CONSERVATION OF GENETIC STOCK OF CATTLE BREEDS IN THE UKRAINE

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SUMMARY

The dynamics of cattle breeds from 1935 to 1990 has been analysed in the paper. It was found out that some breeds such as the Grey Llkrainian and the White-Headed Ukrainian, were on the verge of disappearing, even certain breeds introduced in the early fifties a d well adapted since (Pinzgau, Red Polled and Brown Carpathian). Some forms and methods of conservation of cattle breeds in the Ukraine were considered. Urgent measures of conservation are required, even the number of cattle of the Simmental type was greatly reduced. The group of more recently introduced beef breeds is unstable and small. Methods of cattle breeding for 100 years have been analysed. It was stated that it was necessary to raise the importance of pedigree breeding, to change the selection index principle for cows developed by crossing related breeds of cattle. Methods and forms to conserve valuable genotypes of breeds were discussed. They will help to conserve genetic stock of cattle. It has been suggested to evolve a new type of beef Simmental cattle as well as to use the double purpose type. In order to conserve genetic stock of cattle breeds, thé theory on symmetry of Vernadsky was used. It could allow determining the interrelation "genotype-environment". The importance of continuous on-farm inspection programmes as a means of monitoring numbers and husbandry conditions is underlined.

RESUME

Ce travail analyse la dynamique des races bovines de 1935 à 1990. On a trouvé que certaines races étaient sur le point de disparaître, telles que la Grey L1krainian et la White-Headed LTkrainian, ainsi que d'autres races introduites dans les années 80, qui cependant étaient bien adaptées; par exemple, la Pinzgau, la Red Polled et la Brown Carpathian. En outre, on analyse certaines formes et méthodes de conservation des races bovines. Il est urgent d'établir des mesures de conservation, étant donné que même des races comme celles du type Simznental présentent actuellement une forte réduction. Le groupe de races à viande introduites récemment est instable et peu nombreux. On a analysé les méthodes d'amélioration du dernier siècle. On conclu qu'il est nécessaire de redonner de l'importance à l'amélioration génétique à travers la méthode de pedigree, ainsi que de changer les principes de l'index de sélection pour les bovins avec des croisements avec des races bovines apparentées. On présente également les méthodes et formes de conservation de génotypes de races intéressants, ce qui contribuera à préserver le stock génétique bovin. On suggère de développer un nouveau type de race Simmental à viande, ainsi que d'utiliser des types à double propos. Afin de conserver les stocks génétiques des races bovines, on a utilisé la théorie sur la symétrie de Vernadsky; ce qui nous permet de déterminer la relation "génotype-environnement". On souligne l'importance des programmes de suivi dans les élevages afin de contrôler l'effectif et les conditions de la conduite.

1.0 INTRODUCTION

The importance of forms and methods of breed conservation as a means of cattle breed selection has been increasing in recent years. The use of numerous imported breeds for crossing, greatly reduced the number of native cattle; today even exotic breeds of cattle such as Simmental and Red Steppe, imported and widely used since before the war, are in danger. Others, such as the Swiss Brown and Pinzgau, are on the verge of disappearing under the pressure of crossbreeding with the Black and White. It is necessary to take urgent measures to conserve this animal genetic stock. Therefore, the state plan of area distribution, new methods of purebred selection and various forms of genetic stock conservation are of great importance. In order to conserve breed genotypes the teaching of V.I. Vernadsky on symmetry could be used and continuous monitoring by herd inspection must be done by highly qualified specialists in the field of animal science. Processes that take place in selection are not simple.

On the other hand, in recent years a new Red and White milk breed type was developed in the Ukraine (1992), evolving from the local Simmental cattle. In 1993 a new Ukrainian beef breed was approved; the result of erossbreeding between the indigenous Grey Ukrainian and Simmental, Charolais and Chianina breeds. These developments encouraged the author to examine fizrther this problem.

2.0 DATA COLLECTION AND POPULATLON CHANGES

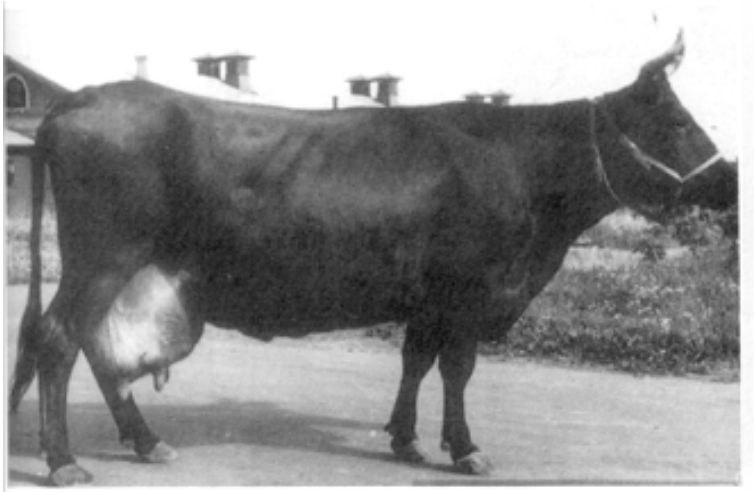
The dynamics of cattle breeds in the Ukraine from 1935 to 1990 were studied in detail. Note can be taken of the methods of breed selection and the different trends according to breed productivity for the period of more than 100 years.

