

Lithuanian pig breeds: Lithuanian White and Lithuanian Indigenous Wattle

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Development of Lithuanian White pig breed

- Lithuanian White pig breed was developed by improving old Lithuanian native pigs with Large White, Middle White, Edelsweine, Berkshire and local Danish pigs before World War I.
- Intensive selection activities began in 1926 when the Society for pig breeding was established.
- Occupations and World War II stopped selection activities, part of best pig genetic material was lost during the war and post war period of forced collectivization.
- The proportions of the breeds used and the exact origin is unknown.
- Selection of the surviving pigs was continued and Lithuanian White pigs as original breed was officially recognized in 1967.

Certificate of Lithuanian White pig breed


СОЮЗ СОВЕТСКИХ СОЦИАЛИСТИЧЕСКИХ РЕСПУБЛИК

АВТОРСКОЕ СВИДЕТЕЛЬСТВО
№ 1094

на основании полномочий, предоставленных Правительством СССР, Министерство сельского хозяйства СССР выдало настоящее авторское свидетельство Швейстио Иозас Иозо, Бежявичене П.И., Девенене С.К., Мажейкис Б.И., Маковецкас РИ, Малинаускас А.Ю., Понкайтис А.А., Чепинскис И.В.

на породу свиней мясного направления "литовская белая"

по заявке № 6/96 от 7 февраля 1968 г.
выведен ную на племенных фермах хозяйств
Литовской ССР

