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«BREED INVENTORY» OF DAIRY AND DUAL-PURPOSE CATTLE OF UKRAINE

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The comprehensive evaluation results of thirteen dairy and dual-purpose breeds have been presented by the following parameters: population size of breeding females, reproductive ability, disposal causes, milk performance, growth intensity of young animals, characteristics of production champions.

It has been established advantage of the cows of Holstein and new-created domestic breeds with high inheritance share by Holstein breed (Ukrainian Black-and-White Dairy, Ukrainian Red-and-White Dairy, Ukrainian Red Dairy) over other breeds by milk performance. However, these

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cows were characterized by the shortest disposal age because of reducing performance and reproductive ability violations.

Key words: cows, breed, milk performance, reproduction, growing, young animals

«ПОРОДНА ІНВЕНТАРИЗАЦІЯ» МОЛОЧНИХ ТА МОЛОЧНО-М'ЯСНИХ ПОПУЛЯЦІЙ ВЕЛИКОЇ РОГАТОЇ ХУДОБИ УКРАЇНИ

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Представлені результати комплексної оцінки тринадцяти молочних та молочно-м'ясних порід за племінними і продуктивними якостями: чисельністю маточного поголів'я, показниками відтворення та причинами вибуття із стада, а також, молочною продуктивністю корів, інтенсивністю вирощування племінного молодняка та характеристикою рекордисток.

Встановлено перевагу за молочною продуктивністю, чисельністю корів голитинської та українських червоної, чорно-рябої, червоно-рябої молочних порід над іншими породами. Проте, корови зазначених порід характеризуються найкоротшим віком вибуття, основними причинами якого є зниження продуктивності та порушення відтворувальної здатності.

Ключові слова: корови, порода, молочна продуктивність, відтворення, вирощування, молодняк

«ПОРОДНАЯ ИНВЕНТАРИЗАЦИЯ» МОЛОЧНЫХ И МОЛОЧНО-МЯСНЫХ ПОПУЛЯЦИЙ КРУПНОГО РОГАТОГО СКОТА УКРАИНЫ

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Представлены результаты комплексной оценки тринадцати молочных и молочно-мясных пород по племенным и продуктивным качествам: численностью маточного поголовья, показателям воспроизводства и причинами выбраковки из стада, а также молочной продуктивностью коров, интенсивностью выращивания племенного молодняка и характеристикой рекордисток.

Установлено преимущество по молочной продуктивности, численности коров голитинской и украинских красной, черно-пестрой, красно-пестрой молочных пород над другими породами. Однако, коровы указанных пород характеризуются наиболее коротким возрастом выбраковки, основными причинами которой являются снижение продуктивности и нарушения воспроизводительной способности.

Ключевые слова: коровы, порода, молочная продуктивность, воспроизводство, выращивание, молодняк

Introduction. Dairy cattle breeding are one of the leading livestock sectors of Ukraine, which purpose is providing such milk product volume that complies with state food safety and expansion of export potential.

National project «Revived Cattle Breeding» and «Programme of Dairy Cattle Breeding Development of Ukraine till 2015» [1] provide restoration of genetic potential of livestock by increasing pedigree cattle population of domestic and the world's best performing breeds. Priorities of improving the dairy cattle have been defined further increasing milk performance and its main components, disease resistance and fertility of animals. It was supposed to conduct a comprehensive inventory of the breeds and to direct «breed policy» primarily at the expanded reproduction of the domestic dairy breeds at pure breeding, and further use of the world's best dairy breeds.

Therefore, currently a comprehensive assessment of breeding females of domestic and foreign dairy and dual-purpose cattle breeds by the basic parameters (population size, reproductive ability, milk performance, growth intensity of young animals) is topical.

Material and methods. The research of dairy and dual-purpose breeds was carried out basing on the data of annual cattle valuation (371 breeding farms) for 2013 including 1 farm for breeding Brown Swiss breed, 1 – Ukrainian Whiteheaded, 21 – Ukrainian Red Dairy, 3 – Polish Red, 3 – Ukrainian Brown Dairy, 13 – Red Steppe, 29 – Holstein, 19 – Simmental, 4 – Lebedyn, 2 – Angler, 2 – Ayrshire, 80 – Ukrainian Red-and-White Dairy, 193 – Ukrainian Black-and-White Dairy.

