Gene banking in Benelux: overview and transboundary collaboration opportunities

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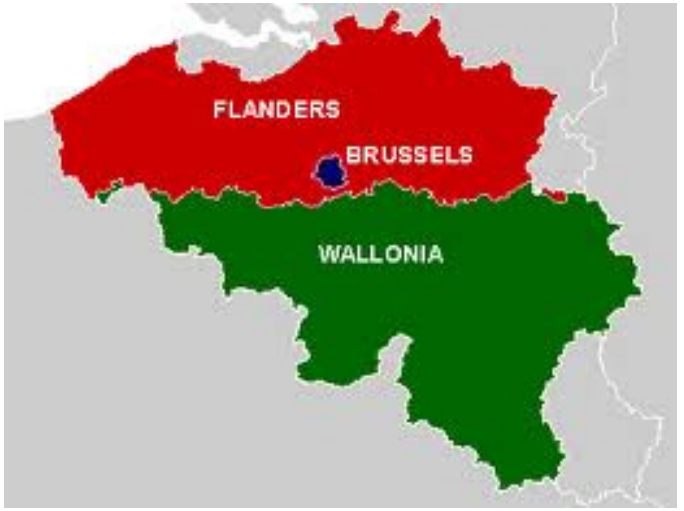
Content

- **Situation in Belgium**
- **Overview of the gene banks in Benelux**
- **Transboundary collaborations**
  - Existing collaboration
  - Opportunities of collaboration

Situation in Belgium

- **Belgium**: 3 regions (Brussels, Flanders and Wallonia)



- **2005-2015:** project of development of a gene bank funded by the Public Service of Wallonia and conducted by the Université catholique de Louvain in two research institutes

- **Objectives:** conservation of genetic material from local breeds of small population size and commercial breeds of Belgian origin or with a specific evolution in Belgium (only breeds present in Wallonia)

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Situation in Belgium

- Main steps for the development of the gene bank

  - List of the breeds to be integrated in the gene bank
  - For local breeds: characterization of the genetic diversity for the choice of the donors based on :
    - molecular data (markers recommended by FAO)
    - information about animal exchanges
    - pedigree data
  - Sampling strategies
  - Sanitary requirements and legal issues
  - Collection and preservation of the material

  → FAO guidelines and experiences of other European gene banks

Objectives of the cryopreservation programs

		Belgium	Netherlands	Luxemburg
Collection goals	To reconstruct a breed	✓	✓	-
	To support in situ conservation	✓	✓	planned
	Back-up of the genetic diversity	✓	✓	✓
	Research	✓	✓	✓
Collection categories	Core collection	✓	✓	-
	Working collection	✓	✓	planned

+ Preserved material beyond the core collection size

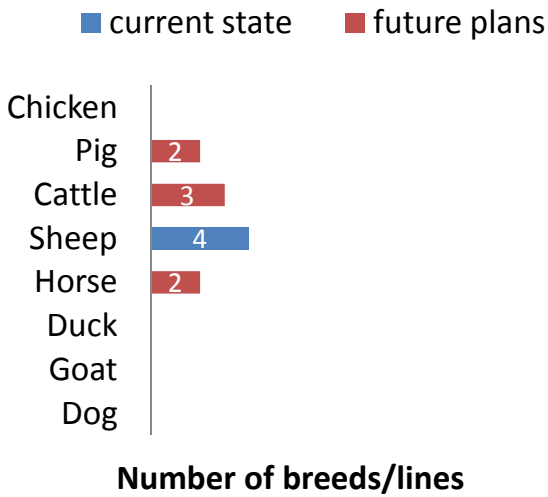
- Extra collection to maximize genetic diversity (in NL and possible in BE)
- « Refresh » collections to take into account genetic progress (in NL and planned in BE)

