

IMMUNE RESPONSE TO *Brucella abortus* IN HOLSTEIN CATTLE OF WESTERN SIBERIA

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INTRODUCTION

The parameters of immune system are major interior traits describing breed and individual features of animals. The study of the immune status of different species and breeds of agricultural animals has the large importance at organisation of monitoring for their health, and therefore, for production quality of animal husbandry. For successful perfection both creation of new breeds and types of animals it is important to carry out a complex estimation of animals with accounting of productivity and interior parameters describing feature of the constitution. The one-sided selection on productivity can result in change the immune the status of a population and increase of diseases susceptibility.

The response of antibodies formation in a major degree depends on an animal's genotype and can be utilized for detection of reactive lines. The mother's and father's influence on the immune response force to some antigens was fixed in some species of agricultural animals. The coefficient of hereditary (h^2) of the immune response force varies from 0.08 up to 0.7 and exceeds h^2 of diseases resistance. The genetic determination of the immune response force to some antigens allows successfully carrying out animal's selection.

MATERIAL AND METHODS

Researches of the immune response to *Brucella abortus* antigen were carrying out in Black-and-White cattle of Western Siberia in some herds of Novosibirsk region. Black-and-White cattle of Western Siberia are represented by different groups of cattle : purebred Black-and-White Siberian cows, hybrids between Black-and-White Siberian cows and Holstein sires and cows imported from some European countries (Germany, Holland). The level of milking productivity was about 5000 kg per lactation. The average frequency of brucellosis in Black-and-White cattle in region constituted 0.80 %. Animals have been vaccinating against brucellosis every year. Total 568 cows – daughters of 11 sire-bulls belonging to main lines of Holstein cattle were investigated. The cows' belonging to family was not taken into account. The age of cows varied from 1 to 4 lactation, but the average age in daughters groups constituted 1.9 – 2.1 lactations.

The titre of antibodies was established on reaction of agglutination. The reaction was estimated on agglutination of the antigen in holes with different blood serum dilution (1/2, 1/4, 1/8...1/256). The maximum dilution upon which the reaction agglutination was observed was taken as indicator of the reaction and was expressed in the module of lg (0.3, 0.6, 0.9...2.4, respectively).

RESULTS AND DISCUSSION

The force of immune response has increased within the age of animals. The cows of all groups exceeded calves on this parameter in 2.7 times, and heifers - on 24, 3 %. ($P < 0.01$). The increasing of the antibodies titre also was observed in cows within the age. So the 2-nd and 3-rd calving animals exceeded 1-st calving cows on 15.5-16.7 %. The coefficient of a variation of the antibodies titre was 34-37 %.

Non-reactive animals with zero titres were found among the cows and calves of all ages. There were no any differences on the immune response between animals of the Siberian and German Black-and-White cattle. It can testify about normal adaptation of cattle imported from Germany.

The increasing of immune response force was observed with the rise of a portion of Holstein "blood" in animals (table 1). Half-blood hybrid cows exceeded low-blood (up to 50 %) Holstein hybrids on antibodies titre on 12, 9 % ($P < 0.05$). The variability of traits had a tendency to increase in high-blood Holstein hybrids.

Table 1. The titre of antibodies in Black-and-White cows and Holstein hybrids

Portion of Holstein blood	n	$\bar{x} \pm Sx$	σ	$C_v, \%$	lim
0	49	0,962 \pm 0,050	0,350	36,4	0 – 1,8
< 50	115	0,964 \pm 0,035	0,375	38,6	0 – 2,4
50	100	0,938 \pm 0,049	0,490	49,8	0 – 2,4
> 50	112	1,088 \pm 0,047	0,497	45,7	0 – 2,4

The comparison of three Holstein lines on immune response has revealed an authentic differences between the cows of sire's line № 198998 and № 252803 ($P < 0.05$) (table 2).

Table 2. The titre of antibodies in different sire lines

Sire line	n	$\bar{x} \pm Sx$	σ	$C_v, \%$	lim
933122	310	0,972 \pm 0,023	0,405	41,7	0 – 2,4
198998	59	1,075 \pm 0,079	0,607	56,5	0 – 2,4
252803	68	0,865 \pm 0,051	0,420	48,6	0 – 1,8

The differences between the daughters of the sires were more expressed (table 3). The maximal difference between groups of the daughters on the immune response achieved 91 %. Offspring's of sire №№ 925, 1264 exceeded the daughters of others sires on an antibodies titre on 1.4 - 1.9 times ($P < 0.05-0.001$).

Table 3. The titre of antibodies in daughters' groups of different sires

Sire number	n	$\bar{x} \pm S_x$	σ	$C_v, \%$	lim
925	26	1,232 \pm 0,135	0,69	56,1	0 – 2,4
1264	14	1,292 \pm 0,078	0,29	23,6	0,6 – 1,8
943	10	1,080 \pm 0,155	0,49	45,4	0,4 – 2,0
937	122	0,996 \pm 0,038	0,42	42,5	0,4 – 2,0
516	12	0,933 \pm 0,092	0,32	34,3	0,3 – 1,3
2719	20	0,855 \pm 0,123	0,55	64,3	0 – 2,4
1238	13	0,831 \pm 0,078	0,28	33,7	0,3 – 1,2
107	18	0,827 \pm 0,099	0,33	39,9	0,3 – 1,4
1054	19	0,711 \pm 0,080	0,35	49,2	0 – 1,4
1021	11	0,645 \pm 0,163	0,54	83,7	0 – 1,9

CONCLUSION

Thus, researches has shown, that modification of a level of antibodies production to *Brucella abortus* is not observed in imported cattle, that shows good acclimatization in local Siberian conditions. At the same time the increasing of antibodies titre in Holstein hybrids can testify both about their good adaptive ability and strenuous function of immune systems of an animal organism. The differences on the immune response force between the daughters of the different sires showing a genetic heterogeneity in herd and possibility of selection.

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