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CLASSIFICATION OF THE UKRAINIAN POPULATION OF THE HOLSTEIN BREED OF CATTLE BY LINES

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The modern genealogical structure of the Ukrainian population of Holstein breed consists of 16 lines. In addition, breeding bulls of Ukrainian Black-and-White dairy cattle and Ukrainian Red-and-White dairy cattle, Jersey, Angler and Swiss breeds are used for reproduction in 5 breeding farms. The most common lines in terms of number are Starbuck 352790, Chief 1427381 and Elevation 1491007 with a total share of 71.42%. The lines of Cavalier 1620273, Astronaut 1458744, Regal 352882, Ideal 933122, Cadillac 2046246, Mett 1392858, Monfrech 91779, Ivanhoe 1189870 and Hanover 1629391 account for less than 1%. The breeding female in 12 herds does not belong to the lines.
Keywords: **genealogical structure, breeding farms, region, line, milk yield**

КЛАСИФІКАЦІЯ УКРАЇНСЬКОЇ ПОПУЛЯЦІЇ ГОЛШТИНСЬКОЇ ПОРОДИ ВЕЛИКОЇ РОГАТОЇ ХУДОБИ ЗА ЛІНІЯМИ

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Сучасна генеалогічна структура української популяції голштинської породи складається з 16 ліній. Крім того, у парувальну кампанію 5 племінних господарств залучено бугаїв-плідників українських чорно-рябої та червоно-рябої молочних, джерсейської, англерської та швіцької порід. Найпоширенішими лініями за чисельністю є Старбака 352790, Чіфа 1427381 та Елевейшна 1491007 зі загальною часткою 71,42%. Лінії Кавалера 1620273, Астронавта 1458744, Рігела 352882, Айдіала 933122, Каділлака 2046246, Метта 1392858, Монфреча 91779, Айвенго 1189870 та Хановера 1629391 займають менше 1%. У 12 стадах наявне маточне поголів'я не має приналежності до ліній.
Ключові слова: **генеалогічна структура, племінні господарства, область, лінія, надій**

Introduction. The modern Holstein breed of cattle of the specialized direction of productivity is a technological population of highly productive animals. 10 tons of milk per cow is the minimum productivity for the realization of the genetic potential of dairy productivity under modern conditions of keeping and feeding. In addition to pure breeding, the genetic material of Holstein bulls is used on the female livestock of domestic breeds [1–4, 7].

Since the breed is a structure, Holstein breed also has components, one of the main ones being genealogy. «The Catalog of breeding bulls of dairy and dairy-meat breeds for reproduction of female livestock» which is formed annually in Ukraine, it can help in understanding the structure of breeding along the lines of Holstein breed in Ukraine. Previous research has shown that the share of the most common lines in Ukrainian Black-and-White dairy is 43.7% (Chief 1427381, Starbuck 352790, Adem 5113607), Ukrainian Red-and-White dairy – 61% (R. Sovereign 198998, W. Im-

prover 333471, Hanover 1629391), Ukrainian Red dairy 79% (Elevation 1491007, Hanover 1629391, R. Citation 267150) and Holstein – 68% (Chief 1427381, Starbuck 352790, Elevation 1491007) breeds [5, 6].

The aim of the research was to analyze the genealogical structure of the Holstein breed along the lines in Ukraine. The aim was also to establish the most common lines, their share in the overall structure, the number of bulls and the female livestock that belongs to them.

