude in the country – just under 300 m a.s.l. All known localities are at altitude between 960 m a.s.l. and 1260 m a.s.l. The new population is the largest in Bulgaria. It is composed of 38 individuals located in an area of 55 m². Of these, 27 individuals are in generative state and 11 individuals are in vegetative state. The habitat is characterized by rich floristic diversity – with 64 associated species. We reported the anthropogenic influence and prospects for the further existence of the population.

6. **Zahariev, D., L. Taneva, 2017, The medicinal plants of Tarnovski Height (Northern Bulgaria), International Journal of Scientific Engineering and Applied Science 3 (8): 121–127 (SJIF 2016: 4.214).**

As a result of our studies of Tarnovski Heights in the period 2015-2016 are described 444 species of medicinal plants belonging to 284 genera and 81 families. This represents 52.54% of the medicinal plant species in Bulgaria. Most families (71.60%) and genera (96.83%) are presented with smaller number species: from 1 to 4. The described medicinal plants belong to 30 floristic elements. We established 3 Balkan endemic species and 44 relic species. Most commonly spread life forms are the hemicryptophytes (47.75%). Perennial herbaceous plants (56.53%) dominate among the biological types. The number of plant species with conservation status is 31 (6.98%). The anthropophytes among the vascular plants are 290 species (65.32%). The results were compared with data for medicinal plants of Frangensko Plateau (Northeastern Bulgaria).

7. **Zahariev, D., D. Miteva, 2017, Invasive Plants in Shumen Plateau Nature Park, International Journal of Advanced Research 5 (8): 952–961, doi: 10.21474/IJAR01/ 5141 (SJIF за 2016: 6.118).**

An investigation of the invasive plants distributed on the territory of the Shumensko Plato Natural Park was carried out for the first time. As a result, 19 invasive plant species were identified. The described species originate in different parts of the world, mainly in North America. The number of affected habitats is 14. In most habitats *Ailanthus altissima* and *Robinia pseudoacacia* are invading. Both species also have the highest count: 24,680 individuals of *Ailanthus altissima* and 5,628 individuals of *Robinia pseudoacacia*. In terms of

biological type, most species are shrubs and annual herbaceous plants. In terms of life forms, the largest group is the group of phanerophytes that includes 11 tree and shrub species. The majority of invasive plants (12 species) are propagated simultaneously in two ways: by seeds and vegetatively. The main reason for the wide spread of invasive plants in the Park is their introduction as decorative plants or forest crops. Another reason is the transportation of fruits or seeds by vehicles. The authors recommend immediate measures to control the numbers and spread of invasive species in order to completely eradicate them from the Park territory. It is necessary to monitor the affected habitats for several years in order to prevent the invasive species' reoccurrence.

8. **Zahariev, D., L. Taneva, 2017, Flora of Tarnovski Heights (Northern Bulgaria), International Journal of Advanced Research 5 (8): 1011–1022, doi: 10.21474/IJAR01/5150 (SJIF за 2016: 6.118).**

Tarnovski Heights are located in the central part of Northern Bulgaria. Inventory of their flora was done for the first time. As a result, 964 species of wild vascular plants from 439 genera and 94 families were described. A floristic analysis was made that includes the following information: taxonomic structure, phytogeographic structure, endemic species, relic species, species with conservation status, distribution of species by biological type and by life form, medicinal plants, antropophytes. The number of invasive species is significant, almost half of the number of invasive plant species in Bulgaria.

9. **Zahariev, D., L. Taneva, 2017, Plants with conservation status, endemics and relics within the Tarnovski Heights (Northern Bulgaria), International Journal of Scientific Engineering and Applied Science 3 (9): 23–27 (SJIF 2016: 4.214).**

