

THE INVOLVEMENT OF DEUTERIUM PRESENCE IN THE *Drosophila melanogaster* EVOLUTION I. EFFECTS OF DEUTERIUM CONCENTRATIONS UPON THE *White* (w^{1118}) GENOTYPE

Gallia BUTNARU^{1*}, Ioan SARAC², Sorina POPESCU³,
Gheorghe TITESCU⁴, Diana COSTINEL⁵

Abstract: To determine the action of different deuterium concentrations on the phenotype of *drosophila* individuals, the w^{1118} genotype was used over 5 generations. D concentrations ranged from 30ppm up to 24.22% [1%= 1,000ppm], creating 6 gradients. The observation has been done at: female prolificacy, larvae motility, pupation height, number of female and male adults and finally sex ratio was establish. The obtained data were statistically processed. Generally the low percent of D (30ppm) improved the average lifespan of descendants and had a favorable effect on all their developmental traits. Compared to the control (140ppm) the reaction of the individuals was divided into 3 groups: - significantly better than it when the amount of D was small (30ppm); - significantly lower if the concentration of D was high (24.22%) and - higher than the control, but without statistical assurance, at all other concentrations. If in larvae and adults the amount of D was unexpectedly high in the DNA the amount of D remained at the natural state as in control.

Keywords: Deuterium, *Drosophila melanogaster* w^{1118} genotype, phenotype reaction.

1. Introduction

Environmental factors as well as hydrogen isotopes can significantly affect the organism biological parameters [18]. The water is an interchangeable mixture of hydrogen and oxygen isopologues. The hydrogen-related isotopologues are: *light water* or *normal water* (H_2O), *semi-heavy water* (HDO), *heavy water* (D_2O), and *super-heavy water* or *tritiated water* (T_2O) [25]. The oxygen isotopologues of water are light and heavy ^{16}O and ^{17}O & ^{18}O respectively [10]. Their peculiarities are used as marker for authenticity of food and other economic purposes [9]. The ratio of D/H in water shows substantial geographical variation, which could affect the plants and animal's evolution [4]. The spatial isotopic distribution in tap

¹Prof. Emeritus Senior Researcher Ph.D. Eng., Banat University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara, Romania, Full member of Academy of Romanian Scientists, (e-mail: galliab@yahoo.com) *.

²Assoc. Prof. Ph.D., Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timișoara, Romania (e-mail: ionutsarac@yahoo.com)

³Prof. Ph.D., Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania" from Timișoara, Romania (e-mail: biotehnologii_usab@yahoo.com)

⁴Researcher, Ph.D., National Research and Development Institute for Cryogenic and Isotopic Technologies - ICSI Râmnicu Valcea, Romania (e-mail:titescu@icsi.ro)

⁵ Researcher, Ph.D. Physicist, National Institute of Research and Development for Technology Cryogenics and Isotopic Technologies – ICSI Râmnicu Vâlcea (e-mail: diana.costinal@icsi.ro)