Anna Caroli[1], Flavia Pizzi[2]

LIVESTOCK BIODIVERSITY

[1]Dipartimento di Scienze Biomediche e Biotecnologie (DSBB)
Università degli Studi di Brescia - Brescia

[2]Istituto di Biologia e Biotecnologia Agraria (IBBA)
CNR - Milano

Biodiversity in Agroecosystems
Milano, 24-25 February 2011

LIVESTOCK BIODIVERSITY: PREVIEW

1. Livestock biodiversity and human culture
2. Local livestock breeds
3. Breed characterisation
4. *In situ* conservation strategies
5. *Ex situ* conservation strategies

LIVESTOCK BIODIVERSITY AND HUMAN CULTURE

Origin and domestication of livestock species

Domestic species	Wild Ancestor	MtDNA clades	Domestication events*	Time B.P.	Location
Cattle	Aurochs (3 subspecies) (extinct)				
Bos taurus taurus	*B. primigenius primigenius*	4	1	~ 8000	Near & Middle East (west Asia)
	B. p. opisthonomous	2	1	~ 9500	northeast Africa
Bos taurus indicus	*B. p. nomadicus*	2	1	~ 7000	northern Indian subcontinent
Horse	Extinct				
Equus caballus		17	multiple	~ 6500	Eurasian steppe
Goat	Bezoar				
Capra ferus	*Capra aegragus* (3 subspecies)	5	2	~ 10000	Near and Middle East, northern Indian subcontinent
Sheep	Asian mouflon				
Ovis aries	*Ovis orientalis*	4	2	~ 8500	Near and Middle East/Turkey (Central Anatolia)
Pig	Wild boar				
Sus scrofa domesticus	*Sus scrofa* (16 subspecies)	6	6	~ 9000	Europe, Near and Middle East, China
					Indian subcontinent, Southeast Asia

Source: FAO. 2007. *The State of the World's Animal Genetic Resources for Food and Agriculture*, edited by Barbara Rischkowsky & Dafydd Pilling. Rome.

LIVESTOCK BIODIVERSITY AND HUMAN CULTURE

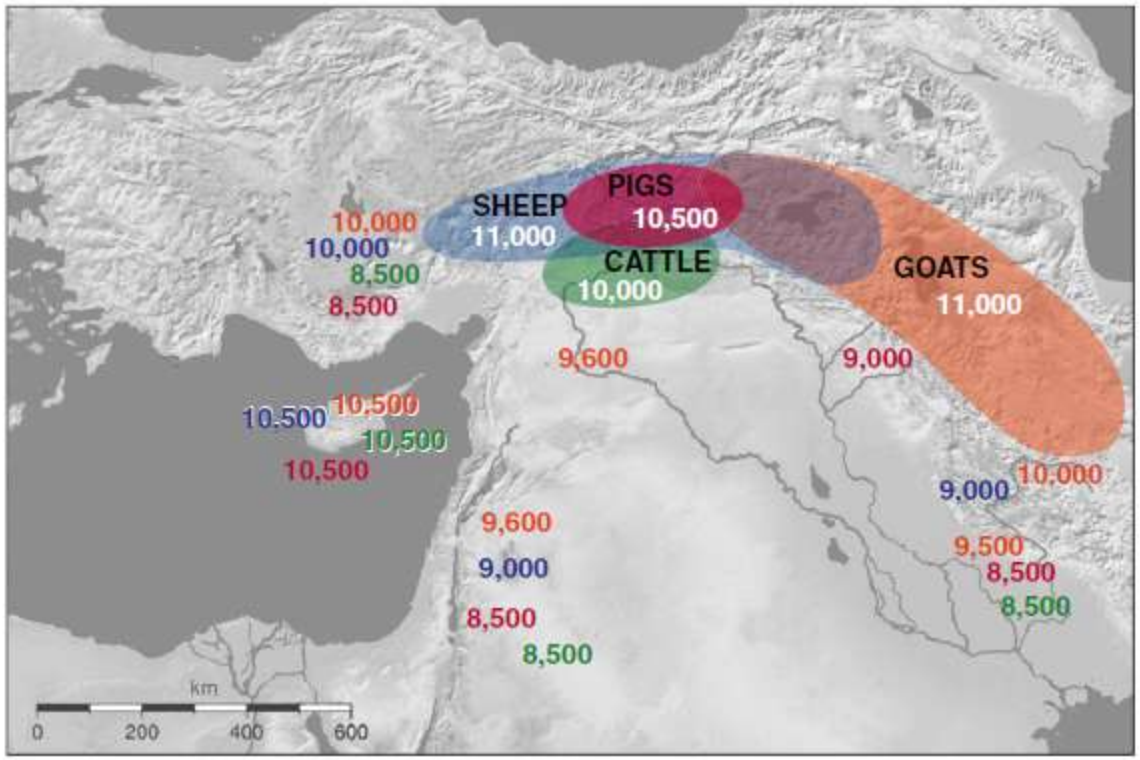
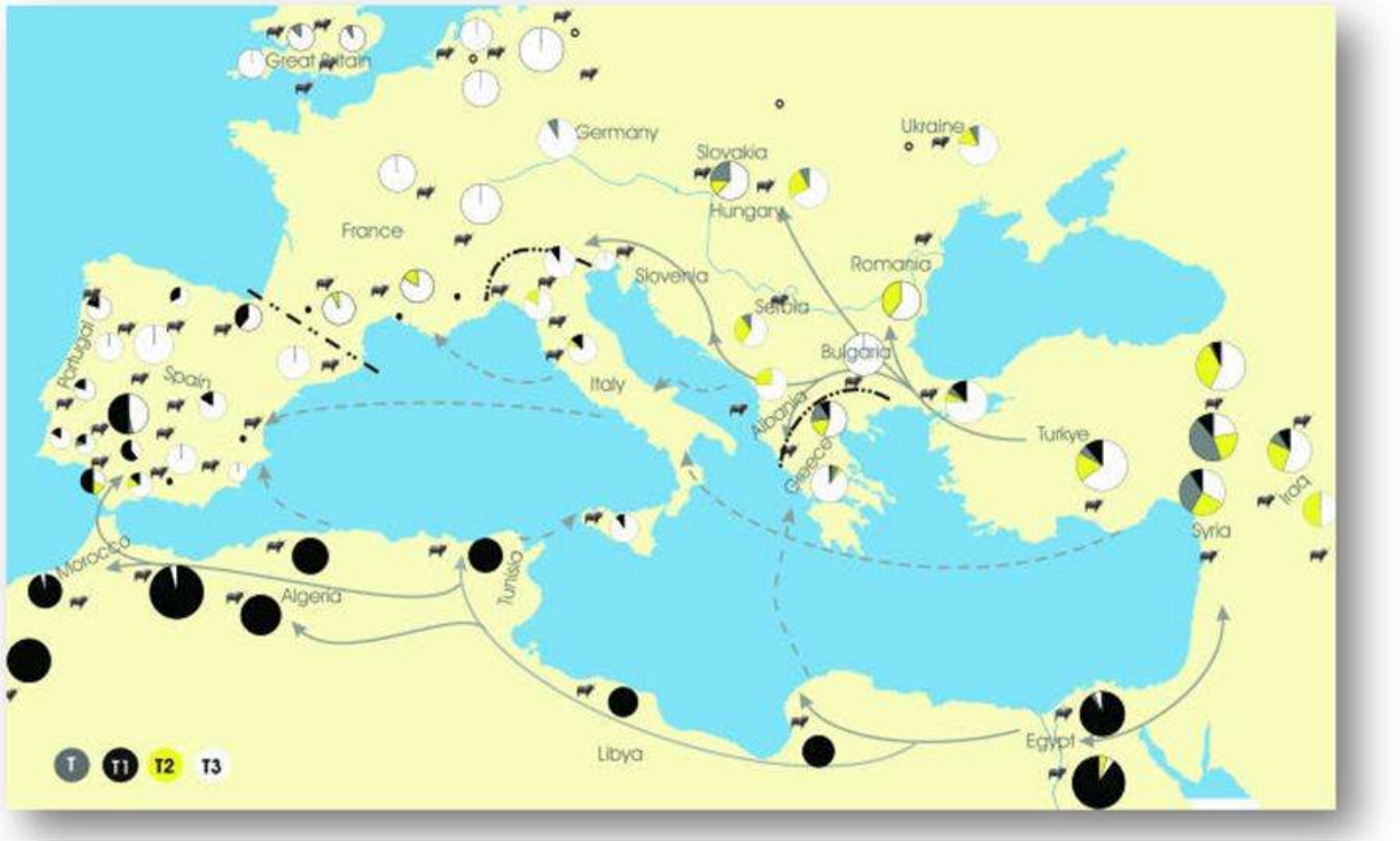


Fig. 1. The origin and dispersal of domestic livestock species in the Fertile Crescent. Shaded areas show the general region and the approximate dates in calibrated years B.P. in which initial domestication is thought to take place. Dates outside of the shaded areas show the approximate date when the domesticate first appears in a region. Orange, goats (*Capra hircus*); blue, sheep (*Ovis aries*); green, cattle (*Bos taurus*); fuscia, pigs (*Sus scrofa*).