The Tarnovski Heights are located in northern part of the Republic of Bulgaria around the city of Veliko Tarnovo, a town with a 6,000 years history and the capital of the Second Bulgarian Kingdom (XII-XIV AD). Nowadays on the territory of the Tarnovski Heights, there are 12 protected areas and 4 protected zones of the European ecological network NATURA 2000. The aim of our study was to investigate the following three important groups of plants: species with conservation status, endemics and relics. This study within the Tarnovski Heights is performed for the first time. The total number of plant species with conservation status established by us is 64 (6.64% of the total number of species). One of those species is included in the Appendix II of Directive 92/43/EEC. One species is included in the Appendix I of the Berne Convention. Twenty-two of the species are included in the Appendix II of CITES. In the Red Data Book of Republic of Bulgaria, there are 10 species. The Red List of Bulgarian Vascular Plants features 30 species. In the Act on Amending and Supplementing the Biological Diversity Act of the Republic of Bulgaria are included 42 species. Gathering herbs is prohibited from the natural habitats of 10 species. A restrictive regime for gathering herbs from natural habitats is imposed for 6 species. 9 species (0.93%) are Balkan endemics and 3 species (0.31%) are Bulgarian endemics. The flora of the Tarnovski Heights includes a significant number of relic species as well – a total of 59 (6.12%): 50 of them are Tertiary relics and 9 species are Quaternary relics. The obtained data are compared with data of the Frangensko Plateau (Northeastern Bulgaria), near which is located the city of Varna, an important commercial and port town since the Antiquity with about 7,000 years of history. Both regions were settled as early as the ancient times and were major trading centers for centuries.

10. **Zahariev, D., 2017, The medicinal plants of Dragoevska Mountain (Northeastern Bulgaria), International Journal of Scientific Engineering and Applied Science 3 (9): 172–179 (SJIF 2016: 4.214).**

Dragoevska Mountain is part of the Eastern Forebalkan in Northeastern Bulgaria. An investigation of medicinal plants as part of its flora is made for the first time. As a result, 388 species of medicinal plants of 259 genera and 72 families were described. This represents 45.92% of the medicinal plant species in Bulgaria. The described medicinal plants belong to 32 floristic elements. We established 2 species of Balkan endemics and 42 relic species, of which 40 species are Tertiary relics and 2 species are Quaternary relics. Among the life forms with the most species are hemicryptophytes (46.13%). Among the biological types with the most species are the perennial herbaceous plants (53.87%). The number of species with conservation status is 20 (5.15%). The antropophytes are 254 species (65.46%). The obtained results can be used for comparison with the data on medicinal plants in other geographic sites in Bulgaria.

III. Публикации в реферирани научни издания в България с IF или SJR – 1 брой

1. Zahariev, D., 2014, Favorable impact of road infrastructure on the distribution and abundance of populations of *Himantoglossum caprinum* (M. Bieb.) Spreng. in Shumensko plato Protected area (BG0000382) and Rishki prohod Protected area (BG0000149) from the European ecological network Natura 2000, Acta Scientifica Naturalis, Vol. 1, pp. 166–174 (SJIF за 2014: 2.723).

Himantoglossum caprinum (M. Bieb.) Spreng. is one of the target species subject to protection in the European ecological network Natura 2000. It is widespread throughout the country, with relatively small populations. In Shumensko plato Protected area (BG0000382) we have described the most numerous population in Bulgaria – a total of 1954 individuals. The various subpopulations characterized by small size and relatively high numbers. Specific for a part of the subpopulations of target species in the protected area is the preferred location near to asphalt roads. In these cases, the road infrastructure is not a threat, and creates favorable conditions for their existence. Many individuals of the species grow on the edge of the road and are closely related to the existence of the road and the maintenance of low overgrown with shrubs and trees near the roadway. In Rishki prohod Protected area (BG0000149) population is a small number – 47 individuals. We found only one habitat of the species within the area – immediately adjacent to an asphalt road and abandoned construction site. It was used as a temporary depot of ballast materials for the construction on the nearby asphalt road. In this state – no intensive and free of aggregates, the construction site creates favorable conditions for the existence and growth of the population of the species.

IV. Публикации в реферирани научни издания в чужбина – 2 броя

1. Zahariev, D., 2016, Biodiversity of relict vascular plants in Bulgaria, International Journal of Research Studies in Biosciences 4 (1): 38–51, doi: 10.20431/2349-0365.0401008.

Climate changes observed in the last years pose a serious threat to biodiversity. Similar climatic changes, nevertheless, have occurred many times in our planet's history. Relict plants that survived after experiencing climate change can give us information about the past and the future of species. The rich biodiversity in the countries of Southern Europe, including Bulgaria, is shaped by a large number of relict plants. To date, the biodiversity of relict plants in Bulgaria has not been systematically described and remains somewhat unknown. Our aim is to systematize available information and present biodiversity of relict vascular plants in Bulgaria. Using a critical approach, we discovered 346 species of 207 genera and 81 families of relict origin. This number accounts for 8.74% of the natural flora of Bulgaria and 8.43% of the total flora of Bulgaria (which includes foreign species). We divided relict plants into two groups: tertiary relicts (183 species) and quaternary relicts (163 species). The quaternary relicts we divided into 3 groups: glacial relicts (143 species), interglacial relicts (13 species)

and postglacial relicts (7 species). Among the relicts with the largest number are perennial herbaceous plants, followed by shrubs and trees. 144 relict species have conservation status.

