



NATIONAL AGRICULTURAL
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Current Situation in Gene Bank of Animal Genetic Resources in Slovakia

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Introduction

Ratification of the Convention on the Biodiversity was confirmed by the Slovak Republic in 1994, to protect biodiversity and guarantee sustainable use of its components including also animal genetic resources.



Generally, the importance of animal genetic resource protection, which are realized using *In situ* and *Ex situ preservation*, including national gene banks (NGB), emerges from biological, economic, landscaping and cultural needs of each country.



In the last fifty years there was a significant decrease in the animal number in the Slovak Republic, and in some species the original, autochthonous breeds completely disappeared.

The possible extinction of these breeds would also mean irrecoverable loss of the genetic variability and loss of unique gene and allele combinations that would be very useful in the future e.g. for the generation of new farm animal genotypes.



Animal Gene Bank

should guarantee monitoring, collection and preservation of samples from genetic resources (spermatozoa, oocytes, embryos, somatic cells, tissues, DNA etc.) in original condition, deeply frozen or lyophilized,

their storage, molecular-genetic characterization of samples, research-comparison of the genetic biodiversity, management of information system about stored samples and their use for original breed restoration.



Current Animal Genetic Resources in Slovak Republic 2016

Breed	Animals (N)	Females in herd book (N)	DNA*	ID** (N)	Frozen embryos	Frozen stem cells
Pinzgau cattle	9883	1583	yes	200	yes	no
Slovak spotted cattle	161 550	30 545	yes	250	yes	no
Walachian sheep	2437	553	yes	150	no	no
Tsigaja	123 660	7066	yes	100	no	no
Improved Valachian	131 573	7732	no	no	no	no
Nitra rabbit	1300-1500	-	yes	155	yes	yes
Zobor rabbit	100-120	-	yes	267	yes	yes
Holic blue rabbit	260-390	-	yes	154	no	no
Slovak pastel Rex	80	-	yes	42	no	no
Slovak greyish blue Rex	700-900	-	yes	17	no	no
Oravka hen	1200-1800	-	yes	100	no	no
White short-haired goat	8036	1062	no	no	no	no
Brown short-haired goat	1627	116	no	no	no	no
Slovak carniolan honeybee	262 000	-	yes	no	no	no

Endangered Breeds in the Slovak Republic

Cattle breeds:

Pinzgau cattle



Sheep breeds:

Wallachian sheep (Valaška)



Rabbit breeds:

Zobor and Nitra rabbits



Chicken breeds:

Oravka hen



Geese breeds:

Slovak White goose
Suchovy goose



Bees:

„Slovak“ carniolan honey
bee



Animal Gene bank in Nitra, Slovak Republic

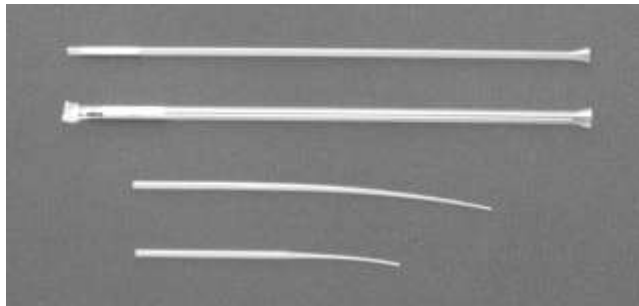
- **FAO database** (<http://efabis-sk.vuzv.sk>)
- **establishment** - at the NPPC - Research Institute for Animal Production, Nitra
- **adapted and rebuilt:**
 - **long-term storage room for cryopreserved samples** of germplasm (oocytes, semen, embryos, stem cells, DNA)
 - **laboratories for packing and freezing of samples**
- **problems** - not approved legislation



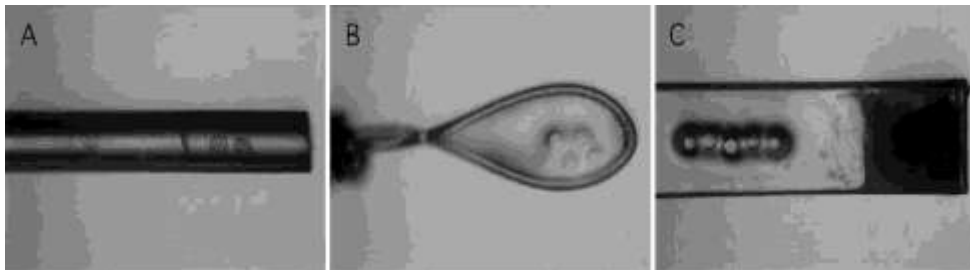
Application of biotechnological methods and animal genetic resources

DNA analysis (microsatellites)