Зам. Министра сельского хозяйства *П. Морозов* П. Морозов

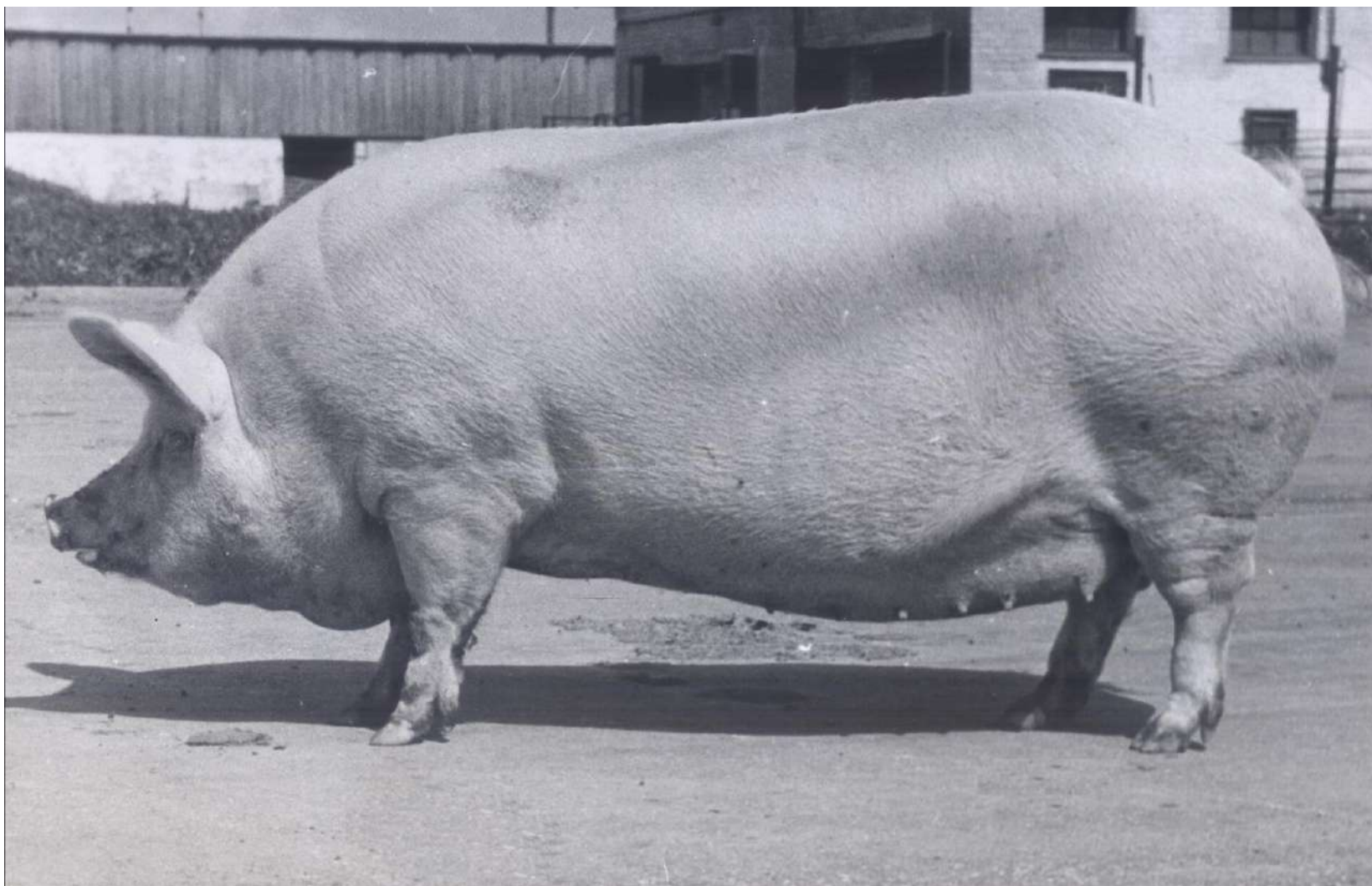


Зарегистрировано Государственным Комитетом по делам изобретений и открытий СССР в Государственном реестре селекционных достижений СССР 26 мая 1970 г.