2. Zahariev, D., 2016, Flora of Frangensko Plateau (Eastern Bulgaria), Phytodiversity of Eastern Europe, Vol. X, No 2, 96–114.

Inventory of the Frangensko Plateau flora is provided for the first time. The study presents information on: taxonomic structure; phytogeographic structure; endemic species; relict species; the distribution of species by biological type and by life form; medicinal plants; species with conservation status. Invasive species and the antropophytes on the plateau are described for the first time. For the first time in the Northeastern floristic region are indicated *Papaver rumelicum* Velen. and *Fraxinus pallisiae* Wilmott.

V. Публикации в реферирани научни издания в България – 8 броя

1. Dimitrov, D., M. Kurteva, D. Zahariev, 2012, Flora and vegetation of Dervisha Managed Rezerve, Phytologia Balcanica 18 (1): 49–57.

Three hundred and twenty-two species of vascular plants, belonging to 219 genera and 68 families have been recorded in the Dervisha Managed Reserve. As compared to earlier investigations, 61 species, 25 genera and two families have been added. Among the seven identified types of floristic elements, the Circumboreal (33.23 %), European (25.78%) and Mediterranean (20.19%) types dominate. Seven Balkan endemics and 20 relict species have been found. Analysis of life forms has shown that cryptophytes (119 species) dominate, followed by hemicryptophytes (62), therophytes (54) and phanerophytes (48). Herbaceous perennials showed the greatest abundance of species (183 species), followed by the annuals (54), trees (22) and shrubs (16). There was a significant number of antropophytes: 192 (59.63%). Composition of the herbaceous layer of the *Aesculus hippocastanum* community has proved much richer, as compared to the previously available data. Four new species have been recorded for the floristic region of Northeast Bulgaria.

2. Zahariev, D., 2014, An investigation into the flora of the Shumen Heights, Phytologia Balcanica, Sofia, 20 (1): 79–88.

As a result of our investigations of the Shumen Heights in the period 1998–2012, 878 vascular plant species were identified, belonging to 432 genera and 107 families. Most families (66.36%) and genera (92.82%) were presented by a small number of species: from one to four. There were eight types of floristic elements divided into 49 groups. Of the life forms, most common were the cryptophytes (33.26%). The flora included mostly herbaceous perennials (53.42%). A total of 418 plants were medicinal (47.61%). There were 42 (4.78%) ornamental plants on the territory of the Heights. The antropophytes were 476 (54.21%). Eighty-six of the species (9.79%) had conservation status. Three species have been recorded for the first time in the floristic region of Northeast Bulgaria.

3. Zahariev, D., 2015, The medicinal plants of Chepan Mountain (Western Bulgaria), Acta Scientifica Naturalis, Vol. 1/2015, pp. 50–67.

Bulgaria is one of the European countries with the greatest biodiversity, including biodiversity of medicinal plants. The object of this study is Chepan Mountain. It is located in Western Bulgaria and it is part of Balkan Mountain. On the territory of the Chepan Mountain (only 80 km²) we found 344 species of medicinal plants from 237 genera and 83 families. The floristic analysis indicates, that the most of the families and the genera are represented by a small number of inferior taxa. The hemicryptophytes dominate among the life forms with 49.71%. The biological types are represented mainly by perennial herbaceous plants

(60.47%). There are 7 types of floristic elements divided in 27 groups. The largest percentage of species are of the European type (58.43%). Among the medicinal plants, there are two Balkan endemic species and 18 relic species. We described 23 species with protection statute. The anthropophytes among the medicinal plants are 220 species (63.95%).

