

Thursday, 13 August 2020

Mr. Fernando Tejerina
Chair of the Ex situ conservation working group

Report of Ex situ conservation ERF working group – 2019/2020

1. Objectives of the group (Summary)

The three main aims of the WG Ex Situ are:

1. To exchange experiences and knowledge between European countries on Ex Situ conservation strategies;
2. To support the establishment, further development, efficiency and effectiveness of national gene banks for AnGR
3. To develop the European Gene Bank Network for AnGR (EUGENA)

2. Membership of the group (chair in grey)

Country	Name Member	Surname
Albania	Lumpturi	PAPA
Austria	Beate	BERGER
Belgium	Sandrine	VANDENBEMPT
Bulgaria	Valentin	GEORGIEV
Croatia	Jelena	RAMLJAK
Czech Republic	Jana	RYCHTAROVA
France	Delphine	DUCLOS
Germany	Martina	HENNING
Greece	Katerina	SARATSI
Italy	Gustavo	GANDINI
Latvia	Iveta	KLAVINA
Lithuania	Ruta	ŠVEISTIENĖ
Montenegro	Dusica	RADONJIC
Nordgen	Mervi	HONKATUKIA
Norway	Nina	SÆTHER
Poland	Ewa	SOSIN-BZDUCHA
Portugal	Rosa	PEREIRA
Romania	Livia	VIDU

Country	Name Member	Surname
Serbia	Srdjan	STOJANOVIĆ
Slovakia	Elena	KUBOVICOVA
Slovenia	Mojca	SIMCIC
Spain	Fernando	TEJERINA
Sweden	Eva-Marie	STÅLHAMMAR
Switzerland	Markus	NEUDITSCHKO
The Netherlands	Marjolein	NEUTEBOOM
Turkey	Vedat	KARAKAŞ
Ukraine	Svetlana I.	KOVTUN
United Kingdom	Marcus	BATES

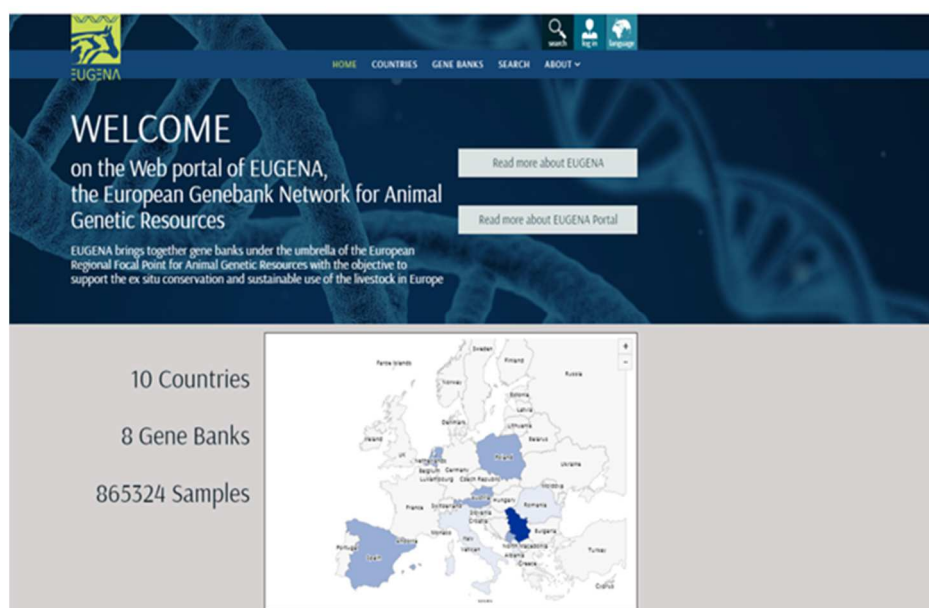
3. Activities in the past year and output/results.

1. Development of the EUGENA network.
2. Development of Material Transfer/Acquisition Agreements (MTA/MAA) proposals in collaboration with ABS Task Force.
3. Ad Hoc Action (AHA) for the Development of specifications for a modern gene bank documentation software (CryoWEB 2.0)
4. Ad hoc action to support the development of EUGENA, to identify candidate EUGENA gene banks, and improve the information about the gene banks in Europe.
5. Collaboration with GenRes Bridge Project.
6. Annual meeting of the WG Ex Situ, 1st July (Webconference).
7. Others.