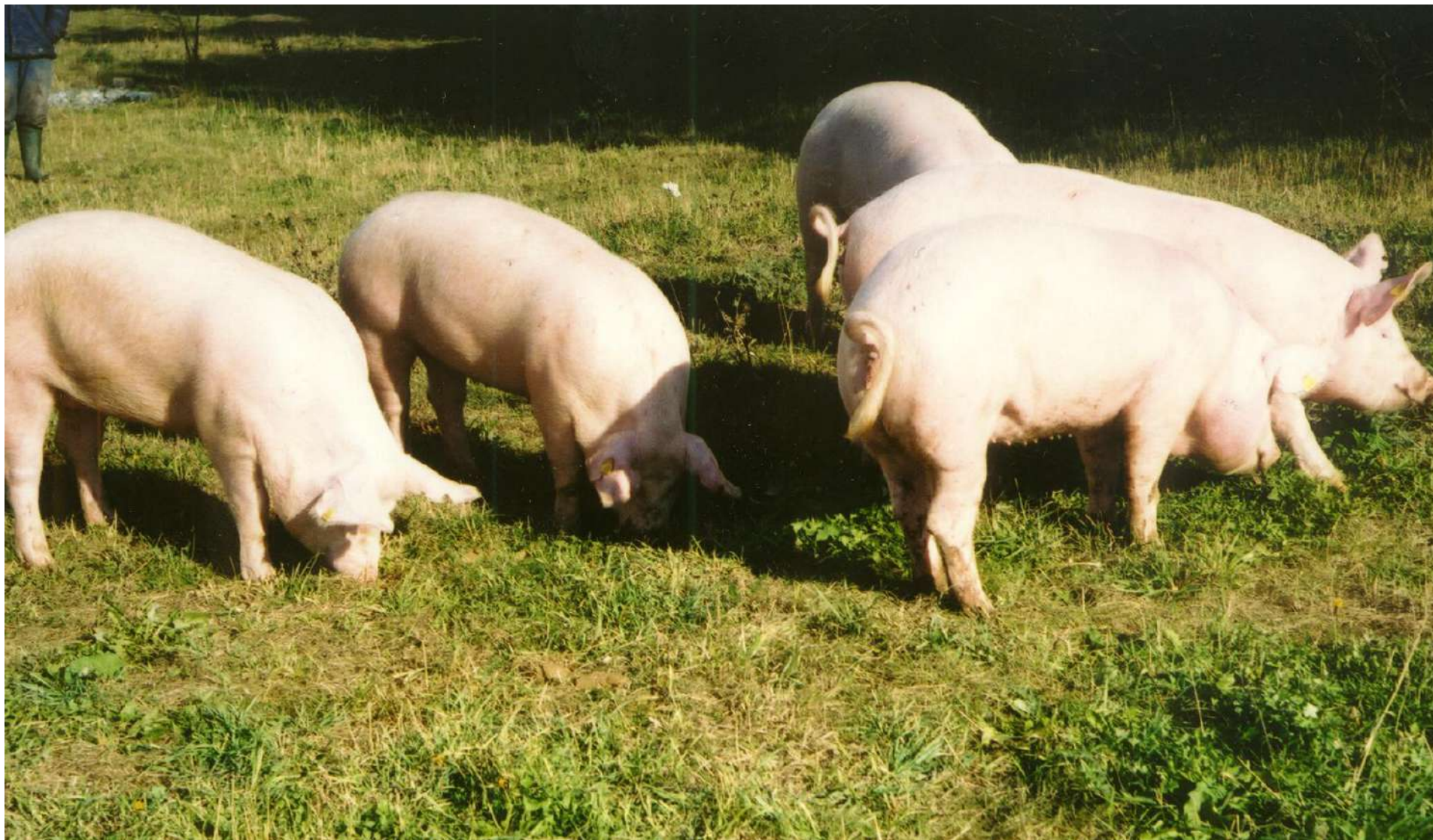
Начальник отдела *А. Мухоморов*

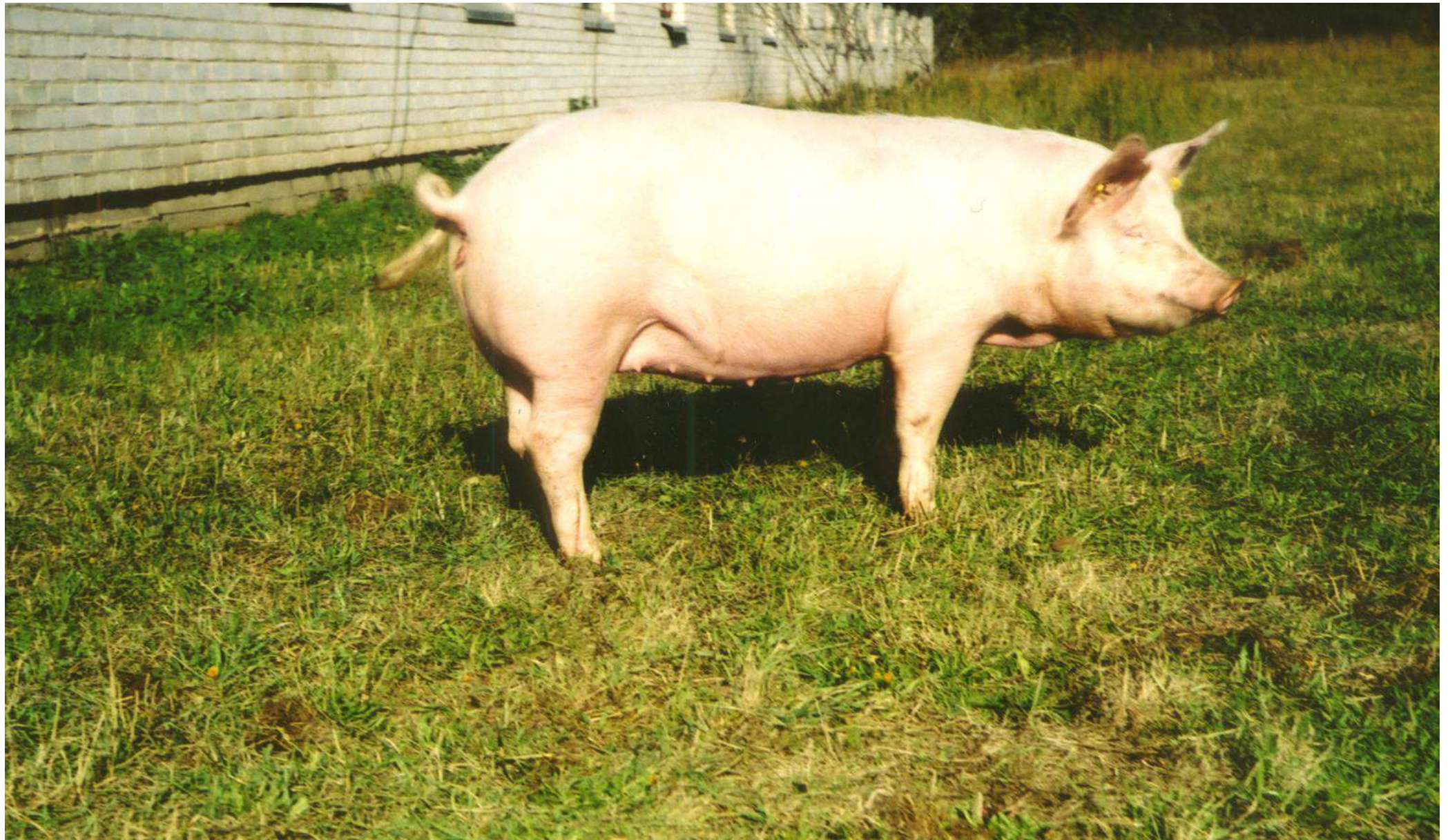
25.XII.1963, Тир. 6000 экз. Моск. печ. ф-ка Гознака, 1964, Лист 1/1968.

Lithuanian White sow



Lithuanian White gilts





Phenotypic characteristics of Lithuanian White pigs

- It is a middle-sized, unicoloured white breed with erect ears;
- No distinctive features;
- The breed is well-adapted to the local conditions;
- The pigs have strong constitution and are known for low stress susceptibility.

Lithuanian Indigenous Wattle pigs



Lithuanian Indigenous Wattle pigs

- The exact origin is unknown. There was no selective breeding controlled by breeding organizations and these pigs are considered as the breed of „natural“ selection.
- It is considered that animals were domesticated in southern areas and then moved to the north. However, new archeological and genetic research insights showed that also the wild boar could have been later additionally domesticated in the territory of Lithuania.
- Moreover, different pigs imported to the landowner estates influenced native pigs.