4. **Zahariev, D., C. Kacheva, 2015, The medicinal plants of Frangensko Plateau (Northeastern Bulgaria), Acta Scientifica Naturalis, Vol. 1/2015, pp. 68–86.**

The Frangensko Plateau is located in the northeastern part of Bulgaria and covers an area of 360 km². On the territory of the plateau there are two protected areas, as well as two areas of the European ecological network NATURA 2000. The study of the medicinal plants on the territory of the Frangensko Plateau is made for the first time. As a result of our research we found 362 species of vascular plants from 242 genera and 80 families. The most of the families and the genera are represented by a small number of inferior taxa. The analysis of their life form indicates that the hemicryptophytes dominate with 39.50%, followed by the phanerophytes (22.10%). The biological types are represented mainly by perennial herbaceous plants (52.21%), annual herbaceous plants (14.09%) and trees (10.50%). There are 8 types of floristic elements divided in 32 groups. The largest percentage of species is of European type (51.93%). Among the medicinal plants, there are two Balkan endemic species, one Bulgarian endemic species and 30 relic species. Thirty four species with protection statute are described. The anthropophytes among the medicinal plants are 242 species (66.85%).

5. **Zahariev, D., K. Racheva, I. Ivanov, 2015, The medicinal plants in Danubian Plain (Northern Bulgaria), Acta Scientifica Naturalis, Vol. 1/2015, pp. 199–207.**

The study of the medicinal plants in Danubian Plain (Northern Bulgaria) is made for the first time. To determine the boundaries, we used the map of the floristic regions in Bulgaria. This study was conducted through the analysis of the data in the Conspectus of the Bulgarian vascular flora. The results show a significant diversity of the medicinal plants in Danubian Plain floristic region: 570 species of vascular plants from 345 genera and 95 families. The majority of the families and genera are presented with a small number of species – from 1 to 4. The analysis of the life form indicates that the hemicryptophytes dominate (45.26%). The biological types are represented mainly by perennial herbaceous plants (57.02%). The highest percentage of species are of the European type (57.72%), followed by species of Mediterranean type (15.79%). Among the medicinal plants, there are 2 Balkan endemics and 28 relics. The number of species with conservation status is 57 (10.00%). Twenty species are prohibited from gathering herbs from their natural habitats. For 8 species are imposed restrictive regime for gathering herbs from their natural habitats. The antropophytes are 360 (63.16%). The obtained data can be used as a basis for a comparison with the data of the medicinal plants in other floristic regions in Bulgaria.

6. **Zahariev, D., L. Taneva, 2015, The plants with protection statute, endemics and relicts of Lilyaksko Plateau (Northeastern Bulgaria), Acta Scientifica Naturalis, Vol. 1/2015, pp. 208–216.**

The study of the species with conservation status, endemic and relicts within the Lilyaksko Plateau is performed for the first time. The total number of species with conservation status established by us is 31 (3.94% of the total number of species). One of those species is included in the Annex II and two species are included in the Annex V of Directive 92/43/EEC. One species is included in the Appendix I of the Berne Convention. Eleven of the species are included in the Appendix II of CITES. The IUCN Red List for Bulgaria features 10 species in the following categories: critically endangered – 1, endangered – 3, vulnerable – 3, nearly threatened – 1 and least concern – 2 species. In the Red book for Bulgaria there are 5 species in the following categories: critically endangered – 1, endangered

– 3, vulnerable – 1. In the Biological Diversity Act, 8 species are included in Annex III and 18 species – in Annex IV. Seven species are prohibited from gathering herbs from their natural habitats. For 4 species is imposed restrictive regime for gathering herbs from their natural habitats. Four species (0.51%) are Balkan endemics. The flora of the plateau includes a significant number of relict species – 31 (3.94%): 30 species are Tertiary relicts and one species is Quaternary relict. The obtained data are compared with data of adjacent geographical sites in Northeastern Bulgaria.

7. Zahariev, D., L. Taneva, K. Racheva, 2015, Medicinal plants in Rhodope Mts (South Bulgaria), Acta Scientifica Naturalis, Vol. 2/2015, pp. 99–109.

A complete inventory of medicinal plants in Rhodope Mts (South Bulgaria) is made for the first time. The study was conducted on the basis of the latest data on the distribution of vascular plants in Bulgaria. There have been established 714 species of vascular plants from 393 genera and 101 families. Comparison is made with other studied floristic regions of the country: Stara Planina Mt, Northeastern Bulgaria and Danubian Plain. The conducted floristic analysis provides detailed information on medicinal plants as well as in mountain and in its different parts. Information on the taxonomic structure, life forms and biological types is presented. An analysis of the origin of species by major types of floristic elements is included. Special attention is paid to the endemic and relict species. Detailed information on the species of conservation status is presented. Anthropogenic impact is measured by the number of antropophytes. A systematic list of medicinal plants in Rhodope Mts is presented in specially Appendix. The presented data can be used for comparison with data for medicinal plants in other mountains, both in Bulgaria and in other countries.

