The University of York

Heritage Sheep AGRI GEN RES action 040

co-funded by the European Commission
under Council Regulation (EC) N° 870/2004[1]

www.heritagesheep.eu

[1] Council Regulation (EC) No 870/2004 of 24 April 2004 establishing a Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture. Official Journal L 162 , 30/04/2004 P. 0018 - 0028

1. Background

There are many different breeds of sheep currently existing in the world. Out of a total number of some 1200 breeds, more than a third of them - 417 are native to the European Union. Selected by generations of farmers, each sheep breed has evolved over the centuries. Today, some are known for the special quality of their meat, their milk and cheese, or their wool; other breeds are specifically adapted to a harsh life grazing the heather on mountains, living off seaweed on beaches, or surviving life on fenland marshes. These local Heritage Sheep Breeds are distinct to their regions, adapted to their environments and provide low-input farming systems that protect landscapes and encourage tourism. Importantly, these regional native sheep breeds contribute to social communities and provide a commercial opportunity to sustain local economies.

Unfortunately this situation is increasingly threatened - and the native sheep breeds of Europe are now losing numbers at such a rate that the breeds are at risk of becoming lost forever. Farmers are preferring intensive agriculture, using foreign breeds that grow rapidly but need much higher levels of management and food than the local breeds. Disease outbreaks and epidemics are also ever-present threats, with risks made much worse when each Heritage breed is concentrated within a single region.

These sheep breeds are a resource for future generations - people will need to turn to more sustainable farming systems protect the environment and encourage rural development to support a secure food supply for expanding cities and the rising global population.

We need to learn urgently how best to protect these valuable farm animals from extinction - before it’s too late.

Veluwe Heath sheep of The Netherlands

1.1. Breeds in the project and the threats they face

When the foot and mouth disease epidemic hit certain regions of the United Kingdom in 2001, the local breeds of those regions were nearly killed out **[1]** (Bowles et al, 2003). Policy makers realised for the first time that concentration in a particular region could pose a real threat from disease - and 'Heritage Breed' became a recognised definition. When the whole of Europe was surveyed **[2]** (Jones & Bowles, 2006), it was realised that all the Member States had their own unique regional Heritage Sheep Breeds - each supporting their local communities and helping to sustain economies and environments.

As animal scientists and farmers we recognised that these breeds were facing increasing problems - even the possibility of extinction in the near future. For this reason, we gained funding from GENRES project to study the breeds in more detail and work out new ways of protecting the sheep and their commercial potential. As partners in the United Kingdom, France, Netherlands, Greece and Slovenia we each identified our national Heritage Sheep Breeds for the project.

France			
Basco Bearnaise	Bizet	Causses du Lot	Corse
Grivette	Limousine	Manech Tete Noire	Manech Tete Rousse
Mourerous	Merinos d'Arles	Rava	Tarasconnais
Velay Black			
Greece			
Boutsiko (Orino)	Frizarta	Katsika	Kefallinias
Sfakia			
Slovenia			
Bela Krajina Pramenka	Bovec Sheep	Istrian Pramenka	Jezersko Solcava
The Netherlands			
Black Blazed	Blue Texel	Drenth Heath	Flevolander
Kempen Heath	Mergelland	North Holland	Schoonebeek
Swifter	Texel	Veluwe Heath	Zeeland milksheep
United Kingdom			
Brecknock Hill Cheviot	Cheviot	Clun Forest	Dalesbred
Derbyshire Gritstone	Devon Closewool	Exmoor Horn	Herdwick
Lonk	Romney	Rough Fell	Shetland
South Welsh Mountain	Southdown	Welsh Hill Speckled	

We prepared questionnaires and contacted local breed societies to collect as much information as possible. This included recording the special values of each breed, the range and number of threats facing the breeds, the numbers of breeding animals that currently exist and whether in the future, those numbers were likely to go up or down. All of the answers to the questionnaires were built into a database http://www.heritagesheep.eu/Default.aspx that can be rapidly accessed for information on each of the breeds in each partner Member State.

The most serious general threat highlighted by all breed societies, across the EU, was farms ceasing to farm - in part due to the ageing population of sheep farmers, the reluctance of their children to carry on the farm and the decision of many farmers, young as well as old, to go out of sheep farming completely because of decreasing returns for the work needed. This is a very real risk - just when food security is becoming recognised as an urgent issue.

Changes in government policies and reform of the Common Agricultural Policy were also political issues perceived to threaten the livelihoods of sheep farmers. And new diseases now appearing in Europe for the first time can rapidly reduce sheep numbers.

Heritage Sheep of Greece

Our survey showed that the Heritage Sheep Breeds were far more regionally concentrated than previously thought. In the UK, we worked with breeders to get information on individual flocks - and for the first time accurately geo-referenced these Heritage Breeds - putting each and every flock 'on the map' **[3]** (Carson et al, 2009). This showed for example that more than 95% of the Herdwick breeds, a famous sight in the Lake District national park, are all found within an upland area just 40km across. Clearly this presents an immense risk if the worst were to happen and there was a disease outbreak in the area. Already in the Netherlands and France there have been significant numbers of sheep lost due to the disease called Bluetongue Virus, which until 2006 had never been found in Northern Europe.