3.1 Development of the EUGENA network

In the past year the number of countries enrolled in EUGENA remained stable in 10: Italy, Romania, Montenegro, Slovenia, Albania, Spain, Poland, The Netherlands, Austria and Serbia. All countries signatories of the MoU have been included in EUGENA webpage.

Poland communicated the recognition of the National Bank of Biological Material as an EUGENA gene bank and its information was added to the EUGENA portal (<https://eugena-erfp.net/en/>).



As consequence of the incorporation of the new gene bank in EUGENA and the updating of the information from the rest of gene banks in the net, the number of samples reached 865.324 (+ 67.292 than in 2018) and the number of breeds reached 241 (+20 than in 2018). In the next figures or tables are presented the number of samples per gene bank (Figure 1), the number of samples per specie (Figure 2), the number of breeds per specie (Figure 3) and the samples per type of material (Table 1).

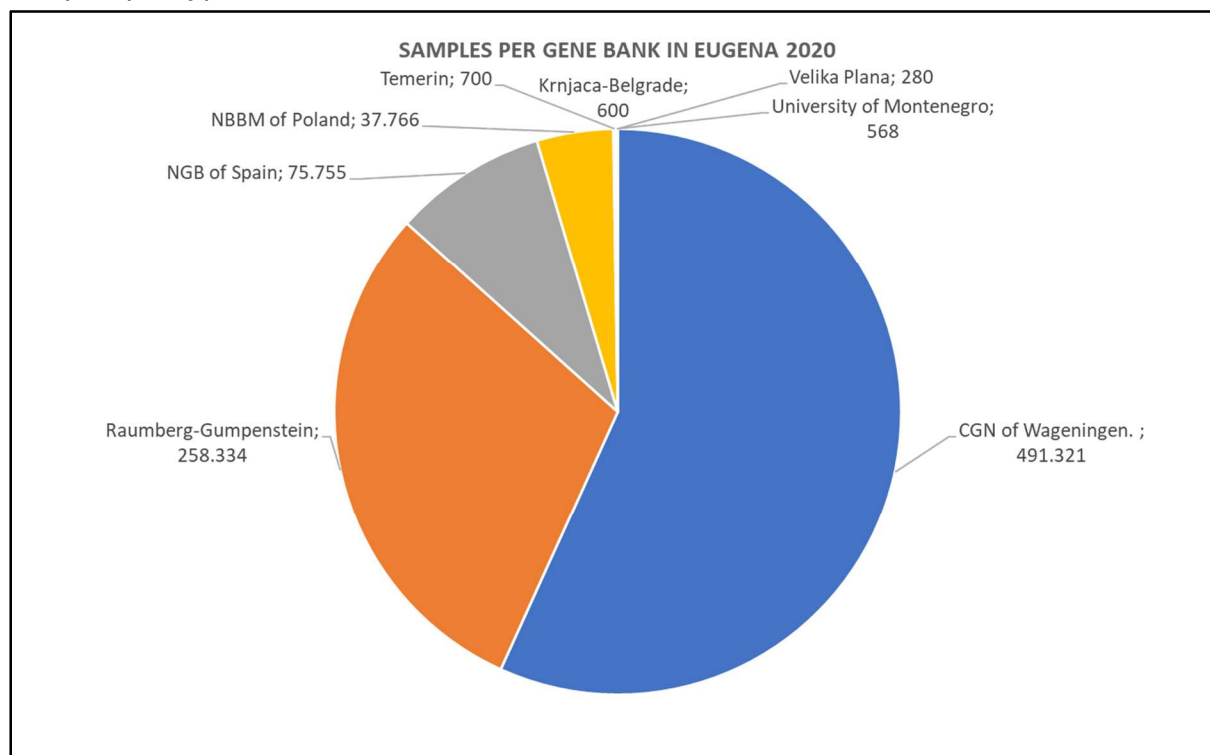


Figure 1. Samples per Gene Bank in EUGENA.

