

## **PREDICTION MILK PRODUCTION of COWS UKRAINIAN RED DAIRY BREED**

**A. R. Dudok**  
ardudoc@mail.ru

Ascania Nova Institute of Animal Breeding in the Steppe Regions  
named after M.F. Ivanov - National Scientific Selection-Genetics  
Center for Sheep Breeding  
Chervonoarmiyska Street, 1, Askania Nova, Chaplinka district,  
Kherson region, 75230, Ukraine

*The factors influencing the performance milk production of cows Ukrainian Red Dairy breed are investigated. The high degree of repeatability coefficients between milk production ranks lactations, indicating the possibility of early prediction of future milk production of cows on the basis of performance in the first lactation and indicate possible to rapidly increase efficient breeding animals in mass selection.*

*The best yield performance of cows recorded in the oldest age groups of animals at first calving (30 months and older). However, it is not economically profitable and is the result of insemination of heifers by live weight. It is proposed in the farm breeding to pay attention to questions directed cultivation of repair young. Also found that heifer's season of birth did not affect the expected future performance of dairy cows.*

*Given the results of research influence first calving season on milk production of cows recommend planning to spend massive calving cows during winter-spring that will increase milk production and better implementation of the genetic potential of animals.*

*Finally is proved that high milk yield of cows caused by genetic factors inherited from their fathers and ancestors and optimal environmental conditions. The dependence between the indexes of milk production, age and body weight of cows at first calving season, belonging to genotype lines and bulls is determined.*

**Keywords:** heifer, cow, breed, milk yield, live weight, season, offspring.

# **ПРОГНОЗУВАННЯ МОЛОЧНОЇ ПРОДУКТИВНОСТІ КОРІВ УКРАЇНСЬКОЇ ЧЕРВОНОЇ МОЛОЧНОЇ ПОРОДИ**

**А. Р. Дудок**  
ardudoc@mail.ru

Інститут тваринництва степових районів імені М. Ф. Іванова  
«Асканія-Нова» – Національний науковий селекційно-генетичний  
центр з вівчарства  
вул. Червоноармійська, 1, смт Асканія-Нова, Чаплинський р-н,  
Херсонська обл., 75230, Україна

*Досліджено фактори, що впливають на формування показників молочної продуктивності корів української червоної молочної породи. Встановлені високого ступеня коефіцієнти повторюваності молочної продуктивності між рангами лактацій, що свідчать про можливість проведення раннього прогнозування подальшої молочної продуктивності корів на підставі даних показників за першу лактацію і вказують на змогу швидкого темпу підвищення ефективної селекції з тваринами при масовому доборі.*

*Кращі показники надою корів відмічені у групі тварин найстаршого віку при першому отеленні (30 місяців і старше). Разом з тим, це економічно не вигідно та є наслідком проведення осіменіння телиць за живою масою. Тому пропонуємо в господарстві звернути увагу на питання спрямованого вирощування ремонтного молодняка. Також встановлено, що сезон народження телиць не впливає в майбутньому на очікувану молочну продуктивність корів.*

*Враховуючи отримані результати досліджень впливу сезону першого отелення на молочну продуктивність корів рекомендуємо проводити планування масових отелень корів на період зима-весна, що сприятиме підвищенню молочної продуктивності та кращій реалізації генетичного потенціалу тварин.*

*В цілому доведено, що висока молочна продуктивність корів зумовлена генетичними факторами, успадкованими від своїх батьків і предків та оптимальними умовами зовнішнього середовища. Встановлено залежність між показниками молочної продуктивності та віком, живою масою корів і сезоном при першому отеленні, належністю до лінії та генотипу бугая.*

**Ключові слова:** телиця, корова, порода, молочна продуктивність, жива маса, сезон, потомки.

# **ПРОГНОЗИРОВАНИЕ МОЛОЧНОЙ ПРОДУКТИВНОСТИ КОРОВ УКРАИНСКОЙ КРАСНОЙ МОЛОЧНОЙ ПОРОДЫ**

**А. Р. Дудок**  
ardudoc@mail.ru

Институт животноводства степных районов имени М. Ф. Иванова  
"Аскания-Нова" – Национальный научный селекционно-генетический центр по овцеводству  
ул. Красноармейская, 1, пгт Аскания-Нова, Чаплинский р-н,  
Херсонская обл., 75230, Украина

*Проведены исследования факторов, которые имеют влияние на формирование показателей молочной продуктивности у коров украинской красной молочной породы. Установлены высокой степени коэффициенты повторяемости молочной продуктивности между рангами лактаций, которые свидетельствуют о возможности проведения раннего прогнозирования последующей молочной продуктивности коров на основании данных показателей за первую лактацию и указывают на вероятность быстрым темпом повышения эффективной селекции с животными при массовом отборе.*

