

AT THE BIRTH CENTENARY OF PROFESSOR NICOLAE BOTNARIUC

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Abstract. In the framework of the 22nd Edition of the **International Scientific Conference "Museum and Scientific Research"**, organized by the Department of the Natural Sciences Museum of Oltenia, Craiova, in collaboration with Dolj County Council (September 10-12, 2015, Craiova, Romania), the author proposes that the participants have a moment of meditation in honour of the birth centenary of Professor Nicolae Botnariuc - eminent representative of the Romanian biology. This is a particularly fortunate occasion to celebrate the centenary and to pay tribute to this remarkable scholar, as a sign of gratitude we bear, we - colleagues, disciples, friends, who form the scientific community studying the nature surrounding us, surveying the living world problems. The first part of the presentation is a chronicle of Professor Nicolae Botnariuc's life and work. The second part highlights certain aspects of the book "*Life in the Delta*" published by the Professor more than half a century ago, a book which has remained immortal, like many of the great naturalists' travel journals. The author of the presentation considers that "*Life in the Delta*" is a book revealing more than a real literary talent; it is more than a book popularizing science to young people. "*Life in the Delta*" is a book addressing all people, which introduces the reader with rare mastery into the paradise of scientific knowledge and makes him aware of the delta assets with tact and patience. It is a captivating book that challenges your curiosity and brings you closer to nature, which stimulates your mind to find out what is going on around us, wherever we are. "*Life in the Delta*" is equally a scientific treatise and a captivating literary work; it is like a "sheet for the mind, heart and literature" about nature. How inspired was the Professor and what a suggestive guiding principle he chose when he inscribed Charles Darwin's words as the motto of the work: "*I sometimes think that overall and popular presentations are almost as important for the progress of truth as original works*". The author concludes with a few quotations from "*Life in the Delta*", which are vivid illustrations of Professor Nicolae Botnariuc's remarkable scientific thinking.

Keywords: biological biography, Romanian Professor Nicolae Botnariuc, the Danube Delta, biodiversity, habitats and population descriptions.

Rezumat. La centenarul nașterii Profesorului Nicolae Botnariuc. În cadrul celei de a 22-a Ediții a **Conferinței Științifice Internaționale „Muzeul și cercetarea științifică”**, organizată de Secția de Științele Naturii a Muzeului Olteniei Craiova, în colaborare cu Consiliul Județean Dolj (10-12 septembrie 2015, Craiova, România) autorul propune participanților un moment de meditație în onoarea aniversării centenarului nașterii Profesorului Nicolae Botnariuc – eminent reprezentant al biologiei românești. Este un prilej deosebit de favorabil de a celebra centenarul nașterii și de a-l omagia pe acest remarcabil savant, ca semn al recunoștinței pe care i-o purtăm, noi cei care formăm comunitatea științifică a celor ce studiază natura care ne înconjoară - colegi, discipoli, prieteni. Prima parte a prezentării reprezintă o cronică a vieții și operei Profesorului Botnariuc. Partea doua a prezentării are în vedere sublinierea unor aspecte din cartea „*Viața în Deltă*”, pe care Profesorul a publicat-o cu peste o jumătate de secol în urmă, dar care a rămas nemuritoare, aidoma multor jurnale de călătorie ale marilor naturaliști. Autorul prezentării consideră că „*Viața în Deltă*” este o carte care evidențiază mai mult decât un real talent literar, este mai mult decât o carte adresată tinerilor și în care se popularizează știința. „*Viața în Deltă*” este o carte adresată tuturor, care te introduce cu o rară măiestrie în paradisul cunoașterii științifice, al expunerii și explicării acestuia, pentru conștientizarea cititorului, cu tact și răbdare. Este o carte captivantă care te reține la aflarea istoriilor până la capăt, care îți deschide curiozitatea și te apropie de natură, care îți stimulează gândirea pentru a afla ce se petrece în jurul nostru, oriunde ne-am afla. "*Viața în Deltă*" este, în egală măsură, un tratat științific și o operă literară captivantă, alertă; este parcă o „Foaie pentru minte, inimă și literatură” despre natură. Cât de inspirat a fost și ce principiu director sugestiv și-a ales profesorul luându-și ca motto al lucrării sale vorbele lui Charles Darwin: „*Mă gândesc uneori că expunerile generale și populare sunt aproape tot atât de importante pentru progresul adevărului ca și lucrările originale*". În încheierea prezentării autorul citează câteva fraze din „*Viața în Deltă*”, care reprezintă valoroase reflecții ale gândirii științifice a Profesorului Nicolae Botnariuc.