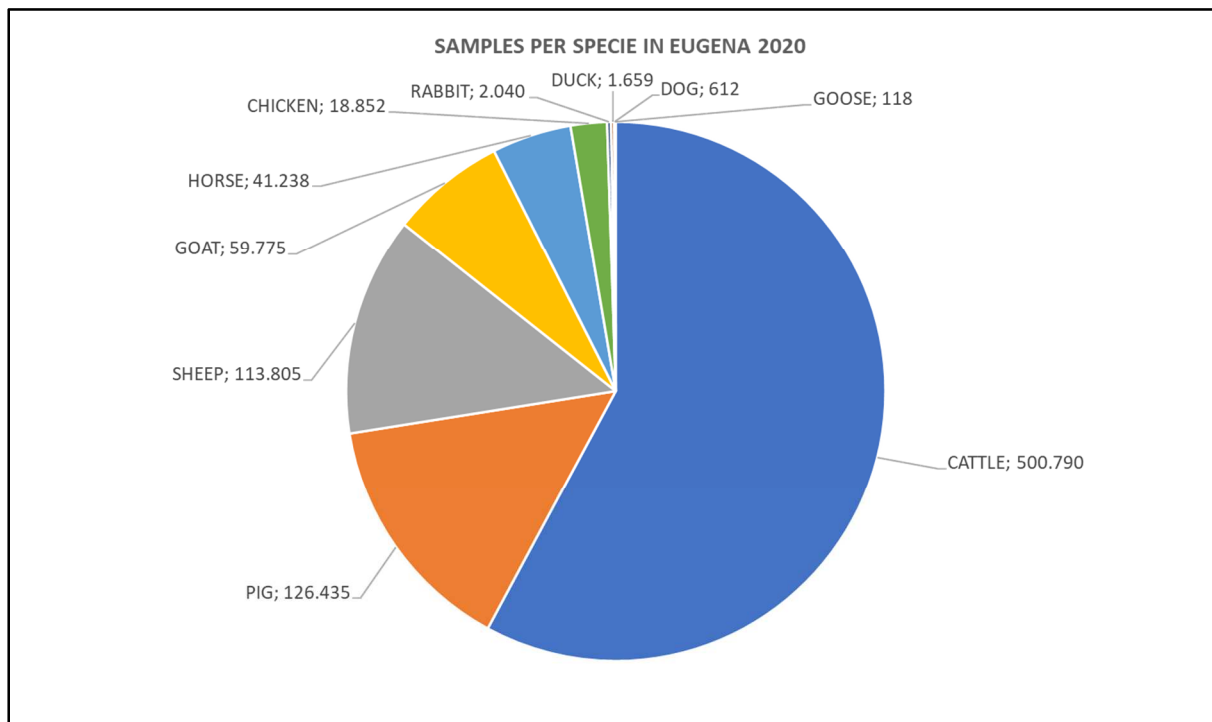


Figure 2. Samples per specie in EUGENA.