Material and methods of research. The main materials were breeding records, namely reports on a comprehensive assessment of Holstein animals for breeding and productive qualities. The study included information on 57 breeding farms, including Volynska (APE «Rat» (1), PRAE «Rus» (2), FE «Perlyna Turii» (3)), Dnipropetrovska (LLC AF «Obrii» (4), PE AF «Borysfen» (5), LLC AF im. Horkoho (6), APE «Chumaky» (7), LLC «Rodina Treid» (8), LLC «AF «Krasnyi Zaboishchyk» (9), Erastivska doslidna stantsiia (10)), Donetska (PrJSC «Ekoprod» (11), LLC AF «Svitanok» (12), ALLC «Valer′ianivske» (13)), Zhytomyrska (SC RE «Rykhalske» (14), LLC «Dolynivske» (15)), Ivano-Frankivska (LLC «Iamnytsia» (16), LLC «Hudvelli Ukraina» (17)), Kyivska (PRAT «Ukraina» (18), SC «Chaika» Filiia «Dudarkiv» (19), LLC AF «Kolos» (20), ALLC «Ahrosvit» (21), LLC «Ukrainska molochna kompaniia» (22)), Kirovohradska (LLC «Prohres» (23)), Luhanska (FE «Krot» (24)), Mykolaivska (ALLC «Promin» (25), LLC «Kolos 2011» (26)), Odeska (LLC «Shabska ferma» (27)), Poltavska (ALLC «Voskobiinyky» (28), ALLC «Khorobor Ahro» (29), LLC AF «Soniashnyk» (30), LLC «Promin-Lan» (31), LLC «Obrii» (32), LLC AF im.Dovzhenka (33), LLC AF «Maiak» (34), LLC «Orion-Moloko» (35), LLC «Promin-Pryvat» (36), LLC «RPE «Hlobynskyi miasomolochnyi kompleks» (37), ALLC «Vitchyzna» (38), PE «Ahroekolohiia» (39)), Rivnenska (PAE «Ukraina» (40), LLC AE im.Volovikova (41)), Sumska (LLC «Moloko Vitchyzny» (42)), Ternopilska (LLC «Buchachahrokhlibprom» (43)), Kharkivska (ALLC «Khorobor Ahro» (44)), Khersonska (PE AF «Promin» (45), LLC «TH «Dolynskoe» (46), Cherkaska (ALLC «Ahroko» (47), PJSC BF SC «Zolotoniske» (48), ALLC «Lomovate» (49), ALLC im.Vatutina (50), ALLC «AF «Maiak» (51), LLC «Bohodukhivka» (52)), Chernihivska (SC «Chaika» Filiia «Chemer» (53), PrJSC «Kremin» (54), LLC AF «Losynivska» (55), LLC «UkrZalizBud» (56), ALLC «Batkivshchyna» (57)) regions of Ukraine.

The study included data on the estimated female livestock of Holstein breed, average milk yield for the herd for the last completed lactation and genealogical structure of the herds. The affiliation of the female livestock to the lines was studied according to the management system of dairy cattle breeding «ORSEK».

The results of research. 16 lines are used in the Ukrainian population of Holstein breed. On the female livestock is used genetic material that is unrelated to Holstein breed, namely the bulls of the Angler, Jersey and Swiss breeds. Among the common lines (tab. 1), 71.42% are occupied by Elevation 1491007, Chief 1427381 and Starbuck 352790 lines. The average milk yield of the daughters of bull lines that were used has wide limits, ranging from 3 to 12 tons.

1. Evaluation of the most common lines in the Holstein breed Ukraine

Line	Number of bulls	Breeding females		Number of cows	Milk yield, kg (LIMIT)
		heads	%		
Elevation 1491007	371	20916	35.79	8268	3770–12361
Chief 1427381	441	19993	24.22	9475	4183–11128
Starbuck 352790	172	6669	11.41	5052	3591–11672
Marshal 2290977	48	1823	3.12	1447	5503–11317
J. Besne 5694028588	28	1676	2.87	1403	3590–11173
I. Bell 1667366	42	1494	2.56	1299	5562–11543
Valiant 1650414	30	1007	1.72	945	4593–11120

