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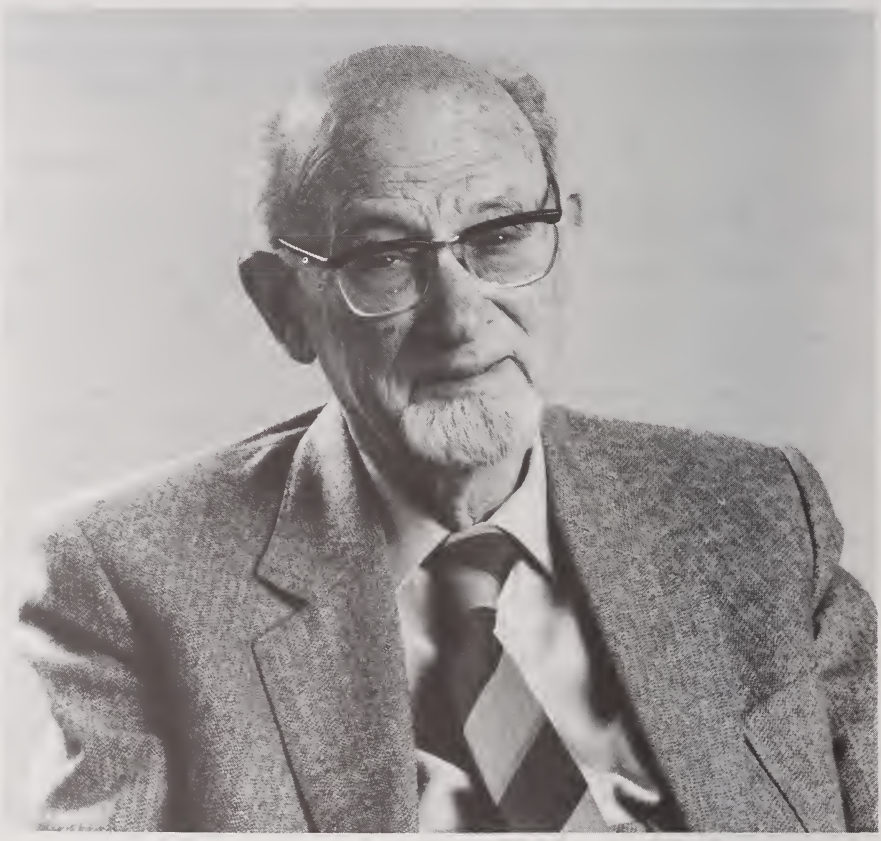
Zdravko Lorković (1900–1998): short biography and scientific work



Zdravko Lorković was an eminent biologist in world terms and one of the greatest in Croatia in the 20th Century. He was an entomologist and lepidopterist, taxonomist and ecologist, a geneticist and experimental biologist; and, an expert in all these fields. He was born in Zagreb, Croatia and spent the whole of his life there. He studied Natural Sciences at the Faculty of Philosophy, University of Zagreb, then became assistant in the

Mineralogical and Petrological Museum, under Professor F. Tućan, and later assistant at the Biological Institute of the Faculty of Medicine under Professor B. Zarnik. He received his Ph.D in 1928 and was for many years Professor of Biology at the Medical and Veterinary faculties. At the same time he taught zoology and entomology to students of the Agriculture and Forestry Faculty, and genetics to students of the Natural Science Faculty and to post-graduate students of the University of Zagreb. From 1965 he was a regular member of the Yugoslav Academy of Sciences and Arts (now, the Croatian Academy of Sciences and Arts). He was a member of the Zoological Academy in Agra (India), the European Lepidopterological Society, the Lepidopterists' Society of the USA, the Entomological Society of the Kingdom of Serbs, Croats and Slovenians, the Yugoslav Entomological Society, the Croatian Entomological Society and the Croatian Biological Society. He was, for many years, the chief editor of the journal *Acta entomologica jugoslavica* and during the last years of *Entomologia Croatica*. He was also on the editorial boards of the journals *Genetika, Periodicum biologorum, Natura Croatica* and *Shilap*. He published 86 scientific papers (including three important summaries of congress reports), and more than 50 professional papers, congress reports and obituaries.

For many Holarctic lepidopterists Lorković was, above all, a highly respected taxonomist (Lorković, 1927, 1930–31, 1938, 1943, 1950, 1953c, 1955c, 1960, 1967, 1968, 1969, 1976a, 1985, 1989b, 1993a, 1998). As a butterfly specialist, especially in Pieridae, Lycaenidae and Nymphalidae (incl. Satyrinae), he described several new butterfly species, namely *Leptidea lactea* Lorković, 1950, *Erebia calcaria* Lorković, 1953, *E. nivalis* Lorković & de Lesse, 1954, *Pieris (napi) balcana* Lorković, [1970]. He also described many subspecies, for example, *Cupido argiades tibetanus* Lorković, 1943, *Erebia styx trentae* Lorković, 1952, *E. gorge vagana* Lorković, 1955, *E. stirius kleki* Lorković, 1955, *Leptidea reali melanogyna* Lorković, 1993. In making taxonomic revisions, before the advent of modern sophisticated computer methods, he established the foundations of distinguishing among closely related and phenotypically similar species. He did so by identifying discontinuities arising from the correlation of inherited qualitative and quantitative characteristics (Lorković's method

with estimation of total and partial transitions; Lorković, 1927, 1928, 1943) generated by reproductive isolation. At the same time, he recognised the taxonomic importance of morphological differences in non-functional parts of organs (Lorković, 1931, 1953a, 1955a).