Cuvinte cheie: biografie biologică, Profesor Nicolae Botnariuc, România, Delta Dunării, biodiversitate, habitate și descrierea populațiilor.

In this traditional scientific meeting – The 22nd Edition of the International Scientific Conference "The Museum and Scientific Research", organized by the Department of the Natural Sciences Museum of Oltenia Craiova in collaboration with Dolj County Council (September 10-12, 2015, Craiova, Romania) I invite you to a moment of meditation in honour of the birth centenary of Professor **Nicolae Botnariuc** - eminent representative of the Romanian biology.

The Professor was a great man of rare modesty, a biologist from the gallery of the great personalities of the Romanian biology, an avid lover of nature, of the world of our waters.

Professor Nicolae Botnariuc has given us - students, colleagues, friends, admirers, a lesson of life, a lesson of work, a lesson of achievements in many directions:

- prodigious teaching and research career at the University of Bucharest and the Romanian Academy; formed many generations of students and doctoral students, trained biologists, to whom he delivered lectures with the latest information in the field;

- scientific activity carried out in several biological fields, interlinked by research (ecology of continental waters) by systemic concepts and methods applied in biology; his whole work has led to important generalizations in general biology, which contributed to strengthening modern evolutionary theory;

■ active supporter of systematic and modern taxonomy, correlating the morphological and anatomical study of species with the study of phylogeny and ontogeny, ecology and ethology, including the spatial distribution of species in the past and at present;

■ has contributed substantially to the protection and conservation of a rich range of natural habitats from the mountains to the Danube Delta, following the tradition inherited from Emil Racoviță, Grigore Antipa and Alexandru Borza.

On the occasion of the birth centenary of Acad. N. Botnariuc, the Department of Biological Sciences of the Romanian Academy organized at the Romanian Academy on the 12th of March 2015, the homage Session "**The Personality and Work of Academician Nicolae Botnariuc**", where the following presentations were made:

- **Acad. Cristian Hera:** Academician Nicolae Botnariuc - a great zoologist and biologist Romanian;
- **Acad. Maya Simionescu:** Prof. Nicholas Botnariuc - a life dedicated to the "science of life";
- **Prof. dr. Dan L. Danielopol:** The centenary of Academician Nicolae Botnariuc - an evocation of his scientific contribution to modern debates on evolutionism;
- **Prof. dr. Marian Traian Gomoiu:** Pages of Prof. Botnariuc opera - Delta fascination;
- **Prof. dr. Adrian Bavaru:** Effects of global warming on biodiversity;
- **Prof. dr. Octavian Popescu:** Pluricelularity in the frame of biological systems evolution - Acad. Nicolae Botnariuc vision;
- **Dr. Dumitru Murariu** - Biological sciences philosophy in the work of academician Nicolae Botnariuc.

Today, I would like to highlight some data which mark the great scientist's life and work, then we will have the pleasure to listen to the presentations of two distinguished colleagues who had the fortunate opportunity to be with the Professor every day in the unusual conditions of the first Romanian Trans-African Expedition, from Dakar to Mombasa (1970-1971):

- **Prof. dr. Coman Nicolae** - Remembering the first Romanian Trans-African Expedition (1970-1971);
- **Prof. dr. Neculce Dragoș** - Through Some forests in Africa, West India (Goa), the Caribbean and Central America, in the context of climate perturbations.