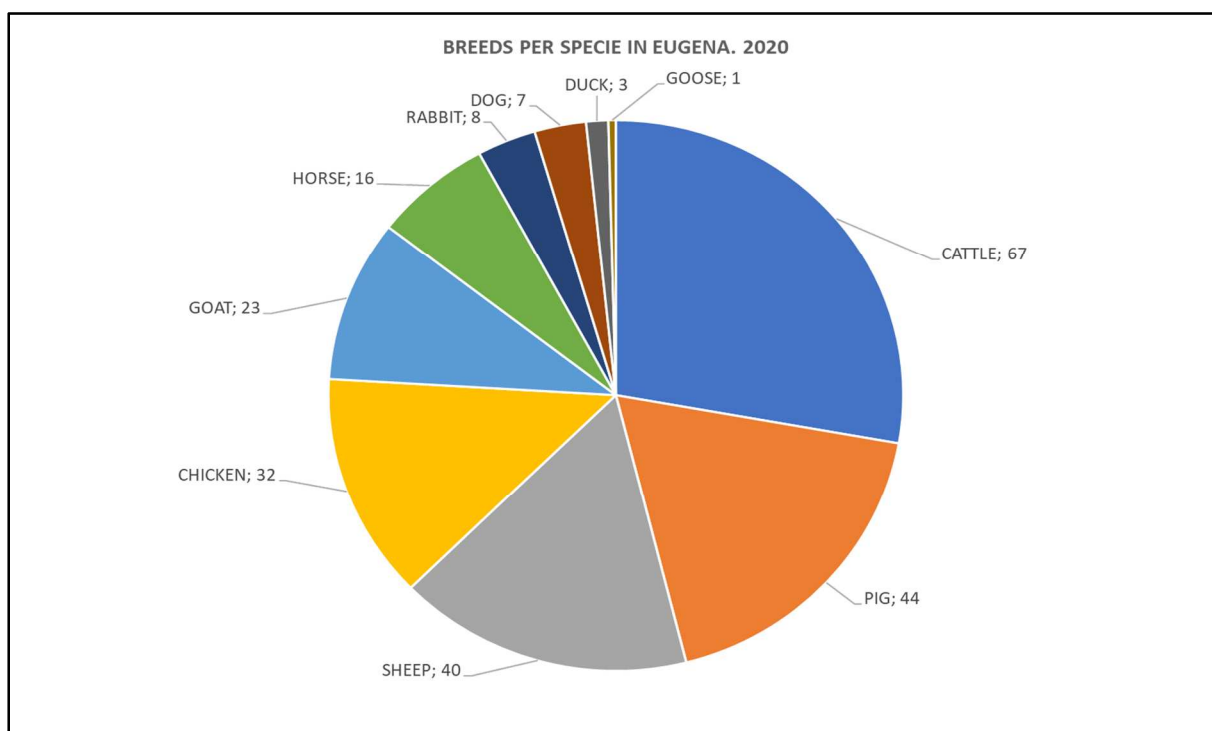


Figure 3. Breeds per specie in EUGENA.

Table 1. Samples per material type.

MATERIAL TYPE	SAMPLES 2019	SAMPLES 2020
Blood	1.198	1.397
Embryos	413	590
Hair	48	48
Semen	796.373	863.289
Total	798.032	865.324

The number of breeds (241) with material stored in EUGENA gene banks represented the 6% of the total number of breeds in the European Region (4.063, in accordance with EFABIS).

3.2 Development of MTA/MAA proposals in collaboration with ABS TF.

After the Ghent General Assembly the models of MTA/MAA for use of gene bank material in breeding, conservation and research were ended and uploaded in ERFP Webpage:

<https://www.animalgeneticresources.net/index.php/news/final-version-of-the-guidelines-of-material-acquisition-agreements-and-material-transfer-agreement-for-genebanks/>

3.3 Ad Hoc Action for the Development of specifications for a modern gene bank documentation software (CryoWEB 2.0).

The aim of the AHA is review the status of documentation of the national gene banks across Europe, identify the information needs of the various countries in this regard and prepare functional specifications for an up-to-date documentation software.

To reach these goals the AHA team developed a survey, which was sent to the all NC, IMAGE project participants and Ex situ WG members, and a total of 25 responses were collected.

The results of the survey were analysed in a web-conference meeting of the members of the AHA at 11 of March. Harvey Blackburn, Coordinator of the National Animal Germplasm Program of USA attend to the meeting and explained the organization of Animal-GRIN, the multi-country (USA-Canada-Brazil) database for managing animal genetic resources (https://agrin.ars.usda.gov/main_webpage_dev/ars?language=EN&record_source=US).

Zhivko Ducheve presented the final results of the AHA in the annual WG meeting in relation with 3 different issues (see the AHA report for details):

- Setup and documentation in the gene banks.
- Documentation software employed in the gene banks.
- Requirements for a new documentation software.

After the presentation of the results, a small survey was launched to collect the impressions of the WG members in relation with the development of a new software and Zhivko Ducheve also introduced the characteristics and organization of the Animal-GRIN to all WG members.

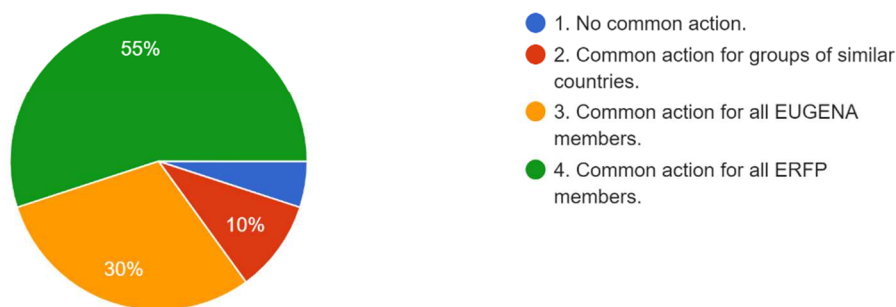
From the analysis of the results of the AHA, and the experiences in other countries (Animal-GRIN) four options to develop a new documentation software for gene banks were proposed in the WG meeting:

- No common action
- Common action for groups of similar countries
- Common action for all EUGENA members
- Common action for all ERFP members