Phenotypic characteristics of Lithuanian Indigenous Wattle pigs

- It is a middle-sized breed with a pair of wattles under the neck, multicoloured (mostly spotted). Colour variations include white, black and white and ginger.
- Pigs are insensitive to the sun and are suitable for grazing
- Ear shape variations include lop and erect.
- Body size is lower but ear size is higher than those of Lithuanian White
- Pigs have a calm friendly temperament

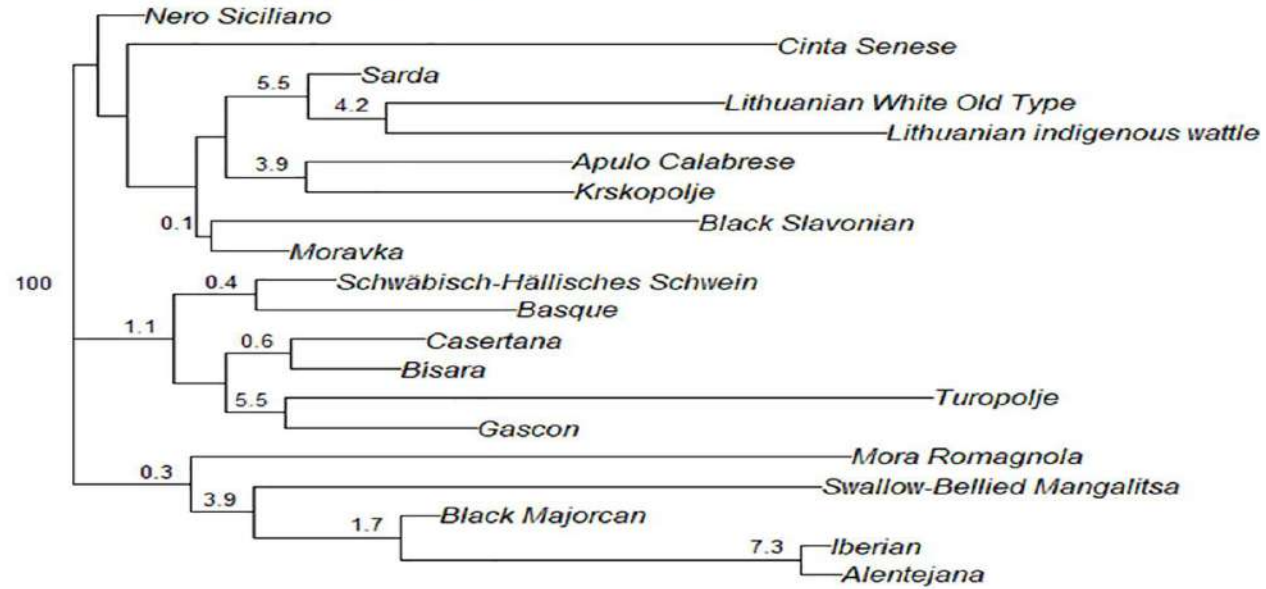




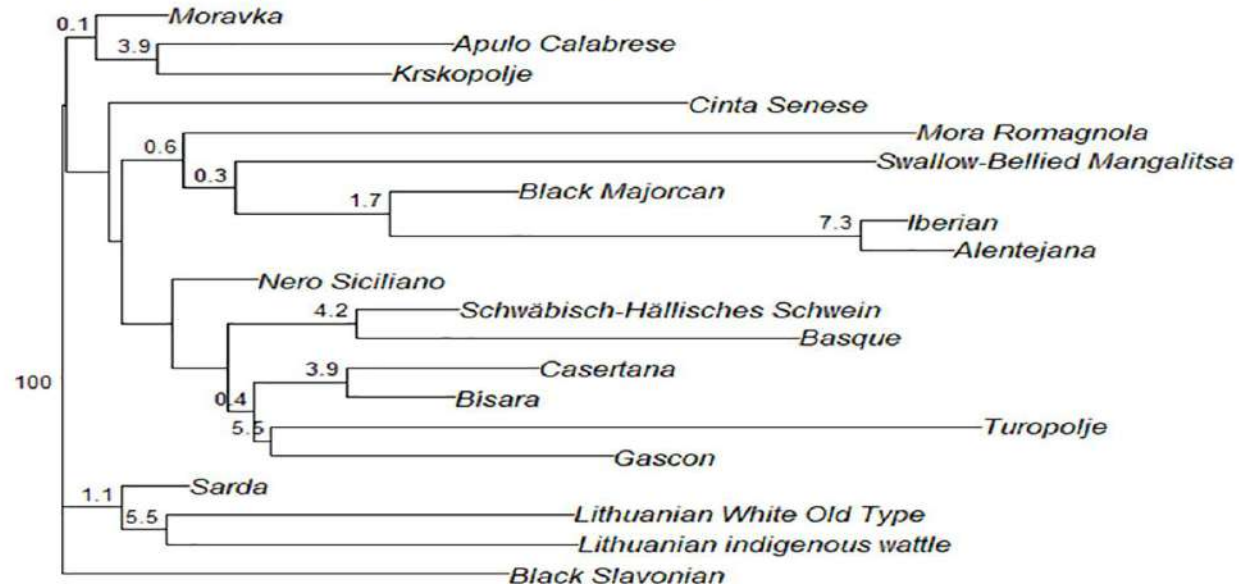
Phylogenetic trees within TREASURE project