*Лучшие показатели удоя коров отмечены в группе животных, которые по возрасту при первом отеле были старше (30 месяцев и старше). Вместе с тем, это экономически не выгодно и является следствием проведения осеменения телок по живой массе. Поэтому предлагаем в хозяйстве обратить внимание на вопрос направленного выращивания ремонтного молодняка. Также установлено, что сезон рождения телок не влияет в будущем на ожидаемую молочную продуктивность коров.*

*Учитывая полученные результаты исследований, влияние сезона первого отела на молочную продуктивность коров рекомендуем проводить планирование массовых отелов коров в период зима-весна, что будет способствовать повышению молочной продуктивности и лучшей реализации генетического потенциала животных.*

*В целом, доказано, что высокая молочная продуктивность коров обусловлена оптимальными условиями внешней среды и генетическими факторами, которые наследованы от родителей*

*и предков. Установлена зависимость между показателями молочной продуктивности и возрастом, живой массой коров и сезоном при их первом отеле, принадлежности к линии и генотипу быка.*

**Ключевые слова:** телка, корова, порода, молочная продуктивность, живая масса, сезон, потомки.

The intensification of dairy cattle linked to the rational using of the gene pool of domestic cattle.

Increasing genetic potential of livestock on the main economic useful traits is possible through the using of breeding valuable animals, most of which is concentrated in breeding plants.

Definition of selection-genetic parameters and their relationships between breeding plants - one of the main ways of intensification of selection, because it reveals the breeding value of each animal and the population in general, to plan effectively recruitment and selection, identify areas of work with the herd and breed.

The main features of milk production occupy a central place in animal breeding cattle intensive dairy type. The main features of milk production occupy a central place in cattle breeding of intensive dairy type. More - or connected, or badly needed for dairy products at the lowest cost over a longer period of productive use of cattle, providing good health of animals, good reproductive functions and their resistance to unfavorable conditions of environmental.[1].

The level of milk production and composition of milk cows depend on many factors: age of the animal, birth and calving season and others. [2]. Unbiased establish the factors that determine the level of milk production is a profound basis for selecting the method of breeding aimed at improving the hereditary physiological characteristics that limits performance animals which are evaluated [3].

Signs of breeding dairy cattle which include the yield of milk, the mass of fat and protein in milk, live weight, body measurements and other indicators are determined by variability of genotype and paratype of populations, ie performance of any specimen depends on the genotype and the environment [4].

The purpose of research is to find ways of forecasting milk production of cows Ukrainian Red Dairy breed at an early age. Therefore, the definition of the relationship between the signs of breeding and the influence of genotypic and paratype factors on milk production performance is important.

**Material and methods research.** Studies conducted according to the basic data of accounting breeding farm with breeding Ukrainian Red Dairy breed CDD "Dawn" Belozersky district, Kherson region.

Milk yield of cows I, II, III lactations were evaluated for such parameters: milk yield, fat content in milk output and milk fat.

Statistical analysis of research materials was held by algorithms of N.A. Plohynskiy [5], E.K. Merkur'yeva [6] on the PC.

**Results.** The degree of repeatability breeding has enough features essential for selection, because the higher it is, the safer selection by first estimates, and the sooner we can determine the breeding value of animals, predicting effectiveness of selection.

As a result the studies were noted the factor age repeatability of milk production of cows between adjacent ranks of lactations increases differently (Table. 1). Established gradual growth of this factor on the milk yields and the number of milk fat to sixth lactation ( $r_s = 0,609, 0,613$ ), and for the fat content in milk - the seventh lactation ( $r_s = 0,284$ ).

**Table 1. Age repeatability of milk production of cows,  $r_s$**

Rank of lactation	n	Milk yields kg	Milk fat	
			%	kg
I-II	3560	0,322	0,048	0,319
II-III	2823	0,331	0,104	0,334
III-IV	2143	0,527	0,160	0,526
IV-V	810	0,528	0,150	0,509
V-VI	544	0,609	0,068	0,613
VI-VII	350	0,509	0,284	0,508
VII-VIII	216	0,616	0,193	0,601

The next data (Table 2) show that the factors repeatability of milk yield and the highest amount of milk fat were between I-IV lactations ranks at 0.330 and 0.332. The best lactation has highest amount of fat content in milk between all ranks which was 0, 338 (Table. 2). The coefficients which were installed showed the possibility of early prediction of future milk production of cows on the basis of performance in their first lactation and indicate possible to rapidly increase efficient breeding animals in mass selection.