Source: Zeder MA 2008. Domestication and early agriculture in the Mediterranean Basin: Origins, diffusion, and impact. PNAS 105 11597–11604

LIVESTOCK BIODIVERSITY AND HUMAN CULTURE



Cattle diffusion in Europe

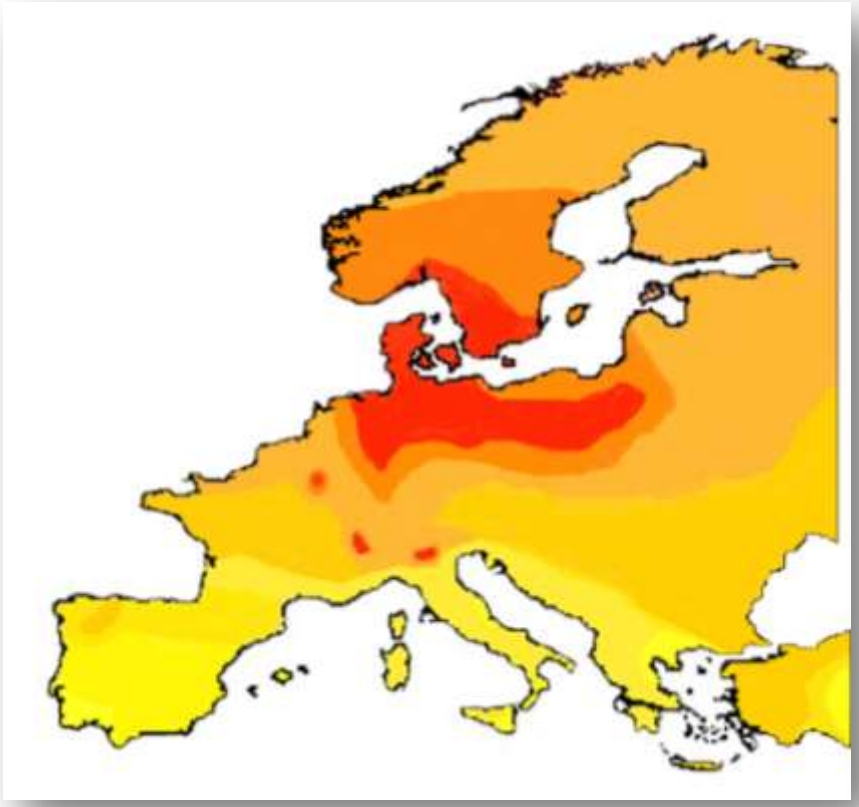
Source: Beja-Pereira et al. 2006. The origin of European cattle: evidence from modern and ancient DNA. PNAS 23 103:8113-8.

LIVESTOCK BIODIVERSITY AND HUMAN CULTURE

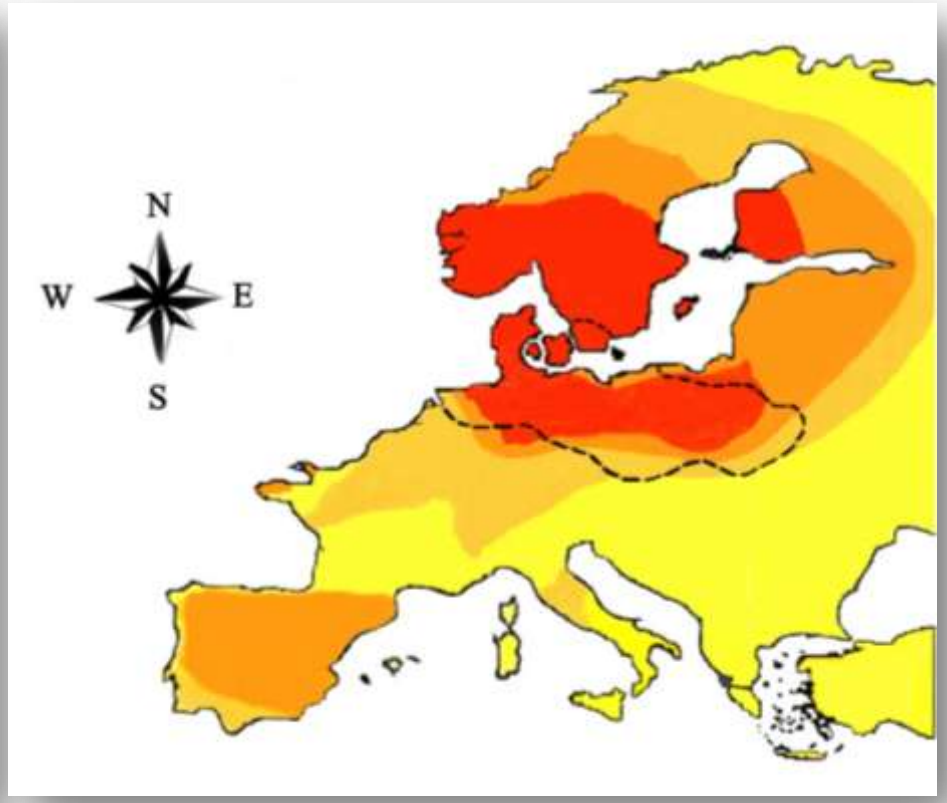
- Livestock biodiversity is integral to human culture, history, environment, and economy.
- Example: dairy cattle will be considered.
- Cheese was made 9000 years ago.
- Milk from domestic cows has been an important food source for over 8000 years, especially in lactose-tolerant human societies.
- Some human populations have the genetically determined ability to digest lactose by persistent lactase enzyme in adulthood, benefiting from the rich food resources occurring in cows' milk.

LIVESTOCK BIODIVERSITY AND HUMAN CULTURE

Source: Beja-Pereira et al. 2003. Nature Genetics 35:311–313.



Map of allele frequencies at the cattle milk protein genes



Map of lactase persistence allele in European human populations

LIVESTOCK LOCAL BREEDS

- Thousands of livestock breeds have evolved to fit particular environments and farming systems
- Biodiversity is a prerequisite for genetic improvement and environmental adaptation

http://www.agraria.org/

*Giant Italian **Chianina** reared from Roman times*

http://www.fao.org/

*Trypanosome tolerant African **N'Dama***

LIVESTOCK LOCAL BREEDS

- However, diversity of Animal Genetic Resources (**AnGR**) has been in a continual state of decline
- Main causes:
  - trends in the livestock sector
  - disasters and emergencies
  - animal diseases, control measures
- Need for safeguard strategies

Apulian livestock (by Elisa Pieragostini)

LIVESTOCK LOCAL BREEDS

- AnGR are managed by Global Plan of Action (Food and Agriculture Organisation, 2007)
- Strategic Priority Area 1: Characterization, inventory and monitoring of trends and associated risks
- World Watch List for Domestic Animal Diversity (**WWL-DAD**): information system (**IS**) to identify and monitor livestock breeds

Apulian livestock:
Murgese horse
(by Elisa Pieragostini)

LIVESTOCK LOCAL BREEDS

6379 livestock breeds belonging to 30 different species reported in WWL-DAD 3rd edition

DAD-IS: http://dad.fao.org

Source: FAO 2000 World Watch List for Domestic Animal Diversity. Scherf, B. (ed.)