8. Zahariev, D., 2015, Plants with protection statute, endemics and relicts of Chepan Mt (Western Bulgaria), Acta Scientifica Naturalis, Vol. 2/2015, pp. 110–116.

Our studies of species with conservation status within Chepan Mt showed a significantly greater number than those established by other authors. The total number of species with conservation status established by us is 66 (8.42% of the total number of species). One of those species is included in Appendix II of Directive 92/43/EEC. One species is included in Appendix I of the Berne Convention. In Appendix II of CITES are included 14 species. The IUCN Red List for Bulgaria features 29 species in the following categories: Endangered (4 species), Vulnerable (10 species), Nearly threatened (7 species) and Least concern (8 species). In the Red book of Republic of Bulgaria there are 6 species in the following categories: Endangered (3 species) and Vulnerable (3 species). In the Biological Diversity Act of Republic of Bulgaria, 17 species are included in Appendix III and 28 species – in Appendix IV. The number of endemic species is comparable to number established by other authors. Balkan endemics are 26 species (3.32% of the total number of species). Bulgarian endemics are 4 species (0.51% of the total number of species). The study of relict plant species of Chepan Mt is performed for the first time. The flora of the mountain includes 39 relict species (4.97% of the total number of species). The obtained data are compared with data of adjacent geographical sites in Western Bulgaria.

VI. Публикации в нереферирани научни издания в България – 13 броя

1. Захариев, Д., И. Колева, С. Сали, З. Бехчет, 2017, Албифлорни растения от българската флора, Сборник с доклади от Национална конференция с международно участие „Природни науки“, 29.09-01.10.2017, Варна, Унив. изд. „Еп. Константин Преславски“, Шумен, 98-109.

Цветните растения в българската флора са повече от 4020 вида. При липса на синтезиране на пигмент в цветовете всяко от тях може да има албиносни по отношение

на цветовете индивиди. При повечето от цветните растения това явление се наблюдава изключително рядко. Обект на настоящото проучване са дивите растения в България с албифлорни форми.

В резултат на проучването на достъпната литература установихме, че във флората на България са описани 107 вида, принадлежащи към 78 рода и 33 семейства, които имат албифлорни форми. Това съставлява 2,61% от видовете, 8,54% от родовете и 23,74% от семействата висши растения в България. В приложение е представен списък на видовете.

Растенията, които са част от естествената флора на България и притежават албифлорни форми, са изключително разнообразна група по отношение на разпространението. Те са представени както от разпространени в цялата страна видове, така и от локално разпространени, включително и ендемични видове. По отношение на обичайната багра на цветовете почти при всички видове тя се дължи на наличието на антоциани. Именно нарушенията в тяхната биосинтеза са причина за появата на албифлорни форми. При повечето растения наличието на форми с бели цветове не е отразено в тяхната таксономия.

2. **Захариев, Д., Д. Добрева, Д. Димитров, Д. Йорданова, 2017, Лечебните растения в Беласица, Сборник с доклади от Национална конференция с международно участие „Природни науки“, 29.09-01.10.2017, Варна, Унив. изд. „Еп. Константин Преславски“, Шумен, 110-119.**

Беласица е една от граничните планини, разположена в Югозападна България на границата с Гърция и Република Македония. На територията ѝ се намира най-новият природен парк в страната – ПП „Беласица“. Обект на настоящото проучване са лечебните растения, които се намират в българската част от планината – 565 вида, които принадлежат към 340 рода и 90 семейства. Анализ на данните за лечебните растения се прави за първи път. Получените резултати са сравнени с данните за лечебните растения в Чепън планина (Западна България).

3. **Zahariev, D., L. Taneva, 2014, New locality of *Ophrys apifera* Huds. in Bulgaria, Proceedings of the Second student scientific conference “Ecology and Environment”, Vol. 1, Konstantin Preslavsky University Press, Shumen, 25–34 (in Bulgarian).**

The first evidence of the opening of *Ophrys apifera* Huds. in Bulgaria by the end of the 19th and early 20th century. Although in 1898 it was included in the Annex to the first Bulgarian flora, due to lack of herbarium material and information for new fields the species is not included in the next editions of the Flora of Bulgaria. For 84 years – from 1913 to 1997, the species has not been confirmed to spread in our country. In 1997, a locality of the species is found in the Eastern Rhodopes. In the coming years *Ophrys apifera* was established in 18 localities in different floristic regions. In Northeastern Bulgaria floristic region so far the species is known only by a locality of Shumen Plateau. In 1999, Radoslavova founded the species near Shumen Town – 95 years after its discovery by Davidov in the same area. In June 2013 we opened a new locality of the species of the territory of the Lilyaksko Plateau, west of the village Podgorica. We have described a population of 17 individuals in the generative condition of an area of 10.96 ha.

