

A critical review of prof. V. A. Kunakh's monography «Mobile genetic elements and plant genome plasticity»

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In 1984 R. B. Khesin published a summary of the capital «Inconstancy of genome», which dramatically altered the traditional mentality of the vast majority of geneticists in Russian-speaking territories. In this book, R. B. Khesin expanded the meaning of the term «genome», meaning by it (for eukaryotes) the totality of nuclear and cytoplasmic DNA and RNA carriers with localized genetic elements in them, including some functional (epigenetic) relations between these elements. In other words, the term «genome» refers to all the hereditary system of cell. The terms «genome» and «genotype» became in this extended sense semantically close, partly even synonymous. This is true scope of the term «genome», in instability of which significantly contribute transposable elements.

In 1951 B. McClintock published in the works of the most authoritative Symposium (Cold Spring Harbor), the results of her 6-year-old works on mobile elements (jumping genes). These works, however, were not accepted by the genetic community. Authoritative summary by A. Stertevant, published in 1965, even doesn't mention the work of B. McClintok. Only in the 70s of last century it became clear that the discovery of the mobile elements is one of the main directions in the establishment of the destiny of modern genetics.

Were discovered two classes of mobile genetic elements (MGE) – retrotransposons and DNA transposons. Basic experimental studies were conducted on the classical objects of genetics – *Drosophila* and *Arabidopsis*. Thus, in the Institute of Cytology and Genetics of Siberian Branch of RAS contributions of transposons in increased activity and, hence, the magnitude of quantitative traits was successfully studied in *Drosophila* by V. A. Ratner and L. A. Vasilyeva.

Until today the need for a summary of capital on the role of MGE in the adaptation and evolution of plants was acutely felt. And finally, such book was published. It gives the volumetric proportions of the MGE in the genomes of plants, the history of the discovery and study of the MGE. The mechanisms of MGE and the reasons for their transposition, the details of their structure, evolution, biological significance and practical value were described. Proofs of multiple functions of MGE in cell regulation and evolution of the genome size, its structure and plasticity were provided. The role of MGE in mechanisms of higher plant adaptation, at both the individual and the population levels was shown. It is assumed that invasion of MGE and their further amplification is one of the principal factors forming, ensuring adaptation to variations of the environment, and in some cases leading to a rapid adaptation to new environments.

Monography by V. A. Kunakh has a wide coverage of plant MGE problems, exhaustive analysis of the majority of the principal publications on this issue (704 sources in the bibliography), logical presentation, good, strictly scientific (but affordable) language.

This valuable book should be translated into Russian and English – it will be very useful for a wide range of professionals both in Russian and in English-speaking countries. It adequately demonstrates the high level of Ukrainian plant genetics.

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