From 1935 and up to 1990 cattle breeds in the Ukraine were only analysed according to their productivity. The population changes of dairy, dual purpose and beef breeds of cattle were estimated and are given in Tables l, 2 and 3. There are today in all 32 breeds of cattle in the Ukraine ineluding 17 dairy breeds, 7 dual purpose breeds and 8 beef breeds. The number of dairy breed cattle was increased from 69.54% in 1935 to 73.06% in 1990. In particular, the numbers of the so-called Red dairy type breeds were reduced from 56.07% in 1935 to 38.38% in 1990 (Table 1). At the same time, the numnbers of Black and White dairy cattle have greatly inereased from 0.80% in 1935 to nearly 35% in 1990. The reduction of the number of other breeds of dairy cattle was spectacular, from 12.6% in 1935 to 0.29% in 1990.

The oldest major dairy breeds of cattle in the Ukraine is the Red Steppe (37.44% in 1990), while the Black and White (32.05%) is a later arrival. The numbers of the indigenous White Headed Ukrainian dairy cattle were reduced from 12.53%(1935) to 0.04% (1990). If an etivrt is not made urgently to preserve this breed, it will certainly be past history by the end of the century.

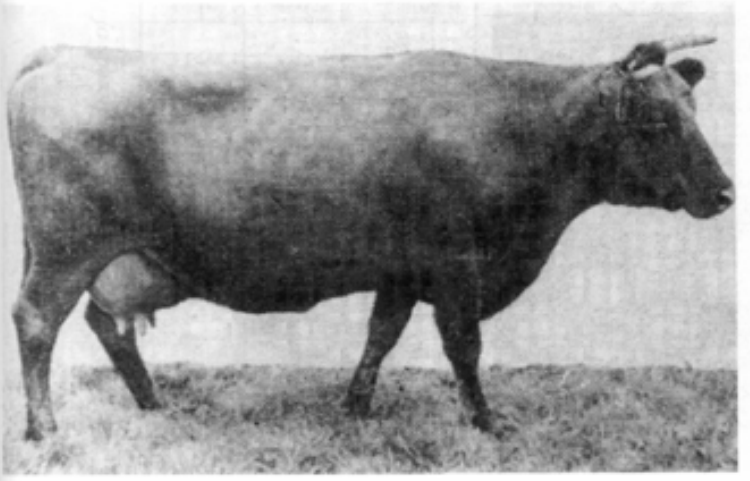
There was a reduction in the number of dual purpose breed cattle from 30.13% in 19 35, up to 45.67% in 1955, and down still further to 26.79% in 1990. The indigenous Grey Ukrainian is totally endangered; from 6.45% at all cattle i1 1935 to (0.01%) in 1990. The numbers of cows of the “regional” imported breeds were slightly reduced the I.ebedin breed from 3.24o/o in 1935 to 2.93% in 1990, and the Brown Carpathian breed from 0.98% in 19 35 to 0.86% in 1990, the Pinzgau follows the same trend (0.27% in 1935-0.09% in 1990). Simmental breed cattle went from 21.52% in 1935 up to 39.34% in 1964 and 22.90% in 1990.

There is no truly indigenous beef breed in the Ukraine; there exists a small population of improved beef cattle:14.09% in 1935; 2.79% in 1955; 21.36% in 1990. In 1993 the Chernigov beef type and Prednieper beef types were united and formed one group, the Ukrainian beef breed with a population making up for half of all beef cattle. Today the most important breeds in the Ukraine are the Black and Whites, the Red Steppe and Simmental. Then, the Red Poll, the Lebedinskaya, and the Brown Carpathian. The indigenous Grey Ukrainian and the White Headed Ukrainian are in serious danger of disappearing. State protection is urgently required to conserve them.