Population size of breeding females, distribution of cows after calving, reproductive ability, milk performance with describing the best performing cows, growing young animals have been studied basing on the data of breeding records.

Results. Development of dairy cattle-breeding is directed towards expanded reproduction of a herd that provides increasing breeding cows and defines perspective of a breed in general.

The most numerous breed among domestic dairy cattle is Ukrainian Black-and-White Dairy, its breeding females were 56 % of total number of dairy cows (table 1).

1. Breed composition of dairy cattle population

Breeds	Population size	Number of cows	Number of heifers at the age of		Number of young bulls at the age of	
			6–18 months	18 months and over	6–12 months	13–18 months
Brown Swiss	112	100	4	8		
Ukrainian Whiteheaded	596	300	185	107	2	
Ukrainian Red Dairy	12155	6563	4169	1805		
Polish Red	750	389	277	84		
Red Steppe	6346	3062	2022	1262		
Ukrainian Brown Dairy	657	350	190	117		
Holstein	22144	12924	6730	2415	59	16
Simmental	5525	2809	1812	782	86	34
Lebedyn	1981	971	713	297		
Angler	389	149	160	28	20	32
Ayrshire	841	539	238	34		
Ukrainian Red-and-White Dairy	47617	24906	15738	7939	242	140
Ukrainian Black-and-White Dairy	131125	65697	45176	19075	540	637

Productive use duration is one of the most important selection traits. Cows eliminated quickly from a herd are usually unprofitable even with high milk performance. Describing distribution of cows after calving (table 2) it is noteworthy that among the new-created domestic breeds with high inheritance share by Holstein breed (Ukrainian Black-and-White Dairy, Ukrainian Red-and-White Dairy, Ukrainian Red Dairy) the part of the cows after calving III and older was 2–3 % greater compared with Holstein. The Lebedyn, Polish Red, Ukrainian Whitehead and Ukrainian Brown Dairy cows were characterized by the longest productive use duration, but small population size of these breeds does not provide reliable evidence to suggest their leadership by economic use duration among other dairy breeds.

The important strategic goal of improving a breed is rising and maintaining its competitiveness due increasing genetic potential of milk production, fat and protein contents, prolongation of lifetime use duration and improving its efficiency [4].

2. Distribution of cows after calving

Breeds	Number of cows	calving					
		I	II	III	IV-V	VI-IX	X and older
Brown Swiss	100	18	35	34	11	2	
Ukrainian Whiteheaded	350	82	80	66	32	29	11
Ukrainian Red Dairy	6563	2312	1790	1345	886	222	8
Polish Red	389	87	65	60	83	77	17
Red Steppe	3062	969	610	573	580	302	28
Ukrainian Brown Dairy	350	75	66	81	77	41	10
Holstein	12924	4852	3431	2198	1763	643	37
Simmental	2809	959	665	609	404	161	12
Lebedyn	971	258	196	117	159	175	66
Angler	149	82	24	26	12	5	
Ayrshire	539	219	137	93	80	10	
Ukrainian Red-and-White Dairy	25681	8417	5995	4693	3807	1762	232
Ukrainian Black-and-White Dairy	65697	21036	17048	13261	9783	4205	364

Holstein cows retain the significant advantage by the average milk yield for some lactations among dairy and dual-purpose cows (table 3). Assessing milk performance it is noted that the Ukrainian Red-and-White Dairy cows had the highest growth of milk performance compared to defined standard, (70–80 % greater than breed standard requirements for lactation). The average milk yield of the Ukrainian Red Dairy, Simmental and Ukrainian Black-and-White Dairy cows was 50-60% greater than the breed standard requirements. The average live weight of all the investigated breeds met the standards of the breeds fully, and sometimes it dominated over them.