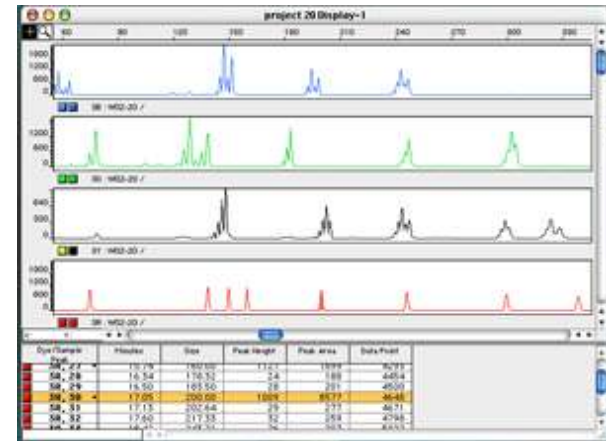
Cryopreservation (Vitrification) of animal embryos, sperm and stem cells



Classic and OPS straws



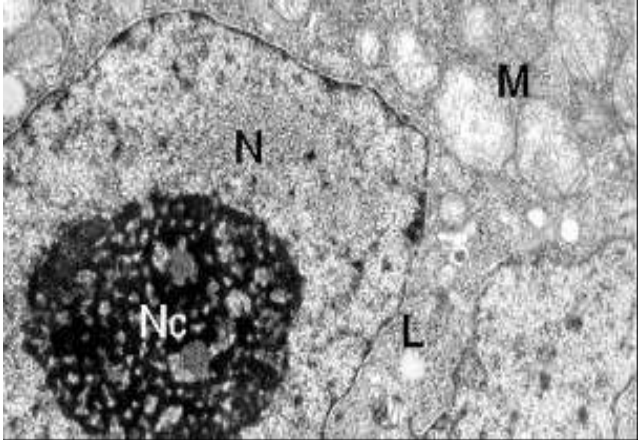
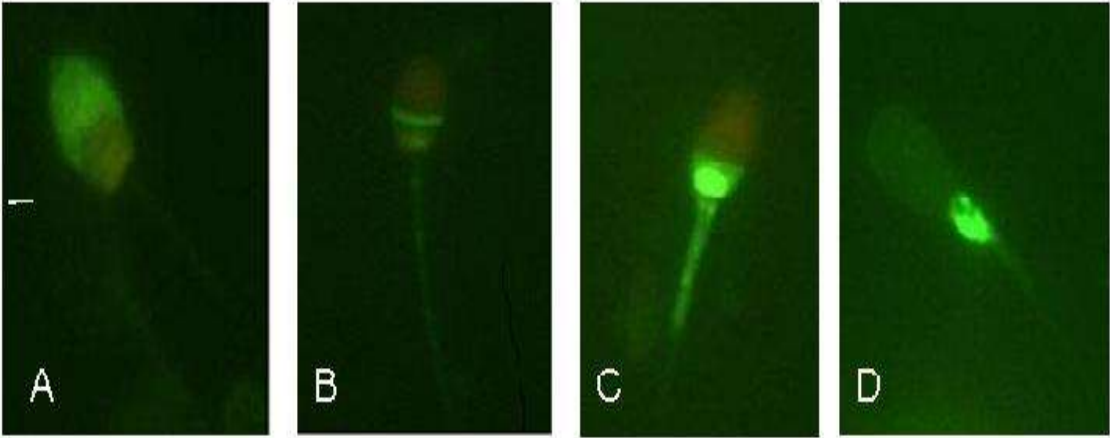
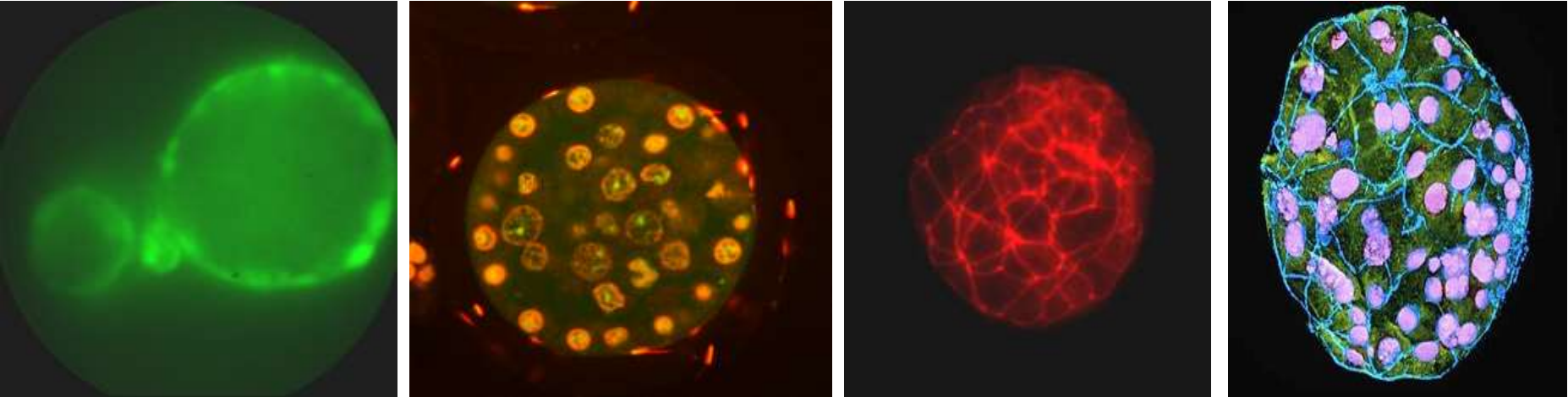
A - pipette tip; B - Cryoloop; C - Cryotop