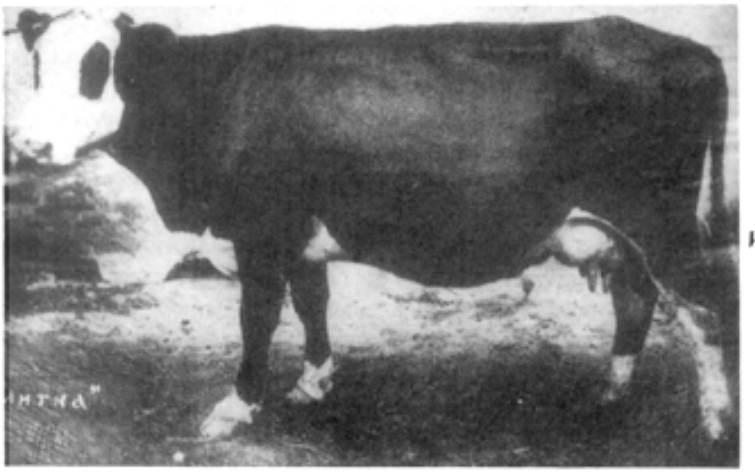


Red Steppe: the Cow Kama

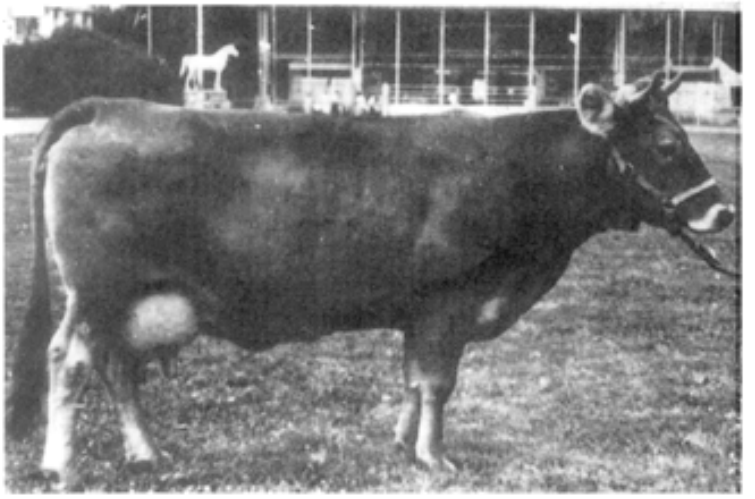
Red Steppe: the Bull Asket



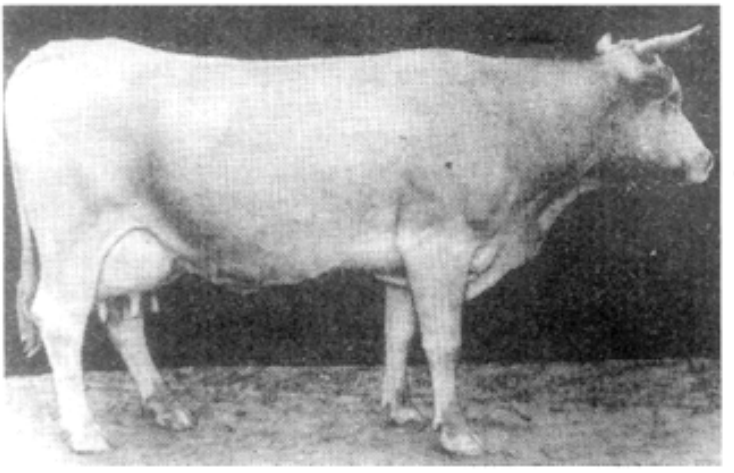
Red Polled: the Cow Shruba



White Headet Ukrainian: the Cow Ulitka



Labedinskaya: the Cow Mereshka



Brown Carpathian: the Cow Yuvileyna

Table 1: *Dynamics of dairy breeds of cattle in the Ukraine (%)*

Breeds	Year								
	1935	1939	1955	1960	1964	1969	1974	1985	1990
Red Steppe	56.01	58.18	38.63	40.16	40.03	39.57	39.62	38.35	37.44
Brown Lathvian	-	-	0.02	0.22	0.16	0.17	0.13	"-"	-
Red Estonian	-	-	"-"	0.10	0.02	0.04	0.05	"-"	"-"
Red Polled	-	-	2.31	2.25	1.86	1.96	1.54	1.02	0.86
Red Danish	-	0.03	-	-	"-"	"-"	"-"	0.08	0.02
Angler	0.06	"-"	0.04	0.01	"-"	"-"	"-"	0.11	0.06
Red Lithuanian	-	-	-	0.02	"-"	"-"	-	-	-
Total number of red breed	56.07	58.21	41.00	42.76	42.07	41.74	41.34	39.56	38.38
Black and White	-	-	6.04	6.91	7.44	9.17	11.93	28.32	32.05
Dutch	-	0.80	-	-	"-"	0.01	0.01	0.03	0.02
Black and White Estonian	-	-	-	-	"-"	"-"	0.01	"-"	0.01
Black and White Lithuanian	-	-	-	0.02	-	-	-	"-"	0.01
Ostfriesian, Black and White German	0.50	-	-	-	-	-	-	"-"	0.02
Holstein Black and White, Red-White	-	-	-	-	"-"	-	-	0.40	2.26
Friesland	-	-	-	-	"-"	-	-	-	-
Oldenburg	0.30	0.57	-	-	-	-	-	-	-
Black and White Danish	-	-	-	-	-	-	-	"-"	0.01
Britain-Friesian	-	-	-	-	-	-	-	"-"	0.01
Total number of Black and White breeds	0.80	0.65	6.04	6.93	7.44	9.18	11.95	28.75	34.39
White Headed Ukrainian	12.53	11.98	7.28	6.42	5.58	4.58	4.12	0.35	0.04
