I. V. Stefurak, Yu. P. Stefurak, M. V. Pasailyuk. Natural resistance of Hutsul horses from the Pokuttya Carpathians

Introduction. Carpathian Mountains are a place which favoured formation of the main breed characteristics of Hutsul horses. We think different climate conditions influence to the isolated populations of Hutsul horses. It is reflected at the level of horses' adaptation to changing environmental conditions by different reactions in contact with pathogens.

Differences are expected for the bactericidal properties of blood serum of Hutsul horses living in the conditions of high mountains, middle height mountains and the pre-Carpathians.

Therefore, the aim of this study was to explore indicators of nonspecific resistance of the organism of Hutsul horses living in the conditions of high mountains of the Carpathians, the middle height mountains of the Carpathians and the pre-Carpathians.

Materials and methods. The blood samples of healthy Hutsul horses living in the conditions of high mountains of the Carpathians, the middle height mountains of the Carpathians and the pre-Carpathians were studied. To assess the status of horses morphological and biochemical indicators of blood were studied. Peripheral blood samples were selected from horses before early feeding by puncture of the jugular vein according to the standard technique into test tubes with anticoagulant (10 IU/ml) and without it. To obtain serum the blood samples were centrifuged. To study the resistance of animals in the whole blood the index of completed phagocytosis (ICF) was determined, in the serum of blood bactericidal activity (BABS), lisozyme activity (LABS), total protein and its fractions were determined. To determine lisozyme and bactericidal activities culture of *Micrococcus lisodecticus* ATCC 10240 та *Bacillus subtilis* ATCC 6633 was used respectively.

Statistical processing of the results was conducted according to the procedures of G. F. Lakin using Microsoft Excel software.

Results and discussion. Exploring the parameters of nonspecific resistance of the organism of Gutsul horses from different climate zones, differences were revealed for cellular immune parameters depending on the localization of the horses. For individuals living at altitudes of 1600 meters above sea level the index of completed phagocytosis was lower. The bactericidal and lisozyme activities of blood serum were lower for horses living in highland, than for horses in pre-Carpathian region and the middle height lands. These facts suggest the view that the nonspecific resistance intensity is lower for natives of the mountains as compared with animals, whose habitat is limited to the terms of the pre-Carpathians and middle height lands.

The protein fractions content from blood serum of horses is typical. So, deviations from the norm of the total protein were not revealed, however, difference in the percentage content of protein fractions was noticeable. For animals of middle height lands, and from the pre-Carpathians, in contrast to animals living in highland, the content of albumin and α-globulins was higher but content of γ-globulins was slightly reduced.

Fractional composition of proteins from the blood serum is a diagnostic indicator of the animal organism. The higher content of albumin fraction is indicator of the more stable organism to changing conditions, i.e. its adaptive capabilities are

better. Thus, horses living in the middle height lands and the pre-Carpathians are better adapted to changing environmental conditions than their highland relatives.

On the other hand, the increased levels of γ-globulin in highland Hutsul horses are indicator of compensatory mechanism of nonspecific protection in the organism, especially on the background of lower indicators of cellular immunity and nonspecific humoral factors. At the same time, in this group of horses the level of α-globulin was low relatively. It is evidence of pathological state absence in organisms of the experimental animals, as proteins of this fraction are the informants of the stressful situation intensity and probable inflammation in a body.

It is known that levels of some blood components depend on height above sea level. We have shown that for the horses living in the pre-Carpathians and middle height lands the characteristic of protein content is similar, but for the representatives of highland the difference in the same indicators is statistically significant.

Analysis of the cellular and humoral factors of nonspecific resistance showed weaker intensity of the indicators in the horses from high altitudes. Trend to increase of indicators was at horses living in middle height mountains, and the highest was at horses from the pre-Carpathians.

Conclusions. It is established the nonspecific resistance indices of an organism in the Hutsul horses depend on localization of individuals above sea level. So, the intensity of nonspecific resistance of an organism in the animals kept under conditions of the Carpathian highlands is lower as compared with animals, whose habitat is limited to the terms of the pre-Carpathians and middle height lands. These representatives have lower level of ICF, BABS, LABS, α-globulin. Also the level of γ-globulins is the highest compared with the Hutsul horses from the Carpathian Mountains and middle height lands and that may be a trait of compensatory mechanism of nonspecific protection of an organism.

The indicators of nonspecific resistance of an organism show a similar pattern for representatives from pre-Carpathians and middle height lands, statistically significant differences are noted only for LABS, which is higher in horses living in the pre-Carpathians.

Keywords: **Hutsul horses, the pre-Carpathians, middle height mountains, highland, index of phagocytosis completeness, bactericidal activity of blood serum, lysozyme activity of blood serum, content of proteins**