Study of age at first calving cows on the formation of milk production showed that animals whose age at first calving was maximum value (30

months or more), characterized by higher rates of milk production (yield - 4346 kg, and the amount of milk fat - 165.8 kg) and they dominated the smaller animals by age yields 120 ... 390 ( $R \geq 0,095$ ) (Table. 3).

**Table 2. Repeatability of milk production of cows,  $n=3560$   $r_s$**

Rank of lactation	Index	$r_s$
I-III	Yields,kg	0,144
	Milk fat: %	0,038
	kg	0,139
I-IV	Yields,kg	0,330
	Milk fat: %	0,022
	kg	0,332
I-V	Yields,kg	0,241
	Milk fat: %	0,034
	kg	0,265
I-VI	Yields,kg	0,195
	Milk fat: %	0,051
	kg	0,243
I- the best lactation	Yields,kg	0,148
	Milk fat: %	0,338
	kg	0,087

Studies show that with increasing age of the cows observed their milk yield better however, it is not economically profitable and is the result of insemination of heifers by live weight. So it is necessary in the farms breeding to pay attention to the directed cultivation of repair young.

On the basis of the studies noted the impact of the varied live weight at first calving cows in milk production. Also found that heifer's season of birth did not affect the expected future performance of dairy cows.

Experience of cattle breeding indicates the existence of substantial dependence of quantitative and qualitative indicators of milk production from such paratype factors as the season of calving cows. According to the results of numerous studies the animals that had calved in the autumn-winter and winter-spring periods were characterized by the highest milk yields, and the lowest yield was observed in cows with summer calving period [7, 8, 9, 10].

Analysis of indicators of the seasonality of calving animal Ukrainian Red Dairy breed, indicating that in the farm had taken place year-round calving with displacement greater part thereof in the winter-spring months.

Study of the season at first calving cows milk production showed that animals that calved during winter and spring, characterized by better yields compared to the first-born who calved in other seasons (tab. 4).

The resulting impact indicators paratype factors including the age and live weight at first calving season, showed the impact of these factors on parameters of milk production of cows Ukrainian Red Dairy breed.

According to the analysis of milk production of cows Ukrainian Red Dairy breed of different genotypes found that the maximum productivity from animals whose genotype has more than 75% of blood Holstein breed, 4887 ... 5357 kg of milk.

**Table 3. Effect of age of first calving cows on their milk production during their first lactation for 305 days**

Age in months	Index	$X \pm S_x$
Before 24,9	<b>n</b>	<b>33</b>
	Yields,kg	3956±156,0
	Milk fat %	3,89±0,027
	kg	153,5±5,84
25,0-27,9	<b>n</b>	<b>224</b>
	Yields,kg	4226±68,0
	Milk fat %	3,87±0,011
	kg	163,1±2,54
28,0-30,9	<b>n</b>	<b>772</b>
	Yields,kg	4043±38,7
	Milk fat %	3,83±0,005*
	kg	154,5±1,44
After 30	<b>n</b>	<b>2345</b>
	Yields,kg	4346±25,2*
	Milk fat %	3,83±0,003*
	kg	165,8±0,93*

Note: \*  $R \geq 0,095$

Equally important is the selection for study of the effect of linear association, parents on the performance of dairy cows performance management. As shown evaluated milk production of cows of different linear

association, in a dairy farm were descendants 1458744.64 lines of Astronavt in milk yield 6003 kg and Valiant 1650114.73 - 5484 kg.

**Table 4. Effect season first calving cows on their milk production during their first lactation for 305 days**

Season	Index	$X \pm S_x$
Spring	<b>n</b>	<b>1197</b>
	Yields,kg	4325±33,4
	Milk fat %	3,83±0,004
	kg	165,3±1,25
Winter	<b>n</b>	<b>715</b>
	Yields,kg	4373±43,5
	Milk fat %	3,82±0,005
	Kg	166,5±1,61
Summer	<b>N</b>	<b>871</b>
	Yields,kg	4119±40,6
	Milk fat %	3,84±0,004
	kg	157,7±1,51
Autumn	<b>n</b>	<b>592</b>
	Yields,kg	4231±48,9
	Milk fat %	3,83±0,007
	kg	161,7±1,82

Overall, the best yield performance of the farm animals characterized by Astronavt 1458744.64 lines, Valiant 1650114.73, Eleveyshn 1491007.65, Inhansera Rs and 343514.77 and Hanover Red 1629391.72, from which received 4093 ... 5313 kg of milk for the first lactation. Animals other lines were characterized by lower milk production for the first lactation.