Kholmogor	0.03	0.02	-	0.02	0.03	0.02	0.01	-	-
Yaroslavl	0.11	0.03	-	-	-	-	-	-	-
Tagil	"-"	"-"	-	-	-	-	-	-	-
Jersey	-	-	-	"-"	0.09	0.01	"-"	"-"	"-"
Ayrshire	-	-	-	-	-	"-"	"-"	0.48	0.25
Other dairy breeds	12.67	12.03	7.28	6.44	5.70	4.61	4.13	0.83	0.29
Total number of dairy breeds	69.54	70.89	54.32	56.13	55.21	55.53	57.42	69.14	73.06

Note: "-" specific weight of breeds below 0,01% is designated.

Table 2: *Dynamics of dual purpose breeds of cattle in the Ukraine (%)*

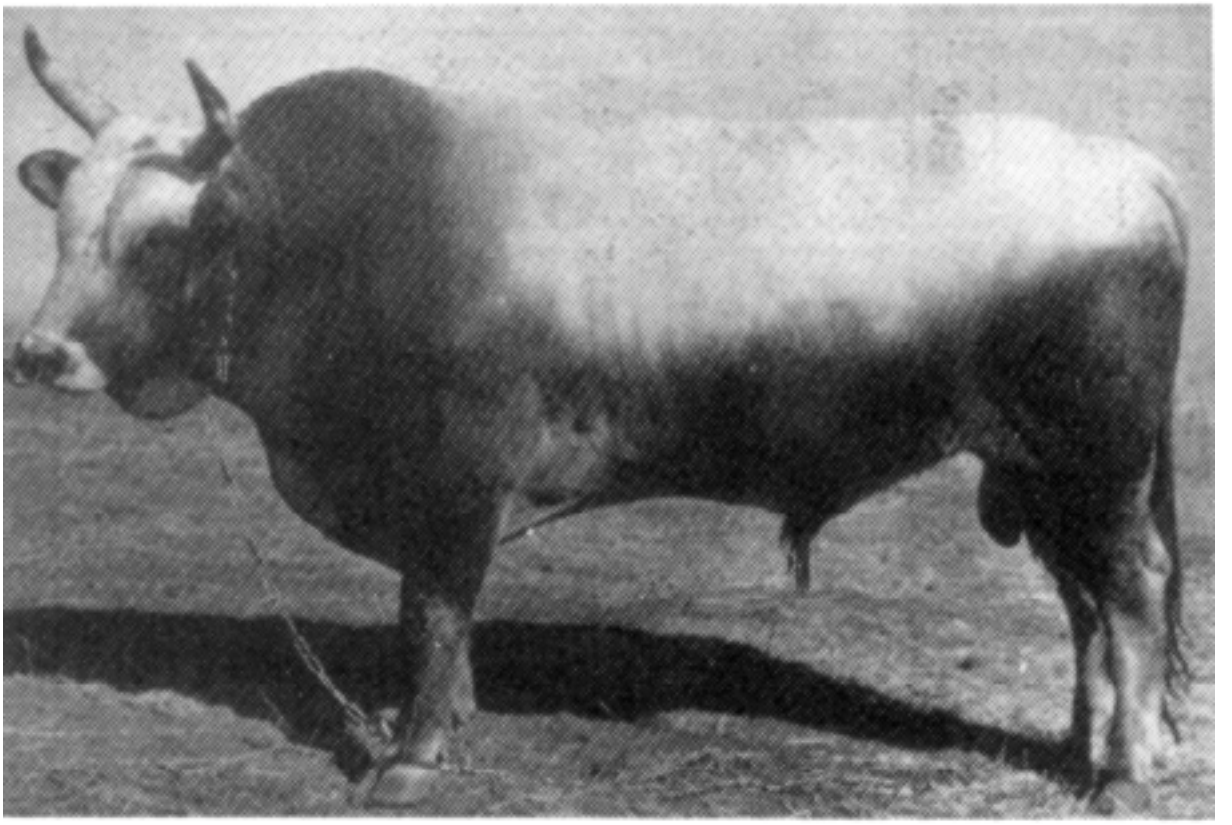
Breeds	Year								
	1935	1939	1955	1960	1964	1969	1974	1985	1990
Simmental	21.52	22.82	37.49	37.30	39.34	39.18	37.38	26.19	22.90
Sichevsk	-	-	-	-	-	"-"	"-"	-	-
Monbeliard	-	-	-	-	-	-	-	0.03	"-"
Total number of "red spotted"	21.52	22.82	37.49	37.30	39.34	39.18	37.38	26.19	22.90
Swiss	2.18	1.88	-	-	"-"	0.01	"-"	0.01	"-"
Lebedinskaya	-	-	3.24	3.47	3.61	3.91	3.91	3.38	2.93
Kostromskaya	-	-	0.01	0.01	0.01	-	-	-	-
Brown Carpathian	-	-	0.98	0.93	0.93	1.05	1.00	0.97	0.86
Total number of "brown" breeds	2.18	1.88	4.23	4.41	4.55	4.97	4.91	4.36	3.79
Pintsgau	-	-	0.27	0.20	0.17	0.15	0.10	0.10	0.09
Grey Ukrainian	6.43	4.19	3.68	1.96	0.72	0.15	0.03	"-"	0.01
Shorthorn dairy type	-	-	-	-	"-"	"-"	-	-	-
Bestuzhev	"-"	"-"	-	-	-	-	-	-	-
Red Gorbatovskaya	"-"	"-"	-	-	-	-	-	-	-
Kurganskaya	-	-	-	"-"	"-"	-	-	-	-
Total number of other dual purpose breeds	6.43	4.19	3.95	2.16	0.89	0.30	0.13	0.10	0.10
Total number of dual purpose breeds	30.13	28.89	45.67	43.87	44.78	44.45	42.42	30.68	26.79