4. **Zahariev, D., L. Behchet, 2014, The plants with conservation status, endemics and relicts of Frangensko Plateau, Proceedings of the Second student scientific conference “Ecology and Environment”, Vol. 1, Konstantin Preslavsky University Press, Shumen, 35–43 (in Bulgarian).**

The study of the species with conservation status, endemic and relicts within the Frangensko Plateau is performed for the first time. The total number of species with

conservation status established by us is 50 (6.42% of the total number of species). One of those species is included in the Appendix II and two species are included in the Appendix V of Directive 92/43/EEC. Two species are included in the Appendix I of the Berne Convention. Sixteen of the species are included in the Appendix II of CITES. The IUCN Red List for Bulgaria features 25 species in the following categories: endangered – 8, vulnerable – 12, nearly threatened – 3 and least concern – 2 species. In the Red book for Bulgaria there are 10 species in the following categories: endangered – 8, vulnerable – 2. In the Biological Diversity Act, 13 species are included in Appendix III and 20 species – in Appendix IV. Six species (0.77%) are endemics: one species is Bulgarian endemic and 5 species are Balkan endemics. The flora of the plateau includes a significant number of relict species – 38 (4.88%): 36 species are Tertiary relicts and 2 species are Quaternary relicts. The largest number of species with conservation status, endemics and relicts confirms the importance of the Frangensko Plateau, the territory of which were announced two protected therophytes in Bulgaria and two protected areas, included in the European network of protected areas Natura 2000.

5. Zahariev, D., M. Dimitrova, 2014, The synanthropic plants in the flora of Frangensko Plateau (Northeastern Bulgaria), Proceedings of the Second student scientific conference “Ecology and Environment”, Vol. 1, Konstantin Preslavsky University Press, Shumen, 44–53 (in Bulgarian).

The study of the synanthropic plant species of the Frangensko Plateau is made for the first time. We found 454 species from 273 genera and 75 families. It is 58.28% of the total number of species which we have found on the territory of the plateau. The large number of synanthropic plants due to the proximity of the plateau to the city of Varna – one of the largest cities in Bulgaria, as well as the specific location of the plateau bordering on the Black Sea coast. The majority of the families and genera are presented with a small number of species – from 1 to 4. There are 8 types of floristic elements divided in 39 groups. The largest percentage of species are of the circumboreal type (38.55%). From the life forms are the most common hemicryptophytes (39.87%) and therophytes (26.87%). The main part of the synanthropic species is represented by perennial herbaceous plants (44.71%). The ornamental plants are 9 species (1.98%). Species grown in forest plantations are 2.42%. As invasive species have been identified 16 species (3.52%).

6. Zahariev, D., K. Racheva, 2014, Medicinal plants of Lilyaksko Plateau (Northeastern Bulgaria), Proceedings of the Second student scientific conference “Ecology and Environment”, Vol. 1, Konstantin Preslavsky University Press, Shumen, 152–160 (in Bulgarian).

The study of the medicinal plants on the territory of the Lilyaksko Plateau is made for the first time. Carried out by other authors inventories in the region are on the vascular flora, but special attention is not given to the medicinal plants. They are from the late 19th and early 20th century. Their data were used for production of the first floras in Bulgaria. A characteristic feature of these studies is that they are conducted under the then administrative regions. As the administrative boundaries have since changed repeatedly, we did not choose an administrative division sign and chose split geographically. As a result of our research we found 262 species of vascular plants from 200 genera and 76 families. The most of the families and the genera are represented by a small number of inferior taxa. The analysis of their life form indicates that the hemicryptophytes dominante with 43.89%, followed by the groups of the phanerophytes (23.66%). The biological types are represented mainly by perennial herbaceous plants (56.87%) and trees (12.60%). The largest percentage of species are of the circumboreal type (38.55%). Among the medicinal plants, there are one Balkan endemic species and 22 tertiary relicts. Twelve species with protection statute are described. The anthropophytes among the medicinal plants are 181 species (69.08%). We not registered

effects that lead to overexploitation and destruction of the habitats of the medicinal plants. We found the opposite phenomenon – abandonment of arable land in the territory of the plateau, which leads to an increase in localities of some medicinal plants. The data obtained were compared with data on medicinal plants that we have found for neighboring sites.