The least used are the lines of Astronaut 1458744 (with a total share of 0.50%), Cavalier 1620273 (0.61%), Hanover 1629391 (0.11), Regal 352882 (0.04%), with the corresponding values of the number of female livestock and cows: 293 goals and 235 goals, 355 and 319, 67 and 51, 21 and 21 goals. In the lines of Idea 933122l and Mett 1392858 there are 1 daughter of descendants from 1 bull left. In addition to Holstein bulls, the genetic material of Swiss (3 bulls and 19 cows with extreme milk values 8470 kg – 11007 kg), Jersey (8–56–6138–8694), Angler (2–2) and Ukrainian Black-and-White dairy cattle (2–52), Ukrainian Red-and-White dairy cattle (2–4) breeds are used on female livestock. The share of female livestock from crossing with other breeds is 0.16%. More than 6% in the general structure are occupied by descendants without any affiliation to the lines.

Analysis of the genealogical structure of Holstein breed in breeding herds showed that the number of lines used ranges from 2 to 9, and the number of bulls from 6 to 330. More than 100 bulls have 4 farms. In our opinion, a large number of bulls in herds are related to imports. It was found that the Starbuck 352790 and Elevation 1491007 lines are used in 55 herds (tab. 2) with the corresponding shares (share from 0.7% to 81.1%) and (0.2%–59.5%), Chief 1427381 in 54 herds (0.2%–69.4%), Marshal 2290977 in 33 herds (0.1%–33.3%), I. Bell 1667366 in 31 herds (0.1–17.9), Valiant 1650414 in 29 herds (0.1–12.0), J. Besna 5694028588 in 28 herds (0.1–56.1), Cavalier 1620273 in 12 herds (0.2–10.7), Astronaut 1458744 in 5 herds (0.1–16.7), Cadillac 2046246 and Hanover 1629391 in 4 herds 0.2%–5.6% and 0.4%–3.7%, Monfrech 91779 and Ivanhoe 1189870 in 3 herds 0.1%–0.7% and 0.2%–3.7%, Regal 352882, Ideal 933122, Mett 1392858 in stage 1 with the corresponding values of 0.8%, 0.7%, 0.5%. Ukrainian Black-and-White and Red-and-White dairy bulls are used in 2 herds – 0.4%–8.2% and 0.3%–1.1%, Jersey in 3 herds (0.7%–3.5%), Swiss and Angler in 1 herd, and their share is 2.4% and 1.0%, respectively. In 12 herds there are the breeding bulls with indeterminate affiliation to the lines with a share of 0.1% to 95.4%. The most common lines are highly productive, and the realization of the genetic potential of milk productivity depends on the average milk yield of herds.

A similar situation (selection of the most promising lines) is observed in the regions of Ukraine (tab. 3). Breeding bulls of Chief 1427381 and Elevation 1491007 lines are used in all studied regions of the country. Among the common ones are the lines of Starbuck 352790, I. Bell 1667366, Valiant 1650414, Marshal 2290977 and J. Besne 5694028588. Mett 1392858 and Monfrech 91779 lines are used in Dnipropetrovsk region. The female livestock of Jersey bulls is in Kyivska**,** Odeska and Chernihivska regions, and the Swiss breed is in Odeska region**.**

It is promising in further scientific research to conduct an inventory of existing genealogical formations of related groups in breeding farms engaged in breeding Holstein breed and to form a strategy of breeding selection system to prevent related breeding.

Conclusions. The genealogical structure of the Ukrainian population of the Holstein breed is represented by 16 lines. The most common lines are Elevation 1491007, Chief 1427381 and Starbuck 352790, which occupy 71.42%. The lines of Regal 352882, Ideal 933122 and Mett 1392858 are not numerous. In breeding herds from 2 to 9 lines are used. Also, it should be noted the share, namely from 0.1 to 95.4% in 12 herds of breeding bulls have an indeterminate affiliation to the lines.

