

Genealogical kinship Holstein bulls in the bloodlines

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The genealogical relationship bulls of Holstein breed, used in the Ukraine are studied. It is established, that the closest genealogical affinity for each other bulls were bloodlines Chief, Elevation and Starbuck.

Holstein breed, line, bull, breed leader, genealogical kinship, inbreeding, breeding value

The main method of improving breeds are pure breeding lines for them. This line is enriched with valuable inheritance of the founder, individual characteristics which in turn group [1, 2, 3].

Linear belonging bulls is determined on the basis of his ancestry on the paternal side. The feminine side of the pedigree is not taken into account. One of the methods of selection and breeding of species in breeding plants in Ukraine are periodically crossing of lines, resulting in the pedigrees appear common ancestors of different lines. It leads to a narrowing of genealogical variability animals in line, reinforced by the founders of hereditary influence others, not planned, lines. This created great genealogical homogeneous group of animals with amplification of related connections between them. The resulting are uncontrolled inbreeding and decrease milk production of cows on 150 - 334 kg [4 - 5].

The purpose of research. The level of genealogical kinship bulls of Holstein breed, which were used in breeding farms in Ukraine during the 2012 - 14 year the ancestors of lines to determine and intensity of use of inbreeding for their preparation.

Methods of research. Material for research served as the official genealogies 342 bulls, these bulls Catalogs and dairy cattle breeds for reproduction of breeding stock in 2012 - 2014. Genealogical kinship coefficient (Kc) was determined by the formula [6, 7]:

$$Kc = \frac{0,5n_1F_1 + 0,25n_2F_2 + 0,125n_3F_3 + 0,0625n_4F_4 + 0,03125n_5F_5 + m.d.}{\sum n} * 100$$

%, where

$n_{1,2,3} \dots$ - number of animals recorded in each generation;

$F_{1,2,3}$... - generation order;

n - total number of recorded offspring of each line.

Σn - total number of bulls all lines are considered.

Results. Analysis of the origin of bulls suggests that different ranks of their pedigrees often meet the same known ancestors - ancestors of lines: Chief 1427381, Valiant 1650414, Blackstar 1929410, Elevation 1491007, Aerostar 383 622, Starbuck 352790, Bell Elton 1912270, et al. Thereby their pedigrees saturated genetic material limited number of bulls leaders and formed a genealogical relationship bulls one line of ancestors of other lines.

The degree of genealogical relationship with bulls ancestor lines are not equivalent and are determined by the number of animals (branching) in line, their distance from the founder of the system and the selection of animals. Thus, the coefficient of kinship lines bulls, descendants of which have 5 or more ranks in the pedigree; Chief 1427381 ($n = 79$), Valiant 1650414 ($n = 10$) and Elevation 1491007 ($n = 64$) of the progenitors of these lines were respectively 5,67; 8,81 and 8,37% (Table. 1).

Slightly higher rates were genealogical relationship bulls to carry on these lines Blackstar 1929410 on 2,28% (7,35%) and Belwood - by 1,67% (6,37%), due to the using of the latter in the pedigrees of bulls on the maternal side .

Significantly higher rates were genealogical kinship bulls of Starbuck bloodline 352790 ($n = 112$) and ancestor of continuing this line. Thus, the coefficient of kinship bulls Starbuck line with their ancestor was 13,4%, and with continuing Aerostar 383622 – 16,9% Mtoto 6001001962 – 9,0%, Storm 6820564 – 10,9% and Shotl 598172 – 9,8% .

It is established, that the highest rate of genealogical kinship was the bulls of new bloodlines and related groups Marshall 2290977 – 30,5; Toystori 60372887 – 18,5; Bucca - 130588960 – 14,8; Goldwyn 10705608 – 19,1 and Shotl 598172 – 25,1%. This is because the offspring were within 1 - 2 generations of their founders.

The high interline genealogical relationship bulls. Thus, the ratio of genealogical kinship bulls all lines to the ancestor Starbuck 352790 was 0,96 – 13,4, and his son Aerostar 383622 – 2,9 – 16,9%.

Average degree of kinship bulls entire population of these leaders breed is also very high (8,16 and 11,42%, respectively). This indicates a large saturation

pedigrees of all bulls of Holstein breed genes bull Starbuck 352790, Aerostar 383622 and Elevation 1491007, which complicates scheduling pedigree selection even when crossing lines because each line genealogy animal ancestors encountered the same bull several lines. This may explain the increasing in the number of inbred cows in the latest generation of Ukrainian black and white dairy cattle to 71,3 – 91,3% [5].