After a discussion on the cost, personnel and maintenance needed for each of the alternatives, the WG agree in develop a survey to the NC (with the advisement of the WG members) to identify the most suitable option in the month of July. A total of 20 responses were collected and the most relevant results of the survey were:

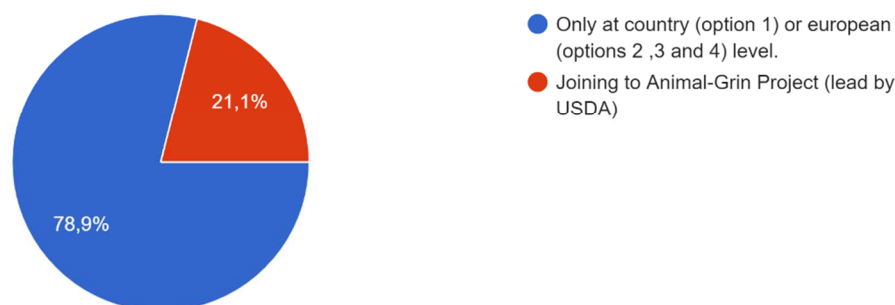
In relation with the development of a new documentation software for Genebanks, the most suitable option for your country, is.

20 respuestas



The previous selection (option) will be developed:

19 respuestas



3. 4. Ad hoc action to support the development of EUGENA, to identify candidate EUGENA gene banks, and improve the information about the gene banks in Europe.

The main objective of the Ad Hoc Action is to increase the number of member countries and gene banks 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 gene banks 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*”

The activities and outputs of the AHA have been:

1. The designing of the EUGENA Flyer: <https://www.animalgeneticresources.net/wp-content/uploads/2020/06/2020-EUGENA-Flyer-V2.pdf>
2. The designing of the EUGENA Membership Certificate (Example in Annex I).
3. The development of a survey to collect information from the European gene banks.
4. The writing of template e-mails and its translation to the languages (22) of the European countries
5. 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).
 - d. Breeder's societies approved by the MMSS and third countries in the European Region (1.064).

- 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: 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.
6. The development of the European Inventory of Gene Banks, which collect information about 126 different institutions (1 from Brazil) identify as gene banks by the IMAGE Project, EUGENA and AHA.

For more details consult the Report of the AHA.

3.5. Collaboration with GenRes Bridge Project.

The Chair of the Working Group attended to the Workshop (Webconference) on sharing resources among genebanks and conservation sites 17st to 19st march.

The working group have collaborate actively in the development of the integrated conservation strategy for genetic resources in Europe and the European genetic resource's programme/strategy for AnGR.

The WG members developed a Proposal of specific strategic recommendation for AnGR *ex situ* conservation (Annex II), with the aim to be used in the bot strategies

3.6. Annual meeting of the WG Ex Situ, 1st July (Webconference).

Due to coronavirus restrictions to travel, the WG annual meeting was a Webconference and it was celebrated on 1st of July.

The issues of the meeting agenda were:

1. Report on the activities of the WG in the last year.
2. Report on the results of the AHA development of specifications for a modern gene bank documentation software (CryoWEB 2.0) and further steps. The WG meeting agree launch a survey to the NC (with the advisement of the WG members) to identify the most suitable option to develop a new software (see point 3.5) in the month of July.

3. Update of the EUGENA status and AHA to support the development of EUGENA, to identify candidate EUGENA gene banks, and improve the information about the gene banks in Europe.
4. Update of the development of the European Integrated Strategy for the Conservation and Use of crop, forest and animal genetic resources by Danijela Bojkovski.
5. Present the AHA Transboundary breeds in Europe by Enrico Sturaro.
6. Workplan for 2020-2021: The chair presented a proposal of workplan for 2020-2021. After the meeting a consultation period will be opened to send comments to the proposal, and also for a prioritization of the tasks (with the exception of EUGENA development, which is the high priority for the WG).

3.7. Others activities.

- Dissemination of IMAGE outputs and attendance to IMAGE Final Conference in Madrid.
- Collaborate with ERFP Secretariat in the dissemination of information and knowledge in the ERFP Webpage and Social Media.
- Collaborate with the others WGs ERFP in the design of the Ad Hoc Action Transboundary breeds in Europe. Promote concerted action between countries.

4. Plans and priorities for the next year (to be formally approved by Assembly)

The chair presented a proposal of Workplan for 2020-2021 in the annual meeting, after the meeting a consultation process was opened to collect comments to the proposal. After this first step a prioritization of the task was developed by the members of the Working Group (with the exception of EUGENA development, which is the highest priority for the WG).