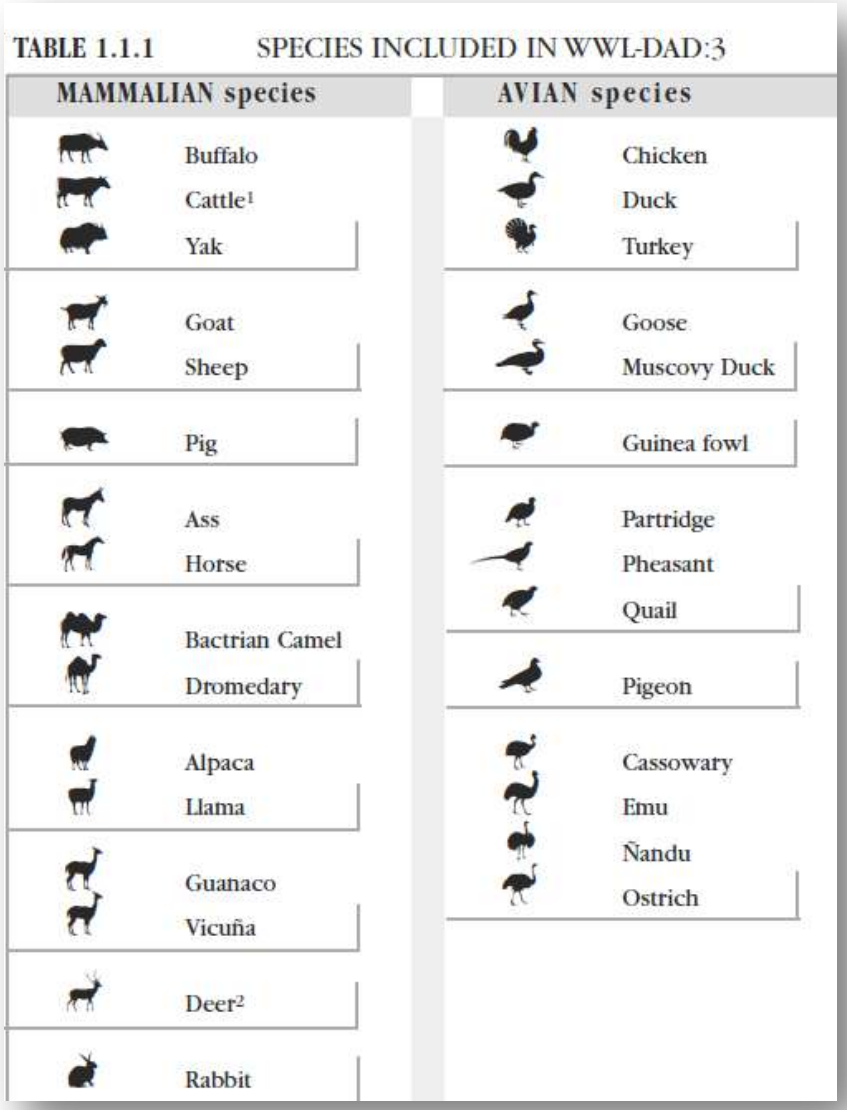


TABLE 1.1.1 SPECIES INCLUDED IN WWL-DAD:3

MAMMALIAN species	AVIAN species
Buffalo	Chicken
Cattle[1]	Duck
Yak	Turkey
Goat	Goose
Sheep	Muscovy Duck
Pig	Guinea fowl
Ass	Partridge
Horse	Pheasant
Bactrian Camel	Quail
Dromedary	Pigeon
Alpaca	Cassowary
Llama	Emu
Guanaco	Ñandu
Vicuña	Ostrich
Deer[2]	
Rabbit	

LIVESTOCK LOCAL BREEDS

Table 3. Status of information recorded in the Global Databank for Animal Genetic Resources.

Year of analysis	Mammalian species		Avian species		Countries covered
	Number of national breed populations	% with population data	Number of national breed populations	% with population data	
1993	2 719	53	–		131
1995	3 019	73	863	85	172
1999	5 330	63	1 049	77	172
2006	10 512	43	3 505	39	181
2008	10 550	52	3 450	47	181

Source: FAO (2009b).

In 2008, 48% of mammalian breeds and 53% of avian breeds recorded in DAD-IS had no population data recorded (Martyniuk et al., 2010)

LIVESTOCK LOCAL BREEDS

Different actions in defense of AnGR are developed.

Animal resources

012: Cattle
http://www.regionalcattlebreeds.eu

066: Livestock breeds
http://www.elbarn.net

020: Farm animals
http://efabis.tzv.fal.de/cgi-bin/index.cgi

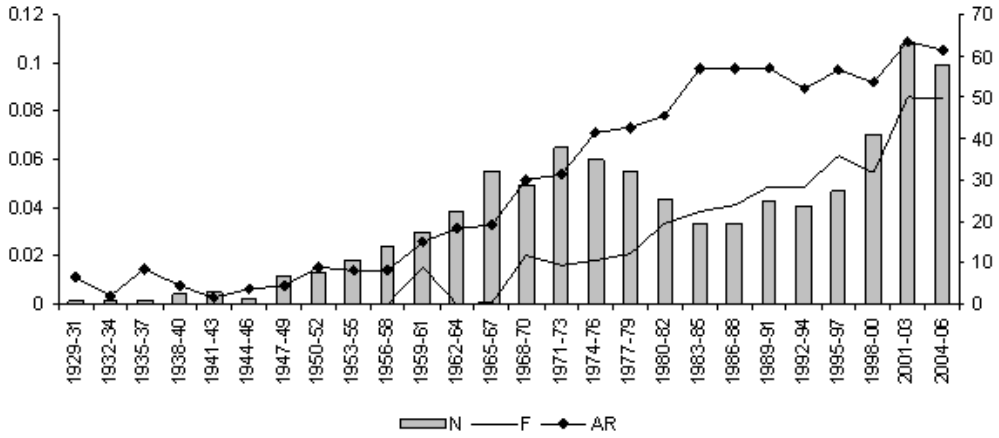
067: Livestock globalview
http://www.globaldiv.eu

040: Sheep
http://www.heritagesheep.eu

Five projects funded by the European Community Program 2006-2011 for genetic resources

BREED CHARACTERISATION

Conservation of AnGR relies on demographic characterisation of breeds and definition of correct breeding schemes.



Trends in level of inbreeding (F), average relatedness (AR) and number of individuals by year of birth in the period 1929-2006.

Martina Franca donkey
Apulian livestock (by Elisa Pieragostini)

R. Rizzi (2011): Monitoring of genetic diversity in the endangered Martina Franca donkey population. J. Anim. Sci. (in press)

BREED CHARACTERISATION

Zootechnical characterisation is also a prerequisite for safeguard.

Garfagnina goat (Tuscan breed at risk of extinction)

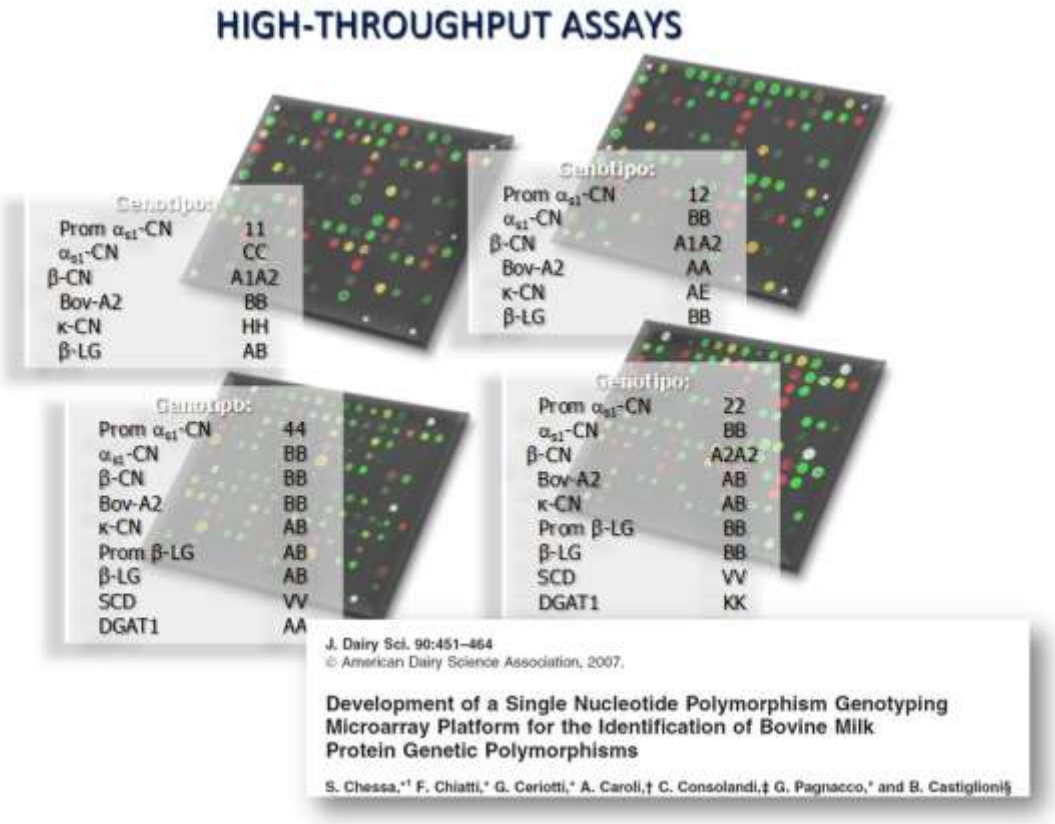
Data on:

- size of the breed
- zoometric measures
- breeding system
- milk quality

Source: Martini et al. (2010). The Garfagnina goat: a zootechnical overview of a dairy local population. J. Dairy Sci. 93, 4659-4667.

