EUROPEAN UNION REFERENCE CENTRE FOR ENDANGERED ANIMAL BREEDS

ERFP





Working group « ERFP – EURC »

Indicators used to assess the status of endangerment breeds

Coordination by Stéphanie Minery, France

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1

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Working Group EURC-ERFP

Country	First Name	Name	Organization
BELGIUM	Steven	Janssens	KU Leuven's Centre of Animal Breeding and Genetics
BULGARIA	Zhivko	Duchev	Department "Information services", Agricultural Academy
FRANCE	Eleonore	Charvolin	INRAE
FRANCE	Stéphanie	Minéry	Institut de l'Elevage (IDELE)
GERMANY	Lisa	Balzar	BLE
GREECE	Christina	Ligda	Hellenic Agricultural Organization
SERBIA	Srdjan	Stojanovic	Ministry of Agriculture, Forestry and Water Management
SLOVENIA	Tina	Flisar	University of Ljubljana
SPAIN	Clara	Santos	Spanish Ministry of Agriculture
UNITED KINDOM	Marcus	Bates	British Pedigree Association - Chief Executive of British Pigs Association

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Request of EURC - EAB

« **A review will be done of the indicators** used to assess the breeds' genetic variability (within-breed genetic diversity), based on the information and views of the breeding organisations responsible for the breeding programmes of endangered breeds.

Expected output : **a guideline on indicators to assess genetic health of endangered breeds**

This work will be undertaken in close collaboration with experts of the ERFP WG.

The indicators will be assessed in relation with the **data available** and their **ease of understanding** by breeding organisations in order to assess easily their breeds' genetic health and associated risk status.»

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3

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Contents

Indicators used to assess the status of endangerment breeds

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Guideline

May 2026

Table of contents

1. Context
2. Objectives of the guideline
3. Review of the different classifications
   - The FAO classification system
   - European Union regulations
   - Review of indicators currently used to assess the status of endangerment breeds in the European countries
4. Recommendations
5. Conclusion
6. References

Draft

1.Context
2.Objectives of the guideline
3.Review of the different classifications
  The FAO classification system
  European Union regulations
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4.Recommendations
5.Conclusion
6.References

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First step : review of indicators

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The different classifications

The FAO classification system

The guidelines of **FAO, 2013, "In vivo conservation of animal genetic resources"**, propose a risk categorization system. The categorization is primarily based on three parameters:

1. numerical scarcity (number of breeding females)
2. inbreeding rate (DF)
3. presence of active conservation programmes

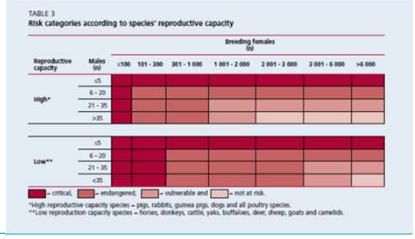
TABLE 3
Risk categories according to species' reproductive capacity

Reproductive capacity	Males (M)	Breeding females (M) ≤100	101 - 200	201 - 1 000	1 001 - 2 000	2 001 - 3 000	3 001 - 6 000	>6 000
High*	≤5							
	6 - 20							
	21 - 35							
	>35							
Low**	≤5							
	6 - 20							
	21 - 35							
	<35							

– critical, – endangered, – vulnerable and – not at risk.
*High reproductive capacity species – pigs, rabbits, guinea pigs, dogs and all poultry species.
**Low reproduction capacity species – horses, donkeys, cattle, yaks, buffaloes, deer, sheep, goats and camelids.

European Union regulations

Since 2014, criteria for the assessment of the endangerment criteria of local breeds are described in Article 7, paragraph 3 of Document 32014R0807 (**COMMISSION DELEGATED REGULATION (EU) No 807/2014 of 11 March 2014**).

The number of breeding females should be stated at a national level, and the number of endangered breeds, including the status of endangerment must be certified **by a recognised relevant scientific body.**

There are **no specific recommendations regarding criteria or thresholds**.