Sampling strategies

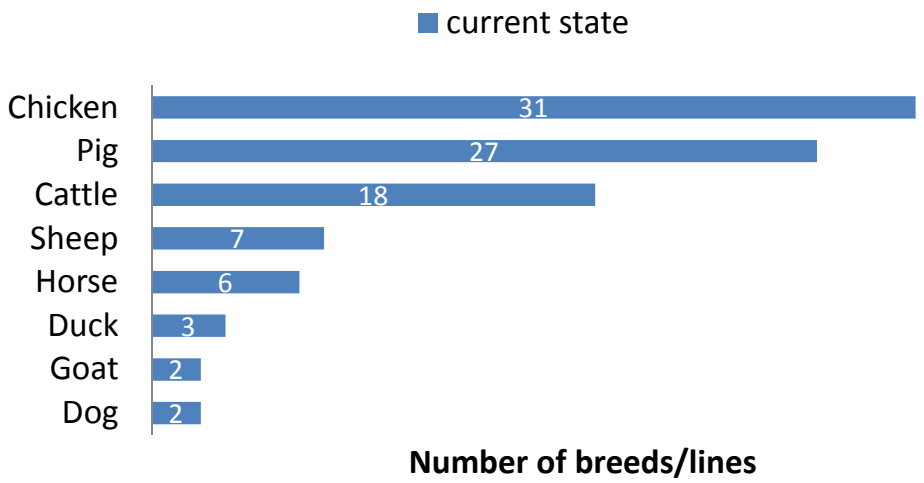
		Belgium	Netherlands	Luxemburg
Type of material	semen	✓	✓	planned
	embryo's		✓	
	oocytes		✓	
	somatic cells	possible	not allowed	✓
	DNA	✓		
Type of populations	local breeds of small population size	✓	✓	planned
	widely used native breeds	✓	✓	
	commercial breeds	✓	✓	✓
Selection of donors	molecular data	✓	✓	
	pedigree	✓	✓	
	animal exchanges	✓		
	proposal of breeding associations	planned	✓	✓
	at ramdom		✓	

State of the collection and future plans

Belgium



Netherlands



Luxemburg

Tissue samples preserved by breeders associations for commercial pig and cattle breeds

Further expansion

- Number of doses for sheep: core collection size
- 2 pig breeds, 3 cattle breeds/lines, 2 horse breeds (semen, DNA and serum)

Further expansion

- Number of doses: core collections size and beyond
- Oocytes? Embryo's ? Somatic cells?

Further expansion

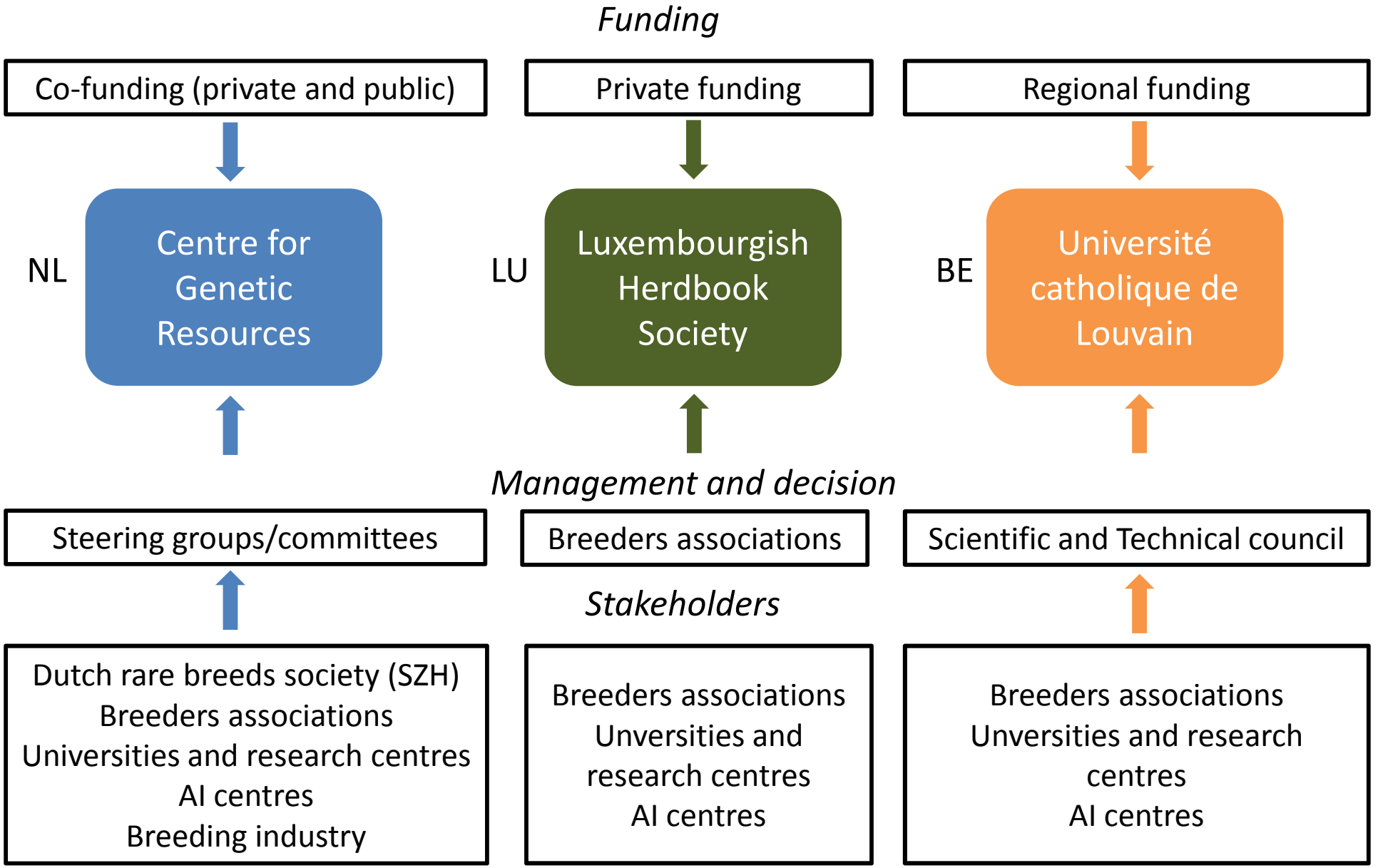
1 horse breed (Ardennes draft horse) in collaboration with France and Belgium