Table 3: *Dynamics of beef breeds of cattle in the Ukraine (%)*

Breeds	Year								
	1935	1939	1955	1960	1964	1969	1974	1985	1990
Hereford	-	-	"-"	"-"	0.01	0.01	0.02	0.04	0.02
Aberdeen - Angus	-	"-"	-	"-"	"-"	0.01	0.04	0.01	0.03
Santa - Gertrude	-	-	-	-	"-"	"-"	"-"	"-"	"-"
Charolais	-	-	-	-	"-"	"-"	0.10	0.02	"-"
Limousin	-	-	-	-	"-"	"-"	-	"-"	"-"
Shorthorn beef type	0.14	0.21	0.01	"-"	"-"	-	"-"	-	-
Kazakh White Headed	-	-	-	"-"	"-"	-	"-"	-	-
Holloway	-	-	-	-	-	-	"-"	-	-
Kalmitskaya	0.19	0.01	-	-	-	-	-	-	-
Chernigov beef type	-	-	-	-	-	-	-	0.07	0.08
Prednieper beef type	-	-	-	-	-	-	-	0.04	0.02
Kian	-	-	-	-	-	-	"-"	"-"	"-"
Aquitaine Light	-	-	-	-	-	-	-	"-"	"-"
Men - Anjou	-	-	-	-	-	-	-	"-"	"-"
Total number of beef breed	0.33	0.22	0.01	"-"	0.01	0.02	0.16	0.18	0.15

Breeds have both Iocal and world-wide distribution and significance. The evolution and economic adaptability of cattle breeds are due to the history of their development. Cattle of the Simmental, Swiss, Red, Black and White and some breeds of beef type belong to the ones having world-wide significance. Local breeds have, in general, dwindling numbers despite their valuable peculiarities, adaptability to local conditions and specialized high quality of products.

To obtain more exact information on the area distribution and distance evolution in a country such as Ukraine, it is necessary to take into account the regional situation: Steppes, Forest Steppes, woodlands, and the Highlands and Foothills of the Carpathian mountains. From the so-called "new" breeds the Red Steppe has ben well acclimatéd in the Steppe region: the Simmental and Lebedinskayain the Forest Steppes, the Black and White breed in the Lowlands and Woodlands, the SimmentaI and Brown Carpathian breeds adapted better in the Highlands and Foothills of the Carpathians.