Prof. Nicolae Botnariuc - Biographical data and scientific work (the data are based on the literature – TATOLE, 2005; CONSTANTINESCU, 2010; NEGREA & NEGREA, 2010):

- born on **March 13, 1915** at Râșcani, Bălți, Bessarabia. Homeland on the Podolian Plateau, Răuț River Basin, was a real point of interest for the future scientist; the student was attracted by local fauna and also the rocks in the area;
- attended and graduated from "Ion Creangă" Râșcani;
- **1936-1938** - attended Bucharest Polytechnic School;
- **1942** - obtained the diploma, being a brilliant student at the Faculty of Natural Sciences of the University of Bucharest, which had a host of eminent professors, among them Ion Popescu Voitești (1876-1944), Ion Atanasiu (1892-1949) Andrei Popovici-Bâznoșanu (1876-1969), Gh. Th. Dornescu (1898-1980) and Constantin Motaș (1891-1980);
- **1943** - assistant at the Laboratory of Animal Morphology;
- **1946** - defended his doctoral thesis published a year later in "Notationes Biologicae" under the title "*Contributions à la connaissance des Phyllopoetes Conchostracés de Roumanie*";
- **1948** - published his „*Contributions à la connaissance du développement des Phyllopoetes Conchostracés*” in „Bulletin Biologique de la France et de la Belgique”; research focused on discovering and describing a **new type of larva**, which he called **heilophora**;
- **1948** - associate professor, then professor and head of the Department of Biology - a position he held until his retirement (1983); taught students the subjects General Biology and Ecology;
- **1962** - was appointed Dean of Biology - a position he held until 1972;
- **1942-1983**, performed a rich didactic activity, crowned with the success of his students, for whom he was a real mentor.

Through his activity at the Faculty of Biology and the Romanian Academy, Professor Nicolae Botnariuc also stands out as a genuine scientist:

- **1949** - became editor of the series "Fauna of Romania" of the Romanian Academy;
- **1964** - was appointed corresponding member of the Romanian Academy;
- **1976** - appointed Chairman of the Committee for the Protection of Natural Monuments, President of the Romanian National Committee for the "Man and Biosphere" Program, chief editor of the journal "Protection of Nature and Environment";
- **1970** - led the first Romanian scientific expedition across Africa (Botnariuc Nicolae, Dragoș Neculce, Nicolae Coman and Valeriu Cimpoeru), crossing 12 countries and travelling 18,000 kilometres;
- **1981** - active member of the "International Council for MAB / UNESCO Coordination Program";
- **1990** - full member of the Romanian Academy and Chairman of the Department of Biological Sciences for a term of four years. He was appointed honorary member of the Academy of Sciences of Moldavia;
- **2001** (October 17) - He was awarded the title of Doctor Honoris Causa of the University "Alexandru Ioan Cuza" Jassy.

In the field of zoology, Prof. Botnariuc, based on systematic and modern taxonomy, focused on crustaceans - conchostracea since faculty years (1941); together with T. Orghidan he finished the volume "*Phyllopoda*" in "Fauna of Romania" (1953) and published together with Victoria Cure the "*Manual of Chironomidae larvae Identification*"

(1999), organisms which play an important role in the trophic cycles of continental waters. It is worth mentioning his work on evolution, phylogeny and classification of brachiopoda, based on Henig's cladistic method (1980).

Professor Botnariuc's scientific interest focused on the ecological study of inland waters of Romania, especially the Danube Delta floodplain: regular waters population dynamics (1953) study of horizontal distribution of zooplankton in Tăul Șurianu (1954-1956) and hydrobiological study of Lake Gâlcescu (1957); Crapina-Jijila lakes (1956-1960), (1961-1975).

