

THE ROLE OF PHAGOCYTOSIS IN MASTITIS RESISTANCE IN DAIRY COWS

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SUMMARY

The results of studying phagocyte activity in dairy cows of West Siberia and its association with the frequencies of mastitis in different lines, hybrids are presented. It is noted, that the differences in mastitis morbidity between cows can correlate with on the level of cell factors of nonspecific resistance genetically determined.

Key words: phagocytosis, mastitis, dairy cattle.

INTRODUCTION

The problem to increase animal resistance to diseases particularly infections causing great economic damages is an urgent one in modern animal husbandry. The most frequent causes of cow elimination are mastitis. It reduces to minimum the possibility to select and discard animals for their level of productivity. At present numerous experiment data testifies to the availability of hereditary determination of animal resistance to many diseases.

At the same time breeding for disease resistance has been noted to have a number of difficulties. Many diseases are controlled by polylocus system of genes, the ones taking continuous time to be accumulated in a population. The obtained success in breeding procedures can fail due to mutations of a pathogen. Having moved into new environmental conditions animals can be encountered by novel races of microorganisms possessing no immunity to those. In this situation the importance of nonspecific resistance goes up as universal means to defend organism against diseases.

MATERIAL AND METHODS

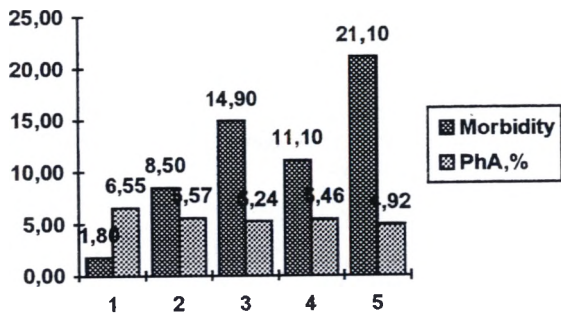
Objects of investigations were 450 purebred Black-and-White and hybrid cows with varying level of Holstein/Black-and-White breeding. All cows belonged to main lines of Holstein and Holland cattle. As an indicator of nonspecific resistance of animals the phagocytic activity (PhA) of leucocytes was defined as a percent of phagocytizing neutrophils among the general neutrophils number. *Escherichia coli* was used as test-microorganism. In groups of animals the frequency of mastitis was accounted.

RESULTS AND DISCUSSIONS

The modern herd of dairy cows in West Siberia can be grouped according to maternal genesis. Most animals belong to the group of Siberian Black-and-White cattle produced in continuous crossbreeding of aboriginal dams with Black-and-White sires. Besides, there are some groups of animals, who are offsprings of the dams imported from Holland, Denmark and Germany. The analysis of phagocyte activity in cows of different

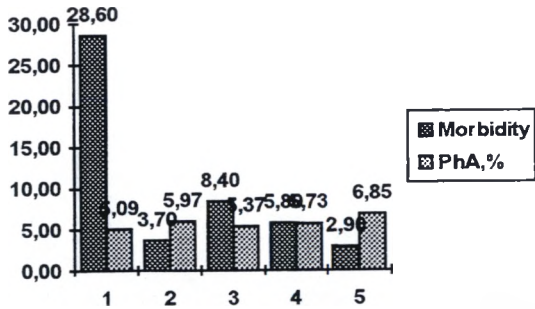
maternal genesis showed that the cows produced by from German dams were characterized by highest intensity of phagocytosis. The portion of influence of maternal genesis on this trait was not large: 3.5%.

The differences on intensity of phagocytosis between cows, belonging to different sire-lines of Holstein and Holland cattle were more pronounced (fig.1). So, the highest intensity of phagocytosis was observed in cows of M- Chieftain 0956679, which exceeded animals H-Adema 37910 ($P < 0.05$). Analysis of mastitis morbidity in cows of different lines developed the correlation between phagocyte activity of leucocytes and incidences of morbidity in animals. Most number of sick animals were in line H-Adema 37910 - 21.1% , whereas M- Chieftain 0956679 line was characterized by highest resistance to mastitis.



1. M-Chieftain, 2. W-Ideal, 3. R-Sovering, 4. S-T-Rocket, 5. H-Adema
Figure 1. Phagocyte activity and morbidity of mastitis in cows of different sire-lines.

Similar tendency was observed in cows with varying levels of Holstein/Black-and-White breeding (fig.2).



1. Purebred, 2. 1/4Holstein, 3. 1/2Holstein, 4. 3/4Holstein, 5. > 3/4.
Figure 2. Phagocyte activity and mastitis morbidity in purebred cows and Black-and-White/Holstein hybrids.

As whole Holstein hybrids were characterized by increased PhA as compared to with purebred Black-and-White cows. True differences were established between hybrids of high level of Holstein ($>3/4$) and purebred and $1/2$ Holstein animals ($P < 0.05-0.01$). Frequency of mastitis in hybrid animals was from 3.4 to 9.8 times less than in purebred cows. These results can testify to genetic differences between animals of different breeds for traits of nonspecific resistance and mastitis resistance as well. Taking to account ancient genesis of cell factors of immune system and their early forming in young animals, perhaps, the index of phagocytosis could be used for evaluation and prognosis of mastitis resistance of animals.

The studying of incidents of mastitis in groups of animals with low, middle and high level of PhA developed significant differences among cows. Cows with low meaning of PhA were sick 2.5 and 3.5 time more often than animals with middle and high PhA, respectively.

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