УДК 636.2.082.21(477)

METHODICAL ASPECTS OF THE MONTBELIARDE BREED GENE POOL CREATION IN UKRAINE

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The methodical aspects of the Montbeliarde breed gene pool in Ukraine creation are presented. The animals have been estimated and selected by their ancestors' milk productivity, ability to transmit these productive traits, body development, term of pregnancy and pedigree. The milk quality was defined by methods according to ISO 5538: 2004.
Keywords: **Montbeliarde breed, genealogical bloodline, successor of bloodline, heifer**

МЕТОДИЧНІ ОСНОВИ СТВОРЕННЯ ГЕНОФОНДНОГО СТАДА МОНБЕЛЬЯРДСЬКОЇ ПОРОДИ В УКРАЇНІ

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Викладено методичні підходи, які були використані при створенні генофондного стада монбельярдської породи в Україні. Оцінку та добір тварин здійснено за ознаками молочної продуктивності та племінної цінності предків, типом екстер'єру, загальним розвитком тіла, періодом тільності, а також походженням за батьком. *Якість молока визначали за методиками, згідно ДСТУ 5538:2004.*
Ключові слова: **монбельярдська порода, генеалогічна лінія, продовжувач лінії, нетель**

МЕТОДИЧЕСКИЕ ОСНОВЫ СОЗДАНИЯ ГЕНОФОНДНОГО СТАДА МОНБЕЛЬЯРДСКОЙ ПОРОДЫ В УКРАИНЕ

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Изложены методические подходы, которые были использованы при создании генофондного стада монбельярдской породы крупного рогатого скота в Украине. Оценку и отбор животных проводили по признакам молочной продуктивности и племенной ценности предков, типу экстерьера, общему развитию, срокам стельности, происхождению по правой стороне родословной. Качество молока определяли по методикам, согласно ДСТУ 5538:2004.
Ключевые слова: **монбельярдская порода, генеалогическая линия, продолжатель линии, нетель**

Introduction. The Montbeliarde breed comes from the local mountain Alsatian live-stock in eastern France, which was crossed with Swiss Simmental from Canton Bern and officially registered as Montbeliarde in 1888, in connection with the emergence of such a name in the region of France [1]. Animals were formed in the conditions of a mountain continental climate with a sharp changes in temperature and a long time (for 5–7 months) maintenance in winter condition. These conditions helped to create a strong constitution of animals, able to tolerate the cold and hot weather conditions, consume rough forage and adapt perfectly to any conditions and systems of cultivation.

Animals of Montbeliarde breed have a red and white body with white head, legs and low abdomen and short horns. Dairy cows have wide and deep breast, broad, straight and long well muscular

back, wide, straight pelvis, strong skeleton with strong feet and legs and well-expressed meat forms. Form of udder look like as bath or cap, well developed, firmly attached and properly placed teats. Animals are characterized by polymastia, which manifests itself even when crossing. The live weight of adult cows is 600–700 kg, and the height in the rump is 145 cm, while the bulls are 900–1200 kg and 145–150 cm, respectively.

Milk of the Montbeliarde breed cows has a high content of cappa-casein BB, which provides the production of high quality cheeses (grupper, emmental). Therefore, the French farmers attach particular importance to the health of the udder and the components of milk. For this purpose, in cows' diets use mainly rough forage and has not practiced feeding silage and hay silo.

For the purpose of qualitative improvement of the Simmental breed in Ukraine from 1972 to 1976, 191 heifers and 49 bulls of this breed were brought from France, and placed in breeding plants "Trostianets" of Chernihiv (170 heads) and "Old Kavray" (21 heads), Cherkasy regions. The imported animals belonged to nine genealogical bloodlines. Bravo 12.571 – (55 cows and 10 bulls) and Oseano 11.594 (23 cows and 10 bulls) were the most numerous. The remaining genealogical bloodlines were less numerous: Asho 14.257 – 18 cows and 4 bulls; Elio 15.421 – 7 heads of cows and 6 bulls, Pirate 11.695, Ideal 7128, Ideal 9226 – Espion 14.347, Emyu 15.410. More than 75 pure breed Montbeliarde and 125 crossed with Simmental bulls were used on the breeding enterprises of Ukraine [2]. The average yield of 136 cows of the "Trostianets" breeding plant in 1987 was 4834 kg with a fat content of 3.84%. Bulls of the Montbeliarde breed were used intensively in the creation of the southeast inner breed type of Ukrainian Red-and-White breed of cattle. Animals, which were received in a result of crossing with Simmentals, characterized by the strength of the skeleton, increased milk fat contain, and reproductive ability. However, they could not compete with the Holstein breed for their milk yield, so they were used in crossing with them.

