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Bogdan Kuzmanov (1934-1991) – his life and career

Since 22 December 1991, our colleague Prof. Dr Bogdan Kuzmanov is no more. So sudden and unexpected was his death that it is still difficult to speak and write of him in the past tense. With his demise, the Institute of Botany with Botanical Garden has lost one of the most enthusiastic, persevering and erudite scientists in the field of plant taxonomy, biosystematics and evolution.

He was born on 19 April 1934 in a small cottage then in the outskirts of Sofia, the long-awaited first son, after four daughters, of a rather indigent worker's family. He was christened Bogdan, meaning "Given by God". The cottage was surrounded by a small garden and was close to the city's most beautiful park, "Tsar Boris's Garden". There, Bogdan was in daily touch with nature. He stayed with his parents, hard-working and clever folk, for most of his professional career, and when they passed away of old age he had already become an MSc and senior research associate at the Institute of Botany.

Let us attempt to retrace Kuzmanov's university years, which were to be decisive in determining his subsequent career, through the recollections of three of his female fellow students.

"In my memory Bogdan will always remain that tall, thin boy with curly hair and a schoolboy tunic. We were in one and the same student group. Our friendship was sincere, as youth always is. Bogdan was exuberant and full of youthful vigour, he spoke and laughed loudly, used to fling his arms about, and could not hide his joy at having become a university student. His university record can be condensed into three words: studious, modest, emotional. After our second year's botany field course he knew every plant we had encountered. There was an urge in him to share his knowledge with his fellow students, and he was surprised at our ignorance of the name of some plant even when we had already passed the botany exams. He was not only an assiduous and thorough student, but wanted to be the best in everything he happened to tackle. Rarely would he pass an exam with less than an A grade. He graduated with excellent marks. Bogdan was a man of rich mentality, who could be easily hurt." [Assistant Prof. Dilova].

"In his participation in workshops and botanical exercises Bogdan was competent, intelligent, knowledgeable, thorough. He used to read a lot. His life outside the university lecture hall was very modest, I dare say necessitous. When on occasion I visited him at home, where his ever-smiling mother would receive me, I could notice that his life was not easy; but no one ever heard him complain. Later on, when news of his scientific

success would reach me, I rejoiced much more than at the achievements of my other fellow students whose childhood and university years had been easier." [Mrs Tingarova].

"Bogdan was an outstanding person, thanks in particular to his diverse and deep interests. He realized early on the many deficiencies of our system of secondary and high-school education, and was convinced that a successful scientist must have a versatile mind. Already in his first-level university studies he devised plans for his further self-education in ancient history, literature, music, and theatre. He sought to associate with people who could provide him valuable knowledge, and he would always take the trouble of sharing everything he had learnt with us, his friends." [Assistant Prof. Koleva].

Bogdan Kuzmanov began his work at the Institute of Botany with Botanical Garden in 1958, having won a postgraduate scholarship in botany. Having defined the subject of his MSc thesis, he immediately started an intense, world-wide correspondence with all botanists known to have worked on the same or a related topic. Soon, having improved his command of the English language, he corresponded regularly with many eminent experts of biosystematics and plant evolution. In 1961 he successfully defended his MSc thesis, a "Taxonomic, ecological-geographical and economical study of the Bulgarian species of *Euphorbia*".

In this early work already, Bogdan was dissatisfied with the traditional research methods used by the older generation of plant systematists. Being familiar with contemporary botanical literature, he realized that modern taxonomy stood on a higher level than the orthodox approach then in use in Bulgaria. In his MSc thesis he consistently applied the type method and used the correct categories and terms (holotype, paratype, neotype, syntype) for the nomenclature of species and infraspecific taxa. He also studied species variability both in the wild and in cultivation, using biometric methods to characterize intra- and inter-population variability, etc.

The two then youngest botanists in the Institute, Stefan Kožuharov and Bogdan Kuzmanov, shared an obstinate drive, to introduce the most advanced methods of research into Bulgarian plant taxonomy, as witnessed by their common work "Biosystematic studies of the vascular plants" (1968).

From the very onset, Bogdan Kuzmanov had been invited join the team of authors of the *Flora na Narodna Republika Bălgarija*. His contribution to the 9 published volumes of this fundamental work concerns 18 families. He authored or co-authored (mostly with Jordanov, Kožuharov and, for *Mentha*, with the monographer Harley) the treatments of 105 genera, 380 species, 10 subspecies, 214 varieties and 80 forms of wild plants, plus 21 genera with 64 species of cultivated plants. He proposed new combinations or transfers in rank for 6 species, 14 subspecies, 34 varieties and 4 forms. In other words, his own or co-authored contributions make up for nearly 15 % of the genera and 13.8 % of the species treated so far in the *Flora*. Among the families for which he alone was responsible, one may mention the *Euphorbiaceae* and *Saxifragaceae;* examples of the larger and more critical groups are the caryophyllaceous genera *Arenaria* and genus *Minuartia*, treated jointly with Kožuharov.

Three difficult legume genera, *Genista, Chamaecytisus,* and *Vicia,* were worked out by Kuzmanov alone. They all show high morphological variability and reticulate patterns of relationship. In *Chamaecytisus* the classical species concept alone sufficed; in

Genista, species groups were used in addition; in *Vicia,* both species group and species complex were needed. Bogdan's treatments of *Genista* and *Chamaecytisus,* with their main centres of evolution in the Mediterranean area and on the Balkan peninsula, are essentially monographs and are highly valued as such by Bulgarian and foreign experts.