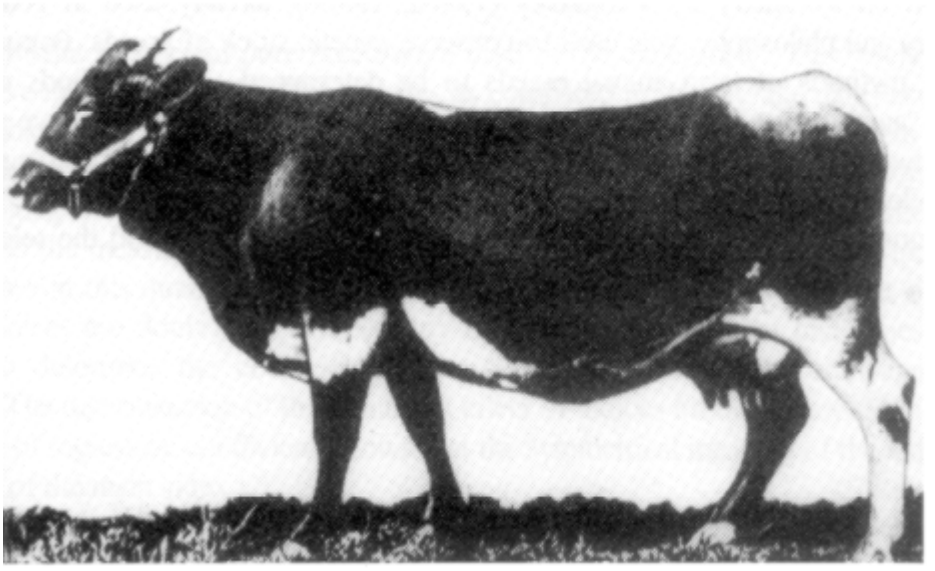


Grey Ukrainian: the Bull Glif

3.0 METHODS OF SELECTION

As for the methods of breeding and selection, it is possible to follow the changes that have taken place for the period of more than 100 years. The evolution of breeding methods has been gradually changed. It is now associated with the rate of breed improvement. Crossbreeding is widespread in the Ukraine. Purebred is not often used nowadays. Crossing of different breeds has led to the reduction of local breeds of cattle despite the fact that the latter are characterized by their strong constitution adaptability and other useful qualities. The problem of related breed mixing should be a1so clarified. At a certain stage of breed improvement this method played a very important role in the Ukraine. However, in spite of the relationship between breeds they are in fact different, not only in the qualities but in adaptation for climatic conditions. The relationship is conditional: the breeds used were separated from their ancestors by decades. During that period different methods of selection and breeding were used. It concerns the group of SimmentaIized breeds (Simmental, Monbeliard, etc.), the group of Black and White breeds (Black and White, Holstein, Dutch, etc.), the group of Brown breeds (Lebedinskaya, Brown Carpathian, Swiss of American type, etc.). Under such conditions it is necessary to understand and raise the importance of such notions as breed type, constitution, resistance to different diseases, the strength of adaptability, etc. That is why it is necessary to give a more precise definition to the practice of pedigree selection in the Ukraine, taking into account correct methods of breeding and selection:

Method	Requirements for breedmg methods
Pure breed	Evolving of pure breed parents of one and the same breed. In absorbing crossing, beginning with hybrids of the third generation if the type of the breed is well defined. In introductory crossing, begrinning with hybrids of the third generation if the aim to evolve a desirable type of cattle breed is achieved.
Crossing	Crossing of different breeds (related and unrelated/distant) as well as breeding of hybrids “in itself’.



Cow Pinzgay

The pure breed method will promote the development of animals of strong constitution. The number of regions where there are externa conditions of cattle breeding has been increased in the Ilkraine. It is connected with the disastrous effects of the explosion in the Chernobil atomic power station.

Purebred animals with strong constitution will meet the requirements of cattle breeding in the conditions mentioned above. To conserve valuable genotypes, methods and forms of conservation of genetic stock of cattle have been worked out:

Forms of genetic stock	Methods of breed genetic
conservation of breed	stock conservatïon
Client for breed	Conservation of selection main body of breed and improvement by methods of intrabred selection (pedigree; seection)
Genetic stock depot of produccers' sperm and frozen embryo ot different breeds	Long-time maintenance of producers' sperm of all to use in the selection
Relic farm	Genetic resere of sharply reducing native breeds, pedigree selection with outbred type of selection
Genetic stock-farm	Genetic reserve of sharply reducing native breeds, pedigree selection with outbred type of selection
Genetic stock-pedigree farm	Rearing of valuable pedigree producers for pedigree farms. Method of pure breed in Liniars together with inbreeding is used

The reserve of producers' sperm of different breeds in special depositories is one of the forms that is widely used in the Ukraine and in many other countries of the world. But this form of genetic stock conservation of breeds does not solve all the problems. The genetic stock of local breeds is to be used now when intensification of production is taking place, as the. strength of their constitution and the resistance to different diseases are the necessary conditions ofcattle selection.