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Review of indicators currently used to assess the status of endangerment breeds in the European countries

EURC-EAB :
Review and Proposal for the indicators used to assess the status of endangerement breeds

Stéphanie Minéry, Coralie Danchin
6-7 May 2025

Based on results of the survey on the implementation of Regulation (EU) 2016/1012 for endangered breeds sent in May 2023 to representatives of breeding organizations and federations of breeding organizations, national competent authority and national coordinators for animal genetic resources.

+ completed by email sollicitations (2024/2025)

7

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Analyse of the 2023 Survey completed by email sollicitations (2024/2025)

- Number of answers : **35 countries**
- Situation known in May 2025

Use of the FAO classification system ?	Yes	14 countries	Croatia, Czech Republic, Denmark, Greece, Ireland, Italy, Latvia, Lithuania, Malta, Montenegro, The Netherlands, Rep. Of Cyprus, Slovenia, Sweden	≈50%
	Yes, but adjusted	2 countries	Norway, Portugal	
	No	14 countries	Austria, Belgium, Bulgaria, Estonia, France, Germany, Luxembourg, Poland, Serbia*, Slovakia, Spain, Switzerland, UK**, Iceland	≈50%
	No specified	5 countries	Finland, Georgia, Hungary, Romania, Armenia	

** Use partially*
*** UK switch to using FAO rules in April 2026*

8

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How countries are using indicators?

- Some counties are using **a unique criterion** to determine the status of endangerment
  - Ex. Germany (Ne)
- Many countries use **2 or 3 indicators**, combined in a decision tree
- Some countries use a **multi criteria approach**, including socio-economic information's
  - To adjust thresholds : ex. France, Bulgaria
  - To compute a "score of risk" : ex. Poland, Switzerland

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Second step : Guideline

*How to answer to a European country **asking for recommendations** about computation of risk status?*

- LEVEL 1 : Primary indicators
  - **Group 1 "Demographic Data"**
  - **Group 2 "Genetic Data"**
  - **Group 3 "Geographic distribution"**
- LEVEL 2 : Secondary indicators
  - **Group 4 "Breed viability" (economic context)**
  - **Group 5 "Organization" (genetic management of the breed)**
  - **Group 6 "Social context"**
  - **Group 7 "Cultural"**


European Regional Focal Point for Animal Genetic Resources

ERFP Task Force – Risk Status and Indicators

RFP EUROPE

Final Report

Edited by: Eléonore Charvolin

2015


European Regional Focal Point for Animal Genetic Resources

Socio-economic and environmental parameters and their applicability into a tool to evaluate risks and trends

Final Project Report

Edited by Christina Lipda and Enrico Sturaro

Project members

RFP EUROPE

[2017]

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Primary indicators

- Demographic data

Total population size
Number of breeding females
Number of breeding males
Population trend
Age structure of the animal population
Number of herds
Average flock size

Advices on how to implement depending on the situation:

1/ nothing is known

2/ there are census data

3/ a registry exists

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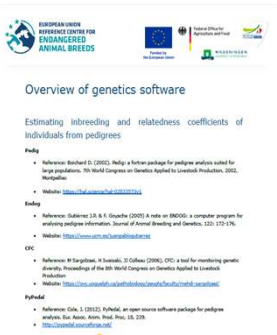
Primary indicators

- Genetic Data

Effective population size (*Ne*)
Inbreeding rate/kinship
Percentage of pure breed animal

Some documentations available on EURC Web Site



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Primary indicators

- Geographic distribution

Concentration of a major part of the population in a restricted geographical area or in a few herds will usually place the breed at greater risk from the consequences of catastrophic events

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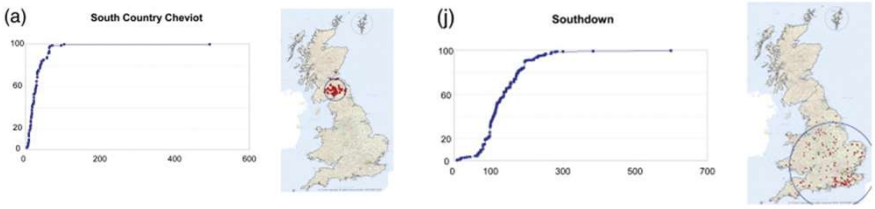
Primary indicators

- Geographic distribution
  - **Mean weighted center (MWC) method** (ex. Carson et al., 2009 : 95% of the 74,597 South Country Cheviot sheep were located within a 64km radius)



The vertical axis is cumulative percentage of purebred animals, and the horizontal axis is distance from the mean centre of that breed in km

  - **Raster data model:** The 1 × 1 km raster method was applied by Flisar et al. to Slovenian autochthonous breeds and proved effective in accurately identifying regions containing 75% of the population. It is considered feasible for routine use due to the small population sizes and Slovenia's limited area.