Also found that compared with their peers daughters of bulls V.Dina Et 5661918 Red, S.S. Houm Et Red 399 264, Jayma Reid 399 456, H.Ch.Herri Et Red 5839897, Karlo Red 3231599, Orient Red TI 391781, Sapfir Et Red 401,799, Indhzyr 2431896, Smiliy 473, Krokot Et Red 395835, Vulkan 439, Azot 22, Salon 2059, Zamok 1429, Max Red 203228/3074, Zontik 2025, Symvol Et 815, Segment Et Red 4055421, O.Z.Harri Red 5007059, Kumach 1945, Radar 4439 and Yar 8613 for the first lactation produced more milk (over 4,000 kg).



**Conclusions.** The high degree of repeatability coefficients between milk production ranks lactations, indicating the possibility of early prediction of future milk production of cows on the basis of performance in the first lactation and indicate possible to rapidly increase efficient breeding animals in mass selection. Given the results of the above studies of the impact of the first calving season on milk production of cows recommend planning to spend massive calving cows during the winter-spring that will increase milk production and better implementation of the genetic potential of animals.

Finally is proved that high milk yield of cows caused by genetic factors inherited from parents, ancestors and optimal environmental conditions. The dependence between the indexes of milk production, age and body weight of cows at first calving season, belonging to genotype lines and bulls is determined.

#### **List of the quoted literature**

1. Basovskiy N.Z. Metodicheskiye rekomendatsii po razrabotke i optimizatsii programm selektsii v molochnom skotovodstve [Guidelines on the development and optimization programs selection in dairy cattle breeding]: / N.Z. Basovskiy, V.M. Kuznetsova. – Leningrad, 1977 – 87 p. (in Russian)
2. Eysner F.F. Plyemennaya rabota s molochnym skotom [Breeding work with dairy cattle] / F.F. Eysner. – Moscow: Agropromizdat, 1986. – 184 p. (in Russian)
3. Basovskiy N.Z. Krupnomashtabnaya selektsiya v zhitovnovodstve [Large-scale breeding in animal husbandry]: / Basovskiy N.Z., Burkat V.P., Vlasov V.I., Kovalenko V.P. – Kyiv: Ukraine, 1994. – 375 p. (in Russian)
4. Plohinskiy N. A. Rukovodstvo po biometrii dlya zootehnikov [Guide biometrics for livestock]: Plohinskiy N. A. – Moscow: Kolos, 1969/ - 25 p. (in Russian)
5. Myerkuryeva Ye. K. Biometriya v selektsii i genetike selskohozyaystvennykh zhitovnykh [Biometrics in plant breeding and genetics of farm animals]: Myerkuryeva Ye. K. – Moscow: Kolos, 1970. – 423 p. (in Russian)
6. Nyedviga N. Nyekotorye faktory, vliyayushchiye na molochnyuyu produktivnost korov – pervotyolok [Some factors affecting the milk production of the first-born cows] / Nyedviga N., Dripa A., Pudyk I // Puti uvelicheniya proizvodstva i uluchsheniya kachestva produktsii zhemlyedeliya i zhitovnodstva. [Ways to increase production and improve the quality of products of agriculture and animal husbandry] – Kyiv, 1980. – p. 152-155. (in Russian)
7. Ramik V.P. Vplyv otelennya na molochy produktivnist pervistok ukrainskoyi chervono-ryaboyi molochnoyi porody [Effect of calving season on milk produc-

tion firstborn Ukrainian red-white dairy cattle] / Ramik V.P., Melnik V. Ya., Oliynychenko // *Novi metody selektsii i vidtvorennya vysokoproduktyvnyh porid il typiv tvaryn* [New methods of selection and playback of high-performance breeds and types of animals]: materials of science and manufacturing conference. – Kyiv: Association “Ukraine”, 1996 – P. 145

8. Suprun I.O. Vplyv sezonu otelennya na produktyvnist I dov golittya koriv ukrainskoyi chervono-ryaboyi molochnoyi porody[Effect of calving season on the productivity and longevity of cows Ukrainian red-white dairy cattle] / Suprun I.O. // *Visnyk Cherkaskogo institutu agropromysloвого vyrobnytsva - Bulletin of Cherkassy Institute of Agroindustrial Production*, Issue. 3. -2002. – P. 188-192.

9. Sopek Z. Wplyw sezonu wycielenia na wydajnosć i skład mleka krow hodowanych woborze tradycyjnwi i w oborach wielkostadnych / Sopek Z., Janicki C. // *Roczn. Nauk. roln. Ser.* – 1988. – V. 104, № 1. – S. 45-55.