Urgent measures including the ones at the State level must be taken to conserve valuable breeds of cattle in the Ukraine. For example Simmental breed is a dual purpose breed. But it has become a dairy breed due to crossing with Red and White Holstein and other dairy breeds. Breeding for beef characters has also become important. To solve this problem is necessary to evolve beef types and breeds of cattle, to introduce intensive methods of beef production as well as to use genetic stock of Simnmental mixed and other breeds of this type, to develop Simmental cattle of beef type.

The method on symmetry by Vernadsky (1988a, 1988b), already used in geology, physics ,

chemistry, biology and philosophy, was used to conserve genetic. stock of breeds. Population genetics allows the main methods of farm animal breeds to be determined. The methods of isolation of morphologically "average" and "extreme" phenotypes on the basis of total quantitative signs has been suggested by Zhivotovsky and Altuchov (1980), Altuchova (1989). The basic teaching on symmetry consists in the following: the animal should be considered only in interrelation with the environmental conditions. The question is that the popu.Iation of breeds must be resistant and the selection must be purposeful.

Experiments were carried out at the breeding farm “Pervuhin-sky”, Bogoduhov district, Kharkov region. Purebred Simmental cows were used. To determine principles of selection of thoroughbred cattle, the method of symmetry was used. There are 2177 head of cattle on tho farm, including 680 cows of Simmental and Red and White breeds. The farm has 2 904 ha of land of which 2 664 ha is of arable land including 2 457 ha of field. 924 ha of la.nd are under forage crops, 34.7% of the total number. For the last three years the amount of fodder units per hectare was 473 double centner; 65.8 d.centner of fodder units per cow were spent on average. The milk yield per cow for the 1ast three years was 4 550 kg; gross milk yield - 3 094 tons, per 100 ha of arable land -1120 d.centners. It was necessary to spend 1.44 centner of fodder units to produce 1 centner of milk.

Purebred cows of the Simmental breed were selected (taken) for the experiment. Special methods were used to select the cows.15 measurements were taken and the fatness of cows was estimated in numbers. To define the effect of the milk yield on the indices under review, all the cows were divided into three groups depending on the yield; the first group - cows having the average milk yield per group the second group - above average and the third one - below average. The coefficient values of yield regression as compared to the effect of 17 signs (measurements, fatness, fat content) were determined. To give more detailed characteristics of the cows’ index of conformation and other sig_ns that influence the yield of milk, fat content, live weight, the development of bone tissue have been adduced (table 4).

TABLE 4:

Characteristics of dairy qualities of cows of the Simmental breed depending on the level of productivity

Indications	Average per group	Above average	Below average
Dairy qualities (kg)	4 422.3	5 345.8	3 650.0
Fat content of milk (%)	3.78	3.77	3.79
Milk fat (kg)	167.2	201.5	138.3
Live weight (kg)	503.5	505.2	502.6
Yield per 100 kg of live weight (kg)	878	1058	726
1kg of milk per 1cm of grasp off metacarpus(kg)	225.0	270.5	187.2
1 kg of milk per 1 cm of height at withers (kg)	33.84	41.06	27.84
1 kg of milk per 1 cm of grasp of ehest (kg)	21.73	26.08	18.04
1 kg of milk per 1 cm of the grasp of belly kg)	19.04	22.67	15.90

Cows of the Simmental pure breed were used in the experiment. They were divided into three groups (above the average, below the average, as compared to the average data) according to the yield of milk (Tables 5 and 6). One can see that there is 1 % inerease in fat content of milk, the yield decreasing accordingly in all 3 groups (R). On the basis of measurements, the dependence of milk yield on the changing of 1 cm of sign dimension has been stated. If the index has the sign /-/, the yield decreases and the measurement increases in 1 cm or visa versa. If there is 1 cm increase in index, the yield increases in this quantity. If the standard deviation exceeds the coefficient of regression for all cases the indices are doubtfizl. Unauthenticity of indices of some sign underlines the fact that it is necessary to determine the coefficient of regression of yield on the combined effect of all 17 indications. The determination of the combined effect of indices on the milk yield in cows expressed in the meaning of regression coefficient, shows that the symmetrical meaning of the indication depends on the quantity of the main index.