Kuzmanov planned a critical revision of volumes 1 and 2 of the *Flora,* already out of print. He co-authored a paper "The *Flora* of the People's Republic of Bulgaria: some problems of the edition", in which it is stated that one of the most common errors in projects of this kind is underestimation of the difficulties involved. Additional problems lie in the varying scientific background of project participants, in the historical background of Bulgarian botanical science, etc. The main chapter on "The concept of species and level of taxonomic detail", which concerns future work on the *Flora,* is still relevant today and gives valuable guidance both to experienced botanists and beginners.

For the purposes of this same *Flora,* a sizeable group of scientists, of which Kuzmanov was one of the most active, devised a phytogeographical subdivision of the country. Thanks to this scheme, shown as a map at the end of vol. 3 and subsequent volumes of the *Flora,* it became possible to present chorological data in a standardized format.

Kuzmanov's work on the Bulgarian flora brought him international renown. He was invited to join the *Flora europaea* Organization as regional adviser for Bulgaria, first (for vol. 2) jointly with Prof. Nikolaj Stojanov, then alone. He contributed the treatment of *Hedraianthus* to vol. 4 of that *Flora.* Upon invitation by the *Flora europaea* Steering Committee he participated in a postgraduate course in the United Kingdom and took part in most of the *Flora europaea* Symposia, including the final one.

By 1969 most of the leading botanists in Bulgaria had accepted the plan of compiling a chromosome atlas of the county's vascular flora. This plan was elaborated in detail in paper "On the project *A chromosome atlas of the vascular plants in Bulgaria*". Bogdan's cytotaxonomic research (carried out alone or in collaboration with other botanists) resulted in first chromosome counts for 26 taxa, e.g. *Chamaecytisus frivaldszkyanus, Genista rumelica,* and *G. subcapitata.* He contributed cytotaxonomic data for more than 410 species of 228 genera and 13 families, including 74 chromosome numbers new for Bulgaria and the description of 91 karyotypes.

Kuzmanov used a complex methodology in his studies, including comparative morphology, karyology, anatomy, and chemotaxonomy. An example of this approach is the collaborative work on *Tragopogon.* A taxonomic study was followed by work on the karyology and chemotaxonomy, after which some doubt persisted concerning the taxonomic status of *T. rumelicus, T. stribrnyi,* and *T. balcanicus.* The subsequent comparative biochemical study of their phenol components enabled a detailed understanding of the nature of these taxa and of their taxonomic relationship with *T. orientalis, T. latifolius,* and *T. crocifolius.* The results of the three methods combined led to a new taxonomic scheme, with the three first-named taxa each demoted to the status of a subspecies of one of the three latter.

A study of biogenetic processes of iridoids, combined with morphological and karyological data, enabled Kuzmanov and his co-workers to understand important evolutionary traits of *Plantago* on a global scale (1984). By comparative morphological, karyological and phytochemical studies on *Peucedanum,* they uncovered new aspects of its evolutionary strategy and differentiation in Bulgaria and on the Balkan Peninsula. In this

context one should mention Kuzmanov & Edreva's work "Chemotaxonomic research on Bulgarian leguminous plants". A comparative chromatographic study of the phenolic components of 39 species, 14 subspecies and 13 varieties of *Leguminosae* yielded additional, objective criteria for assessing the taxonomic relationship and degree of isolation of a number of critical taxa of *Chamaecytisus, Genista, Vicia,* etc. In collaboration with Bulgarian and foreign experts in various fields, Kuzmanov carried out chemotaxonomical studies on c. 160 species of 20 genera and 9 families.

In 1985 Kuzmanov defended his PhD thesis on the "Taxonomy and evolution of Bulgarian *Compositae*", on which he had worked for almost twenty years (1965-1985), using all available methods and techniques of taxonomy and biosystematics to reveal the basic patterns of evolutionary strategy of Bulgarian members of that family. If Kuzmanov had lived to see the taxonomic results of his PhD thesis published, his contribution to the *Flora na Narodna Republika Bălgarija* would have risen to 1150 species of flowering plants, of 180 genera and 19 families.

Among his many contributions preliminary to his PhD was the description of a new species, *Cirsium stojanovii* – an annual member of *C.* sect. *Eriolepis*. It has a limited distribution along the Black sea coast of Bulgaria (near the village of Vlas) and in the E. Rhodope mountains (between Krumovgrad and Momčilgrad), being a thermophilous, diploid grassland plant of the zone of mixed sclerophyll oak woods in the lowlands and foothills of S.E. Bulgaria. It should be looked for in the neighbouring areas of N.E. Greece and European Turkey.

During a field trip to the Ulu dağ in Turkey, subsequent to the Second International Symposium on the Problems of Balkan Flora and Vegetation, Kuzmanov discovered *Erigeron atticus* as a new member of the Turkish flora. Before, the species was only known from the mountains of S. Europe.

It is not possible to enumerate in full detail the scientific achievements of our colleague Bogdan Kuzmanov. They are laid down in more than 150 works and papers of which he is the author or co-author. Of these, 46 were published abroad, and 25 were presented at 25 international symposia and two International Botanical Congresses.

It was Kuzmanov's belief that modern methods should be used as widely as possible in plant taxonomy and evolution, and that the basic texts treating of these problems should published in Bulgarian translation. In 1968 Kuzmanov, together with Kožuharov, translated Stebbins's *Mutation and evolution in plants,* and few years later, Heywood's *Plant taxonomy*. The two of them were invited to act as national Bulgarian advisers for *Med-Checklist.*

Kuzmanov was one of the promoters of the "Plant Red Data Book for Bulgaria", and he published an article "About the Red Book of Bulgarian Rare Plants" expounding his views on its structure and contents. Although his ideas were not brought to bear on the book itself, his contribution to it was significant. He authored a number of entries and, besides, was an active member of the editorial board.

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