Beginning in the 1970-^{s} and at the end of the last century, the Montbeliarde cows in France began to cross with the bulls of the German Simmental (Fleckvieh), Danish Red and Red-and-White Holstein breeds. But, since 2000, selection of the breed was switched to a pure breeding.

Nowadays, the Montbeliarde breed is defined as a dairy breed, that has well expressed meat qualities, a strong skeleton, high resistance to disease by mastitis, high reproductive ability, ease of calving (25% of crossbreds with Charolaise heifers, are calved without complications), extended duration of economic use (24% cows are used during 5 or more lactations). The breeding program of the breed provides high quality of milk and meat, strength of the constitution and an endurance of animals.

As far as 2017, the total number of Montbeliarde cows in France was 387.7 thousand of heads. The duration of milk yield of the first lactation was in average 295 days, milk yield – 6403 kg with a fat content 3.91% and a protein 3.28%, and for the third lactation, respectively – 319 days, 7697 kg, with 3.91 and 3.28% [4]. The average milk productivity of cows of the best farms (Philip, K. and Smith, M.) in 2016 amounted 9473 kg of milk at 4.15% fat contain, 393 kg of milk fat and 3.44% and 326 kg of protein [5].

The semen of the Montbeliarde breed is used intensively in crossing with Holstein cows in the USA and New Zealand to improve a number of economic benefits of different breeds, as well as in all European countries for the improvement of the quality of red-and-white breeds of cattle.

With the growth of Holstein breed heredity in the breeding herds of Ukrainian Red-and-White breed, a trend of decline in fertility, fat content in milk, and the duration of commercial use of animals has been identified in many breeding herds [3]. The Montbeliarde breed animals have a sufficient level of milk productivity, fertility, duration of economic use and the extensive genealogical structure, which are the cause for the assignment of Montbeliarde as an improving breed, for animals of Ukrainian Red-and-White Dairy and Simmental breeds.

The aim of the research was to select the Montbeliarde heifers with calves by type of body structure, milk yield and firm production transmitting ability of the ancestors and affiliation to certain genealogical bloodlines, for the creation of the gene pool herd of this breed in Ukraine.

Materials and methods of research. Materials for research were the animals of the Montbeliarde breed, which were situated on 36 farms in Eastern France. The estimate of animals by exteriors was carried out by appearance and compared with the standard of breed. Other traits were evaluated on the basis of certificates. Genealogical affiliation of animals was established on the father's side of the pedigree to the ancestor of the genealogical bloodline. The milk quality was defined by methods according to ISO 5538: 2004.

The results of the research. One hundred heifers of the Montbeliarde breed with calf were selected and imported into the PLAE "Zhatkivske" of the Chernihiv region. Evaluation of growth, development, the type of body structure showed, that the animals corresponded to the standard of breed requirements and were pregnant for 3–4 months. The parents' type productivity indices (ISU) were 98–147. More than 50% of them were ranked in the top 20 best sires. The milk productivity of the heifers' mothers on 305 days of the first lactation ranged from 5300 to 9100 kg of milk, with a fat content of 3.9–4.4% and a protein of 3.3–3.7%.

Genealogical structure of the herd (100 cows and 64 heifers, which were obtained at the farm PLAE "Zhatkivske") is represented by 5 genealogical bloodlines. The most numerous is the bloodline Charmant – Ideal – Helios 15. 421 (26 cows and 13 heifers). The Charvant sire was quite widely used in the breeding stock practically of all bloodlines. This line is developed through the bulls Corail 3971002640, Cardian 7191071104106 and Isangrin 6393018001 (scheme 1). Not less numerous is the Pirates 11.695 (25 caws and 6 heifers) bloodline, which has two powerful sublines: Novac 17136 and Tabarin 3967923962. The development of these independent branches continues through the bulls: Rhum 7080007171, Ezozo 0189014533, Martien 7176060311, Cantadou, Verglas 3984014417, Leguyer 7495022208, Bois Levin 0186006232 (scheme 2).