2. Evaluation of Starbuck, Chief and Elevation lines in the structure of Holstein breeding farms

Number of the farm of milk yield, kg	Lines	Bulls	Lines:														
			Starbuck 352790					Chief 1427381					Elevation 1491007				
			♂	n	%	♀	milk yield, kg	♂	n	%	♀	milk yield, kg	♂	n	%	♀	milk yield, kg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1–9206	3	10	1	59	20.8	42	6608	3	74	26.1	71		4	90	31.8	90	
2–8993	4	27	5	33	3.8	33	7372	12	465	53.6	172	6999	8	328	37.8	298	7390
3–12074	9	330	11	43	4.1	43		49	250	18.2	138		50	418	30.4	158	
4–6015	7	13	3	98	48.0	54	6007	3	10	4.9	8	4441	1	55	27.0	9	
5–6319	9	44	12	486	42.8	315		9	85	7.5	52		8	421	37.1	239	
6–8753	6	46	7	235	20.4	164		15	285	24.8	102		18	449	39.0	113	
7–7059	4	25	7	139	23.8	42		4	51	8.7	51		9	242	41.4	115	
8–7267	7	30	7	99	12.6	98	7284	10	292	37.2	118	7536	9	334	43.9	163	7170
9–7018	8	29	4	42	9.3	42	5671	5	115	25.4	91	6561	12	211	46.7	33	4876
10–4471	4	7	3	355	81.1	117							2	50	11.4	50	
11–6665	6	12	6	179	34.0	171		1	1	0.2	1	5724	1	49	9.3		
12–8871	5	13	4	30	18.9	28	7723	4	26	16.4	22	7757	3	83	52.2	2	
13–7023	4	10	5	96	50.5	70	6592	1	1	0.5	1	5250	3	70	36.8	3	6884
14–5277	4	9	3	212	59.6	45		3	84	23.6	60		2	12	3.4	12	
15–6490	4	6	2	56	16.1	56		2	99	28.4	19		1	101	29.0	16	
16–7385	4	7	1	8	1.8	8		4	311	69.4	173		1	15	3.3	15	
17–9320	4	42	2	12	3.5	12		7	90	26.5	37		5	46	13.5	46	
18–8563	3	69	15	110	14.4	71		27	269	35.3	126		20	327	42.9	119	
19–8609	7	23	3	9	1.8	9	7377	7	203	40.8	201	7696	9	271	54.5	56	8074
20–8305	4	9	3	200	26.7	176							3	446	59.5	157	
21–8609	7	47	7	247	15.7	243	8252	16	335	21.2	107	8236	16	650	41.2	203	8171
22–10321	8			372	4.1	323	8707		4217	46.3	1917	9288		3816	41.9	1073	9534
23–8876	7	39	7	60	5.8	60	8874	16	363	34.8	289	9056	11	489	46.9	152	9030
24–6104	4	10	4	8	15.1	5		3	31	58.5	16		1	4	7.5		
25–11355	7	83	19	257	5.9	257	9734	34	1688	38.6	702	9936	19	2130	48.7	655	10500
26–8714	5	54	9	272	20.5	155		17	508	38.3	197		21	485	36.5	231	