The genealogical relationship of the main lines of bulls of Holstein breed, which were used in Ukraine during the 2012 - 2014 year to the progenitors of lines and new bulls leaders, %

Name of famous bulls	Rate of genealogical kinship the bulls of main bloodlines						
	Chief, (n = 79)	Valiant, (n = 10)	Marshall, (n = 27)	Elevation, (n = 64)	Starbuck, (n = 112)	Cavalier, (n = 13)	Average degree of affinity (n = 305)
Elevation 1491007	5,07	4,50	1,23	8,37	2,14	1,83	4,35
Starbuck 352790	6,26	4,00	3,35	5,65	13,40	0,96	8,16
Aerostar 383622	7,51	7,65	4,86	4,98	16,91	2,90	11,42
Prelude 392457	1,97	-	0,23	2,57	7,31	-	2,68
P. Mtoto 6001001962	7,50	-	0,92	1,37	9,04	-	5,66
Storm 6820564	7,20	-	2,19	5,76	10,88	-	6,25
Shotl 598172	-	-	-	25,1	9,82	-	4,19
Rudolph 5470579	4,02	10,00	7,40	3,84	7,03	-	3,62
Chief 1427381	5,67	8,90	3,38	2,44	2,01	3,50	2,56
Valiant 1650414	2,40	8,81	0,23	2,11	1,79	-	5,07
Blackstar 192410	7,35	8,40	4,86	2,14	5,94	1,25	3,85
Belwood 2103297	6,73	5,00	17,12	2,53	2,63	-	3,54
Marshall 2290977	1,26	-	30,55	1,95	2,12	-	4,31
Toystori 60372887	-	3,75	18,50	-	-	-	1,80
Bucca 130588960	-	-	14,81	-	-	-	1,31

Goldwyn 10705608	19,06	-	-	-	-	-	4,93
Bell 1667366	2,37	5,00	3,24	6,50	2,14	0,96	2,78

Perhaps, to avoid this problem, specialists USA prolong transmission of hereditary traits in founder generation by removing so-called "inbred" lines. To do this, carefully selected to bull-production cows with high complex economic useful features (yield, fat and protein), a line selects bulls leading the same line with those of breeding values (homogeneous selection). By applying different degrees of inbreeding remote (IV - IV), moderate (III - III of III - IV) close to (II - II) obtained inbred animals are bred again "in itself" (complete inbreeding). Probability of obtaining a larger number of animals with hereditary traits founder line performance increases. Yes, with 342 bulls used in Ukraine, 30 goals (8,77%) obtained in this way, and 4 rows of pedigree bulls used as parents only this bloodline (Fig. 1 - 2).

Use moderate levels of inbreeding and remote maintains high uniformity bulls genealogical ancestor of the line with their long-term generation and accumulation in populations of features inherent in the ancestor lines.

Share inbred bulls in all lines is quite high and amounts to 80,7%. On average, the population of 15 bulls obtained as a result of close inbreeding levels (II - II, II - III). Number of moderate inbreeding (III - III, II - IV, III - IV, IV - IV and IV - V) in the preparation of these bulls was 244 and remote (V - V and above) - 195.

In addition, the pedigrees of bulls identified 116 fathers and 59 mothers who received as a result of different levels of inbreeding. Among them, 15 goals (8,57%) as a result of close, 127 units (72,6%) - moderate and 33 heads (18,8%) - remote degrees of inbreeding, which also forms the genealogical relationship between the level of bulls of different lines.

Conclusions

Index genealogical relationship characterizes the intensity of bulls leaders, pioneers and their successors lines for breeding stock, both paternal and maternal sides of the pedigree and genealogical connections between different lines, it is important to consider when further genealogical structure formation rock.

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Изучена генеалогическая родственность быков-производителей гоштинской породы, которые использовались в Украине. Установлено, что наиболее близкими по генеалогической родственности между собой были быки линий Чифа, Елевейина и Старбака.

Гоштинская порода, линия, бык-производитель, лидер породы, генеалогическое родство, инбридинг, племенная ценность.

