

Final Report of the ERFP *Ad Hoc* action to support the development of EUGENA, to identify candidate EUGENA genebanks, and improve the information about the genebanks in Europe

1. Objectives (Summary)

The main objective of the Ad Hoc Action (AHA) is to increase the number of member countries and genebanks enrolled in EUGENA, due to a better knowledge of EUGENA between the actors of the management of the AnGR (Breeder societies, reproduction centres, competent authorities, researchers) in the European Region. In parallel, the activities of the Ad Hoc Action must collect the information about the facilities where the genebanks are hosted, and this information should be registered by the ERFP in a file. The Ad Hoc Action will continue the work done within the IMAGE project “*Inventory and mapping of European animal genetic collections*”

2. Membership

The Ad Hoc Action will be developed by Coralie Danchin, Delphin Duclos, Oscar Cortes, Sipke Hiemstra (all of them with experience in the report of Inventory and mapping of European animal genetic collection, of the IMAGE Project) Zhivko Duchevev, Manuel Luque (Manager of FEAGAS, biggest breeder federation in Spain, for the administrative work) and Fernando Tejerina (Chair of the ex situ WG).

3. Main activities developed.

1. The designing of the EUGENA Flyer:
<https://www.animalgeneticresources.net/wp-content/uploads/2020/06/2020-EUGENA-Flyer-V2.pdf>.
2. The development of a survey to collect information from the European genebanks, with the next questions:
 - a. ***Name of the institution holding the genebank (mandatory).***
 - b. ***Postal address (mandatory). Fields: Address, City, Zip Code and Country.***
 - c. ***E-mail address (mandatory).***
 - d. ***Species of the donors of the material stored in genebank (mandatory). Multi-answer question, with the next options: Cattle, Buffalo, Donkey, Goat, Horse, Pig, Rabbit, Sheep, Poultry, Water species, Fur species, Pets, Wild Species and Others.***



- e. ***Type of biological material stored*** (mandatory). Multi-answer question, with the next options: Semen, Embryos, Oocytes, DNA, Blood, Tissue, Hair, Feathers y Others
 - f. ***Main objective of the genebank***. (mandatory). Multi-answer question, with the next options: Conservation, Research and Commercial.
 - g. ***Web page*** (no mandatory).
 - h. ***Profiles in social media*** (no mandatory).
 - i. ***EUGENA encourages and promotes collaboration between genebanks, do you want to receive more information about EUGENA? Yes/no***
3. The mailing of the EUGENA Flyer and the survey to:
- a. National coordinators of the ERFP.
 - b. Members of the ERFP WGs.
 - c. Semen collection and storage centres, embryo collection and production teams approved by the MMSS of the EU and third countries in the European Region (1.957). (see table 1).
 - d. Breeder's societies approved by the MMSS and third countries in the European Region (1.064). (see table 1).
 - e. Animal Breeding Industry: EFFAB, FABRE TP (for the dissemination to their members).
 - f. NGOs in relation with conservation and sustainable use on AnGR: SAVE, RARE BREED and RBI (for the dissemination to their members)
 - g. Researchers associations: ESDAR, EAAP and AETE (for the disseminations to their members).
 - h. Competent authorities in the zootechnical field of the MMEE, and in the European Commission.
 - i. Participants in previous projects, as IMAGE Project

	COUNTRY	BREEDERS SOCIETIES	REPRODUCTION INSTITUTIONS	TOTAL		COUNTRY	BREEDERS SOCIETIES	REPRODUCTION INSTITUTIONS	TOTAL
1	AUSTRIA	53	50	103	18	LATVIA	10	20	30
2	BELGIUM	41	52	93	19	LITHUANIA	18	6	24
3	BULGARIA	46	1	47	20	LUXEMBOURG	8	0	8
4	CROATIA	23	0	23	21	NETHERLANDS	64	74	138
5	CYPRUS	1	5	6	22	NORWAY	15	6	21
6	CZECH REPUBLIC	2	16	18	23	POLAND	15	65	80
7	DENMARK	12	48	60	24	PORTUGAL	51	18	69
8	ESTONIA	12	6	18	25	ROMANIA	31	74	105
9	FINLAND	5	27	32	26	RUSIA	1	0	1
10	FRANCE	39	563	602	27	SLOVAKIA	9	5	14
11	GERMANY	103	409	512	28	SLOVENIA	17	17	34
12	GREECE	37	12	49	29	SPAIN	163	249	412
13	HUNGARY	0	39	39	30	SWEDEN	26	49	75
14	ICELAND	2	2	4	31	SWITZERLAND	29	12	41
15	IRELAND	27	0	27	32	TURKEY	1	0	1
16	ISRAEL	1	0	1	33	UNITED KINGDOM	136	12	148
17	ITALY	66	119	185	34	UKRAINE	0	1	1
						TOTAL	1064	1957	3021