Reproductive ability of dairy cows is an important component of comprehensive cattle evaluation. Regular annual calving stimulates lactation and received offspring enables to maintain expanded reproduction of a herd, improve economic efficiency of milk production through sale of breeding calves etc. Thus, fertility of cows with their milk performance is a main selection feature. Reproductive ability of dairy cows determines by many indicators, including: gestation length, service period, calving interval, and dry period.

Natural biological antagonism of milk yield to reproductive ability [3] led, in most cases, reverse distribution among the breeds by service period length (table. 4). The longest average length of service period observed in the cows of Holstein breed, 51 % of them (according to take into account) had service period length over 90 days.

Good reproducible ability is determined largely by dry period length. Breeding practice and numerous studies have found that the optimal dry period length should be within 45–70 days, its reducing or increasing is accompanied by decrease milk yield at the next lactation [6]. Describing the average dry period length (table. 4) it is noteworthy that proportion of the cows with a value of more than 70 days is large (within 20%) in the Ukrainian Red Dairy, Holstein and Ukrainian Red-and-White dairy breeds.

For optimum repairing a herd should be entered 25–30 first-calf cows per 100 cows [5] with optimal insemination period of heifers of 16–17 months at value of live weight at least as 70 % of cow's live weight (at the age of 5 years). There was a difference in 10-12 months between the average age at the first insemination and age at the first calving almost in all the investigated herds (except Ukrainian Red Dairy breed) that may indicate a low level of heifer's fertility at the first insemination.

3. The average milk yield of cows

Performance indicator	Breeds												
	Brown Swiss	Ukrainian Whiteheaded	Ukrainian Red Dairy	Polish Red	Red Steppe	Ukrainian Brown Dairy	Holstein	Simmental	Lebedyn	Angler	Ayrshire	Ukrainian Red-and-White Dairy	Ukrainian Black-and-White Dairy
Lactation I													
Number of investigated cows	21	40	1632	67	777	42	2875	703	244	46	134	6033	14410
Milk yield, kg	3702	4521	5463	3092	3679	4383	6390	4729	3832	4016	4992	5459	5327
Milk fat content, %	3,99	3,77	3,81	3,89	3,85	3,91	3,83	3,79	3,81	4,25	3,96	3,75	3,66
Milk protein content, %	3,30		3,18	3,20	3,16	3,13	3,22	3,16	3,29	3,25	2,98	3,16	3,15
Live weight, kg	490	452	508	430	465	516	537	534	484	471	478	513	505
Lactation II													
Number of investigated cows	29	80	1419	57	600	86	3105	653	192	24	134	5562	14686
Milk yield, kg	3954	4618	5974	3565	3989	5101	6851	5110	4535	4394	5389	6554	5753
Milk fat content, %	4,12	3,79	3,86	3,89	3,90	3,90	3,88	3,84	3,83	4,30	4,00	3,78	3,71
Milk protein content, %	3,32		3,19	3,20	3,20	3,13	3,27	3,19	3,27	3,30	3,02	3,18	3,18
Live weight, kg	553	521	540	460	503	560	589	589	528	520	502	562	552
Lactation III													
Number of investigated cows	39	138	1819	245	1398	172	3826	1084	489	42	185	9390	25506
Milk yield, kg	4526	4812	6102	4235	4268	5489	6991	5317	4718	4922	5644	6052	6008
Milk fat content, %	4,15	3,80	3,88	3,88	3,90	3,93	3,89	3,88	3,85	4,30	4,00	3,82	3,75
Milk protein content, %	3,31		3,20	3,22	3,16	3,14	3,24	3,20	3,31	3,30	2,99	3,20	3,18
Live weight, kg	585	556	566	493	529	612	619	635	567	552	519	607	591
Average													
Number of investigated cows	89	258	4870	369	2775	300	9806	2440	925	112	453	20985	54784
Milk yield, kg	4145	4707	5920	3942	4050	5237	6750	5140	4426	4502	5262	5842	5781
Milk fat content, %	4,11	3,79	3,85	3,87	3,88	3,91	3,87	3,85	3,84	4,30	3,96	3,79	3,70
Milk protein content, %	3,31		3,19	3,21	3,19	3,14	3,23	3,19	3,29	3,25	3,00	3,18	3,16
Live weight, kg	552	529	540	477	504	575	589	600	535	517	523	568	556

