Investigation of the Bifurcation Properties of the Dynamics of a Biological Population Based on a Logistic Model

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Abstract. The paper substantiates the structure of the model that describes the dynamics of subpopulations in the general ecological niche. Based on the theory of bifurcations, the results of experimental studies of the effect of excess electromagnetic radiation of worn out or repaired electromechanical equipment on biological objects are analyzed. Analysis of phenotypic changes in the biological test object of Drosophila melanogaster, identified over three generations, based on the bifurcation model, made it possible to identify trends in long-term forecasts, which are in good agreement with the known results of population development in unfavorable conditions.

Keywords: Logistic model · Subpopulation · Theory of bifurcation · Electromagnetic field · Biological test-object · Teratogen · Anthropogenic factor · Phenotype

1 Introduction

Anthropogenic pressure leads not only to a global deterioration of the ecology of the environment, but also to an increase in the number of pathologies of biological objects (a decrease in the level of immunity, a deterioration in reproductive function, etc.). Under conditions of instability of environmental factors, mosaic nature of species ranges, the genetic heterogeneity of species and separate populations increases significantly. The specificity of such a situation must be taken into account during planning nature conservation measures, conducting environmental monitoring, and solving problems of predicting the future state of populations. It is extremely important to study the level of genetic heterogeneity of the human population. The accumulation of pathological recessive genes can be latent for a long time, and from a certain moment it can reveal in the form of a rapid increase in the incidence of certain hereditary diseases. The

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