7. Zahariev, D., I. Ivanov, 2014, The medicinal plants in Northeast Bulgaria, Proceedings of the Second student scientific conference “Ecology and Environment”, Vol. 1, Konstantin Preslavsky University Press, Shumen, 161–175 (in Bulgarian).

The study of the medicinal plants on the territory of Northeastern Bulgaria is made for the first time. To determine the boundaries of the area, we used the map of floristic regions in Bulgaria. This study was conducted through the analysis of the data for vascular flora, published in 2012 in the Conspectus of the Bulgarian vascular flora. The results show a significant diversity of the medicinal plants in Northeastern Bulgaria floristic region: 600 species of vascular plants from 357 genera and 101 families. The majority of the families and genera are presented with a small number of species – from 1 to 4. The analysis of the life form indicates that the hemicryptophytes dominate (46.17%). The biological types are represented mainly by perennial herbaceous plants (57.67%). The highest percentage of species are of the circumboreal type (41.00%), followed by species of European type (27.33%). Among the medicinal plants, there are 3 Balkan endemics and 35 relicts. The number of species with conservation status is 60 (10.00%). The antropophytes were 366 (61.00%). The obtained data can be used as a basis for a comparison with the data of the medicinal plants in other floristic regions, as well as a study of the flora of different geographical sites in Northeastern Bulgaria.

8. Zahariev, D., 2014, Invasive plant species along the major rivers in Strandzha Natural Park, Seminar of Ecology – 2014, Proceedings, Union of scientist in Bulgaria, IBER – BAS, 148–158.

We investigate the spread of invasive plant species along the major rivers in Strandzha Natural Park: Rezovska, Veleka and Mladezhka. Material and Methods: Object of the study are five invasive plant species: *Ailanthus altissima* (Mill.) Swinge, *Amorpha fruticosa* L., *Bidens frondosa* L., *Erigeron annuus* (L.) Desf. and *Robinia pseudoacacia* L. The research was conducted on the route method in 2013. We have mapped the spread of the invasive plant species along the rivers Rezovska, Veleka and Mladezhka. We have determined the number of locations and the number of invasive plant species. We have identified risk areas of occurrence and distribution of the invasive species. It is taking measures to limit the spread of the invasive plant species and a gradual recovery of the affected habitats.

9. Zahariev, D., 2014, New habitats in Ticha Protected area (BG0000178) from the European ecological network Natura 2000, Annual of Bishop Konstantin Preslavski University of Shumen, Vol. XXII B6 Biology, Shumen, 70–77.

In announcing the Ticha Protected area (BG0000178) in it are described 6 habitats. Their codes according to the Directive 92/43/EEC of the Council of the European Communities are: 6110, 9150, 9170, 9180, 91H0 and 91M0. Three of them are priority for the European Community: 6110, 9180 and 91H0. During the mapping carried out by us of habitats in the protected area by means of a pre-established model provides the existence of another 3 habitats – 6210, 6240 and 8210. During field studies in 2011, their presence has been confirmed by us. Besides these, in the period 2011-2012 we found 5 new habitats: 3260, 7220, 91E0, 91G0 and 91Z0. From the 8 new habitats for protected area 4 have priority for the European Community: 6240, 7220, 91E0 and 91G0. The establishment of a total of 14 natural habitats, of which 7 are priorities, increases the importance of Ticha Protected area for the conservation of the natural habitats in the Republic of Bulgaria and the European Union.

10. **Zahariev, D.,** L. Taneva, K. Racheva, I. Talibov, 2015, Medicinal plants in Stara Planina Mt (Central Bulgaria), Proceedings of the Third student scientific conference “Ecology and Environment”, Vol. 2, Konstantin Preslavsky University Press, Shumen, 29–50.