1.2. The best way to protect a breed - conservation on the farm

It is said that the only long-term solution to protect a breed is to ensure there are markets for its produce - whether meat or milk or cheese or wool - or breeding animals to maintain and share the best of the breed's qualities. If there are these markets, there will be sufficient reason to continue to farm the breeds commercially and their numbers can be sustained economically at a high level.

Our French partner studied reasons for the success of three Heritage Sheep Breeds that continue to be commercially farmed in the French Pyrenees and are used for milk production. Through regional economic support for the sheep dairy industry, there has been a doubling of outputs over the last 20 years and very importantly, new special–label products have been developed, particularly the Label Rouge Agneau de Lait des

Pyrénées. Flocks of each breed are managed locally with the farmers working closely with the breed society to maintain top quality animals - through flock records, selective breeding and progeny testing - all aimed to help ensure the milk products from the Heritage Sheep will attract growing markets.

We also looked at all the different ways that sheep breeders in the different partner Member States promoted their products and analysed any difficulties they had encountered to see if there was a common theme for success - such as help from regional governments and more closely monitored breeding programmes for the sheep.

1.3. Protecting genetics as a long term safeguard – genebanks

Some Member States are well organised in collecting germplasm from sheep breeds at threat of extinction and keeping it stored frozen in genebanks. The germplasm can be semen from rams or very young embryos flushed from ewes after artificial insemination. The stores can be an archive and are available to restore a breed or a particular genetic characteristic that could be lost in the event of a disaster.

We wanted to find out the best methods in use across the Member States such as those for collecting semen from rams - whether living animals or taken from dead rams at slaughterhouses - and the range of procedures used for freezing of germplasm. Our partner in the Netherlands took the lead in this work and collated the information into a computerised ”Conservation Planner”, available as a downloadable zip file at the website

http://www.cgn.wur.nl/UK/CGN+Animal+Genetic+Resources/Tools/

This is based on standard population genetics and data collected through this project. We hope that breeders and breed societies planning an ex situ conservation scheme for a Heritage Sheep Breed will find the planner a useful resource.

Based on data collected throughout the project, each of our five partners chose two Heritage Breeds in their countries from which to collect germplasm. Semen from these rams is now safely stored and represents the beginnings of a European–wide genebank of Heritage Sheep Breeds.

A partner from the Heritage Sheep consortium working with a local farmer in the Netherland

2. Communicating value

The GENRES project has enabled us to study Heritage Sheep Breeds across our partner Member States, contribute to a European genebank and discover how best to develop markets as a means of protecting and conserving the numbers and value of the sheep breeds.

All of this information is now available for everyone to see on our website: http://www.heritagesheep.eu Our Greek partners have developed the site to communicate the values of the Heritage Sheep Breeds to the public and to policymakers. They have designed and set up a unique database that you can easily search and use.

These sheep breeds are a resource to their communities and their importance will become increasingly recognised as the need for sustainable farming becomes urgent. We want our information resource to grow - and include studies of the unique sheep breeds of other Member States beyond those of the six partners in the GENRES project.

We are also writing up the technical aspects of our work. A paper describing the geographical concentration of British breeds of sheep is recently published **[3]** and also was presented to the United Kingdom National Committee that protects farm animal genetic resources. More articles are in preparation and will be additional outputs from the project's work, together with a short report specifically aimed at policy-makers across Europe.