Sanitary aspects

		Belgium	Netherlands	Luxemburg
Collection sites	EU-certified centres	planned	✓	planned
	farms	planned	✓	✓
	research stations	✓	✓	
Sanitary status of doses	EU-certified status	planned	✓	planned
	non EU-certified but known status	✓	✓	✓
Utilisation of doses	national use	✓	✓	✓
	export (EU-certified doses)	possible	possible	possible

Sanitary rules for storage: for BE and NL, one room per sanitary status (EU or not) and one species per tank (two storage sites). In Luxemburg, there is one storage site at the breeders associations.

Organisational aspects



Legal issues

		Belgium	Netherlands	Luxemburg
Ownership	Gene bank	✓	✓	
	Breeder	✓	✓	✓
Material Acquisition Agreements A document with responsibilities for cryopreservation, storage and documentation, sanitary aspects, ownership and use conditions, etc.		between the owner of the donor and the scientific council	between the owner of the donor and the CGN	between the owner of the donor and the breed association
Material Transfer Agreements A document with identification of the transferred material, liability for the eventual sanitary risks, statement about Intellectual property rights, etc.		*Not to date*	between the user and the CGN	between the user and the breed association

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Existing collaborations

- **At the Belgian level**
  - No gene bank in the Flanders region but collaboration with Flemish breeders associations
  - Doses of donors from Flemish breeders in the gene bank

- **Collaboration/exchanges with other countries:**
  - Exchanges of information about:
    - Sampling stategies (FR and NL): No. of donors, doses/donor, …
    - Protocol of collection, processing and cryopreservation of epididymal semen (NL)
    - Legal issues: ownership , agreements and committees (FR, NL, DE)
  - Genetic relationships between French and Belgian sheep breeds
  - Project of preservation of semen of the cattle breed « Bleue mixte », a small size breed located along the Belgian-French border

Opportunities of collaboration

- **Exchanges of experiences** for the development of the gene banks about sampling strategies, protocols of collection and cryopreservation, legal issues, etc.
- **Exchange of information**
  - Specific database developed for the Belgian gene bank: informations about the donors, the samplings (sampling dates, quality tests, processing information, etc.) and the collection

  ➔ Interesting to use Cryoweb in Belgium in the future to share information with other gene banks about:
    - preserved breeds (interesting for example for transboundary breeds)
    - the state of the collections
    - …
- **Research collaboration:** e.g. cryopreservation of embryo's, oocytes, epididymal semen, etc. for different species

Opportunities of collaboration

- **Collaboration for the conservation of transboundary breeds:**
  - **Mergelland sheep**
    - ➢ Sheep breed of transboundary origin (BE and NL) and preserved in the Dutch gene bank
    - ➢ Only few breeders in Belgium

    ➔ No material preserved in the Belgian gene bank

    - ➢ Interest to check if there is a genetic differenciation between the Belgian and the Dutch populations

    ➔ *Comparison of the pedigree data or of molecular data (necessity to use the same molecular data and analyses)*

  - **Belgian dairy sheep (BE) and Zealand and Friesland sheep (NL):** crossbreeding occurred between these breeds ➔ evaluation of the genetic relationships

Opportunities of collaboration

- **Collaboration for the conservation of transboundary breeds:**
  - **Ardennes Draft horse**

    - ➢ Present in Belgium, Luxemburg, France, Sweden, …

    ➔ Collection of donors from LU (and FR?) and preservation in Belgium only or partially (secondary storage site for example)

      ➔ *To establish agreements between stakeholders in the case of secondary storage site in another country*

      ➔ *To take into account the sanitary regulation for the transfer and the use of material in another country (doses with an EU-status)*

  - **Dutch/Belgian draft horse**

    - ➢ Material preserved in the Dutch gene bank

    ➔ Coordination to avoid preserving donors with a same genetic profile in two countries

Thank you for your attention!