- Phylogenetic trees, constructed using genetic distances among 20 European local breeds did not reveal enough information to explain these trees. However, regarding Lithuanian breeds the phylogenetic trees agree with the origin and geographical distribution of breeds.
- Moreover, close grouping of Lithuanian and Italian Sarda breeds came as surprise.

a) **Neighbor-joining Tree based on Nei's Distances (Ds)**



b) **Neighbor-joining Tree based on FST**



Pig numbers in Lithuania and pig export during the interwar

- 1925 – about 1.4 million pigs (most of them local)
- Export of live Lithuanian pigs started in 1923;
- Export of pig meat from 1925;
- Export of bacon from 1927;
- Export of pigs and their products encouraged pig selection. Selection achievements increased export volumes until it was stopped by occupation in 1940;
- Western market was lost.

Pig numbers (in millions) after World War II

- 1945 – 0.496;
- 1961 – 1.720;
- 1971 – 2.297;
- 1981 – 2.551;
- 1990 – 2.730 ;
- 1996 – 1.270;
- 2016 – 0.688;
- 2018 – 0.612;
- 2021 – 0.580

Main reasons for changes in the numbers of pigs

- Increase in pig numbers during soviet period:
- permanent food deficiency and huge meat demand in soviet empire;
- Decline in pig numbers after Indipendence restoration:
- loss of soviet market;
- import of cheaper surplus meat from other countries;
- the danger of African Swine Fever and high veterinary requirements for pig farms.

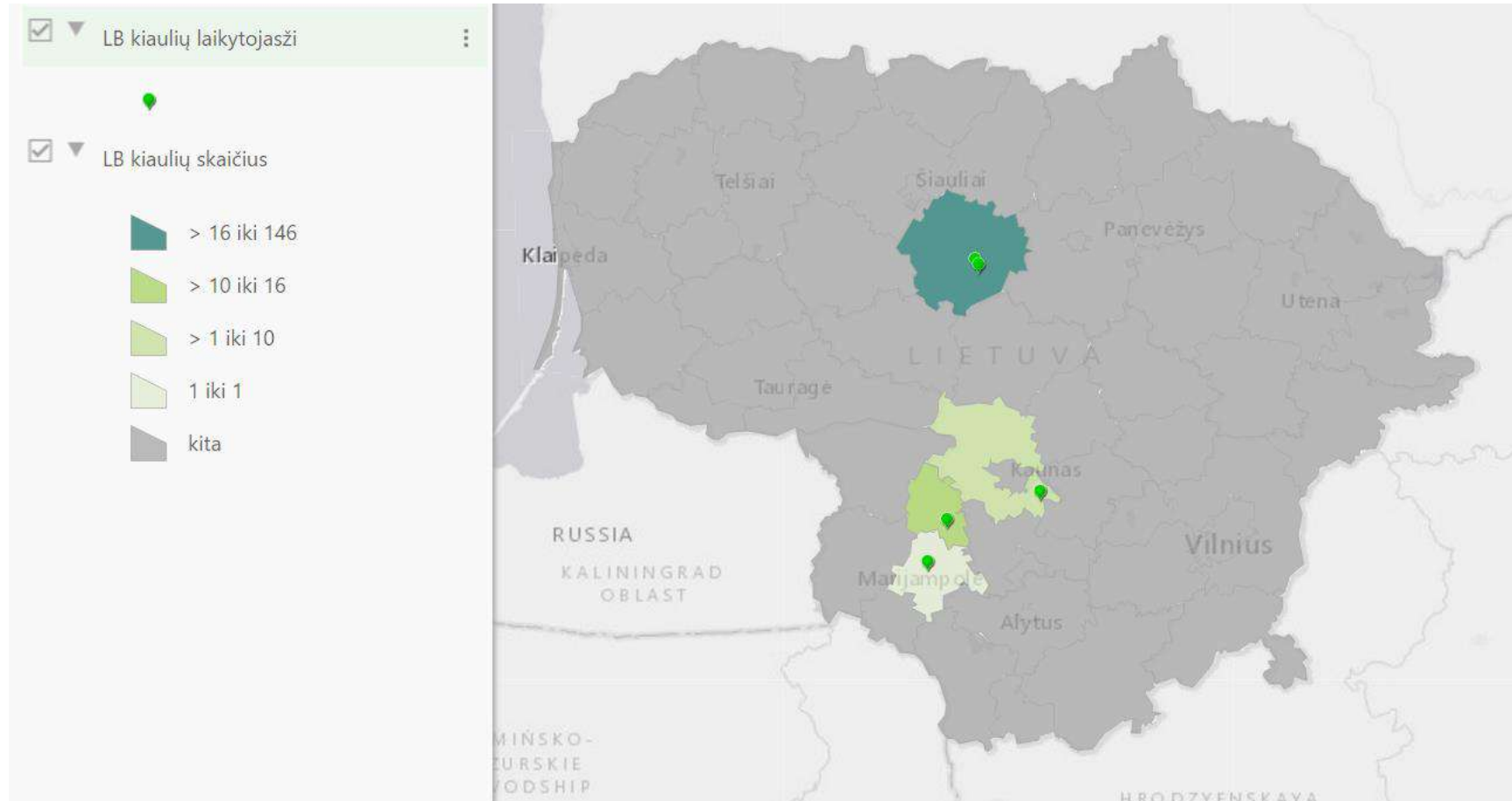
Danger of extinction and conservation of Lithuanian pig breeds

