Assoc. Prof. Dr. Tenyo Meshinev: a tribute to his 80th anniversary

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The value of life is determined not by the length of the time spent, but by the quality of deeds. Seneca

Tenyo Atanassov Meshinev was born on June 29, 1942 in the town of Pavel Banya. The varied natural environment around the town, located between the Sredna Gora and Stara Planina mountains, inspired in him a lasting interest in nature. His mother, Ivanka Meshineva, was a teacher and, as a professional pedagogue, she was enhancing her son's interest in the surrounding world, as well as concern for its preservation. His father, Atanas Meshinev, was an accountant and as such probably influenced his son's flair for precision and attention to detail in all his activities. His junior sister, Evgenia Dimitrova, is a chemical engineer. After finishing primary school in his hometown, Tenyo Meshinev moved to Plovdiv where he continued his studies at the secondary school of landscape horticulture from 1956 to 1960. After graduating, he worked for a year as a horticulture technician in the town of Kazanlak.

Fig. 1. In meadows full of *Fritillaria meleagroides*, Aldomirovsko Blato.

During the two subsequent years he served his time with the military as a border guard at the town of Malko Tarnovo.

The secondary school determined his further professional orientation: botany. After becoming familiar with a significant number of species in gardening, his interest expanded further to the Bulgarian natural flora and vegetation. Meshinev enrolled at the Faculty of Biology of St. Kliment Ohridski University of Sofia in the autumn of 1963. He graduated with honors as a Master of Biology at the Department of Botany in 1968. At the university, he met his wife Velichka Meshineva, and they have two daughters and four grandchildren.

Upon graduation, Tenyo Meshinev was offered a position at the Institute of Botany of the Bulgarian Academy of Sciences. He started work in the Department of Vascular Plants, where he showed an impressive knowledge of the Bulgarian flora. In the years to come, he was actively involved in the Institute's projects. He approached his work with enthu-

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siasm and professionalism and that led to the next level of his career development, namely, a PhD thesis. The topic of his doctoral dissertation was „Ecological and biological features and phytocoenotic role of *Potentilla fruticosa* in Bulgaria", under the scientific tutorship of Assoc. Prof. Slavcho Ganchev. The thesis was completed in the period from 1972 to 1975. During his studies, Meshinev spent much of his time at the Experimental Station of the Institute of Botany in Beglika. Set in the majestic nature of the Western Rhodopes, the Experimental Station provided excellent conditions for creativity. Mention deserves the fact that the building of the Experimental Station, made available by the Ministry of Agriculture to the Institute of Botany in 1968, required some major repairs and renovation. Meshinev was one of the most active colleagues who dedicated time and effort to restoring the building. And despite the difficulties that accompanied such renovation, he felt rewarded by the result. Practical courses with students, project activities related to the vegetation of the Rhodopes took place at the Experimental Station until the turn of the century. Occasionally, it was also used for holydays by the staff of the Institute of Botany.

Tenyo Meshinev obtained three months fellowship grant in 1975 and spent them at the Institute of Ecology in Warsaw, and at the Institute of Botany in Kraków (Poland). The subject of this specialization was the primary biological productivity of meadows and pastures and application of the modern measurement methods. He also did a three-month specialization at the Institute of Botany in Tbilisi (Georgia) in 1977. There, he studied the alpine ecosystems. Memories come alive as Meshinev tells stories about the kind and caring staff of the Institute of Botany, unforgettable hikes in the Caucasus, stay in the high-mountain Kazbegi Station, etc.

Tenyo Meshinev was habilitated in 1989 at the Institute of Botany of the Bulgarian Academy of Sciences, where he proceeded to work until his retirement in 2008. He was Head of the Department of Phytocenology and Ecology from 1993 to 2008. The Department played a leading role in conducting phytosociological and phytoecological research in Bulgaria, which provided extensive information on the composition, structure, dynamics, and distribution of the natural plant communities and natural habitats in Bulgaria.

Fig. 2. With students at the Beglika Station (1999).

Basic research

Meshinev's researches started with studies of soil algae in the Dimitrovgrad area under supervision of Assoc. Prof. Stefan Draganov. These studies were related to the prospects for reclamation of the embankments near the Maritza-Iztok open-pit mines. However, after he joined the Institute of Botany, the management of the Institute became interested in plant ecology, phytosociology and environmental protection. Meshinev developed and started the implementation of a program for complex ecological research under stationary conditions. This research was conducted at the Experimental Station in Beglika. The program involved application of accurate quantitative parameters of the structural and functional characteristics of natural ecosystems in the area ensured by the introduction of modern equipment for measurment of various microclimatic parameters. Data on air temperature, sunshine, humidity, soil temperature, and rainfall have been collected there for more than a decade. On the same study plots, the minimal area of *Piceetum myrtillosum* association was defined. The minimal area of an association is a fundamental concept in plant ecology and it was introduced in Bulgaria for the first time there. The methodological contribution of this research was used later for other types of vegetation.

