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ZOOLOGY IN POLAND: YESTERDAY, TODAY AND TOMORROW – INTRODUCTION

I am pleased to introduce the readers of “Kosmos” to this special issue devoted to zoology in Poland. According to an encyclopedic definition, “zoology” is the study of animals, their life and construction, embracing different biological fields, e.g., systematics, zoogeography, paleozoology, and physiology. Admittedly, this definition is unusually broad, thus allowing the selection of very diverse articles. Equally diverse is the scope of this very issue of “Kosmos”.

In the first article, JERZY PAWŁOWSKI presents a brief description of the development of zoology in Poland. The time-frame covers the period from 11–15th centuries (remarks in medieval chronicles and in the lists of medicaments) to the 2nd half of 20th century. It is worth remembering that the beginning of modern zoology dates back to 1758, i.e., the year the tenth edition of *Systema naturae* by Carl Linnaeus was published. Linnaeus was the first to create a system for classifying organisms using “binomials” (composed of the generic name followed by a specific epithet). This classification system formed the basis of contemporary taxonomy. In our country the symbolic beginning of modern taxonomy begins with a dissertation by Paweł Czenpiński, defended in 1778, which was aimed at popularizing Linnaeus’ system within the scientific community.

Animals inhabit various, sometimes surprising environments. MACIEJ LUNIAK’s article familiarizes us with the faunistic diversity of a large city, using Warsaw as an example. A little known fact is that, in terms of completeness of knowledge, especially with regards to invertebrates and birds, the fauna of

Warsaw represents one of the best studied city faunas in the world.

JERZY M. GUTOWSKI introduces us to the world of saproxylic beetles, which are dependent on dead wood or on other organisms related to dead wood. It turns out that these beetles are very numerous, more abundant than we usually assume, and of great importance, being essential and irreplaceable elements of the ecological equilibrium.

Mechanisms controlling the functioning of organisms are topics of the next three articles. PAULINA A. SZAFRAŃSKA, KAROL ZUB and MAREK KONARZEWSKI present interesting deliberations of factors determining variations in body size of weasels (*Mustela nivalis*), the smallest representatives of the order Carnivora. Thanks to elongated body shape, weasels became the most efficient predators hunting small rodents. Perhaps the hunting efficiency of weasels also contributes to their evolutionary success – at present they belong to mammal species with the largest geographical ranges.

From the article of ANDRZEJ DYRCZ and MARTA BOROWIEC we learn how behavioral ecology (sociobiology) explains diversity and complexity of avian mating systems. According to the authors, monogamy perhaps is not the most primeval reproductive system. Although the majority of bird species are socially monogamous, birds in this respect are rather an exception. It seems that the simplest explanation for origin of monogamy in birds is the necessity to both sexes to cooperate in rising chicks. Nevertheless, it turns out sometimes that offsprings of a species previously thought to be monogamous, have

more than one father and, more rarely, more than one mother (because of dumping eggs by female to other female's nest).

Another aspect of life history of birds is presented by AGNIESZKA OZAROWSKA. Her article is about using orientation cage tests to study directional preferences of birds migrating at night. These examinations are exploiting the migratory drive of birds kept in the captivity (in scientific literature often known as Zugunruhe), what is manifested among others by increased motor activity and intense attempts to take flight. It turns out that orientation cage tests can substantially supplement our knowledge about migrations of bird and that Polish scientists have made significant contributions to this field. Thanks to experimental observations we may soon possess large data sets, which would take many years to collect under natural conditions.

The next three articles exploit the newest techniques of molecular biology. In the first AGATA KAWALKO and JAN M. WÓJCIK write about speciation, that is the evolutionary process by which new biological species arise – in fact, it is a central problem in evolutionary biology. Their deliberations mainly concern two closely related subspecies of the house mouse: *Mus musculus musculus* and *M. m. domesticus*. Although they diverged at least 350 thousand years ago, these taxa have formed secondary contact and hybrid zones, making them valuable for studying isolating mechanisms.

The article by MARTA GAJEWSKA and WIESŁAW BOGDANOWICZ focuses on the deoxyribonucleic acid (DNA) of extinct species of animals. The work with ancient DNA poses greater technical problems than the work with contemporary material. The content of ancient DNA in a studied sample is usually very small, moreover, it is most often highly degraded. Nevertheless, thanks to analyses of ancient DNA we can almost touch evolution and look at fossil species and their populations. We can also assess the influence of climatic changes, the fragmentation of the environment or finally the human impact on individual species of plants and animals in the distant past. Research of this type certainly permits a better understanding of the history of contemporary world, and also provides insights for the future – supporting actions, of which preservation of the environment and its resources is a target.

With a review of advances of genetics and population genomics we can acquaint

ourselves in the article by MIROSLAW RATKIEWICZ. One should expect that applying new methods of molecular genetics and technological progress will create new perspectives in ecology and evolutionary biology. These advances permit also a better understanding of evolutionary processes having an effect on the genome within the given species. This in turn will provide credible information about historical demographic changes and the phylogeny of examined populations, and will provide insight into mechanisms of adaptation to diverse environmental conditions. There is also a huge need for outlining areas of high genetic diversity and pointing out evolutionary significant units – at least for rare and endangered taxa.

The subject of the article closing the issue, by EWA J. GODZIŃSKA, deals with social neuroscience, a newly arising scientific discipline placing emphasis on analysis of the interdependence between the social milieu of the individual and its nervous system. Social neuroscience is using the entire spectrum of research methods, grasping techniques based on classical neurophysiology and ethology, and the newest molecular and noninvasive techniques for examining activities of the brain. An example of such work includes research on the neurobiological basis of social bonding in ants or the neurochemical bases of the monogamy of American voles of the genus *Microtus*.

I hope that this short selection of very diverse articles provides the readers with at least a very basic information about an impact that Polish scientists have made on the comprehensive field of zoology. It is momentous that human beings obtain a better understanding of this very fascinating world. "Kosmos" – the magazine, which is celebrating its 130th birthday – has provided a very important service in educating several generations about the world in which we live. I would like to use this opportunity to wish the Editorial Board of "Kosmos" happy 130th anniversary and many, many more anniversaries! I would also like to thank all authors for the positive reply to my request for manuscripts, whereas reviewers are acknowledged for their anonymous work, suggestions and thorough remarks.