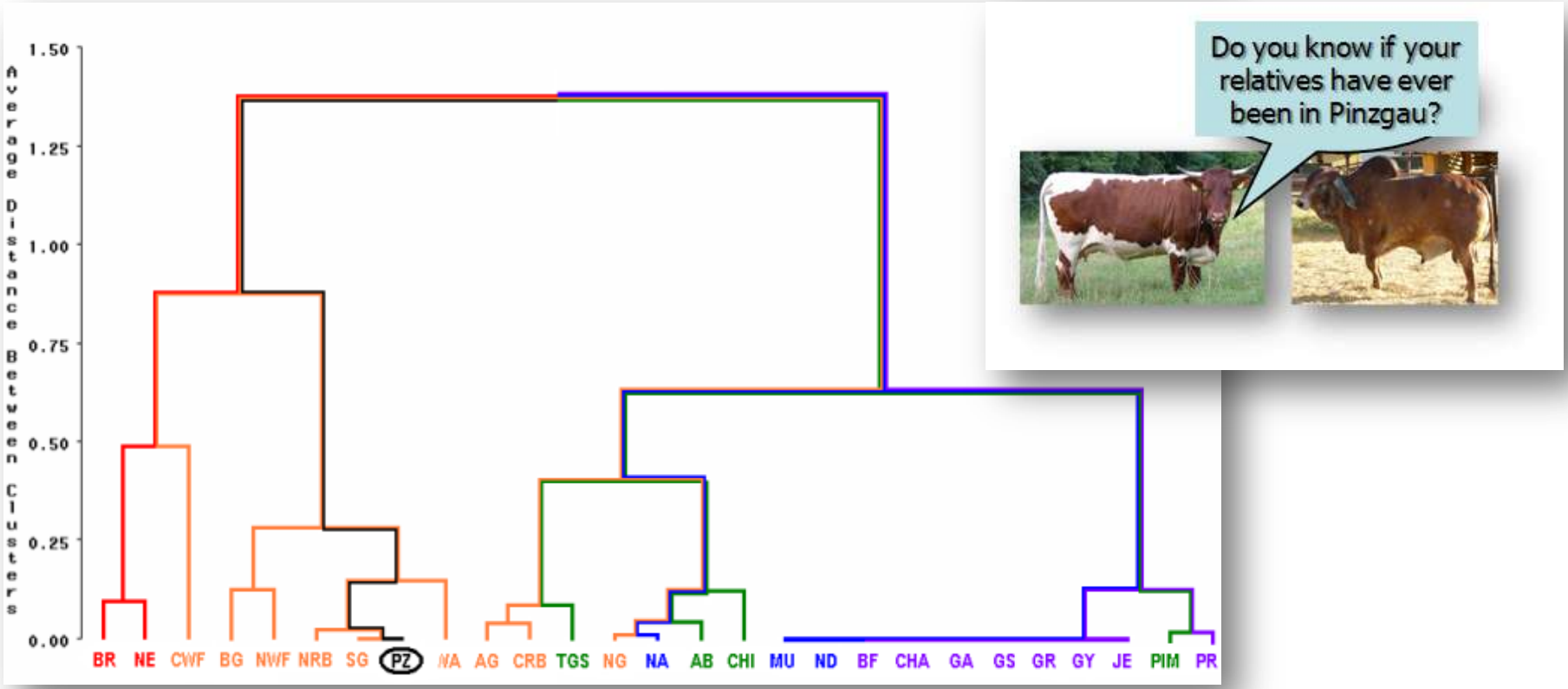
BREED CHARACTERISATION

Molecular genetic studies: allow to identify and monitor the genetic diversity within and across breeds and to reconstruct their evolution history.



BREED CHARACTERISATION

CLUSTERING OF CATTLE BREEDS FOR α_{s2}-CASEIN



Erhardt et al. (2009). *60th EAAP Annual Meeting*, Barcelona, Spain.

Caroli et al. (2010). J. Dairy Sci. 93, 1260–1265.

BREED CHARACTERISATION

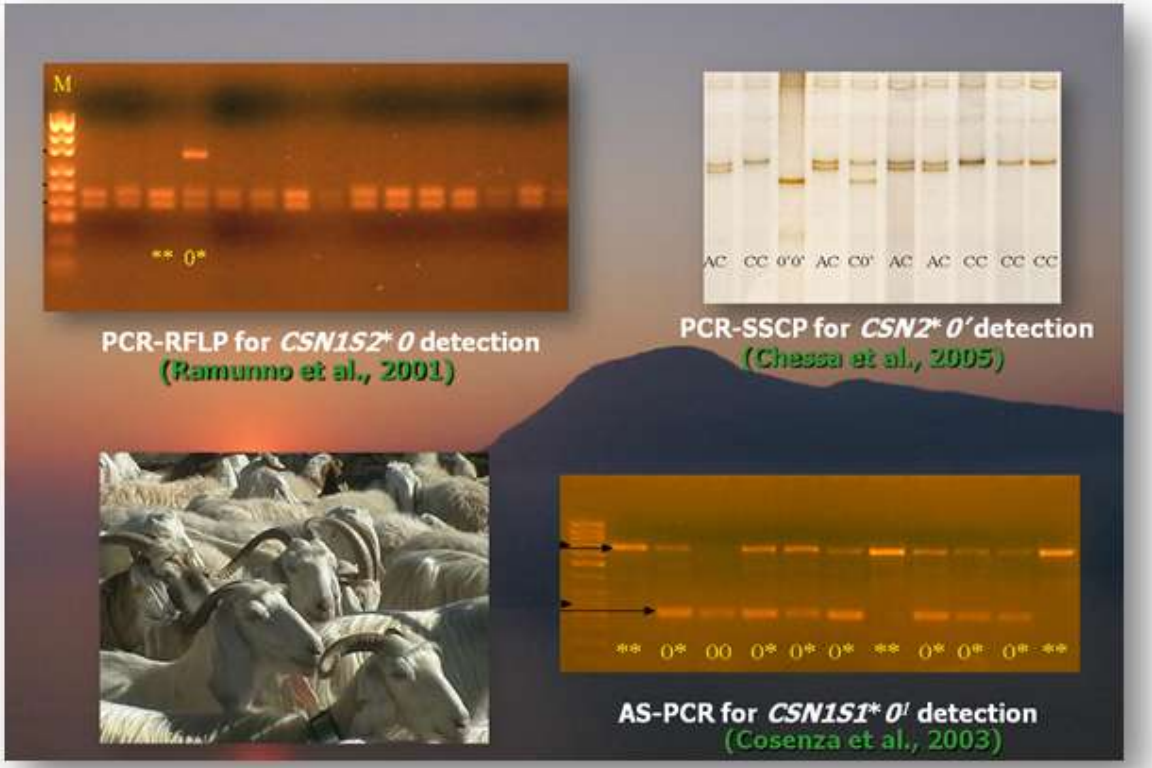
Database/project name	URL	Pigs	Cattle	Goats	Sheep	Chicken	Other sp.	Type of data included
AVIANDIV	http://aviandiv.tzv.fal.de/	n	n	n	n	y	n	Microsatellite genotypes, SNPs
CaDBase	http://www.projects.roslin.ac.uk/cdiv/	n	y	n	n	n	n	Microsatellite genotypes
PigDBase	http://www.projects.roslin.ac.uk/pigbiodiv/index.html	y	n	n	n	n	n	Microsatellite and AFLPgenotypes
PEDE: Pig Expression Data Explorer	http://pede.dna.affrc.go.jp/	y	n	n	n	n	n	Full-length cDNA clones and ESTs
AnimalQTLdb	http://www.animalgenome.org/QTLdb/	y	y	n	y	y	n	Quantitative Trait Loci data
ARKdb	http://www.thearkdb.org/arkdb/index.jsp	y	y	n	y	y	y	Genome mapping data
ChickVD: Chicken Variation Database	http://chicken.genomics.org.cn/index.jsp	n	n	n	n	y	n	Sequence variation map, primarily SNPs
Bovine Genome Project	http://www.hgsc.bcm.tmc.edu/projects/bovine/	n	y	n	n	n	y	BAC and Whole Genome Shotgun (WGS) libraries
Cattle Genome Database	http://www.cgd.csiro.au/	n	y	n	n	n	n	Comparative mapping, QTL
LivestockGenomics	http://www.livestockgenomics.csiro.au/	n	y	n	y	n	n	Genome Browsers (maps) and SNPs
Pig Genomic Informatics System	http://pig.genomics.org.cn/	y	n	n	n	n	n	Gene annotations, maps, SNPs
Bovine Genome Database	http://genomes.arc.georgetown.edu/drupal/bovine/	n	y	n	n	n	n	Genome analysis and annotation, QTL
US Poultry Genome Project	http://poultry.mph.msu.edu/	n	n	n	n	y	y	SNPs, BACs linked to genes, primers
COMRAD – comparative radiation hybrid mapping	http://www.projects.roslin.ac.uk/comrad/introduction.html	n	y	n	n	n	n	Whole genome radiation hybrid map
Gallus Genome Gbrowse	http://birdbase.net/cgi-bin/gbrowse/gallus08/	n	n	n	n	y	y	Wide array of chicken genome data
Geisha – gallus expression *in situ* hybridization analysis	http://geisha.arizona.edu/geisha/	n	n	n	n	y	n	*In situ* hybridization information
AgBase	http://www.agbase.msstate.edu/	y	y	n	y	y	y	Genome, functional annotations
BBSRC ChickEST Database	http://www.chick.manchester.ac.uk/	n	n	n	n	y	n	ESTs
Chicken full-length cDNA Database	http://bioinfo.hku.hk/chicken/	n	n	n	n	y	n	cDNA