Meshinev's greatest contribution was the in-depth study of the ecological and biological features and phytocoenotic role of *Potentilla fruticosa* in Bulgaria, subject of his doctoral thesis. He applied a wide range of experimental methods in the laboratory and in the field to observe the seed germination regime, the influence of soil characteristics on plant growth, the role of accompanying species, etc. All these studies confirmed the experimental approach in phytoecological research in Bulgaria.

For more than a decade, Meshinev has been member of a team elaborating on a vegetation map of Bulgaria. He mapped the vegetation in Northeast Bulgaria. Days of hard work and nights in the great outdoors fill his memories of those years. Meshinev revealed the beauty of the steppe vegetation (Kabyushka Mound, Vodenska Forest, Ludogorie) during field trips. Valuable information was collected and original 1:25000 maps were drafted. Unfortunately, all that remained unpublished, along with the data collected by the other colleagues. Many years later, he returned to these locations and together with his colleague Nikolay Andreev explored the vegetation of the Shumen Plateau.

Meshinev was one of the most active collaborators in the „Man and Biosphere" International Biological Program when it was launched in Bulgaria. He studied the biological and economic productivity of various plant communities. The obtained results were particularly valuable as they can be used to understand the functional characteristics of ecosystems and to optimize the economic use of forest communities, meadows and pastures. However, after the program was discontinued, similar studies were seldom conducted. He was Project Head in two projects: „Ecological assessment of pastures in Beglika, Western Rhodopes" (1993-1996) and „Ecological assessment of pastures in the Mursalitsa part of the Rhodopes" (1996-1999). They were funded by the National Science Fund, and were closely related to the topic of primary production.

Fig. 3. West Rhodopes (2005).

From 1991 to 1993, together with colleagues from the Institute of Botany and Botanical Garden with the Bulgarian Academy of Sciences, Meshinev studied the vegetation of the sand dunes in the Sunny Beach Resort. That project was initiated by Simeon Mitsov, Director of the Gardening Department at the Resort, who understood that tourists would be rather attracted by Nature and its flora, than by urban areas. For the first time in Bulgaria, Tenyo Meshinev applied 1:2000 vegetation mapping by aerial photographs.

Meshinev was one of the most active scholars who introduced the methodological approach of Braun-Blanquet in Bulgaria. In 1994, he invited RNDr. Zdenka Neuhäuslová as lecturer at a seminar held at the Beglika Station. In the course of a week, the participants attended lectures and engaged in practical activities related to the natural vegetation in the area.

Meshinev spent a long time studying the vegetation of the Central Balkan National Park. From 1995 to 1996, he worked on a project for mapping the zone above the tree line, funded by the Bulgarian-Swiss Biodiversity Conservation Program. Intensive field work marked the months from June to September. Field work was exhausting but pleasant, because it was connected with the beautiful nature of the mountain ridge. The team included some students from Plovdiv University - Tsvetelina Tsenova, Kasimira Furdzhieva, Stefan Gardev - who gained invaluable knowledge of the flora, as well as experience in mapping and survival under mountain conditions. The resulting map, along with the described plant communities, still provide the most detailed information about the area above the tree line in the Park. Spas Uzunov, Rumyana Ivanova and Vladimir Trifonov subsequently joined the team and facilitated the study of primary productivity of high-mountain pastures. Studies on the vegetation of the Central Balkan Park prompted a remarkable idea about the *Pinus peuce* reaction to global warming. For the first time in Bulgaria, attention was given to the impact of winter temperatures on vegetation dynamics. Partner in the survey was Dr. Ekaterina Koleva, a professional climatologist. Reaction of the biota, i.e., increase in the upper limit of *Pinus peuce* at peak Vezhen in relation to the significant warming during the winter months, was scientifically proven. Interest in this publication at international level was very high.

The largest project under Meshinev's leadership was the National Grassland Inventory Project, funded by the Dutch Ministry of Agriculture and Fisheries and supervised by Dr. Peter Veen (2001-2004). The project brought together specialists from different institutions and non-governmental organizations. The area that was mapped in scale 1:25000 comprised approximately 10% of the total area of meadows and pastures in Bulgaria. Valuable recommendations were made for polygons to be included in the Natura 2000 network in the country.

Fig. 4. Phytosociological study in the Pirin Mts (2010).

Fig. 5. Field mapping during the National Grassland Inventory project.

Fig. 6. In the Carl Linnaeus Summer House, Sweden (1997).

Meshinev was strongly interested in vegetation succession, having realized that knowledge in this subject makes it possible to reveal some invisible traits of contemporary vegetation, and to predict possible future changes. Succession studies were a difficult and complex task; however, they were extremely useful when managed properly. Important solutions were acknowledged for the sand dunes of the Sunny Beach area, for vegetation of the high-mountain pastures in the Central Balkan National Park and the Bistrishko Branishte Reserve, for occurrence of shrub vegetation in the deciduous forest zone, and expansion of coniferous forests after cessation of grazing in the Rhodopes. Today, many of the studied vegetation types overlap with natural habitats of the Habitats Directive (92/43 EEC) and are subject of conservation.