Table 1. Number per country of potential breeders associations and reproduction institutions recipients of the e-mail

4. The development of the European Inventory of Genebanks, which collect information about 126 different institutions (1 from Brazil) identify as genebanks by the IMAGE Project, EUGENA and AHA.

a) Methodology:

Data were collected through an online survey that was sent (mainly) to a list of institutions potentially holding or managing a collection of farm animal genetic resources in European Countries (1957) or Associations of breeders (1064). See table 1

The list of institutions and contact details was provided through the European Commission in the links below:

- [Approved Establishments in the veterinary field](#)
- [approved establishments in the zootechnical field](#)

Respondents to the survey were 103 institutions belongs to 26 European countries and Brazil, the results of the analysis of the answer are summarize in the next tables (Tables 2-5) and Figure 1.

b). Characterization of the European genebanks.

Table 2 Collections per country and main objective.

Countries	Commercial	Conservation	Research	Grand Total
Albania		1		1
Austria		1		1
Belgium			1	1
Brasil			1	1
Bulgaria		2		2
Croatia		1		1
Denmark		3		3
Finland		1	1	2
France	1	4	2	7
Germany	1	1	1	3
Greece			1	1
Hungary			1	1
Ireland	3			3
Italy	1	4	3	8
Lithuania		1		1
Luxembourg			1	1
Norway	1	1		2
Poland			1	1
Portugal		2		2
Romania	2	2	1	5
Slovenia		2		2
Spain	8	26	8	42
Sweden		1		1
Switzerland		3		3
The Netherlands		1		1
UK	2	2	1	5
Ukraine		1	1	2
Total	19	60	24	103

Figure 1 Genebank records per country

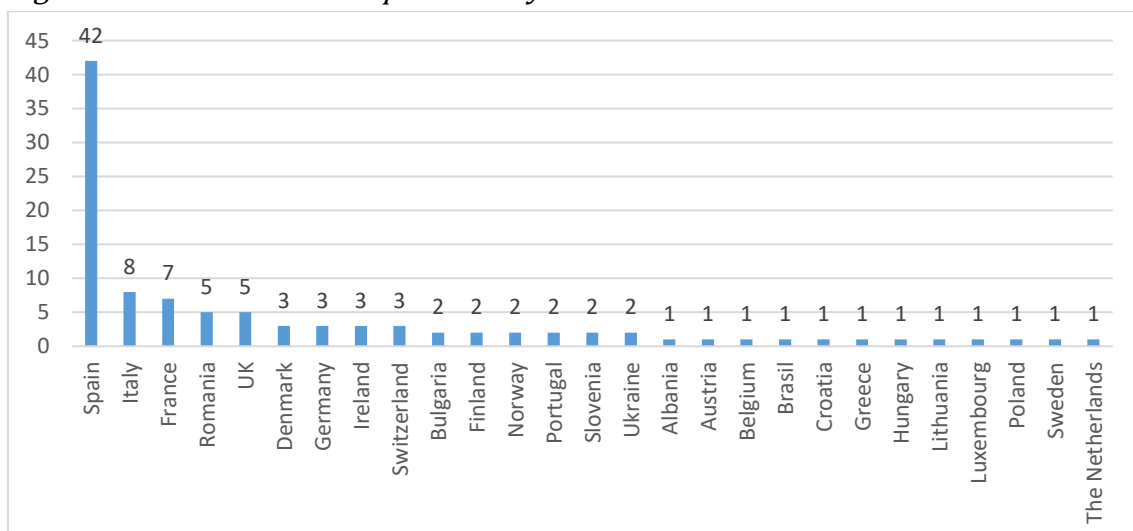


Table 3 Records by country and type of material stored (reproductive, genomic or both types)

