

PHYSIOLOGICAL STATUS OF LIVE-STOCK UNDER THE INFLUENCE OF ABIOTIC ENVIRONMENT FACTORS

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INTRODUCTION

During last fifteen years, the ecological state of the environment became worse, especially on a large area of the western region Ukraine. Based on the facts of the scientists, the quantity of toxic substances, which come into environment, was exceeded four hundred thousand names. The considerable widening of network of industrial enterprises, the increase quantity of dumps and shaft storehouse, using mineral fertilizer, herbicides and other chemical pesticides in excessive quantities. After the accident at Chernobyl AES, wide territories of Ternopil, Rivno and Volyn regions had suffered the pollution from 1 to 15 ki/km² by cesium – 137. Only in Volyn region, 167 populated areas had suffered such pollution, where 144188 of adult population and 46014 children were lived.

During last ten years, live-stock branch, especially cattle-breeding had suffered the decline. There are quite a number of reasons for that. They are – crossing period, change of property form, break down of collective economies, the unsuccessful attempt to change dairy live-stock into meat live-stock at polluted territories, mass rejection of live-stock, especially in many economies of Woodlands. Black-Polish stock was usually bred in this region, but now this breed is the most popular during last 10–20 years, which is adapted to the local conditions very good, and therefore it merits for saving [1, 2, 3, and 4].

But the indices of the productivity of this breed are very low in many economies as in Woodlands as in Lviv region.

Comparing three economies, the lowest milk productivity (during four years) was in cows from CAE “Galuzia” – 965 kg, a little higher from CAE “Svitanok” and the highest from JSC with Ltd. “Zvenyhorod” – 1740 kg. The birth-rate of calves from one hundred cows and heifers was low, and the most of newborn calves were hypotrophies.

And just these facts indicate that cows from these economies are not quite well. The reasons of low indices of productive and reproductive characteristics of these animals we should search for among the factors of the environment, because some of them have injurious action.

During the experiments, directly at live-stock farms, it is impossible to select the action of one factor on the organism. As a rule, they have complex influence on the organism, moreover, the action of one negative factor is frequently intensified by the other. And, as a rule, it takes place because of the deficiency of technological order, among their number is hypodynamia, non-balanced rations for lack of forage and their low quality (Zubets M.V., 2000), unilateral nourishment with a sort of fodder and others. The action of radioactive irradiation, such as toxic chemicals, deficiencies in feeding and keeping, have a harmful influence on the blood-forming organs, immune prevention and animals ability to reproduce.

MATERIALS AND METHODS

Taking into account all high-mentioned thoughts, the purpose of our investigations dealt with the studying of the interior peculiarities of the live-stock organism of Black-Spotted breed by the influence of combined action of unfavorable (ecological, climatic and technological) factors of the environment on exterior indices, morphological and biological content of blood and their changes depending on seasonal and climatic conditions.

It was determined that based on unfavorable factors of the environment, which had a regular influence on animals organism in the economies where the investigations were done, were approached to a certain extent but had different strength. For the most economies the most powerful source of environment pollution was and is still regular, in small doses, ionized reaction: on the territory of CAE “Prominj”, “Majak” and “Nadsluchanska” of Rivne region and “Zbruch” and “Majak” of Ternopil region from 1 to 15 Ki/km², “Galuzia” – from 1 to 5 Ki/km², “Svitanok” and Volynj pedigree association – to 1 Ki/km². The territory of the rest economies refers to a conditionally clean zone.

Hygienic conditions of animals, including the main parameters of microclimate in rooms were satisfactory. In summer, cows were pastured in the pasture-grounds, in winter they were kept on a leash, and bulls were kept in boxes without leash during a year. Animals providing with fodder didn't correspond to hygienic and feeding norms at the most farms. Ration supplying with fodder units for cows in some economies was only 63 per cent concerning needs, digestible protein – 54 per cent, sugar – 34 per cent, phosphorus – %:%, carotene – 32 per cent and some microelements from 25 to 50 per cent. Systematic moving from machine milking to hand, non-rhythmical serving of feed to farm and other violation of technological order were constantly active stressors except long-term hypo dynamics.

Therefore, the conditions of animals keeping and feeding at farms didn't correspond to the physiological needs of organism.

RESULTS AND DISCUSSION

All unfavorable factors of the environment which were active during long period of time and were the cause that after the hibernation, no economies had cows, which living mass didn't correspond to the standard demands for Black-Spotted breed. Cows from JSC with Ltd.”Zvenyhorod” had the biggest living mass – 431,8 kg and the least – 347,3 kg from CAE “Galuzia”. All cows were undersized. Comparatively to the standard, all animals had higher index of long-leg, especially in cows from zone which is polluted with radionuclide. All animals had dramatic reduced overall size.