The work had as its area of interest, among others, primary plankton, macrophytes, bivalves and gastropods, energetic and trophic structure. Another noteworthy aspect was the development of concepts on hydrobiology as, for example, the index of transparency.

Through his research work, Nicolae Botnariuc has brought an important contribution to modern evolutionary theories.

Evolutionary biology was a constant area of interest for Prof. Botnariuc: issues of evolution, variability, the role of environmental factors and completeness in the living world being among the first studies of this type in Romania. Nicolae Botnariuc approached the general theory of systems, was concerned with the evolution of ideas in the field of general biology and the history of biology trends in Europe and America, focused on issues concerning intra- and inter-specific relationships between organisms and environment, the factors of species evolution, the organization of living matter according to the systems theory, the explanation of the adequate and adaptive nature of variability, the issue of hyperthelia, the integrality of biological systems, etc.

Selective publications referring to general biology:

- "The species problem and the discussion around it" (1957);
- "The idea of evolution in the study of living nature and the issue of evolution factors" (1960);
- "Some aspects of intra- and inter-specific relationships at animals" (1960);
- "The organization levels of the living matter" (1964);
- "Some theoretical aspects of completeness issue in biology" (1964);
- "Adaptation and fitness - essentially two particular biological phenomena" (1966);
- "General Principles of Biology" (1967);
- "The self-regulating nature of evolution" (1970);
- "Concept and systemic method in general biology" (1973, 1976);
- "General Biology" (1974 and 1982);
- "Evolutionism at the present time and in the future" (1980);
- "Some problems of current evolutionism" - reception speech at the Romanian Academy (1992);
- "Evolutionism at a deadlock?" (1992);
- "Evolution of supra-individual biological systems" (1999 and 2003).

In his work "*Evolution of supra-individual biological systems*", Professor Nicolae Botnariuc describes the interdependence of ecology and evolution, noting that in the evolutionary process there are two issues that arise *in the analysis of relationships between biological hierarchies - taxonomic and systemic*. The book abounds in the presentation of numerous fundamental concepts: knowledge of biological systems, self-organization, deterministic chaos, fractal nature, role of symbiogenesis in the evolution process, evolution as system assimilation, role of the intertaxonic relationships in the emergence and evolution of pluricellularity, evolution of populations in terms of organizational development, evolution at invertebrata and vertebrata, ecological succession, natural evolution, ecosystem process etc.

Starting with Professor Botnariuc's numerous statements, full of lessons and challenges, we could develop approaches. But as stated by Acad. N. Botnariuc in his reception speech at the Romanian Academy "*Some problems of current evolutionism*", "*now we avoid getting into older or newer traps posed by the controversial issues of theoretical biology*"... Let me quote a few statements from the Professor's work.

First, let me reproduce some general theoretical considerations from Professor Botnariuc's scientific work:

- "Evolution, strictly speaking, is characteristic of the systems at population level - species, entities, representing at the same time the focal point of selection".
- "Biocoenosis integrated into the ecosystem is the one that modulates the selection process in terms of the compatibility of population existence and of fulfilling its effective role in the transfer processes of energetic and informational material within the definite ecosystem in which they take place".
- "Given the well-established principle in the general theory of systems, according to which the whole is more than the sum of its components and the new, emerging features, characteristic of the whole, cannot be reduced to the subsystems attributes or to their sum, we can say that evolution and selection appear as emerging traits resulting from the interaction of systems at different levels (individual, population, biocoenotic) of the organizational hierarchy integrated into ecosystem structure".
- "Through its two-way characteristic, the transfer of inter-specific environmental information has a crucial role in the material and energetic transfer, and thereby, in the selection deployment (modulation). By phenotypes, there are selected the most appropriate genotypes to the given conditions and thus changes take place in intra-population

genetic information, leading to the transformation and divergence of populations. Thus, the transfer of environmental information becomes a way of transforming genetic information and the organization of the biocoenotic level system becomes a factor of transformation and genesis in taxonomic hierarchy".