From the genealogical bloodline Oceano 11594 have been 23 caws selected, from which already 13 heifers were received. The bloodline has been developed through the bulls: Faucon 3990016792, Natif 3997030107, Oxalin 2598012281. Oxbou (scheme 3).

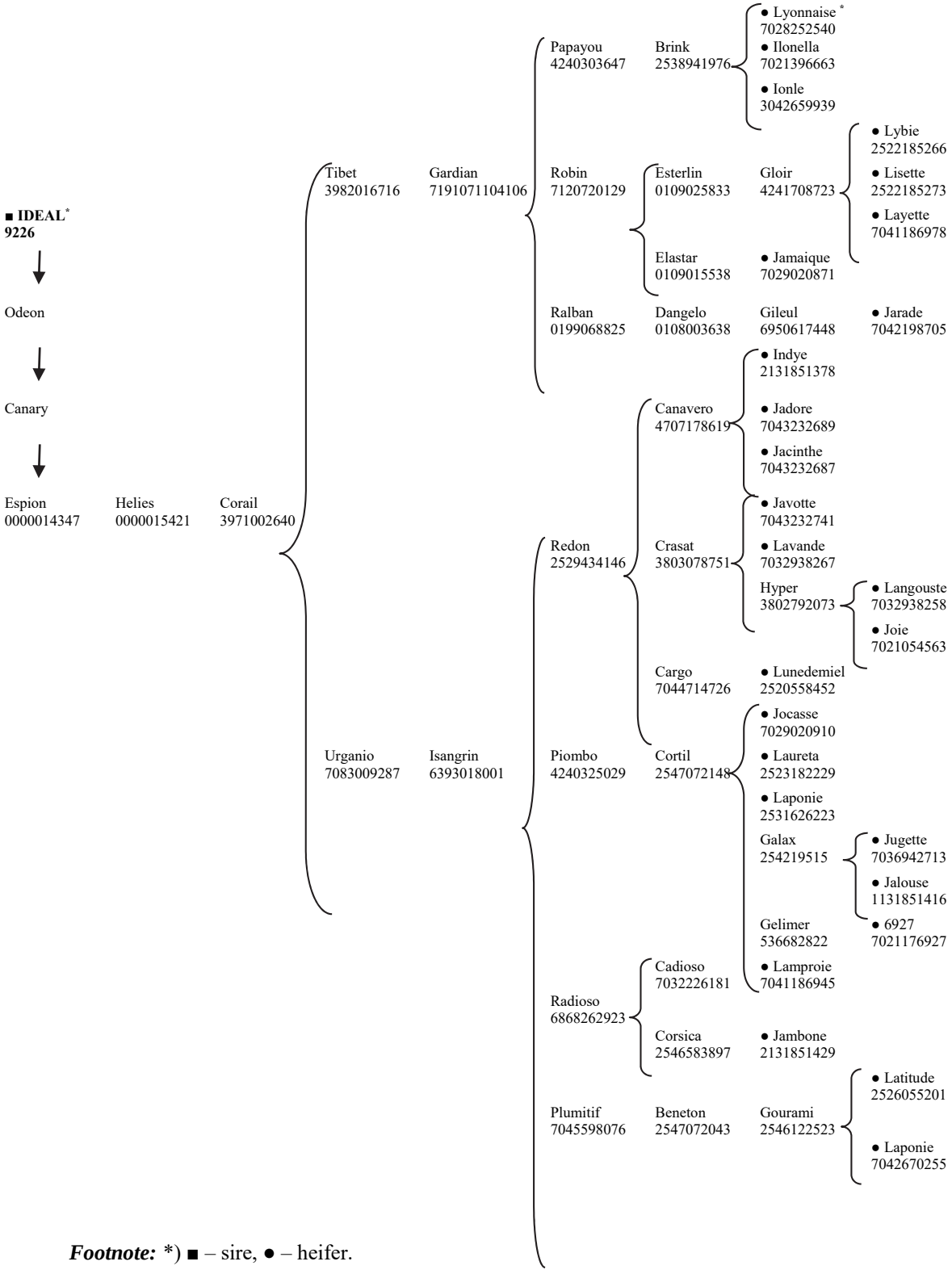
Based on the old bloodline of Ideal 9128, a new bloodline Osiris – Orkan 78315, is developed through the bulls: Lusignan, Jardin 2574010156, Tilleul 3912920526, Boulogne 7086000198 and represented by 15 individuals (scheme 4).