Table 5: *Division of Sinmental cows into three groups according to milk yield (average yield per herd; above average, below average)*

No.	Index	Average per group (n=101)				Above the average (n=46)				Below the average (n=55)			
		M	m	G	Cv	M	m	G	Cv	M	m	G	Cv
1	Milk yield (kg)	4 422.3	104.0	104.0	23.50	5 345.8	108.0	724.9	13.56	3 650.0	66.2	486.8	13.30
2	Fat content (%)	3.78	0.01	0.11	3.08	3.77	0.02	0.16	4.29	3.79	0.01	0.05	1.41
3	Height at withers (cm)	130.7	0.46	4.69	3.59	130.2	0.67	4.51	3.46	131.1	0.65	4.80	3.66
4	Height at sacrum (cm)	138.2	0.51	5.17	3.74	138.3	0.77	5.19	3.75	138.1	0.70	5.16	3.74
5	Breadth of chest (cm)	69.3	0.61	6.17	8.90	69.34	0.84	5.63	8.13	69.27	0.89	6.58	9.50
6	Depth of chest (cm)	49.8	0.76	7.67	15.39	49.69	1.03	6.91	13.91	49.92	1.12	8.24	16.52
7	Slanting length of body (cm)	153.5	0.74	7.40	4.82	154.4	1.24	8.34	5.40	152.7	0.87	6.41	4.19
8	Breadth at hip-joints (cm)	48.8	0.44	4.42	9.04	49.26	0.73	4.92	10.0	48.58	0.53	3.92	8.07
9	Length of hindquarters (cm)	53.0	0.57	5.71	10.77	53.65	0.48	3.25	6.06	52.60	0.96	7.12	13.50
10	The grasp of chest behind the shoulderblades	203.5	1.22	12.26	6.02	205.0	1.24	8.53	4.16	202.3	1.98	14.5	7.19
11	The grasp of metacarpus (cm)	19.65	0.07	0.75	3.82	19.76	0.10	0.68	3.48	19.50	0.10	0.78	4.02
12	Breadth of paunch (belly) (cm)	60.57	0.74	7.42	12.25	60.73	1.02	6.85	11.20	60.4	1.06	7.86	13.0
13	Depth of paunch (cm)	72.03	0.58	5.82	8.08	72.82	0.90	6.04	8.29	71.3	0.75	5.55	7.78
14	The grasp of paunch (cm)	232.3	1.49	14.91	6.41	235.8	2.04	13.7	5.85	229.5	2.07	15.25	6.64
15	Length of paunch (cm)	79.2	0.59	5.95	7.51	80.0	0.77	5.18	6.47	78.6	0.87	6.44	8.20
16	Straight length of body (cm)	133.2	0.71	7.19	5.39	134.0	1.02	6.89	5.14	132.6	1.00	7.37	5.55
17	Fatness, number	3.78	0.01	0.11	3.08	3.77	0.02	0.16	4.29	3.79	0.01	0.05	1.41

TABLE 6:
Dependence of yields of cows of the Simmental breed on dimensions, received with the help of the regression method

No	Index	Average per herd (n=101)		Above th average (n=46)		Below the average	
		R	Standard deviation	R	Standard deviation	R	Standard deviation
1	Fat content in milk	-1008.1	990.48	-175.94	747.42	-759.44	1452.18
2	Height at withers	-30.18	35.76	36.91	38.01	22.53	22.43
3	Height at sacrum	26.68	32.52	37.22	35.2.9	17.18	20.59
4	Breadth of chest	-30.61	-8.89	30.04	-32.69	14.73	24.39
5	Depth of chest	-10.55	15.19	-2.96	21.41	-4.81	9.57
6	Slanting length of body	25.60	18.50	10.01	17.98	12.63	14.45
7	Breadth at hip joints	11.80	27.07	-5.60	23.23	-3.84	23.63
8	Length of hindquarters	9.63	41.03	59.31	44.41	-14.06	25.10
9	The grasp of chest	-7.49	13.30	-39.39	25.23	3.64	7.46
10	The grasp vemetacarpus	-39.55	162.96	-283.59	194.01	-75.66	99.99
11	Breadth ofpaunch	-4.75	19.51	10.52	19.69	0.17	14.65
12	Depth of paunch	2.49	27.67	16.92	34.91	-1.34	21.76
13	The grasp of paunch	4.88	11.98	-4.78	12.49	-14.16	8.48
14	Length of paunch	40.80	31.37	30.26	35.33	-8.53	18.25
15	Straight length of body	-16.73	27.91	-19.96	27.28	15.25	18.42
16	Fatness	164.13	1026.19	-775.7	1362.3	299.30	631.38

4.0 CONCLUSIONS

The use of the method on symmetry by Vernadsky V.I. can explain the state of breed population and give the ground for the breed population to cozrespond with the aims of genetic stock conservation and to show the connection of milk yield with different indications that characterize the constitutional index of a.nimals.

The method of herd inspection by experts who are well aware of the cattle breeds and methods of their impro vement and conservation is of great importance under such conditions.

The method mentioned above can grive the answer to the major problems touching on such trends in breeding programmes as:

- determination of desirable type of cattle in breed;
- studying of breed state and its common reactions to the environmental conditions;
- determination of further improvement of selection progress in breed and breed conservation.

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