Source: Groeneveld et al. Genetic diversity in farm animals- a review. Anim Genet. 2010 41:6-31.

BREED CHARACTERISATION

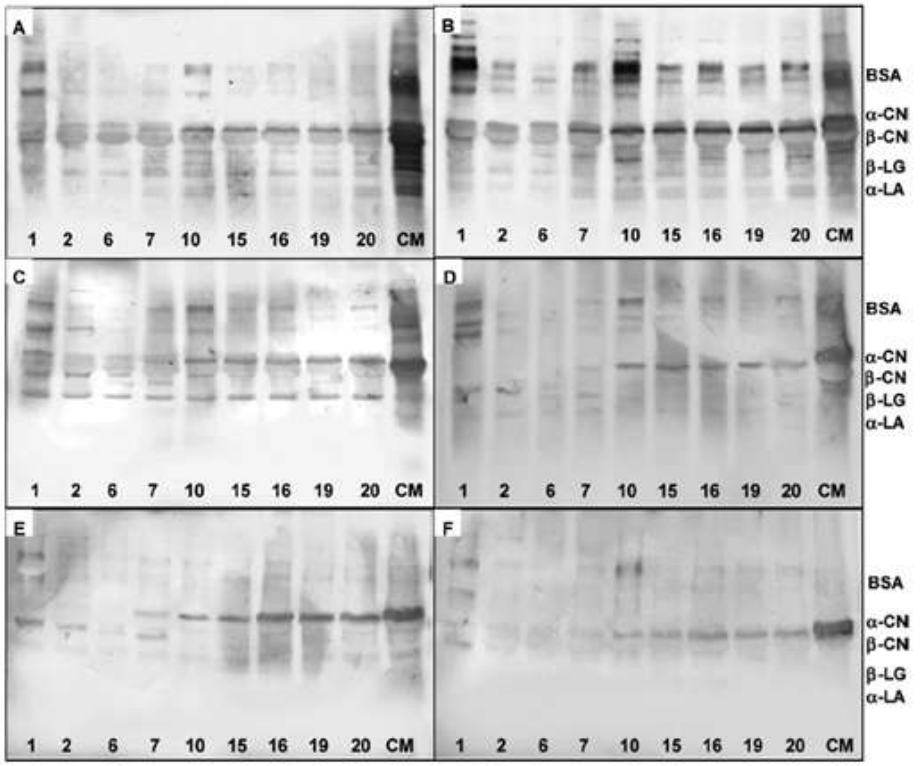
Particular nutritional properties of animal products can be characterised for local breed valorisation

Example: null alleles at goat caseins



BREED CHARACTERISATION

- Lower milk allergenic reaction observed for two milk samples (α_{s1} *CN 00* and *0F*) from local breeds
- Results confirmed by skin prick test on 6 allergic children



Source: Ballabio et al. (2011). Goat milk allergenicity as a function of alpha$_{s1}$-casein genetic polymorphism. J. Dairy Sci., 94, 998-1004.

IN SITU CONSERVATION STRATEGIES

• *In situ* conservation strategy is very important to conserve a breed within its natural habitat

Apulian local breeds (Courtesy of dott. Silvio Schito)

IN SITU CONSERVATION STRATEGIES

• *In-situ* conditions: *conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties* (Convention on Biological Diversity, 1992)

Apulian livestock (by Elisa Pieragostinii)

IN SITU CONSERVATION STRATEGIES

- The presence of local breeds on a farm can be linked to a precise strategy, e.g. cultural affection of farmers to breeds of their parents.
- Example: Italian Reggiana and Modenese cattle kept by some successful Holstein farmers

Gandini et al. 2010. Motives and values in farming local cattle breeds in Europe: a survey on 15 breeds. Animal Genetic Resources, 47:45–58.

IN SITU CONSERVATION STRATEGIES

Efficient *in situ* conservation strategies: based on the self-sustainability of the breed

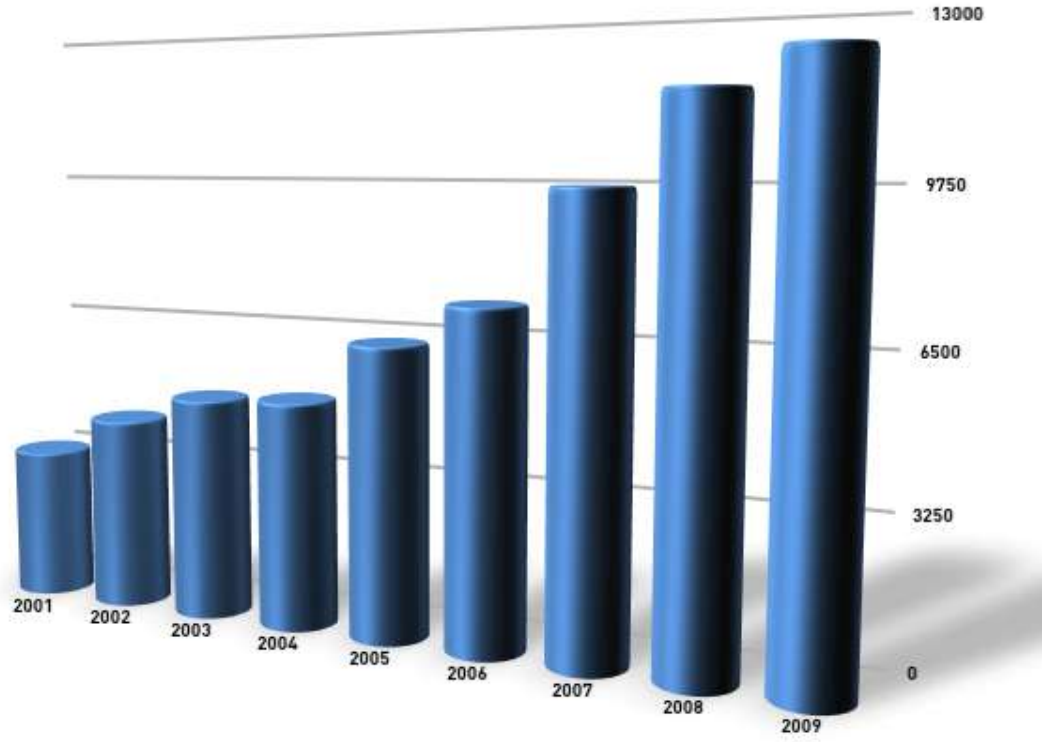
Figura 4. Marchi identificativi del Parmigiano Reggiano di razza Reggiana.

Gandini G., Maltecca C., Pizzi F., Bagnato A., Rizzi R. 2007. Comparing local and commercial breeds on functional traits and profitability: the case of Reggiana Dairy Cattle. J. Dairy Sci., 90: 2004–2011.