Professor Lorković was one of the pioneers in the experimental investigations of phenotypic plasticity of butterfly pupae (Lorković, 1929a) and of seasonal polyphenism among butterflies in the temperate zone (Lorković, 1929b). From the time of his dissertation onwards, he devoted practically the whole of his life to the study of speciation. From the very onset of his scientific work, it was clear that he supported the idea of evolution accepted in its entirety today. He was cited by evolutionist Ernst Mayr himself (1963) as author of a classic example of a complex morphological, genetic and ecological analysis of sibling species of butterflies of the genus *Everes* (= *Cupido*). In this work, dating from the first half of the 20th Century (Lorković, 1928, 1938, 1942, 1943), he gave firm support to the biological species concept. Professor Lorković was one of the pioneers of cytotaxonomy, and was the first to report the number of haploid chromosomes for more than 60 species of Palaearctic butterflies (Lorković, 1941, 1952, 1966, 1968). He was the founder of the hypothesis that through diffuse kinetochore-induced ploidy the appearance of exceptionally large (*Leptidea, Polyommatus*) or small (*Erebia*) numbers of chromosomes in butterflies could be explained (Lorković, 1941, 1949). His great knowledge of butterfly chromosomes and their meiotic behaviour (Lorković, 1974a, 1978) resulted in his being entrusted with the writing of a special chapter about chromosomes and their role in systematics and phylogeny in the book *Introduction to Lepidopterology* (Lorković, 1990) from the series of monographs *The Butterflies of Europe*.

Professor Lorković introduced new methods of artificial butterfly copulation (Lorković, 1947, 1953a), thereby increasing the experimental knowledge of phylogenetic relationships and the pathways of microevolution in butterflies (Lorković, 1978, 1997). In so doing, he demonstrated that, in nature, speciation occurs in different guises. Two of Lorković's examples are of special interest. The *Erebia tyndarus* group and the *Pieris napi* aggregate

illustrate taxa that have only partially undergone the process of differentiation through reproductive isolation into new species (Lorković, 1953b, 1953c, 1957, 1958b, 1962b. 1989a). For such taxa, he accepted and modified Mayr's definition of the concept of *semispecies*, and urged that the *semispecies* category be accepted in international rules of zoological nomenclature (Lorković, 1955b, 1958a, 1962a; Kiriakoff & Lorković, 1958; Lorković & Kiriakoff, 1958). This was eventually accomplished in nomenclature rule Article 6(b) for members of the *aggregate* (= Mayr's term 'superspecies') of *species* or *subspecies within a species* (ICZN, 3rd ed., 1985). He also recognised the independent existence of different reproductive isolation mechanisms (Lorković, 1958b, 1961b, 1978), and proved their independence of total genetic diversity (Lorković, 1986).

Professor Lorković bequeathed a collection of about 40,000 butterflies to the Croatian Natural History Museum in Zagreb. Half of these comprise a faunistic collection, mostly from the neighbourhood of Zagreb and from Mt. Velebit in Croatia, as well as from the Alps and the high mountains of the western Balkans. Half are specimens from crossing experiments (mainly between Pieridae from Europe, and with taxa from Asia and North America). Preserved with them is their documentation. The collection is kept as a special unit, with his microscope slides, library, letters, photographic documentation, diaries and notes in the Croatian Natural History Museum in Zagreb, where offprints of his papers can be obtained. (e-mail: Martina.Sasic@hpm.hr).

Chronological list of publications (co-)authored by Zdravko Lorković

1. Lorković, Z., 1923. Contribution to mineral deposits of Yugoslavia. — *Glasn. Hrvatsk. Prir. Društva* 35(1–2): 17–20 (in Croatian).
2. Lorković, Z., 1927. *Leptidea sinapis* ab. *major* Grund als selbständige Art aus Kroatien. — *Glasn.ent.društva kr.Srba, Hrvata i Slovenaca.* 2(1): 26–41, 2 Taf. (in Croatian, with German summary).
3. Lorković, Z., 1928. Analyse des Speziesbegriffes und der Variabilität der Species auf Grund von Untersuchungen einiger Lepidopteren. — *Glasn. Hrvatsk. Prir. Društva* 39–40: 1–64, 2 Taf. (in Croatian, with German summary).
4. Lorković, Z., 1929a. Gesetzmessigkeit in der Faltergrösse der jahreszeitlichen Generationen. — *Glasn. Jugoslov. Ent. Društva* 3–4(1–2): 109–116 (in Croatian, with German summary).

5. Lorković, Z., 1929b. Unterschiede zwischen homo- und heterodynamer Entwicklung bei den Insekten. — *Jahrb. Univ. Zagreb*: 283–297 (in Croatian, with German summary).
6. Lorković, Z., 1930. *Dasychira grundi*, eine neue europäische Art. — *Verh. zool.-bot. Ges Wien* 80(1–2): 5–11.
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