9 countries (Croatia, Serbia, Austria, Poland, Germany, Portugal, Spain, France and Lithuania) sent their prioritization of the tasks, and the final result is the next ranking:

1. Development of specifications for a modern gene bank documentation software (Ad Hoc Action).
2. Supporting the development of national regulation about germinal products collection intended to be kept in gene Banks and the recognition of gene Banks at national level.
3. Collaboration with the ResGen Bridge Project in the development of the European Genetic Resources Strategy and specific Program for AnGR.

WG ex situ

4. Supporting the application of the new regulation of germinal products in relation with the procedure for germinal products moved to gene banks in another Member State.
5. Collaboration with the Ad Hoc Action: Transboundary breeds in Europe. Promote concerted action between countries.
6. Sharing knowledge and expertise in relation with Cryopreservation protocols by species.
7. Spread information about ex situ conservation and EUGENA in collaboration with the Communication Strategy of the ERFP.

Nevertheless, the first priority of the WG is the development of EUGENA.

5. Other

The European Commission have approved in June the Commission Delegated Regulation (EU) 2020/686 Supplementing Regulation (EU) 2016/429 of the European Parliament and of the Council as regards the approval of germinal product establishments and the traceability and animal health requirements for movements within the Union of germinal products of certain kept terrestrial animals. This regulation recognises for first time a specific status for gene banks in the European animal health regulation. Link to the document: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0686&from=ES>

ANNEX I. EXAMPLE OF EUGENA MEMBERSHIP CERTIFICATE.

CERTIFICATE OF MEMBERSHIP

THIS CERTIFICATE IS AWARDED TO

**Centre for Genetic Resources, the Netherlands (CGN)
of Wageningen University & Research**

**AS MEMBER OF THE EUROPEAN GENE BANK NETWORK
FOR ANIMAL GENETIC RESOURCES
(EUGENA)**

SIPKE JOOST HIEMSTRA

Chair of the European Regional
Focal Point for Animal Genetic
Resources.

Date
9TH JUNE, 2020



ANNEX II. PROPOSAL OF SPECIFIC STRATEGIC RECOMMENDATIONS FOR ANGR. EX SITU CONSERVATION.

A. Background.

- *Ex situ* conservation, in the context of conservation of species or breeds means “activities that take places outside of their natural habitat” (Article 2 of the CBD Convention, 1992).
- For AnGR, there are two types of *ex situ* conservation:
 - *Ex situ in vivo* conservation, is conservation through the maintenance of live animal populations not kept under normal management conditions (e.g. in a zoological park or a governmental farm) and/or outside the area where they evolved or are now normally found and bred, and,
 - *Ex situ in vitro* conservation (Cryopreservation), is conservation through the maintenance, under cryogenic conditions, of cells or tissues that have the potential to be used to reconstitute live animals and populations at a later date. *Ex situ in vitro* is developed in gene banks and is the most spread type of *ex situ* conservation for AnGR
- The Cryopreservation most valuable advantage is its capacity to storage reproductive material without deterioration for at least thousand years, allowing the long-term conservation of the AnGR biodiversity.
- Gene banks have multiple functions, in addition the long-term conservation. Reproductive material from gene banks can be used to support the *in vivo* conservation, as backup in case of genetic problems occur, to develop new lines/breed or for research.
- Although the most developed approach for conservation of AnGR is *in vivo*, *ex situ* conservation is considered as essential complementary activity.
- Almost all European countries have *ex situ in vitro* gene bank collections but still for many breeds, there is a very limited amount of genetic material stored (Leroy et al., 2020). Moreover, at national level, gene bank collections are often not officially recognized by the government for their long-term conservation purpose.
- Aims to strengthen the *ex situ in vitro* conservation approach, the most relevant initiative at the European level, is the European Gene Bank Network for Animal Genetic Resources (EUGENA), governed by the ERFP.

B. Strategic recommendations for ex situ conservation of AnGR.

1. **Improve the knowledge about the *ex situ* conservation activities of AnGR in Europe. Establish or strengthen information systems on gene banks and in vivo ex situ facilities, in order to enable breeders’ associations, industry and countries to make appropriate choices in their breeding/conservation programmes. EUGENA must play a key role in the development of this recommendation.**

Rationale.

