

LEUKOCYTIC INDICES AND MICRONUCLEUS
IN ERYTHROCYTES AS POPULATION MARKERS OF THE IMMUNE STATUS
OF *PELOPHYLAX RIDIBUNDUS* (PALLAS, 1771) (AMPHIBIA: RANIDAE)
LIVING IN VARIOUS BIOTOPIC CONDITIONS

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A differentiated assessment of blood cells and micronucleus species in the erythrocytes of marsh frogs (*Pelophylax ridibundus*) living in reservoirs of the Nizhniy Novgorod region and differing by origin, morphology and chemical composition was performed. Specific abiotic conditions (a peat bog) and anthropogenic load led to the most expressed change of the leukocyte composition of the blood, corresponding to the neutrophilic type of leukemoid reaction and an increased fraction of micronucleus in the erythrocytes. A moderate positive correlation was found between the increase of the number of disintegrated micronucleus ($r = 0.72$, $p = 0.0179$) and the content (mg/l) of nitrites in the reservoir. The complex action of chemical pollutants of technogenic origin in high concentrations (copper, chromium, and oil products) caused activation of the erythropoiesis process and tension of the humoral immunity link, which was confirmed by the nature of leukemoid reaction of a lymphatic type. The cellular and humoral forms of immune reaction, directed to own-foreign molecule differentiation, provided stability of the ontogenesis of frogs under the anthropogenic press. Integral leukocyte indexes: the blood and cellular indicator, the neutrophil-lymphocyte ratio, the lymphocytic-granulocyte index and the index of leukocyte shift, which reflect the level of the body's general reactivity can be considered as population markers of the immune status of amphibians.

Key words: *Pelophylax ridibundus*, micronucleous, immune status.

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