Продовження таблиці 2

27–9079	8	91	5	68	6.2	67		28	396	36.0	184		38	462	42.0	166	
28–8317	4	27	4	50	6.1	25		13	474	57.5	192		6	293	35.6	255	
29–7238	5	30	6	85	58.2	83	6998										
30–8596	5	18	4	6	6.7	4		8	46	51.7	25	7188	30	30	33.7	27	7825
31–8575	4	7	1	27	11.5	27	8346	2	131	55.7	46	8394	3	53	22.6	30	7915
32–7716	5	12	4	18	45.0	18		4	8	20.0	3		2	9	22.5	3	
33–8796	7	106	5	130	6.9	130		49	756	40.4	308		36	797	42.6	194	
34–9179	6	32	2	16	0.7	16		10	1070	48.7	715	9041	14	768	35.0	140	8981
35–7145	6	21	4	107	26.6	107		6	187	46.5	3		7	29	7.2	29	
36–6870	6	19	3	103	21.1	53	6488	6	211	43.1	42	6806	6	136	27.8	51	6508
37–9553	6	171	21	118	10.1	38		73	508	43.4	135		70	499	42.6	213	
38–8161	5	15	2	40	20.9	25	8017	7	87	45.5	64	6874	3	51	26.7	43	7683
39–8133	6	15	2	63	6.6	63		5	411	43.3	128		4	399	42.0	61	
40–8058	3	6	2	13	20.6	13		2	29	46.0	29						
41–7301	6	66	7	24	2.5	23	7016	25	357	37.7	61	7007	24	489	51.6	112	6808
42–10002	5	25	3	628	25.2	539		8	625	25.1	585		10	1006	40.4	895	
43–10148	2	7						2	73	4.3	73		1	4	0.2	4	
44–8269	6	46	7	262	18.3	262	7600	16	705	49.4	224	7460	10	309	21.6	108	7574
45–9870	3	7						3	687	44.9	487		4	766	50.1	681	9000
46–9779	7	84	15	57	6.0	56	8147	27	332	35.2	145	8584	25	356	37.8	102	8608
47–11200	6	32	5	245	9.6	245	11672	4	191	7.5	191	11128	8	440	17.2	440	11104
48–5511	5	10	2	137	44.8	130	5582	3	107	35.0	20	6494	3	18	5.9	18	6454
49–9532	6	37	5	50	9.0	49		21	277	49.9	68		6	135	24.3	57	
50–7651	8	21	2	39	2.4	32		7	462	28.8	126	7511	4	602	37.6	243	
51–9272	7	32	4	48	6.1	48	7626	13	492	62.7	88	8075	9	123	15.7	32	9611
52–7720	6	42	10	131	19.8	26	7623	18	354	53.6	294	7313	7	77	11.6	68	7548
53–9161	6	25	3	13	3.9	13	8127	7	149	45.0	76	8557	11	147	44.4	17	8419
54–9049	6	16						4	248	45.0	23	9057	5	151	27.4	50	8987
55–8000	7	128	12	89	19.0	51	5857	11	109	23.2	48	6196	10	73	15.6	31	6947
56–9526	8	40	3	99	9.7	76	7292	16	327	32.2	284	8000	16	514	50.5	101	8192
57–7545	6	43	10	286	17.2	194	7291	13	331	19.9	137	7219	9	578	34.7	89	7505

3. Location of Holstein breed lines in the regions of Ukraine

Region	Lines																	Breed				
	Starbuck 352790	Chief 1427381	Elevation 1491007	Cavalier 1620273	Bell 1667366	Astronaut 1458744	Regal 352882	Valiant 1650414	Marshal 2290977	No data	J.Besne 5694028588	Ideal 933122	Cadillac 2046246	Mett 1392858	Monfrech 91779	Ivanhoe 1189870	Hanover 1629391	UBWD	URWD	Angler	Jersey	Swiss
Volynska	+	+	+		+	+	+	+	+	+	+											
Dnipropetrovska	+	+	+	+	+	+		+	+		+			+	+	+			+	+		
Donetska	+	+	+		+			+			+		+									
Zhytomyrska	+	+	+		+						+											
Ivano-Frankivska	+	+	+						+	+												
Kyivska	+	+	+	+	+			+	+	+	+					+					+	
Kirovohradska	+	+	+		+			+	+		+											
Luhanska	+	+	+							+	+											
Mykolaivska	+	+	+		+			+	+		+											
Odeska	+	+	+	+	+			+	+		+						+	+			+	+
Poltavska	+	+	+	+	+	+		+	+		+	+	+					+				
Rivnenska	+	+	+		+			+	+	+												
Sumska	+	+	+					+			+											
Ternopilska		+	+							+												
Kharkivska	+	+	+		+			+	+	+	+											
Khersonska	+	+	+		+			+	+		+											
Cherkaska	+	+	+	+	+	+		+	+	+	+		+				+					
Chernihivska	+	+	+	+	+	+		+	+	+	+		+				+				+	

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