A complete inventory of medicinal plants in Stara Planina Mt (Central Bulgaria) is made for the first time. The study was conducted on the basis of the latest data on the distribution of vascular plants in Bulgaria. A comparison with other studied floristic regions of Bulgaria showed the greatest biodiversity of medicinal plants in Stara Planina Mt: 719 species of vascular plants from 394 genera and 101 families. Medicinal plants are relatively evenly distributed in the three parts of the mountain – western, middle and eastern. The conducted floristic analysis provides detailed information on medicinal plants as well as in the mountains and in its different parts. Information on the taxonomic structure, life forms and biological types is presented. An analysis of the origin of species by major floral types is included. Special attention is paid to the endemic and relict taxa. Detailed information on the species of conservation status is presented. Anthropogenic impact is measured by the number of antropophytes. A systematic list of medicinal plants in Stara Planina Mt is presented in specially Appendix. The presented data can be used for comparison with data for medicinal plants in other mountains, both in Bulgaria and in other countries.

11. **Zahariev, D.,** P. Boycheva, K. Kosev, 2015, Review on the medicinal plants of the North Black Sea Coast (Bulgaria), Annual of Sofia University, Faculty of Biology, Book 2 – Botany, Vol. 99, pp. 100–114.

This is the first review of the studies of medicinal plants found in the region of North Black Sea Coast. It shows the significant diversity of the medicinal plants in the northern part of Black Sea Coast floristic region: 593 species of vascular plants from 357 genera and 96 families. The majority of the families and genera are represented by a small number of species, which ranges from 1 to 4. The analysis of life forms indicates that the hemicryptophytes dominante (43.17%). The biological types are represented mainly by perennial herbaceous plants (54.81%). The highest percentage of species belongs to the European type (55.48%), followed by species of the Mediterranean type (17.54%). Among the medicinal plants one Balkan endemic, one Bulgarian endemic and 32 relicts are found. The number of species with conservation status is 55 (9.27%). 18 species are protected by a law prohibiting the herb collection within their natural habitats and collecting of 9 species is restricted by the law regulating the collection of herbs from their natural habitats. The number of antropophytes is relatively high 374 (63.07%).

12. **Zahariev, D.,** P. Mihnev, 2015, Creating e-learning course on biodiversity in the European project Key to Nature, Annual of Sofia University, Faculty of Biology, Book 2 – Botany, Vol. 99, pp. 115–121.

An e-learning course in biodiversity was conducted for the first time among universities in Bulgaria in Shumen University. The aim was to use the opportunities provided by the project Key to Nature (sponsored by the EC Programme eContentPlus) and the e-learning platform Moodle to develop and support the delivery of specialised training courses in Higher Education. In order to realise this goal the authors have developed a sample course in Botany. The course was conducted in the period September 2010 – February 2011. Thirty six students studying biology participated in the course. The results show that it provides an accessible option for remote collection, publication and verification of information of different nature and sources. The course proved the effectiveness of e-learning as a form of self-study that complements traditional forms. In the future, we expect an increase of the role of e-learning in Bulgarian universities, and even to replace some (parts) of the conventional study forms.

13. Zahariev, D., T. Todorova, 2016, The alien plants in Shumen Plateau Natural Park, Proceedings of the Fourth student scientific conference "Ecology and Environment", Vol. 3, Konstantin Preslavsky University Press, Shumen, 57–73.

The alien vascular plants established by us in the Shumen Plateau Natural Park are 58 species, belonging to 53 genera and 32 families. Of these, 13 species are reported for the first time. The majority of the alien plant species are native to Asia (44.83%) and North America (36.21%). The majority of alien plants are distributed in natural habitats, mainly related to the recreation and the road infrastructure. The total number of individuals of the alien plant species is 41745. The number of the individuals of species that have been introduced in a forest crops is the largest, followed by the spontaneously spread individuals and thirdly, there are individuals who are grown as ornamental. From the alien plants 50 species are shrubs or trees (phanerophytes) and 8 species are perennial herbaceous plants from the group of hemicryptophytes. Most of the species are cross-pollinated mainly by insects (entomophilic). The almost half of all species (44.83%), are propagated both by seeds and vegetatively, and even less are propagated only by seeds. The seed propagation and the large number of the seeds are responsible for the spontaneous spread of a number of the alien plant species. According to the reasons for the presence in the Park, the alien plant species are divided into 3 groups: decorative, forest crops and spontaneously spread. The pathways for introduction of the alien plant species in the Park are indicated. The alien plant species have 15 economic applications, from which in the Park are realized only 6. We found 16 invasive species in the Park, 8 of which are a real threat to the biodiversity and the habitats, and the rest still pose a potential threat.

7.12.2017 Г.

Изготвил:

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