4. Reproductive ability of cows

Reproduction indicator	Breeds												
	Brown Swiss	Ukrainian Whiteheaded	Ukrainian Red Dairy	Polish Red	Red Steppe	Ukrainian Brown Dairy	Holstein	Simmental	Lebedyn	Angler	Ayrshire	Ukrainian Red-and-White Dairy	Ukrainian Black-and-White Dairy
Service period													
number of investigated cows	89	258	4907	369	2736	300	10285	2152	925	105	453	21436	54214
average length, days more than 90, cows	125	98	113	86	98	112	160	115	103	103	158	114	110
	46	76	2505	82	1022	127	5204	488	231	20	264	10142	20279
Dry period													
number of investigated cows	89	218	4649	336	2003	291	8766	1674	824	67	319	16830	44395
average length, days less than 51, cows	62	61	65	58	64	61	65	68	64	61	67	64	63
within 51-70, cows	17	29	858	93	456	63	2036	289	69	23	58	3712	9069
more than 70, cows	60	118	2738	202	1088	153	5053	1111	647	32	240	10021	28103
	12	71	1053	41	459	75	1677	274	108	12	21	3097	7223
Survival of calves													
percent	99,9	96	96,8	96,0	98,3	95	95,9	97,1	98,9	99,2	87,0	96,4	95,0
Average age of animals' disposal, calving / month													
cows	4		3,12	4,13	4,16	5,2	3,16	3,9	8,2	3,8	4	3,63	3,84
first-calf cows	33,0		36,5	29,5	28,6	31,0	38,3	32,3	30,0		29,0	32,8	33,0
Average live weight at the first insemination, kg													
heifers	395	330	383	330	361	375	390	397	374	348	350	379	384
Average age at the first insemination, days													
heifers	600	572	613	529	464	541	461	520	562	605	545	523	507
Average age at the first calving, days													
first-calf cows	885	885	853	851	847	845	818	825	854	971	854	824	826
Entered into a herd													
first-calf cows	18	40	2775	87	668	75	3480	679	258	41	155	7907	16950
Disposal causes (low level of productivity and reproductive ability)													
cows		55	1369	20	505	35	1557	218	140	58	27	4404	8546
first-calf cows		24	314	14	69	7	338	41	18	2	2	732	1501
Disposal causes (morbidity)													
cows		34	919	32	209	23	2176	204	79	50	125	1897	7951
first-calf cows		4	220	2	6	7	394	40	3	4	35	262	1265

Productive use duration of cows in a herd influences on dairy cattle profitability. Research has shown [7] that sale of products produced by cows during 1.5–2 years of the first lactation covered only cost of rising and milk production. It means that increasing productive life duration of cows raises profitability of dairy cattle-breeding. Analyzing table 4 it is noted that the decisive disposal reasons from a herd were low level of performance and reproductive ability. The brown breed cows (Lebedyn, Ukrainian Brown Dairy) had the longest productive use length. The average age of disposal in the high productive herds was from three to four calving that confirmed the axiom proven by numerous studies – high-performing cows earlier retire from a herd.

It has known that level of heifer growing has a significant impact in all age periods on animal's health and its subsequent milk performance, reproductive ability and productive use length. Describing organization and technology of growing remount young animals of dairy and dual-purpose breeds it is noted that average live weight of remount heifers of the investigated breed populations complied to the breed standards for animal's live weight at the age of 6, 12 and 18 months and even exceeded them in the majority of the breeds (2–5 %), which is desirable for obtaining high-performing cows (table 5).