IN SITU CONSERVATION STRATEGIES

Efficient *in situ* conservation strategy

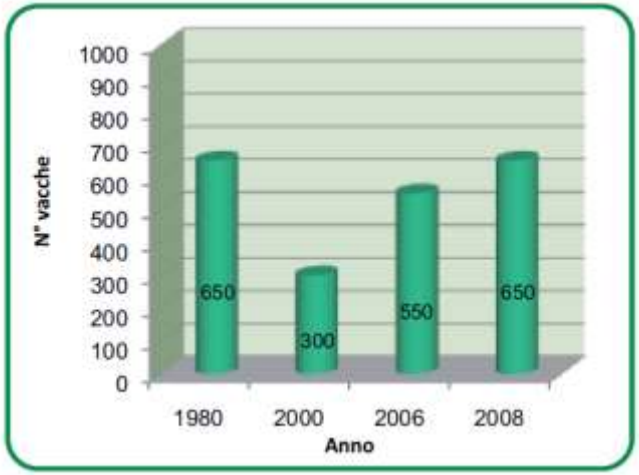
Production of “Parmigiano Reggiano of Reggiana”



http://www.razzareggiana.it/PaginaWeb.asp?TipoInclude=PRODUZIONE

IN SITU CONSERVATION STRATEGIES

Figura 4. Forma di Parmigiano Reggiano prodotta con solo latte di vacche Modenesi.



IN SITU CONSERVATION STRATEGIES

RAZZE ANIMALI DA REDDITO
ALLEVATE IN LOMBARDIA

Specie	Caprina
Razza	Verzaschese o Nera di Verzasca

VERZASCHESE O NERA DI VERZASCA

Origine e zona di diffusione

E' una razza originaria del Canton Ticino e in particolare nella Valle Verzasca che si estende dall'estremità settentrionale del Lago Maggiore verso Nord, dove viene allevata in forma semibrada da tempo imprecisabile.
Lo scambio di animali ha da sempre interessato le aree prealpine al confine con la Svizzera, per la comunanza di alcune aree di pascolo; il grosso incentivo all'allevamento di questa capra si è verificato però negli anni '70 quando sono stati importati dallSvizzera riproduttori allo scopo di sostituire la locale popolazione caprina, molto eterogenea.
E' una razza rustica e resistente sia alle alte che alle basse temperature. Viene allevata in greggi medio-grandi e l'allevamento è di tipo semi-estensivo.

Presenza nelle Province Lombarde

In Lombardia è diffusa soprattutto nella provincia di Varese (Val Veddasca) e nelle valli dell'Alto Lario (Como), ed anche in Val Chiavenna (Sondrio) la consistenza registrata nel Registro Anagrafico è di 2.791 capi in 92 allevamenti.
Presente anche nella provincia di Bergamo.

Caratteristiche morfologiche

E' un animale di taglia medio-grande.
Testa: leggera, profilo fronto-nasale rettilineo, orecchie sviluppate ed erette, collo robusto, ben unito alla **spalla** e al garrese. Le **corna** sono sempre presenti in ambo i sessi, lievemente arcuate all'indietro con una leggera torsione verso l'esterno.
Tronco: spalla larga ben legata al torace, garrese di lunghezza media; **torace** profondo e largo, con coste ben arcuate; cosce muscolose.
Mammella: ben sviluppata, larga alla base.
Il **mantello** è completamente nero, lucido, con **pelo** corto e fine, più fitto nella stagione invernale; i becchi hanno la **barba** e peli più lunghi sul garrese; la **pelle** è morbida, fine ed elastica.
Altezza media al garrese: Maschi cm.80 - 90, femmine cm. 75 - 85
Peso minimo: Maschi Kg 90, femmine Kg. 70.

Caratteristiche produttive

E' una razza a **duplice attitudine** ha una produttività di latte e carne molto buona.
Prolificità pari al 121%
Capretto alla nascita: 5,00-5,50 kg
Produzioni medie latte (AIA 2003): 364 litri con 3,27% di grasso e 3,06 di proteine.
Il latte viene destinato alla trasformazione per ottenere prodotti tipici a "**latte crudo**": formaggi freschi e stagionati a partire dalle lavorazioni lattica o presamica, **yogurt**, **ricotta**. A questa razza è legata la produzione di un formaggio tipico "**Formaggella del Luinese**" per il quale è in corso il riconoscimento di prodotto DOP.

Per saperne di più

Il Registro Anagrafico per questa razza è stato attivato in Italia nel 1997 ed è tenuto dall' Associazione Nazionale Pastorizia (ASSONAPA)
Viale P. Togliatti1587, 00155 ROMA
Tel. +39 06-409001 - fax 06-40900130
info@assonapa.com - www.assonapa.com

CAPRINI
- ☐ Camosciata delle Alpi
- ☐ Saanen
- ☐ Bionda dell'Adamello
- ☐ Frisa Valtellinese o Frontalasca
- ☐ Lariana o Capra di Livio
- ☐ Orobica o di Val Gerola
- ■ Verzaschese o Nera di Verzasca

RegioneLombardia
Agricoltura

IN SITU CONSERVATION STRATEGIES

Cultural value of a local breed (safeguard of landscape, preservation of ancient local traditions)

(Gandini and Villa, 2003, J. Anim. Breed. Genet. 120, 1–11)

Table 1. Analysis of cattle breeds as historical witnesses[a]

Breed	Historical value[b] in the areas of:			
	Landscape	Gastronomy	Folklore	Handicrafts
Bianca Val Padana	+	+ +	–	–
Chianina	+	+	+	–
Garfagnina	+	–	–	–
Maremmana	+ +	–	+ +	+ +
Modicana	+ +	+ +	–	–
Reggiana	+	+ +	–	–
Valdostana Castana	+ +	+ +	+ +	+ +
Valdostana Pezzata Nera	+ +	+ +	+ +	+ +
Valdostana Pezzata Rossa	+ +	+ +	+ +	+ +

[a]For breed antiquity, agricultural systems associated with each breed and their presence in higher artistic expression, see text.
[b]–, negligible value; +, limited value; ++, noticeable value.

IN SITU CONSERVATION STRATEGIES

Grazing Bionde dell'Adamello

Source: http://www.associazionerare.it/

IN SITU CONSERVATION STRATEGIES

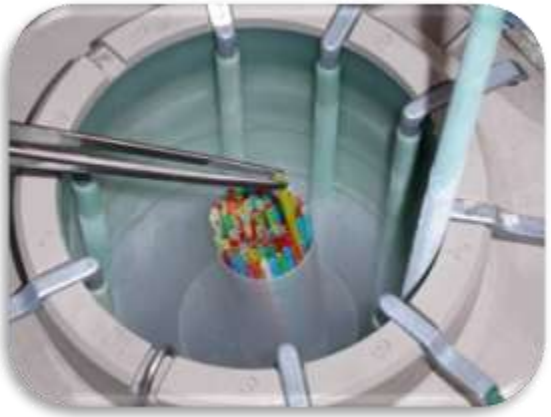
Battle of the Queens

Source: http://www.naturaosta.it/cultura.htm

When in situ conservation is not feasible, or as a support to *in situ* conservation:

EX SITU CONSERVATION STRATEGIES

EX SITU in vitro refers to conservation external to living animal in an artificial environment, under cryogenic condition including, in alia, the cryoconservation of embryos, semen, oocytes, somatic cells or tissue having the potential to reconstitute live animal (including animal for gene introgression and synthetic breeds) at a later date (FAO, 2007)



EX SITU CONSERVATION STRATEGIES

National Cryobanks

Table 2 Summary of annual reports provided by 25 European countries reporting on their activities implementing the *Global Plan of Action* from September 2009 to August 2010

Country	No. of breeds reported to DAD-IS[3]	Strategic Priority 1 Characterization, inventory and monitoring of trends and associated risk	Strategic Priority 2 Sustainable use and development	Strategic Priority 3 Conservation	Strategic Priority 1 Policies, institutions and capacity building	National strategy or/and action plan planned for 2010/11/under development or adopted	National advisory committee to guide national implementation of GPA established	National law planned to review/harmonize or adopted in view of GPA	Cryobank for national AnGR planned for 2010/11/ under development or operational
Albania	42	+	+	++	++	√			√
Belgium	71	+	+	++	++			√	√
Croatia	33	++	+	++	++			√	√
Cyprus	18	++	+	++	+				√
Czech Republic	100	+	+	+++	++	√		√	√
Finland	23	++	++	+++	++	√			√
Germany	185	++++	++	++++	+++	√	√	√	√
Greece	37	++	++	+++	++	√	√		√
Hungary	91	++	++	+++	+++		√	√	√
Iceland	6	++	+++	+++	+++	√	√		√
Ireland	34	++	++	++	+++		√		√
Italy	263	++	+	+++	not reported			√	√
Latvia	10	+	++	++	not reported				
Montenegro	6	++	+	++	+	√	√	√	
Poland	114	+++	++	++++	+++	√	√		
Romania	114	+	+	+	+	√			
Serbia	41	+++	++	+	+			√	
Slovakia	39	++	not reported	++	+++			√	√
Slovenia	63	+++	+	+++	+			√	√
Spain	203	++++	++++	++++	++++	√	√	√	√
Sweden	50	+	+	++	+	√			√
Switzerland	38	++++	++	++++	++			√	√
Turkey	92	++	+	++++	++	√	√		
Ukraine	163	+	+	+	+			√	√
United Kingdom	264***	+++	++	++++	++	√	√	√	

Actions described as (+) initiated to (++++) if all actions are fully implemented and regular monitoring is udertaken.