Countries	Reproductive GB	Genomic GB	Both	Total
Albania			1	1
Austria			1	1
Belgium		1	0	1
Brasil		1	0	1
Bulgaria	1		1	2
Croatia			1	1
Denmark	1	1	1	3
Finland		1	1	2
France	2	2	3	7
Germany	1	1	1	3
Greece		1	0	1
Hungary			1	1
Ireland		1	2	3
Italy	2	3	3	8
Lithuania			1	1
Luxembourg		1	0	1
Norway	1		1	2
Poland			1	1
Portugal			2	2
Romania	4		1	5
Slovenia	1		1	2
Spain	25	4	13	42
Sweden	1		0	1
Switzerland	3		0	3
The Netherlands			1	1
UK	2	1	2	5
Ukraine		1	1	2
Grand Total	44	19	40	103

Table 4 Collections by country and type of material

Countries	Semen	Embryos	Oocytes	DNA	Blood	Hair	Tissue	Feathers	Other
Albania	1				1		1		
Austria	1			1	1		1		
Belgium				1					
Brasil				1		1			
Bulgaria	2				1				
Croatia	1				1	1	1		
Denmark	2	1	1	1					1
Finland	1	1		2	2		2		
France	5	2		3	4		3		3
Germany	2	2		1	1		2		
Greece				1	1	1			
Hungary	1	1		1			1		
Ireland	2	1		3	2		1		
Italy	4	1		6	3	3	1		
Lithuania	1	1	1	1	1	1			
Luxembourg				1		1			
Norway	2	2		1	1	1	1		1
Poland	1			1	1	1	1		
Portugal	2	2	1	2	1	1	2		
Romania	5	2	1	1					
Slovenia	2			1	1		1		
Spain	38	18	2	9	8	3	4		4
Sweden	1								
Switzerland	3								
The Netherlands	1	1	1	1	1	1	1		
UK	4	2	1	2	1		3	2	1
Ukraine	1	1		1	2	1			
Grand Total	83	38	8	42	34	16	26	2	9

The most popular stored genetic material is semen, then DNA and Embryos.

Table 5. Collections by country and species

Countries	Cattle	Buffalo	Donkey	Goat	Horse	Pig	Rabbit	Sheep	Poultry	Water species	Pets	Wild species	Other
Albania	1			1				1					
Austria	1			1	1	1		1		1			
Belgium			1										
Brasil				1		1		1					
Bulgaria	1	1		1	1			1					1
Croatia	1		1	1	1	1		1					
Denmark	2			1	1	1		1					
Finland	2				2	1		1			1		
France	6		1	3	2	4	2	3	2	2			
Germany	3			1	1	2		1	2				1
Greece	1			1				1					
Hungary	0								1				
Ireland	2							1					
Italy	5		1	2	3	2	1	3					1
Lithuania					1	1		1					
Luxembourg					1								
Norway	2			1	1	1		1		1	1		
Poland					1						1	1	
Portugal	2			2	2	1		2	1				
Romania	5	2		1		1		1					
Slovenia	2			1	1	1		1	1				
Spain	30		5	24	18	13		26	5		5	4	
Sweden	1			1	1	1		1					
Switzerland	1			2		1							
The Netherlands	1			1	1	1	1	1	1	1	1		
UK	4			1	1	2		2				1	
Ukraine	1				1	1		1	2	1	1	1	
Total	74	3	9	47	40	37	4	53	15	6	10	7	3

4 Conclusions and perspectives

- A high number of institutions managing genebanks for AnGR in the European Region.
- The main purpose of the genebanks is conservation, then research and finally the commercial use of the stored material.
- Spain has the country with the highest number of recorded genebanks. Italy and France also have a relevant number of institutions holding genebanks
- Semen is the most frequent material stored, and reproductive genebanks are more spread than genomic ones, nevertheless a relevant number of genebanks have both types of material.
- The “five big” livestock species (Cattle, Sheep, Goat, Horse and Pig), are also the species with more collections. We have found a relevant number of collections of poultry and pets.