- Lithuanian local pigs were replaced by selected Lithuanian White pigs. When Lithuania committed to preserve its genetic resources by signing the Convention on Biological Diversity, the remainings of old native pigs were collected, and the nucleus herd of Lithuanian Indigenous Wattle pigs was established at the Institute of Animal Science in 1994.
- All purebred Lithuanian White boars were castrated in 2003 and Lithuanian White pigs were replaced by international lean breeds and their hybrids.
- In case of danger of original breed extinction, the nucleus herd of Lithuanian White pigs was established at the Institute of Animal Science in 1999 and this prevented total disappearance of Lithuanian White pigs as an original breed.

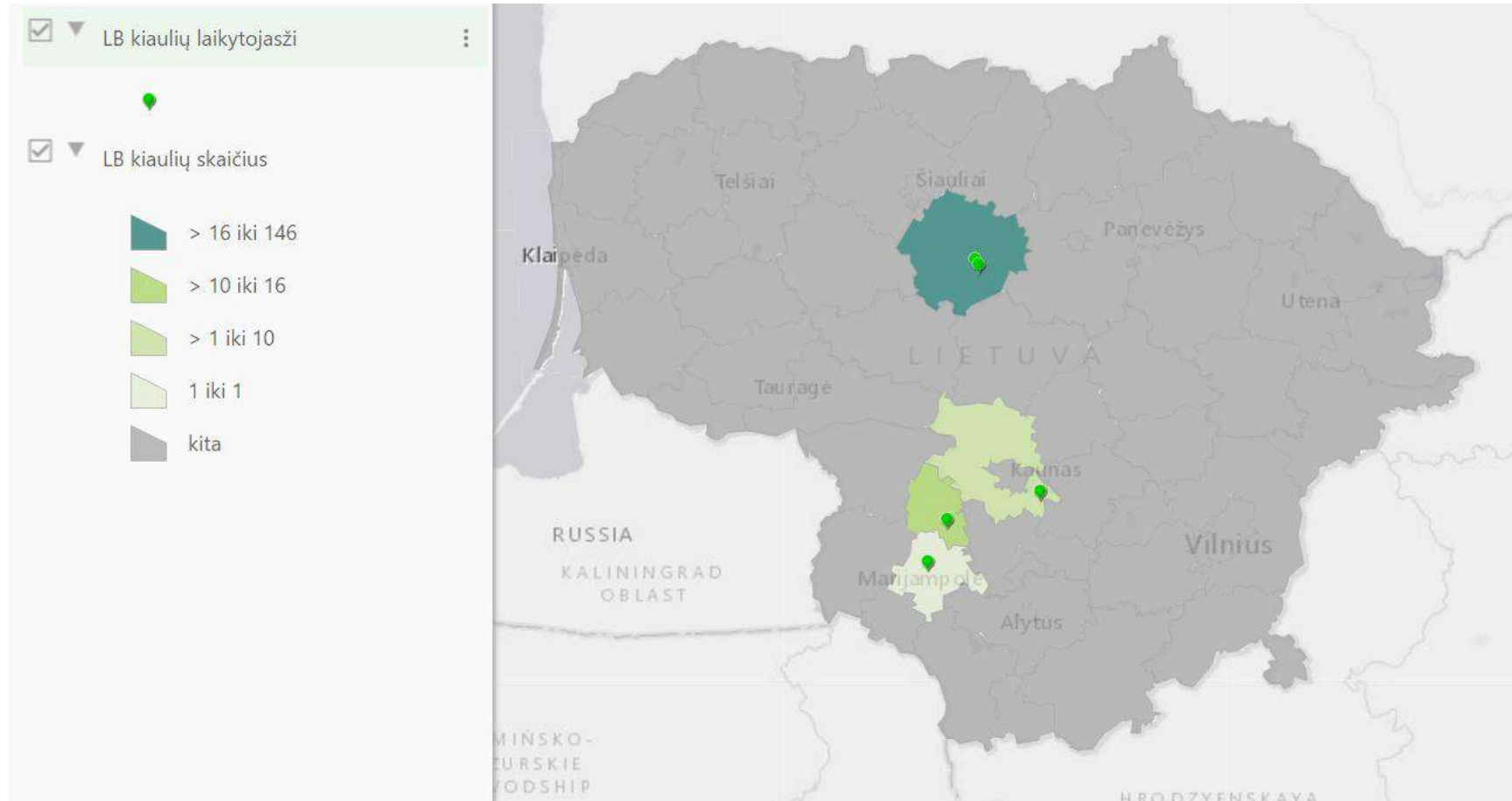
Title corrections

- For some time there was open population of the same Lithuanian White title using lean boars of foreign breeds. Currently this crossed population no longer exists
- In order to distinguish purebred remainings of the breed from their different hybrids and the pigs of other white breeds reared in Lithuania , Lithuanian White pigs were named the old type Lithuanian White pigs

Geographical location and density of old type Lithuanian White pigs



Geographical location and density of Lithuanian Indigenous Wattle pigs



Selection of Lithuanian White pigs

- Good selection results for bacon were achieved in 1926-1938;
- Lithuanian White pigs were selected for double purpose: for bacon and for fatty heavy weight pig;
- Until the end of 20th century Lithuanian White pig breed was one of the main pig breeds used as dam breed in commercial crossing combinations.
- Selection for lean meat increase in Lithuanian White during soviet period was a concern of research but huge demand and permanent food deficiency, including pork and fat, did not support this matter;
- Import of surplus meat from different countries and introduction of SEUROP grading system reduced competitiveness of Lithuanian White pigs in the market;
- Currently selection of this extremely small population is inefficient.

Main characteristics of pig carcasses

Variables	Lithuanian White	Lithuanian Indigenous Wattle
Carcass weight, kg	78.4	75.7
Carcass length, cm	99.9	93.1
Backfat at 10 rib, mm	28.8	35.7
Lumbar fat above <i>m.gluteus medius</i>	21.2	33.3
Loin area, cm ²	34.2	24.8



Belly of Lithuanian White pigs



Belly of Lithuanian Indigenous Wattle pigs



Meat characteristics of Lithuanian pig breeds and conventional hybrids

Variables	Lithuanian White	Lithuanian Indigenous Wattle	Conventional hybrids
pH	5.33	5.45	5.26*
Colour: L*	51.95	53.06	57.80*
a*	16.18	15.05	14.51*
b*	7.03	6.01	7.21*
EZ Drip loss	5.12	5.54	7.41*
Cooking loss	33.63	33.01	37.82*