The most numerous in the past century in the breed, the Bravo 12.571 bloodline has narrowed significantly and is currently developing only through the branch Debount 2572016541, his sons: Tafia 2582003300 and Tartars 7082004021 and their grandsons: Polichinel 2199011839, Maldini 1596099083 and others. At the moment, it's a disappearing bloodline, so the best bulls, such as Ezozo 0189014533, Bois Le Vin 0186006232 and the most promising bulls of Pirate 11.695 bloodline are used widely on the cows of this line. Six animals of this line have been delivered to the Ukraine, from which 3 daughters were taken into the PLAE "Zhatkivske" (scheme 5). In order to prevent the rapid growth of inbreeding, in recent years, in the breed one used crossing between the most remote bloodlines.

Average milk yield of 31 firstborns cows for 305 days of lactation in the farm of PLAE "Zhatkivske" was 7298 (limits 6544–8839) kg, with fat content 4.07%, protein – 3.07% and dry substance – 8.10% (tabl.). The number of somatic cells was 120 – 145 in ml. Thus, the royal stock imported into the PLAE «Zhatkivske» has quite high productivity and reflects the gene pool of the Montbeliarde breed. A selection plan for individual mating, which is implemented in the herd, ensures bloodlinear breeding, and forms the basis for the creation of the Montbeliarde gene pool herd.

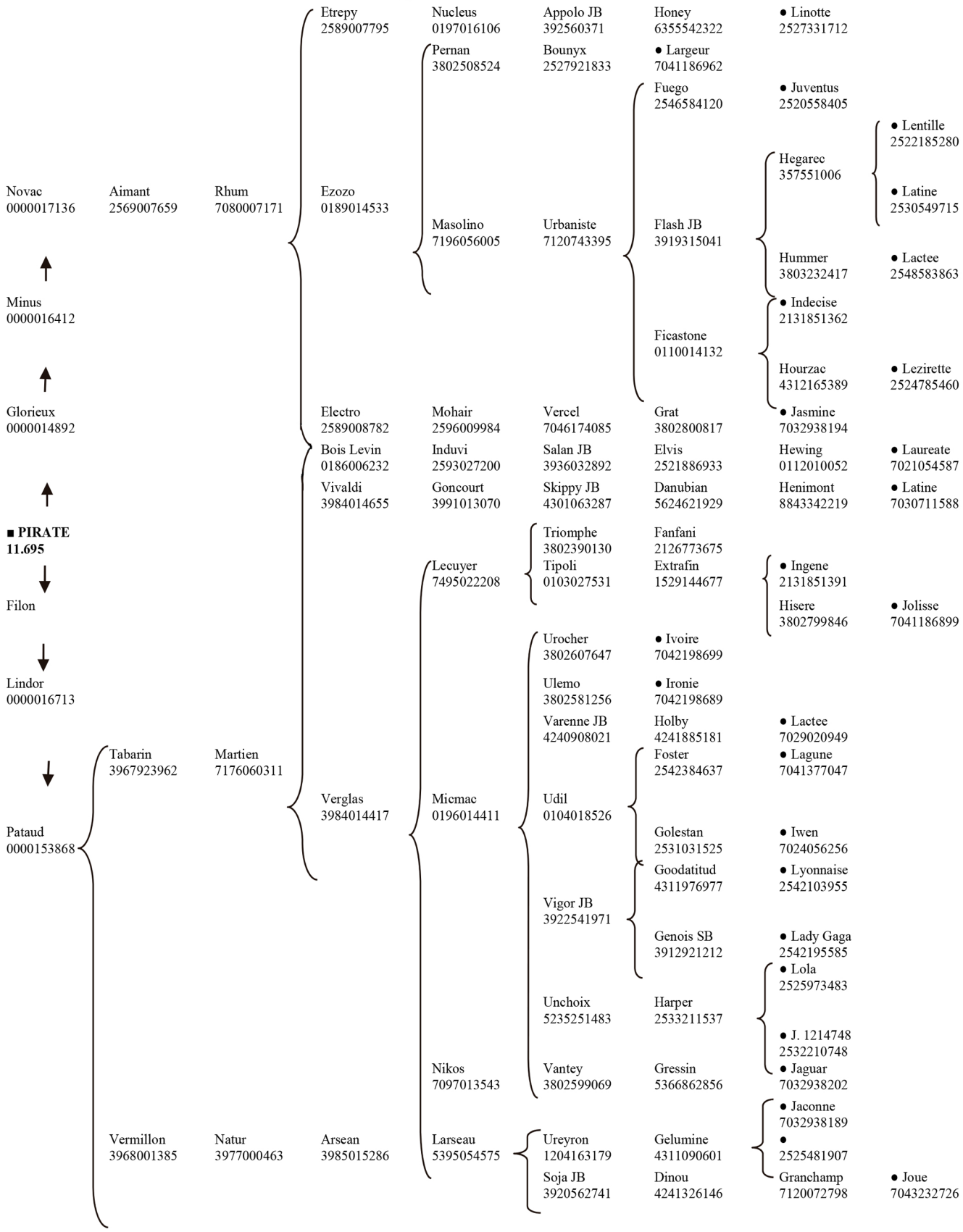
Conclusion. For the confirmation of the implementation by animals of the herd of the PLAE «Zhatkivske»", the remaining economic utility features, inherent to the Montbeliarde breed in the conditions of Ukraine, the gene pool of this breed will be used to create a nucleare farm, obtain and evaluate breeding bulls and to resolve breeding problems, associated with further improvement of domestic dairy breeds of cattle.