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Secondary indicators

- <u>Breed viability (economic context)</u>

Market recognition

Proportion of farms commercializing their most important product connected to the breed)

Breed profitability

Profitability of the activities with the breed, quality sign (label, PDO designation)

Continuity of activities

Proportion of young farmers and / or existence of successor

Existence of infrastructure (e.g. slaughterhouse)

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Secondary indicators

- <u>Organization (genetic management of the breed)</u>

Breeding/conservation program

Collective station; mating plan; use of Artificial Insemination ; % pure bred (low, intermediate, high); percentage of animals of the breed identified; percentage of farms under the performance recording scheme ; breeding index clearly defined, successful of breeding program; Genetic variability maintenance

Genebank/ Cryoconservation

Level of completeness, amount of sperm doses, renewal, accessibility

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Secondary indicators

- Social context

Implementation of research activities on the breed in collaboration with research bodies
Cooperation with other Breeders' Associations
Farmers cooperation in buying farm inputs
Organization of visits to other farms of the breed
Collaboration of breed markets

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Secondary indicators

- Cultural value of the breed

Handicrafts
Folklore
Gastronomy
Specific landscape
Higher artistic expression, such as figurative arts, poetry and prose
Custodian of traditional farming practices, including the management of animals
Level of cultural attachment of farmers to their breed

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Secondary indicators

Risks **linked to the environment**

Epidemics

Risk of extreme weather events (storm, hurricane, drought, heat wave, floods…)

And notion of **short term and long term risk**

Risk assessment	Low	Moderate	High
Short term risk	☐	☐	☐
Long term risk	☐	☐	☐

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Example of template – Primary indicators

Availability & quality of information	Unknown/insufficient data	Partial data	Complete data
1. Demographic Data			
Total population size	☐	☐	☐
Number of breeding females	☐	☐	☐
Number of breeding males	☐	☐	☐
Population trend	☐	☐	☐
Age pyramid of population	☐	☐	☐
2. Genetic Data			
Effective population size (Ne)	☐	☐	☐
Inbreeding rate/kinship	☐	☐	☐
Percentage of pure breed animal	☐	☐	☐
3. Geographical distribution			
Geographical distribution	☐	☐	☐

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Example of template – Secondary indicators

	Available data	
	YES	NO
4. Breed viability		
Market recognition	☐	☐
Breed profitability (quality sign)	☐	☐
Continuity of activities	☐	☐
Existence of infrastructure	☐	☐
5. Organization		
Breeding/conservation program	☐	☐
Genebank/ Cryoconservation	☐	☐
6. Social context		
Cooperation level	☐	☐
7. Cultural value		
Cultural value	☐	☐

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Chart representation

Abondance cattle, France

=> Easier to see **the strengths and weaknesses of a breed** for its long-term viability

=> Can help in deciding what actions to take.

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Conclusion

1. Strengthen harmonization while preserving flexibility
2. Prioritize the collection quality and comparability of primary data
3. Improve the use of genetic indicators
4. Systematically integrate geographic distribution and exposure to risk factors
5. Develop multi-criteria approaches for comprehensive risk assessment
6. Differentiate short-term and long-term risk assessment
7. Address transboundary breeds through coordinated approaches
8. Enhance comparability, transparency and data sharing at European level
9. Support decision-making and policy alignment
10. Invest in capacity building, institutional strengthening and knowledge exchange

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Perspectives

- A final version of the Guideline will be validated and shared on Web Sites (June)
- Should the Working Group continue to exchange about different questions on Indicators, Harmonization, methodologies …. ?
- What are the needs ?

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24