Phytosociological studies were commonly related to new floristic records. Meshinev was a co-author of new records for Bulgarian flora of *Stipa ucrainica* and *Vulpia fasciculata*. He took part in the elaboration of action plans for some endangered species: *Fritillaria meleagroides* and *Viola pumila* (2005-2006). A total of 34 vascular plants were assessed by him following IUCN criteria, and 15 of them were included in the latest edition of the *Red Data Book of R Bulgaria* (2015). Within the framework of the Important Plant Areas project, he worked actively on the methodology and its implementation.

Teaching

From the very beginning of his career, Meshinev was convinced that education is the major factor in shaping nature conservation culture. Several expeditions were supervised by him, and dozens of children gained valuable knowledge about the traits of the plants. A good example are the numerous field trips in the Chernelka region (near Pleven), organized together with the tireless biology teacher Kapka Katerova. Meshinev was a lecturer at the University of Forestry (practical seminars in botany), the Faculty of Biology at Sofia University (a course in vegetation of Bulgaria 2003-2012), Plovdiv University (courses in Phytocenology (1994-1998) and Ecology of plant individuals, populations and communities (1994-2001)). Students were eager to attended his lectures for he attracted their attention with experience, fascinating stories and memories from various field trips. The students were fond of the practical classes conducted at the Beglika Experimental Station. Many of them still remember what they experienced and learned during those events. Tenyo Meshinev was supervisor of 13 Master's theses between 1981 and 2014, and of a one-year fellowship of a Vietnamese botanist. He also tutored five PhD students.

Fig. 7. A field trip with secondary school students (1996).

Nature conservation activities

Meshinev's career was closely connected with nature protection. He took part in the development of parametrization of ecosystems monitoring in Bulgaria and promoted the idea of combining chemical, physical and biological monitoring programs within each particular ecosystem. His suggestion of introducing critical parameters and critical values in monitoring proved particularly useful. In collaboration with other colleagues, he inventoried floristic diversity, structure and spatial distribution of plant communities in Parangalitsa, Bistrishko Branishte, Silkosiya, Torfeno Branishte, Kastrakliy, Kamenshtitsa and Ropotamo reserves, as well as in Etara, Veleka and Silistar protected areas. Proper actions were proposed for maintaining conservation measures.

During the period 1992-1994, Meshinev was member of the team developing the National Biodiversity Strategy, funded by the Global Environment Facility, a project that brought together biodiversity experts and conservationists. He was a leading consultant for the vegetation section.

Nature conservation activities after the year 2000 were related to building of the Natura 2000 network in Bulgaria. Meshinev was involved in this process from the very beginning.

He was a consultant for Bulgaria on the Classification of Palaearctic Habitats (Devilliers, P. & JD Devilliers-Terschuren, 1996). The first list of habitats was initially based on the CORINE Biotopes Mannual (1991) and included 218 habitats selected after expert assessment. Some 112 habitats were found to be present in Bulgaria.

Subsequently, he was the leader of a habitat team in the project „Conservation of species and habitats in Bulgaria: EU - approximation" funded by the Danish Company DANCEE (2003). The project resulted in the first approved list of habitats in Bulgaria. He spoke of the national habitat diversity on numerous meetings at European level.

Meshinev was a key expert in the project "Mapping and determining the nature conservation status of natural habitats and species - Phase I", whose main goal was to provide an update the Natura 2000 network in the country.

Fig. 8. Fourth National Botanical Congress.

Fig. 9. On the mid-symposium excursion of the European Vegetation Survey, Hungary (2008).

A significant part of Meshinev's research was aimed at supporting governmental and public nature protection organizations. In cooperation with the Ministry of the Environment and Waters, he drafted numerous expert assessments, opinions and other written documents that remained outside his published papers, but were valuable sources for management measures. His activities included also an assessment of the vegetation of the Vitosha National Park, with warning of the adverse changes in case of construction of winter sports facilities. He participated in the elaboration of the first management plan for the Central Balkan National Park, and also in the management plans for the Vrachanski Balkan Nature Park, Vitosha, and the Pirin National Park.

Fig. 10. T. Meshinev, a great friend of animals.

Fig. 11. A field trip to Hissarya (2020).

Mention deserve too his efforts related to the promotion of plant ecology and environmental protection among the broader public via scripts for short films, such as *Modern Plant World, Plant World of Bulgaria, Ecosystems, Introduced Plants and Animals in Bulgaria, People and the Biosphere* broadcast by the national TV in 1982. Within a span of 15 years, he has drafted numerous reports and gave lectures to teachers of biology, tourists and nature lovers. Tenyo Meshinev is well known to the international scientific community by his presentations at the congresses of the European Vegetation Survey and the International Association for Vegetation Science, by his contribution to the development of the map of potential vegetation in Europe, etc. He was member of the Bulgarian Botanical Society (1971-2018), European Union for Coastal Conservation (1994-1996), International Association for Vegetation Science (2000-2010), and European Vegetation Survey (2000-2010). He has received awards for his active work at the Institute of Botany, successfully led expeditions with students and for achievement in youth scientific and technical creativity. However, the greatest reward is the gratitude of his colleagues, of the young people to whom he has imparted knowledge, attention, help and understanding. All of us who have worked with him are grateful for the advice, guidance, help, and for the wonderful moments spent together in the field and in the laboratories.

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