72%

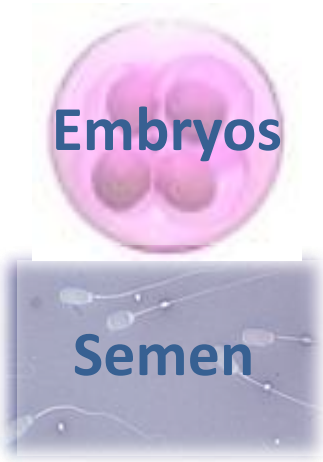
National Cryobank planned for 2010-2011

http://www.fao.org/ag/againfo/programmes/en/genetics/documents/ITWG_AnGR_6/CGRFA_WG_AnGR_6_10_Inf10.pdf

EX SITU CONSERVATION STRATEGIES

Type of genetic material stored

Semen and embryos form the most common material for the cryopreservation of farm AnGR



Possibilities	Limitations
• Carry the entire genome including extra-nuclear genetic material •Allow the complete and immediate recovery of the breed in case of extinction	•Freezing not available for all species •High cost •In small population not enough embryos donors
•Freezing technique routinely available in all species •Low cost	•To reconstruct extinct breed several backcrossing and high number of doses are needed •<100% genome recovered, cytoplasmatic effect lost or altered

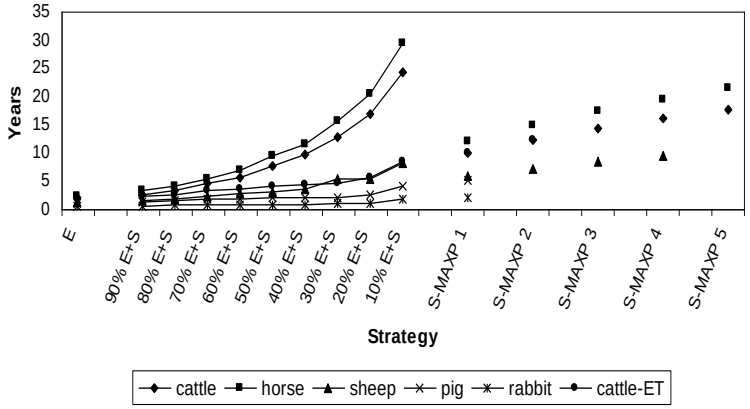
The costs of breed reconstruction from cryopreserved material in mammalian livestock species

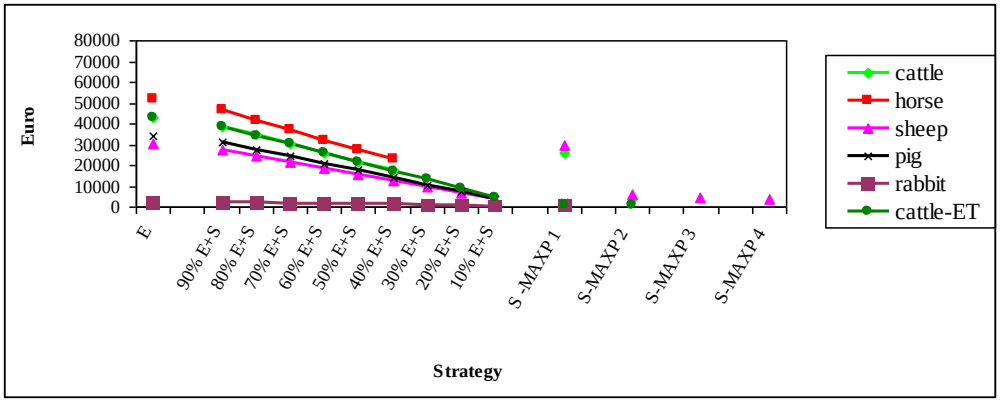
Three strategies:

- Embryos,
- Embryos in combination with semen,
- Semen.

Three cost measures:

- time required for population reconstruction,
- cost for creation of the gene bank,
- number of years-keeping-female to reach reconstruction.





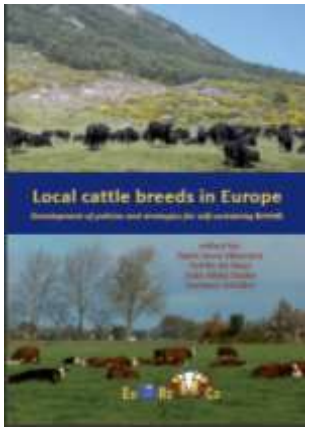
Boettcher P.J., Stella A., Pizzi F., Gandini G. (2005). The Combined Use Of Embryos And Semen For Cryogenic Conservation Of Farm Mammal. Genetic Resources. Genetics, Selection, Evolution 37, 657-675

Gandini G. , Pizzi F., Stella A. , Boettcher P.J. (2007). The costs of breed reconstruction from cryopreserved material in mammalian livestock species .Genetic, Selection, Evolution 39, 465-479

Towards self-sustainable European Regional Cattle breeds

This project is aimed at assisting conservation, development and sustainable use of autochthon, local or regional cattle breeds. These breeds are recognized as **important elements of agro-biodiversity, of agro-ecosystems and of our cultural heritage** in Europe. The most secure **conservation strategy** for those breeds is to **promote measures which contribute to self-sustainability** of the breed.

http://www.regionalcattlebreeds.eu/publications/documents/9789086866977cattlebreeds.pdf



A detailed survey was carried out:

- to compare cryopreservation activities and policies in Finland, France, Italy and the Netherlands.
- to detect similarities and differences between these 4 countries,
- to compare the countries' strategies with the international Guidelines,
- to formulate recommendations for initiating or strengthening cryopreservation programmes.

EX SITU CONSERVATION STRATEGIES

For a total of **52 local breeds** from Finland, the Netherlands, France and Italy detailed information on **2,536 bulls** was collected.

Country	Breed classification according to FAO criteria					
	Critical	Endangered	Critical maintained	Endangered maintained	Not at risk	Total
Finland	0	2	0	0	1	3
France	1	0	1	12	4	18
Italy	0	1	1	9	12	23
Netherlands	1	3	0	0	4	8
Total	2	9	4	17	19	52

EuReCa
Towards self-sustainable European Regional Cattle breeds

EX SITU CONSERVATION STRATEGIES

Number of bulls and number of doses in storage

	N° of bulls	N° of doses
Finland	223	351 981
France	563	1 307 166
Italy	1091	264 208
The Netherlands	659	1 095 162