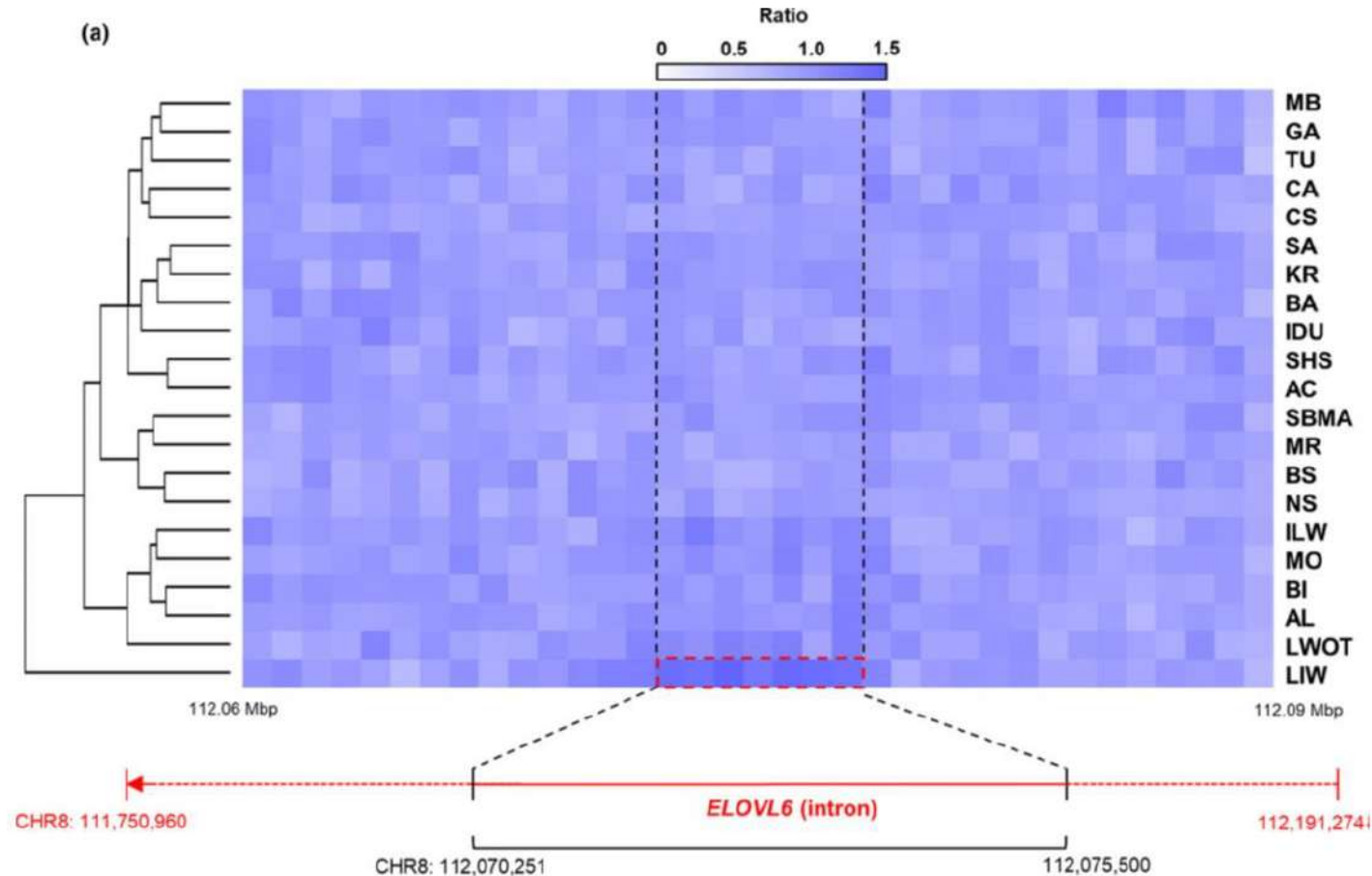
Total saturated, monounsaturated, polyunsaturated fatty acids (in %), fatty acid ratios in intramuscular fat of muscles and backfat and cholesterol content

	Longissimus muscle	Longissimus muscle		Semimembranosus muscle		Backfat	
	Conventional hybrids	LW	LIW	LW	LIW	LW	LIW
SFA		36.3	36.24	32.64	35.28*	42.62	43.34
MUFA		51.92	52.34	48.02	51.24	49.06	48.99
PUFA		9.08	8.69	14.66	10.38*	7.97	7.37
PUFA/SFA	0.60*	0.25	0.25	0.46	0.31*	0.19	0.17
n-6/n-3	12.35*	7.72	8.33	8.73	8.45	6.36	7.37
Cholesterol, mg/100g	44.24*	37.77	38.40	39.65	40.22	32.98	29.90

Fatty acid elongase (ELOVL 6 gene)

- Although porcine ELOVL 6 gene has not been fully characterized it is known that ELOVL 6 affects saturated and monounsaturated fatty acid composition.
- It is known that ELOVL 6 catalyzes the synthesis of stearic (C18:0) and oleic (C18:1) acids from palmitic (C16:0) and palmitoleic (C16:1) acids in lipogenic tissues, respectively.
- Associations with meat quality

Lithuanian Indigenous Wattle pigs uniqueness by elongase (ELOVL6) gene



Status and perspectives of Lithuanian pig breeds

- Both Lithuanian pig breeds are critical- maintained.
- In order to preserve the breeds it is necessary to use them as widely as possible.
- If the research results do not show large differences of some parameters in meat quality by instrumental evaluation, local pig breeds have other useful intrinsic and extrinsic qualities.
- The dream that products of the traditional heritage would be produced also from local breeds, not only from pigs of international breeds and their industrial hybrids grown in Lithuania.

Limiting factors of product use from local breeds

- Low willingness of consumers to pay for quality;
- Import of cheap surplus meat;
- Higher fatness of pigs.
- Low numbers of pigs from local breeds to be selected and meet demand for wider consumption;
- Lack of small slaughterhouses and processing plants;
- Ignoring of small farmers in the existing large slaughterhouses;
- Situation like a vicious circle according to the old saying „Stupid because poor, but poor because stupid“

Thank you for your attention