1. Genealogical bloodline Charvant – Ideal – Helios 15.421

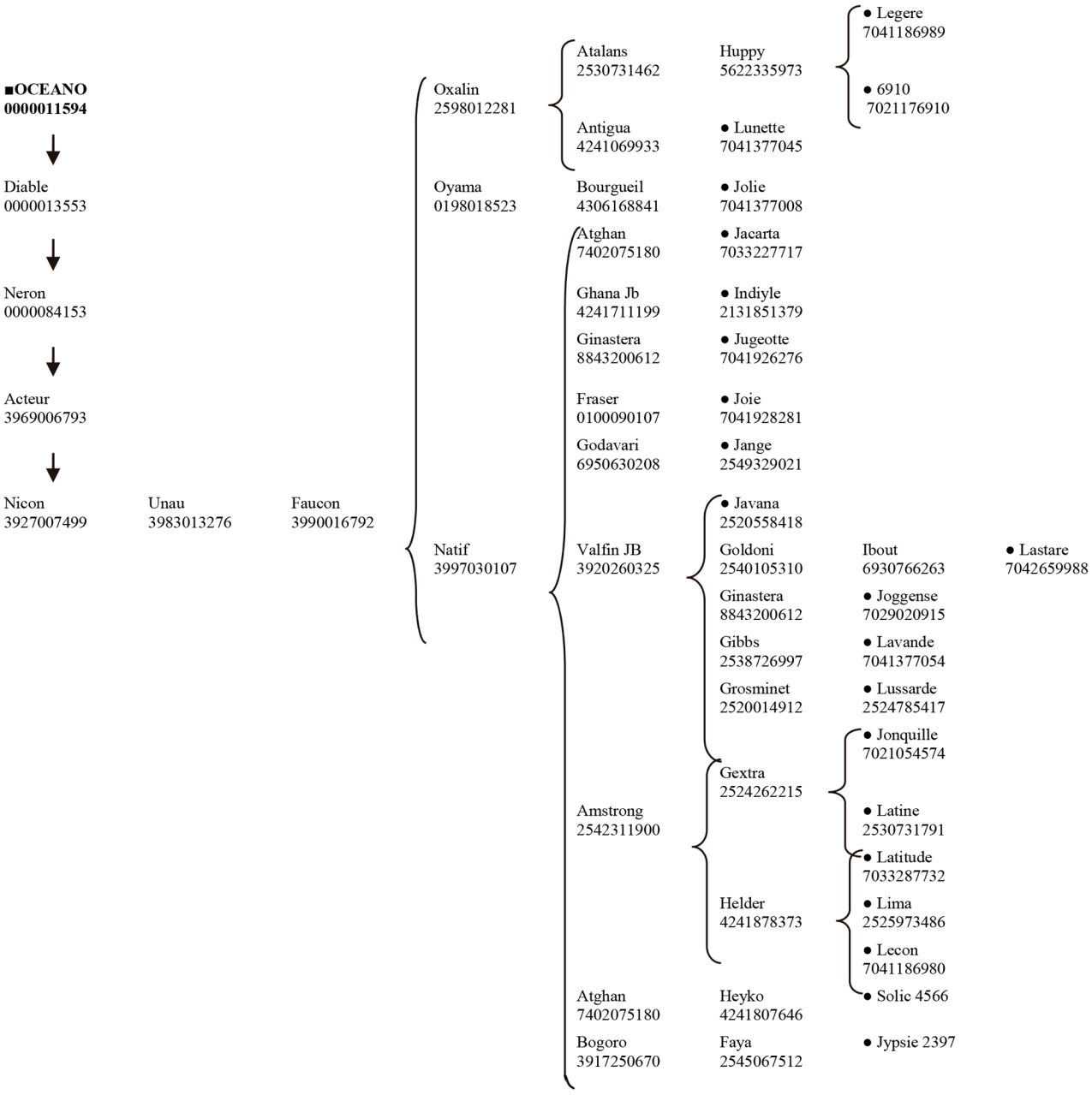