Ex situ conservation is developed by a wide variety of actors: governments, research institutions, universities or private companies. Until now different studies aimed to establish an inventory of the facilities in Europe dedicated to the cryopreservation, but the complexity of this activity do not allow have a complete landscape of all the institutions involved. In the case of *ex situ in vivo* conservation, the lack of information is bigger. A complete register of the facilities working in the *ex situ* conservation allow a better planification of this activity and a better integration with *in situ* conservation, research or the activities of the breeding industry.

2. Establish or strengthen *ex situ in vitro* conservation programmes with the aim to initiate or expand collections, especially from local breeds at risk.

Rationale.

The number of animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities is de indicator 2.5.1 of the Sustainable Development Goals. The European Union and all its members have committed to fulfil the SDG. However, in accordance with the survey of Leroy et al. (2020), many breeds have no material in gene banks and countries should increase their efforts to initiate or expand collections, especially from local breeds at risk.

3. Set a specific recognition at national level for institutions developing *ex situ* conservation by the administrations.

Rationale.

European countries have not stablished regulation to recognize specifically the institutions developing *ex situ* conservation activities. The lack of recognition is a challenge in planification of the AnGR conservation and a great obstacle for the coordination with other relevant stakeholders. An official recognition allows get a better knowledge *ex situ* conservation activity and increase the confidence between all relevant actors working in the AnGR domain.

4. Promote the use of the material stored in gene banks and the *ex situ in vivo* facilities in the conservation/breeding programmes and research. Breeders societies and breeding industry must have a better involvement in *ex situ* activities and the integration between *in situ* and *ex situ* conservation should be increased.

Rationale.

As the results of the IMAGE H2020 have shown, the use of the material from gene banks must not be restricted to long-term conservation. Reproductive material cryopreserved can be use successful to improve the results of the *in situ* conservation activities, but also to support the breeding programs from the industry or in the development of new genomic or reproductive techniques. Better integration between *in situ* and *ex situ* conservation is demanded to reach the optimal results of the conservation.

5. **Undertake research to develop, standardize and implement reproductive technologies and cryopreservation procedures and to decrease their costs, especially, for under-represented species such as rabbits and avian species.**

Rationale.

The relative development of reproduction technologies seems to be one of the main drivers explaining diversity among species in the extent of cryoconservation (Thelie, et al., 2018). There are needs to further research on reproductive technologies and cryopreservation procedures and to decrease cost for under-represented species in gene banks, as rabbits and avians. Also, even for commonly cryoconserved species such cattle, material collection and processing procedures have typically been developed for international transboundary breeds and may thus not be optimized for less common local breeds (Leroy et al., 2020).

6. **Get a supportive application of the national veterinary regulations and the ex situ in vitro conservation.**

Rationale.

Few European countries have specific regulation for the collection of reproductive material intended to be stored in gene banks. Generally, the administrations apply the same animal health requirements either local or mainstream breeds, as a result a lot of burdens merged and the collection of material from local breeds is very difficult or impossible. To allow the cryopreservation of all breeds the collection of material from local breeds demands specific derogation to reach an equilibrium between the protection of the animal health and the conservation of the AnGR.

7. **Improve the information exchange among gene banks, but also other stakeholders (breeders societies, breeding industry, research, national coordinators) is required to optimize the use of the material. This recommendation is highly relevant for transboundary breeds, and EUGENA must play a key role in its development.**

Rationale.

The exchange of information on individuals stored among gene banks could help avoid the unnecessary collection and storage of material from the same or related animal in multiple countries. In addition, the exchange of information improves the integration of gene banks into the *in vivo* conservation programmes, breeding activities and research. The information is also very valuable for the governments in order to follow the rate of compliance of 2.5.1 indicator and communicate the information to the FAO database DADIS. The information exchange among gene banks and DNA collection is very relevant in order to drive the development of the genomic techniques and their use in the conservation and breeding of AnGR.

8. **Stablish backups of samples and databases of the gene banks.**

Rationale.

Gene banks are critical facilities, and either the material or the information must be duplicated stored in other location to avoid their destruction by catastrophic events.

9. Improve the communication and raising awareness of the value of the *ex situ* collections

Rationale.

Gene banks are mainly hosted by public entities, funding by governments, in this sense the society must be concern about the efforts, results and values of the gene banks in order to stimulate the constant funding of the *ex situ* conservation activities.