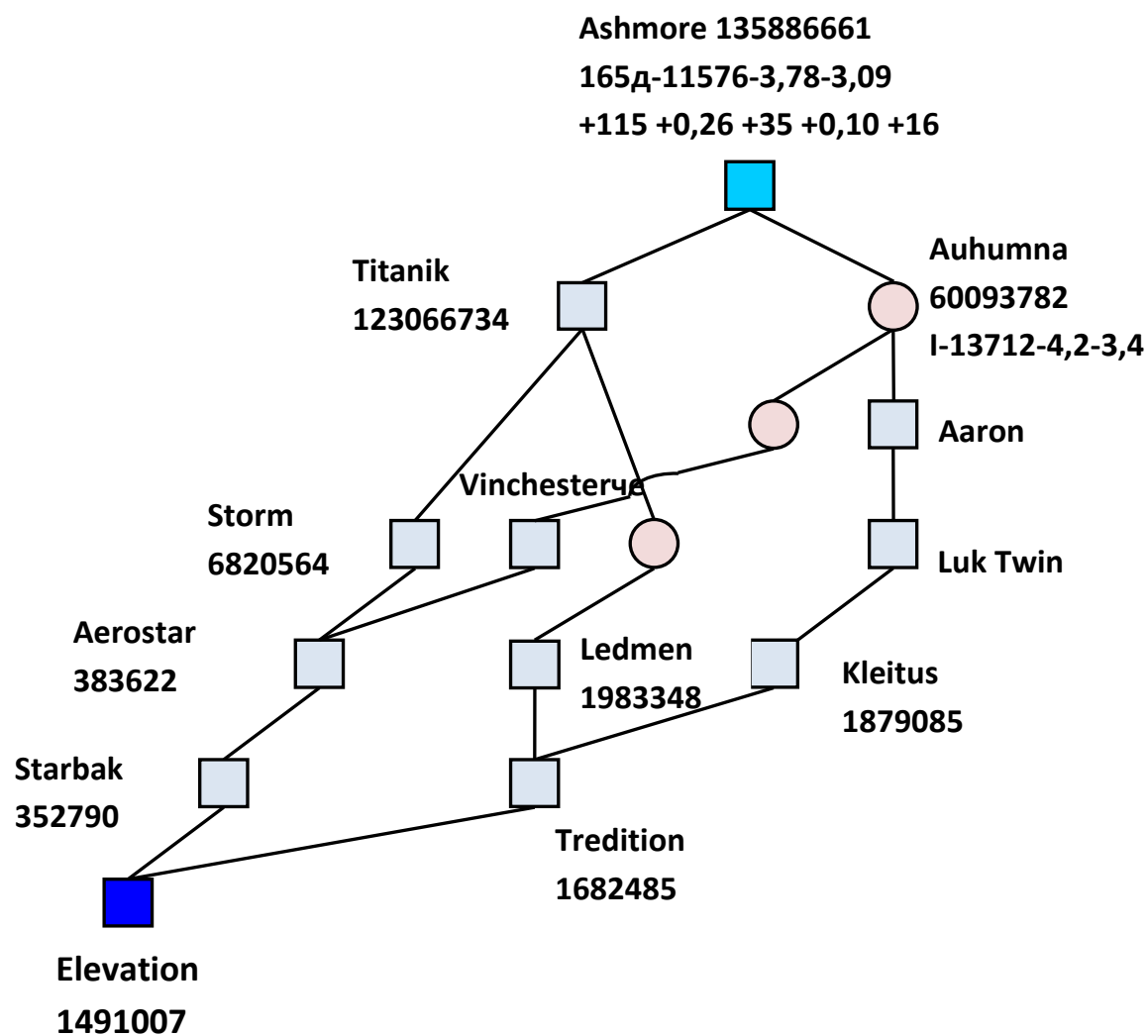


Рис. 1. The bull Ashmore 35886661, have been by the complex inbreeding to Elevation1491007, Aerostar 383622, Starbak, 352790 received

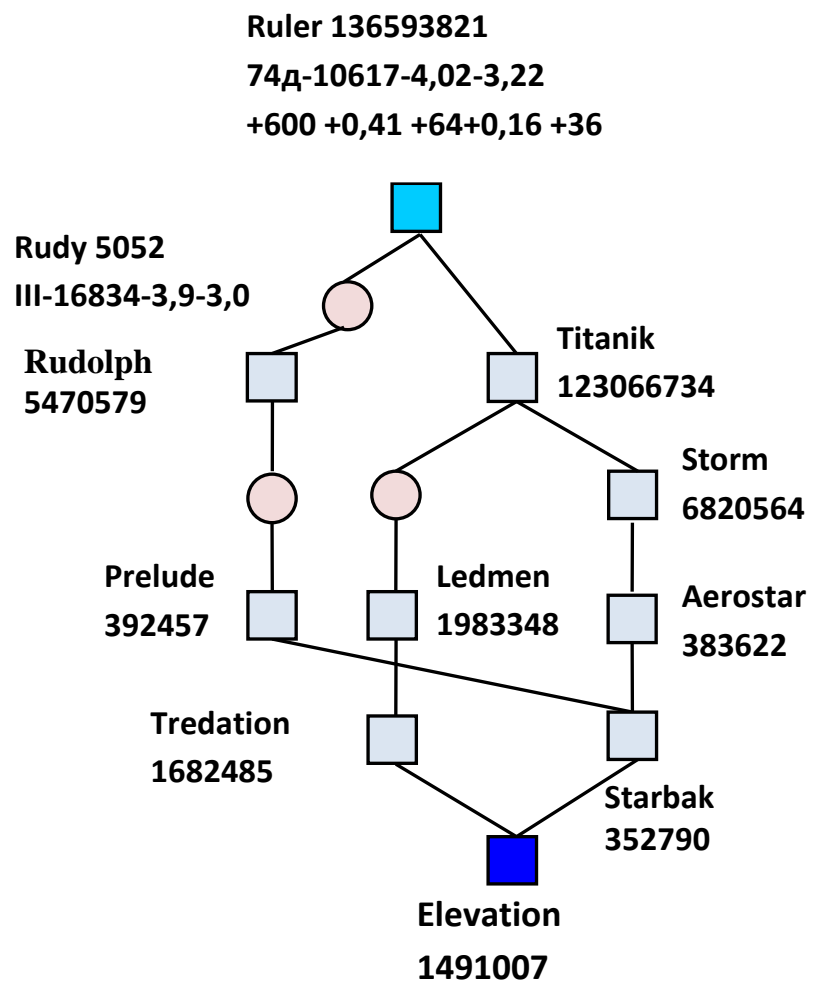


Рис. 2. The bull Ruler 136593821, have been by the complex inbreeding to Elevation1491007, Starbak 352790 received