Multiplex PCR analysis of microsatellites loci in sheep

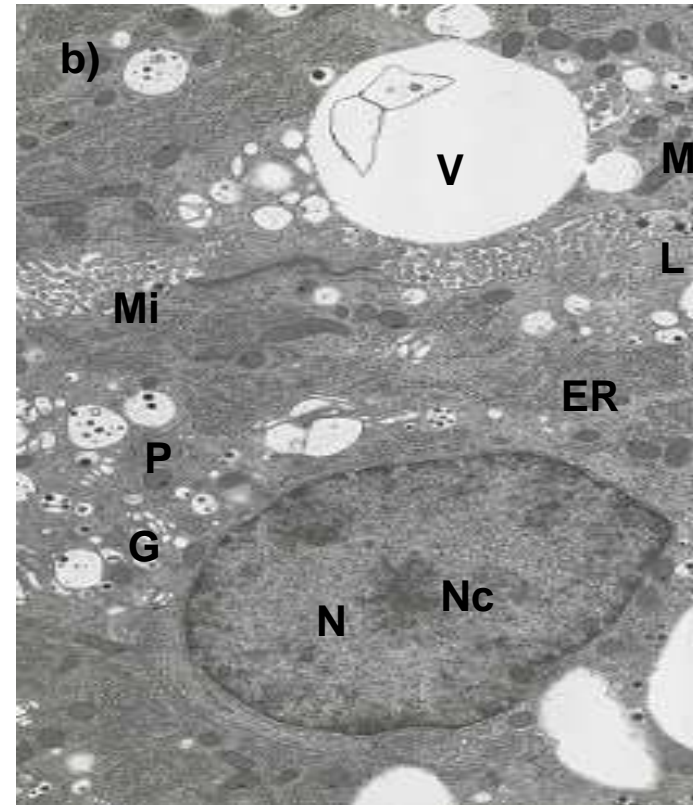
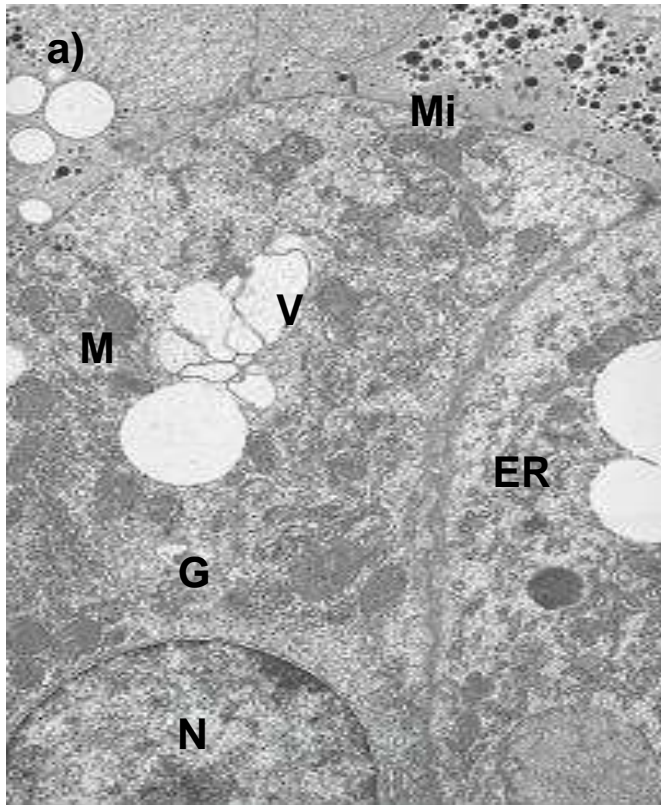


Fluorescent, confocal and electron microscopy



(Chrenek P. et al., Zygote 2013)





Electron micrograph of transgenic (A) and non-transgenic (B) rabbit mammary gland tissues on D35 of third lactation. Each micrograph shows a supranuclear area with a higher presence of mitochondria (M) in the transgenic tissues. Protein globules (P) are seen in the lumen (L) of the alveolus in the non-transgenic tissue. Nucleus (N), Golgi apparatus (G), rough endoplasmic reticulum (ER), and display synthetic activity. Vacuoles (V) and microvilli (Mi) are seen. Magnification: x 12 800.