Footnote: *) ■ – sire, ● – heifer.

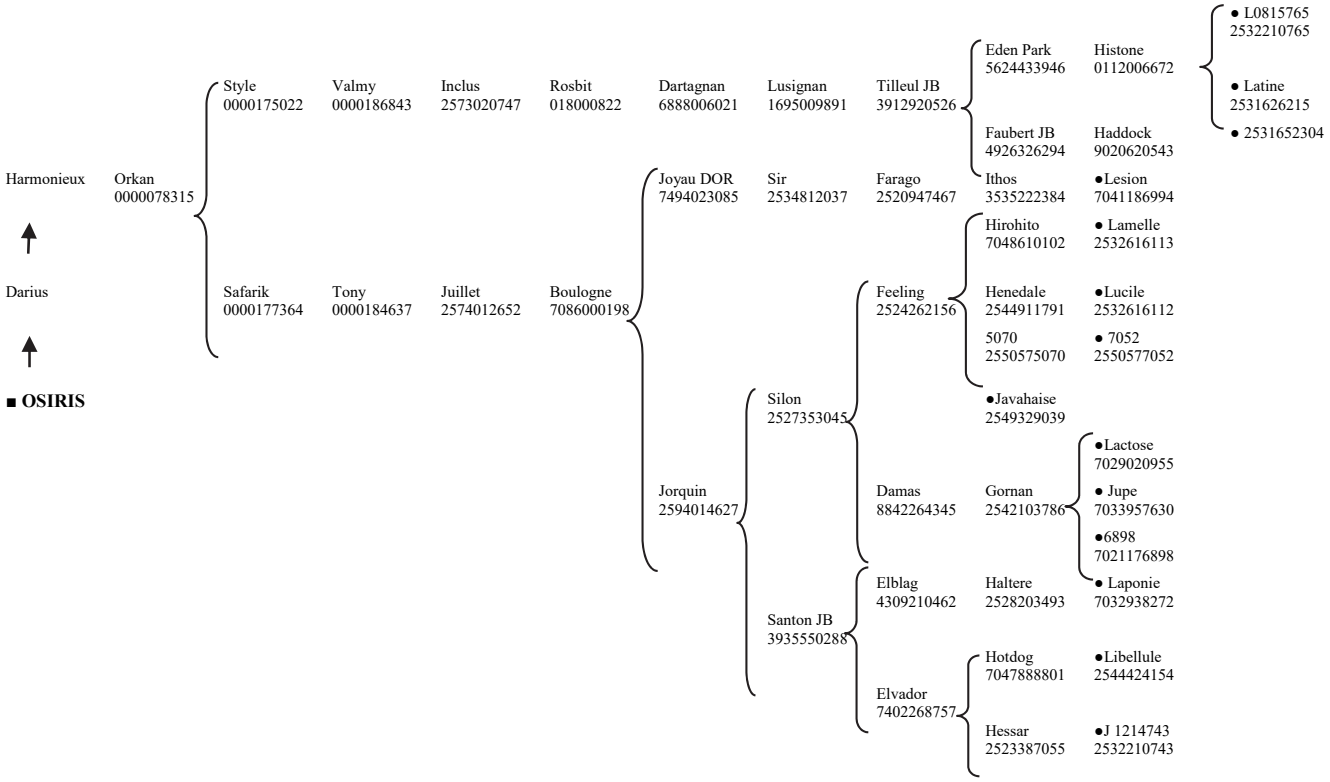
2. *Genealogical bloodline Pirate 11.695*