■ "In the Darwinian concept, the evolution of species was the result of interaction between several factors, in a closely logical succession - variability, overpopulation, struggle for existence, natural selection - leading to species transformation. It is worth emphasizing the symbolic, metaphorical, sometimes declared character of some of these concepts. Overpopulation comprised the issues posed by population abundance and variation; the struggle for existence contained all relationships with the biotic and abiotic environment".

Prof. Nicolae BOTNARIUC - "*Life in the Delta*"

I confess that it was difficult for me to decide which book to choose out of the entire scientific work of Professor Nicolae Botnariuc, which includes over 150 works of fundamental importance. Finally, I chose "*Life in the Delta*", a jewel of writing, worth being in every home, worth being read by everybody, by people who share common concerns and interests, not only by biologists.

"*Life in the Delta*" is a book highlighting more than a real literary talent; it is more than a piece of writing which popularizes science to young people.

"*Life in the Delta*" is a real book which introduces the reader with a rare mastery into the paradise of scientific knowledge and, with tact and patience, makes him aware of the surrounding natural assets; it is a captivating literary book that urges us to be patient, to be close to nature, to think over what is happening around us, wherever we are.

It is a book that should be read by everyone; personally, I consider this book Professor Nicolae Botnariuc's spiritual Delta.

How inspired the Professor was and what a suggestive guiding principle he chose when he took Charles Darwin's words as a motto for his work: "*I sometimes think that general and popular presentations are almost as important as original works for the progress of truth*".

Quotations from the book "*Life in the Delta*"

■ "The book of nature cannot be easily read. It requires thorough preparation, patience, perseverance, imagination, passion and courage. These are not always enough. It requires the help of other sciences, technology, which provide the necessary means for research in biology".

■ "...The life of the Delta as a whole, as a unit, cannot be understood scientifically unless we know first the main elements that make up this whole ... We encounter delta plants and animals in many other places of the country and the world. But what is characteristic of our Delta are just the associations of such creatures (biocoenoses), the combination of their life together and in the climatic, hydrologic, geographic conditions of the delta. And these phenomena cannot be understood unless we know at least the most common creatures of the delta and how their life goes on".

■ "...The Delta is a special corner of nature, where in the endless combination of land and water, the lives of countless aquatic and terrestrial creatures intertwine through links infinitely complex".

■ "...The Delta, like any natural phenomenon cannot be understood and cannot be studied as it should be unless you look into its evolution and development, and all our evidence, all materials we collect must reflect this process. So, in order to gather our evidence - chemical, biological, hydrological - we must choose the places, moments, conditions generally the most characteristic, the most significant for the evolution process of the delta. Then, the link between them will become clear and this will be the very link between the parts of the delta in evolution".

■ "...The associations of creatures (hence the biocoenoses) were formed during their long history by mutually adapting to one another. This adaptation is so strong that these species have become necessary to each other".

■ "...Of all the ties that bind together the creatures of a biocoenosis, the most important are those where each individual ensures its food - so food ties... an immutable law prevails in nature - each species lives at the expense of other species. This law is sure to reign in the Delta too; so, knowledge of feeding links is of utmost importance. It not only reveals the links between living creatures, sometimes completely unexpected links, but also gains some aspects of great practical importance to people".

■ "...Predatory fish and ichthyophagous birds depending on life, place and other conditions have specialized in the destruction of non-aggressive fish at different moments of their ontogeny, in certain proportions, at certain ages, for certain species, for different physiological states of non-aggressive or predatory species. It is a mechanism of smoothness, precision, flexibility and complexity that man cannot achieve under normal conditions".

■ "...The Delta creatures should not be assessed by people only by their direct role in economy. We must look into their mutual links, their links with the environment, their needs, and then even insignificant species in the delta life... become interesting and important through their role as 'indicators' of water health".

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