Actual Situation and Perspectives for the future

Plants

National Gene Bank of the Slovak Republic in Piešťany

established in year 1996

in compliance with aims and needs of National Programme on **Conservation of Plant Genetic Resources for Food and Agriculture** ensures monitoring, accumulation, evaluation, study, identification and long-term conservation of gene pools of all agriculture crops

cooperate with gene banks on the world, mainly in the bilateral exchange of the seeds for research and breeding reason



Animals

Slovak Biological Services, Inc.
Insemination doses of Slovak **cattle**
breeds ONLY



The National Stud Farm in Topoľčianky
Insemination and reproduction centre
(IRC) part of which is a sperm bank - more
than
3000 doses of the rare **stallions sperm ONLY**



NPPC- RIAP Nitra

- Approving the legislation

Creation of the “National Gene Bank” in Nitra

The gene bank (within the programme of biodiversity preservation) conserve:

1. Insemination doses:

Cattle : Slovak spotted, Pinzgau cattle

Sheep: Walachian sheep

Rabbit: Nitra Rabbit, Zobor Rabbit, Holic Rabbit,
Slovak Pastel Rex, Slovak Greyblue Rex

Chicken: Oravka hen

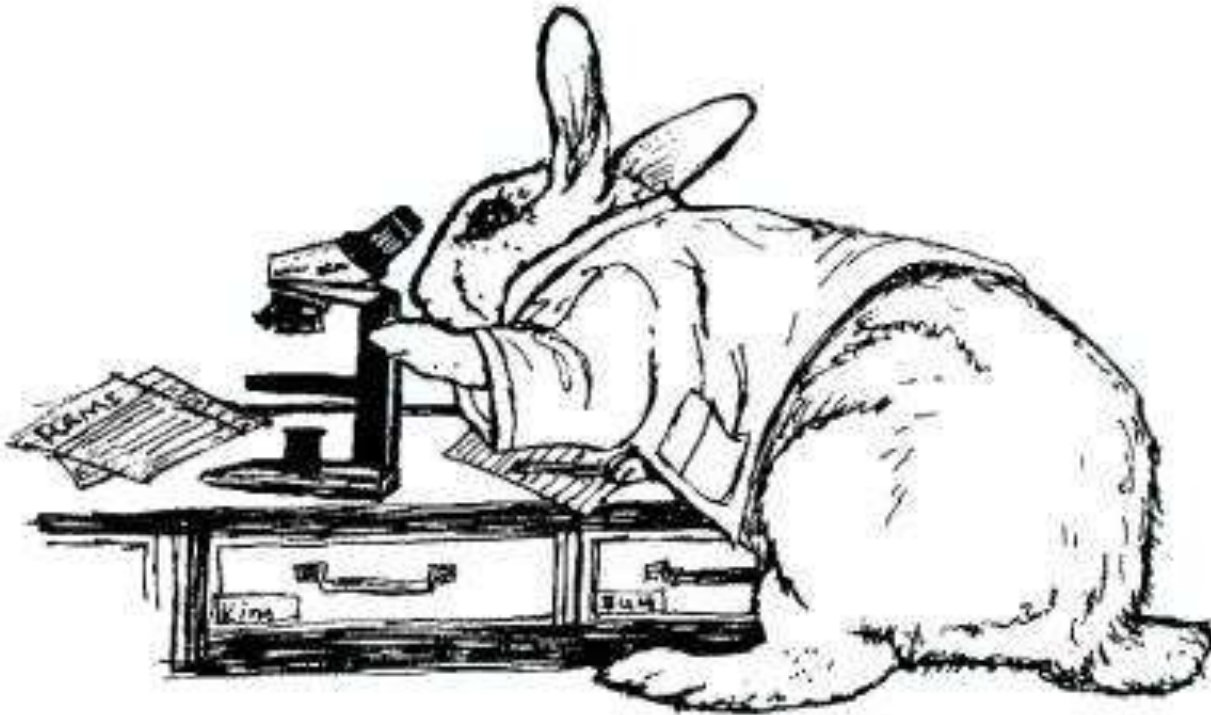
2. **Embryos**: cattle, rabbit

3. **DNA**: cattle, sheep, bee, rabbit, chicken,

4. **Stem and progenitor cells**: rabbit

In future special attention should be paid to establishing a gene bank of tissues, blood derivatives and DNA samples of farm and wild animal genetic resource.





Thank you for your attention

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