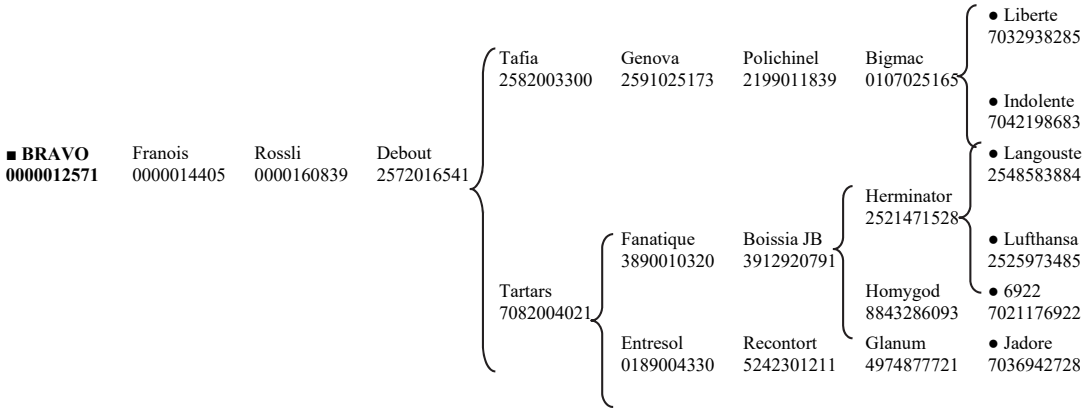
3. Genealogical bloodline Oceano 11.594



4. Genealogical bloodline Osiris – Orkan 78315



5. Genealogy bloodline Bravo 12.571



The milk traits quality of Montbeliarde cows, M ± m, Cv

Fat content of milk, %	Protein, %	Dry substance, %	Density, kg/m^3	Somatic cells/ml
genealogical bloodline of Helios 15.421, n = 14				
4.07 ± 0.12 11.0	3.15 ± 0.08 7.8	8.14 ± 0.22 9.9	1027.4 ± 0.8 11.2	125.3 ± 20.47
bloodline of Pirate 11.695, n = 14				
4.11 ± 0.19 17.4	3.04 ± 0.10 12.4	7.90 ± 0.26 12.2	1025.8 ± 1.0 15.2	120.4 ± 8.78
bloodline of Oceano 11594, n = 15				
3.97 ± 0.10 10.1	3.07 ± 0.05 6.2	8.09 ± 0.19 9.3	1027.9 ± 0.6 8.3	145.6 ± 18.1
bloodline of Osiris – Orkan 78315, n = 9				
4.32 ± 0.29 20.2	3.10 ± 0.08 7.8	8.06 ± 0.19 6.9	1026.3 ± 0.8 9.2	100.1 ± 6.1
bloodline of Bravo 12.571, n = 5				
3.83 ± 0.17 11.0	3.17 ± 0.06 4.8	8.50 ± 0.19 5.7	1029.0 ± 0.7 6.3	143.6 ± 51.5
Mean quantity				
4.07 ± 0.08 14.3	3.07 ± 0.34 8.4	8.10 ± 0.10 9.4	1028.1 ± 1.2 31.6	127.3 ± 8.64

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