This information testifies dramatic decrease of meat quality of cows. But combined action of unfavorable factors of the environment had considerably higher influence over animals from the economies which were in polluted zone, and considerably lower in Lviv region.

Studying the influence of season on the indices of cows' blood, it was determined, that seasonal wavering is inherent for the animals from the most economies. In spring, after the end of stall period the quantity of leucocytes, common protein, alpha-globulins, the concentration of haemoglobines, the level of ceruloplasmine, and also cholesterine and carotene was decreased in blood.

Therefore, spring period directly before the beginning of pasture keeping is a period, when all deficiencies of winter stall keeping are shown. Animal's organism is weak because of the absence

of active motions and inferior feeding during this period of time. During the period of pasture keeping, a number of physiological and biochemical indices of blood partly increase to the level of physiological norm. But for animals, which during winter-stall period were kept in the conditions of underfeeding, summer period with pasture keeping is insufficient for absolute restoration of the level of indices number. Therefore, animals come into hibernation with the violation of metabolism.

Thus, from all factors, which have a harmful influence on functional state of cows' organism, feeding factor was the most powerful, it means non-balanced feeding.

Now, it isn't studied enough about the influence of chronic action in little doses of radiative irradiation on live-stock organism. With this purpose, on the base of two economies "Majak" and "Prominj" in Rivne region, it was studied the indices of cows blood age of which was from 11 to 7 years, part of them was of the same age at the time of Chernobyl crash. The results show the violation in organism of all age cows group of metabolic processes, because of long-term action of unfavorable factors on organism during several years, non-balanced feeding was leading among them, especially in CAE "Prominj".

Though, the content of common milk was in the limits of physiological norm, but albumine – globuline correlation was violated. Abruptly reduced content of albumines and alpha-globuline fraction due to increase beta- and gamma-globulines. The content of immunoglobulins was high especially in those, which were kept in zone for nine years and the concentration of alkaline phosphatase was higher into 2, 5 times. Such indices of blood as the quantity of erythrocyte, the concentration of hemoglobin's and haematocritic value were low.

Similar regularity was also in the indices of blood in cows from CAE "Majak".

In spite of all these problems and difficulties, the agricultural activity is an integral part of inhabitants' life in radioactive polluted territories.

Many scientists, especially Kovalyshyn V.I. and co-authors, 1995; Koroljov A.A. and co-authors had proved, that the necessity of Vitamins and microelements, under such conditions, have to be increased, in comparison with physiological norm into 2–2,5 times.

Taking into account, that non-balanced feeding had weighty harmful factors and taking into consideration the information from literature, we decided to study the effect of trivitamine injection to animals and their foddering with poly-salts of microelements. It was determined, that after winter period of keeping, during which cows from the experimental group were injected with trivitamine and were fed with poly-salts of microelements, the concentration of common protein, albumin and globulin fraction, immunoglobulin, hemoglobin, ceruloplasmine, phosphorus of ATP, carotene and DFA reaction was increased in cows from CAE "Svitanok", and the quantity of erythrocyte, the concentration of non-organic phosphorus glucose and cholesterine was decreased.

In experimental groups, in cows from CAE "Galuzia" the level of common protein, alpha- and beta-globulin, hemoglobin, ceruloplasmine, phosphorus

It was decreased the level of carotene, hemoglobin and ceruloplasmine in cows from the control group.

The level of carotene was considerably raised in plasma of cows in all economies after summer period of pasture in "Svitanok" – 1011 mkg/1000 ml of control and 1076 mkg/1000ml in experimental group in "Galuzia" – 923 and 976 – D.

The results of other investigated indices had enough large oscillation amplitude in cows of as experimental as control group. But under the influence of trivitamine and poly-salts of microelements, it was defined the tendency to some normalization of the indices.

Using trivitamine and poly-salts of microelements favour insignificant rising of the concentration of globulin, erythrocytes in blood and decreasing of haemocritic value in bulls.

Leucocytes, higher concentration of common protein, albumins, alpha-beta and gamma-globulin and also ceruloplasmine were present in the blood of new-born calves from the cows which were got trivitamine and poly-salts of microelements. Calves from CAE "Svitanok" had higher ORE.

Therefore, the information showed that parenteral injection with trivitamine and animals feeding with poly-salts of microelements has positive action under the conditions of insufficient feeding, as during using as during far-off terms.

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