5. Growing breeding young animals

Breed	Average live weight at the age of								
	6 months			12 months			18 months		
	investigated animals	live weight, kg	according to breed standart, kg	investigated animals	live weight, kg	according to breed standart, kg	investigated animals	live weight, kg	according to breed standart, kg
1	2	3	4	5	6	7	8	9	10
Heifers									
Brown Swiss				4	282	269	8	375	365
Ukrainian Whiteheaded	126	157	140	137	253	235	151	349	325
Ukrainian Red Dairy	3165	171	160	2494	288	262	1851	398	355
Polish Red	126	149	140	151	245	235	84	403	325
1	2	3	4	5	6	7	8	9	10
Polish Red	126	149	140	151	245	235	84	403	325
Red Steppe	1957	158	155	1540	264	259	1267	361	355
Ukrainian Brown Dairy	73	179	175	117	285	288	117	387	385
Holstein	4256	177	175	3842	300	288	2391	415	385
Simmental	807	177	170	733	303	284	737	413	380
Lebedyn	351	171	165	362	274	269	297	370	365
Angler	35	166	165	85	267	269	68	369	365
Ayrshire	61	154	153	164	251	250	69	350	340
Ukrainian Red-and-White Dairy	12414	175	175	10433	295	288	8029	400	385
Ukrainian Black-and-White Dairy	25038	177	170	26127	294	284	19333	397	380
Young bulls									
Ukrainian Whiteheaded	4	169	160	19	327	302	9	439	415
Holstein	33	191	190	13	342	365			
Simmental	87	203	190	34	379	365			
Angler	10	170	180	10	330	345	32	420	480
Ukrainian Red-and-White Dairy	324	196	185	330	348	350	33	525	490
Ukrainian Black-and-White Dairy	547	186	185	624	337	350	91	442	485

Obtaining high-performing cows has always been a strategic direction in breeding work. Breeders rely primarily on those animals which differ in high milk yield or descended from ancestors with record performance. Production champions with high lifetime yields reflect genetic potential of a herd, they are an active part of it and participate in improvement of a breed.

Economic use of production champions is one of basic indicators for breeders in dairy cattle-breeding because milk production, getting offspring, and economic situation in general depend on it. Production champions are the most valuable part of a dairy herd. In our country the record for milk yield and milk fat yield, as well as in the world is saved by Holstein cows (table 6), further place in the ranking was in domestic breeds: Ukrainian Black-and-White Dairy, Ukrainian Red-and-White Dairy, Ukrainian Red Dairy.

6. Breed production champions

Breed	Name and inventory number	Milk yield, kg	Milk fat content, %	Holder
Brown Swiss	Sinayka 5900033314	6372	4,22	PJSC «Mykhailivka», Sumy region
Ukrainian Whiteheaded	Beyzha 9348	7739	3,71	LLC «Podolsky gospodar», Khmelnytsk region
Ukrainian Red Dairy	4400193597	12001	3,99	SE «Elitne» of NAASU, Kirovograd region
Polish Red	Konvaliya 4116	7100	3,71	PAL named after Shevchenko, Ternopil region
Red Steppe	Osoka 1951	8148	3,8	PE «Moguchy», Zaporozhye region
Ukrainian Brown Dairy	Ledi 5900030151	8555	3,8	AF «Victoria», Sumy region
Holstein	Shveyana 1200586108	21242	4,00	JSC «Agro-Soyuz», Dnipropetrovsk region
Simmental	Lilli 568217272	11128	4,11	LLC «Agricultural Investment Union», Kyiv region
Lebedyn	Murashka 7400464938	8358	3,9	LLC «Mriya», Chernihiv region
Angler	Oma 6500134822	7297	3,81	CDD «Zorya», Kherson region
Ayrshire	Prima 5119	9881	3,88	SE «Research Farm named after Decembrists NAASU», Poltava region.
Ukrainian Red-and-White Dairy	Fortuna 63006014444	14367	3,50	JV «Zorya», Kharkiv region
Ukrainian Black-and-White Dairy	Synytsya 5900371630	14763	3,80	Pidlisnivka affiliate of JSC «Rise Maksymko», Sumy region

БІБЛІОГРАФІЯ

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