The Bovec heritage sheep of Slovenia

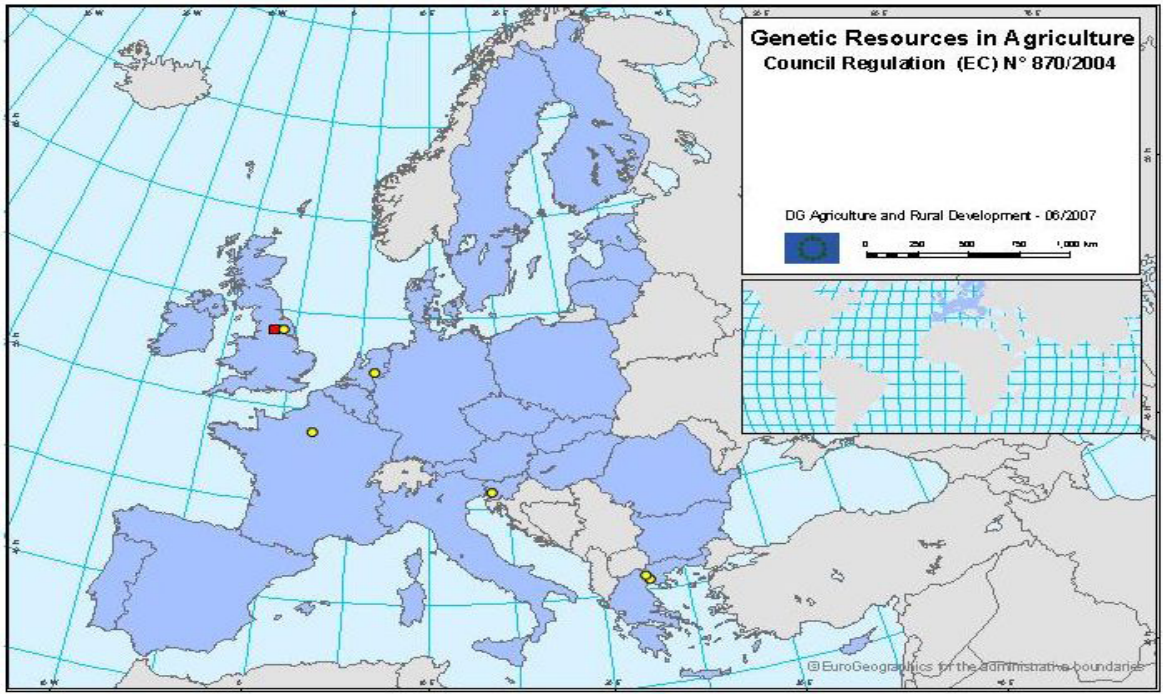
3. The Action and the Partners

3.1. Action details

Heritage Sheep was awarded 356,000 euros from the EU, towards a total project cost for the GENRES project of 720,000 euros. The project started on 1 April 2007. The end-date was 30 September 2009. An extension of three months was provided given the difficulties encountered in germplasm collection during the Blue Tongue virus epidemic of 2008. We, The University of York, coordinated the action. Our partners were specialists from organisations located in five EU Member States - France, Greece, Slovenia, the Netherlands and the United Kingdom.

First meeting of the partners

3.2. Partner details



Location of the partner institutions

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4. Links

This section lets you know how to find out more about the ”outputs” of the Heritage Sheep project – how to access the sheep breed societies and genetic resources that have been collected in genebanks, how to access the information that we have found about the sheep breeds, and how to obtain copies of the scientific, technical and other publications that we have produced.

4.1. The genetic resources

If you would like to know more about Heritage Sheep Breeds, and perhaps start to keep and breed these sheep, we would be glad to hear from you and provide contacts. Please email us at The Sheep Trust on: info@thesheeptrust.org.

Screenshot of our database

4.2. The database

Our database aims to serve as a tool to promote the sustainable use of the Heritage Sheep Breeds, integrating information on the characteristics of the breeds, their uses, the threats they are exposed to and the values attached to the breeds and their products. You can find it on our website at http://www.heritagesheep.eu/Default.aspx

4.3. List of publications

We are writing technical, scientific and policy reports and publications. Publications that were already available at the time of writing are listed in the below.

Our study of British breeds and their geographical concentration is listed as Reference **[3]** (Carson et al, 2009). The report on that study made to the UK Standing Committee on Farm Animal Genetic Resources **[4]** can also be accessed at: http://www.defra.gov.uk/fangr/pdf/sheeptrustrpt-090205.pdf

4.4. Other publications and links

For other publications and links, see the project website http://www.heritagesheep.eu/Dissemination.htm

Other actions co-funded by the European Commission's Community Programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture can be found at: http://ec.europa.eu/agriculture/envir/biodiv/genres/index_en.htm

The Basco Bearnais Heritage Sheep Breed of France

References

[1] Bowles D.J., Gilmartin P., Holt W.V., Leese H., Mylne J., Picton H., Robinson J., and G. Simm. The emergency of 2001: cryopreservation of sheep germplasm during the UK crisis of Foot and Mouth Disease. In Planchenhault D., editor, Workshop on the Cryopreservation of Animal Genetic Resources in Europe. Salon International de l'Agriculture, Paris, France, 2003.

[2] Jones S and Dianna J Bowles. E.R.F.P. Scoping Study. Genetic Resources of Heritage Sheep Breeds across Europe: their value and conservation, 2006.

[3] Amanda Carson, Matt Elliott, Julian Groom, Agnes Winter, and Dianna Bowles. Geographical isolation of native sheep breeds in the UK Evidence of endemism as a risk factor to genetic resources. Livestock Science, 123(2-3):288–299, August 2009. doi:10.1016/j.livsci.2008.11.026.

[4] The Sheep Trust. Geographical Isolation of Commercially Farmed Native Sheep Breeds in the UK evidence of endemism as a risk factor to their genetic resources. A final report to the UK National Standing Committee on Farm Animal Genetic Resources from The Sheep Trust on research supported by a Defra-funded project grant, published by DEFRA. http://www.defra.gov.uk/fangr/pdf/sheeptrustrpt-090205.pdf.