Western Finncattle breed

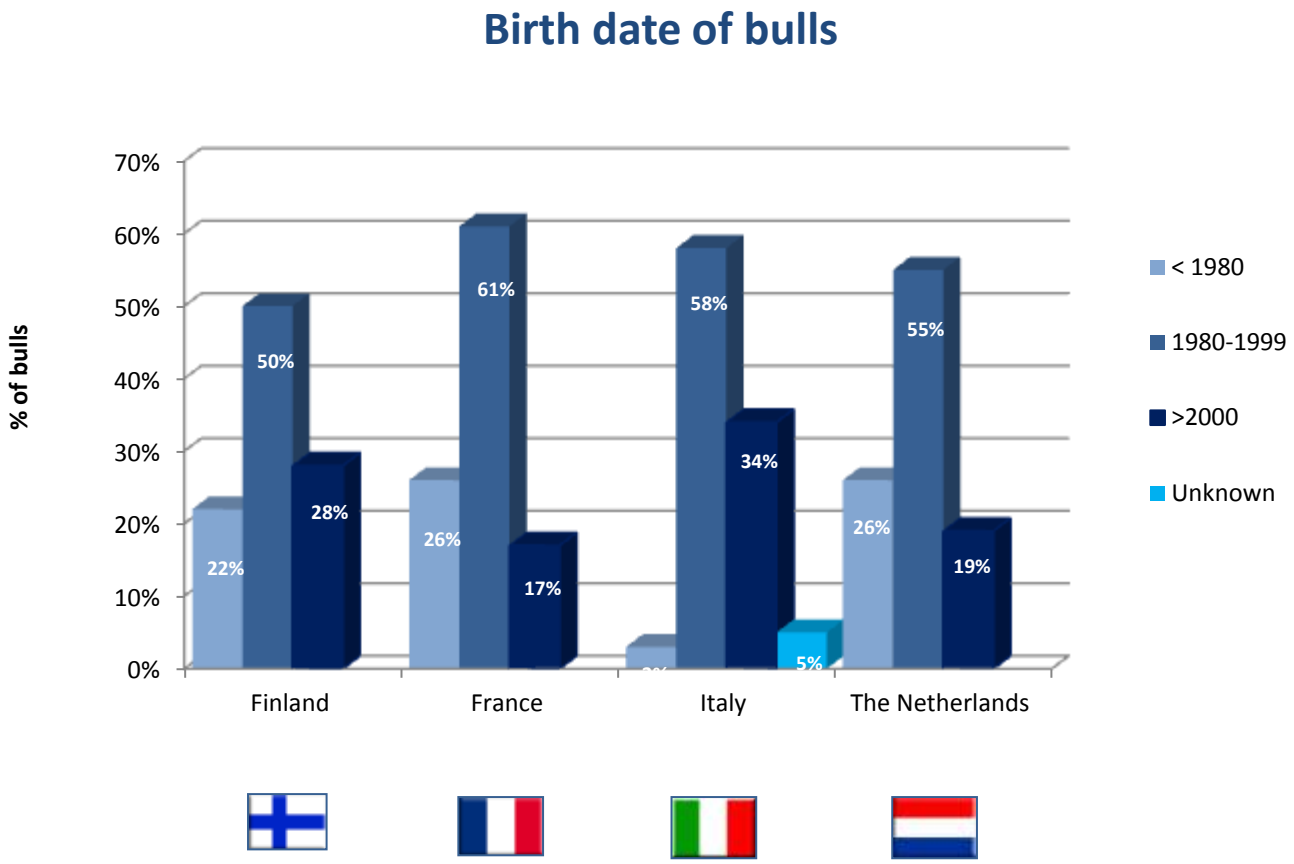
Reggiana

Villard de Lans Breed

Meuse-Rhine-Yssel cattle (MRY)

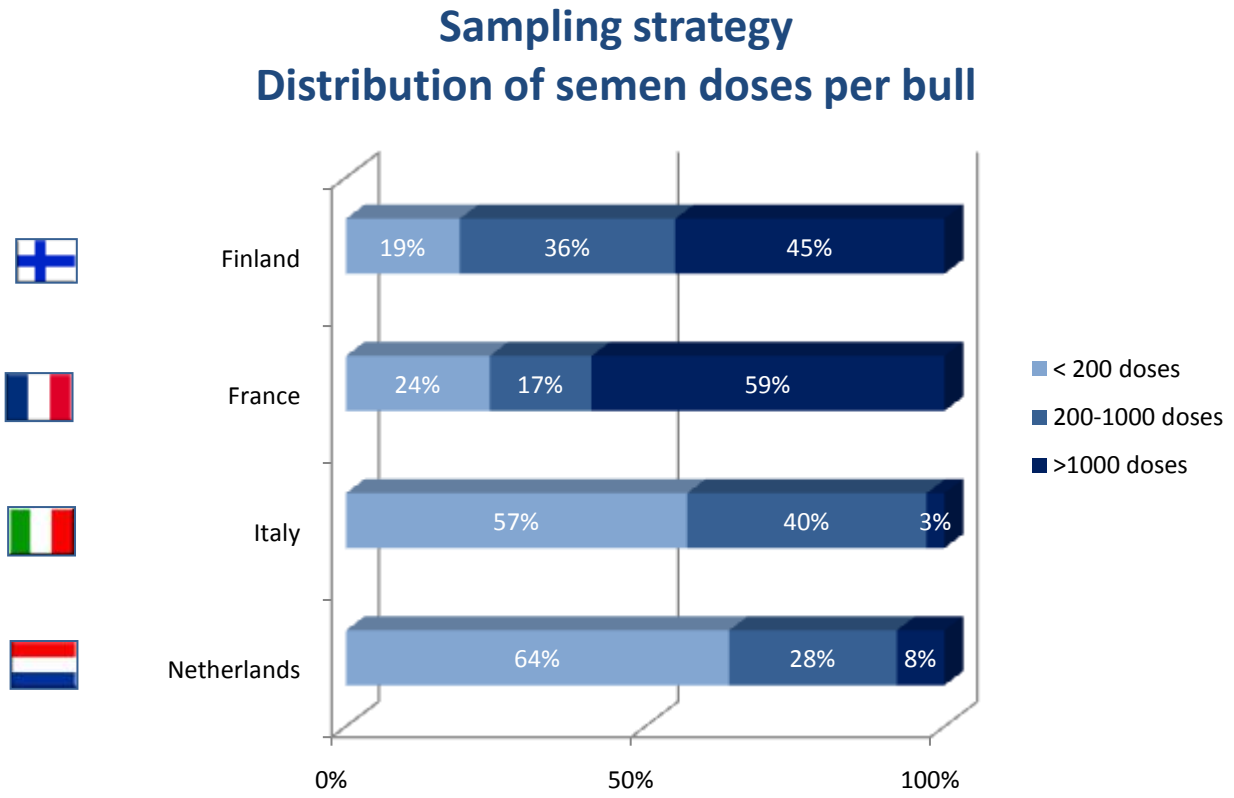
EuReCa
Towards self-sustainable European Regional Cattle breeds

EX SITU CONSERVATION STRATEGIES



Towards self-sustainable European Regional Cattle breeds

EX SITU CONSERVATION STRATEGIES



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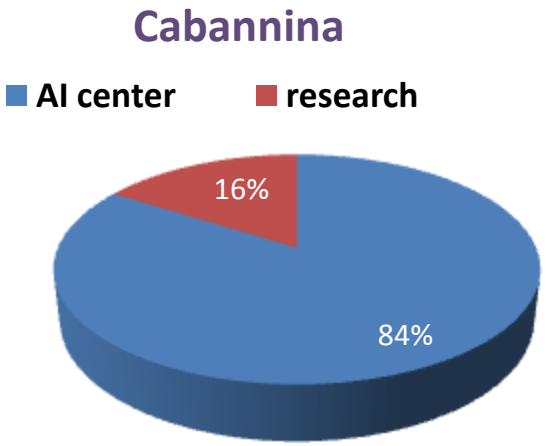
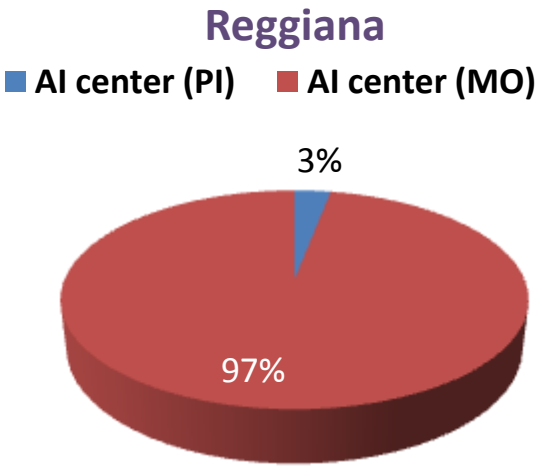
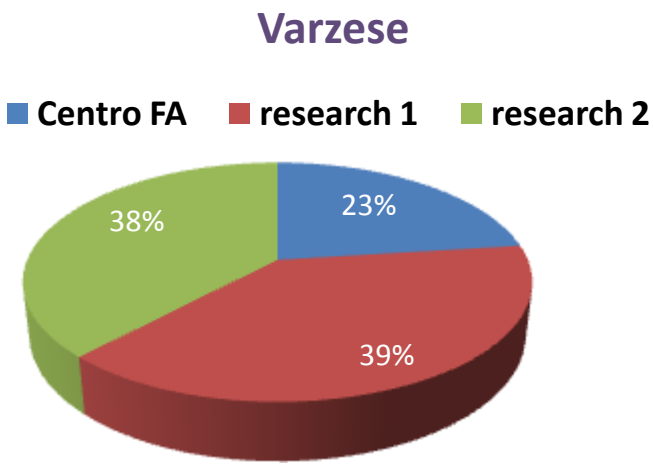
Towards self-sustainable European Regional Cattle breeds

EX SITU CONSERVATION STRATEGIES

Semen sample storage – sites /breed







Italy:
fragmented collections,
lack of coordination

EX SITU CONSERVATION STRATEGIES

Network of the Italian Animal Genetic Resources Cryobanks – CRIONET-IT

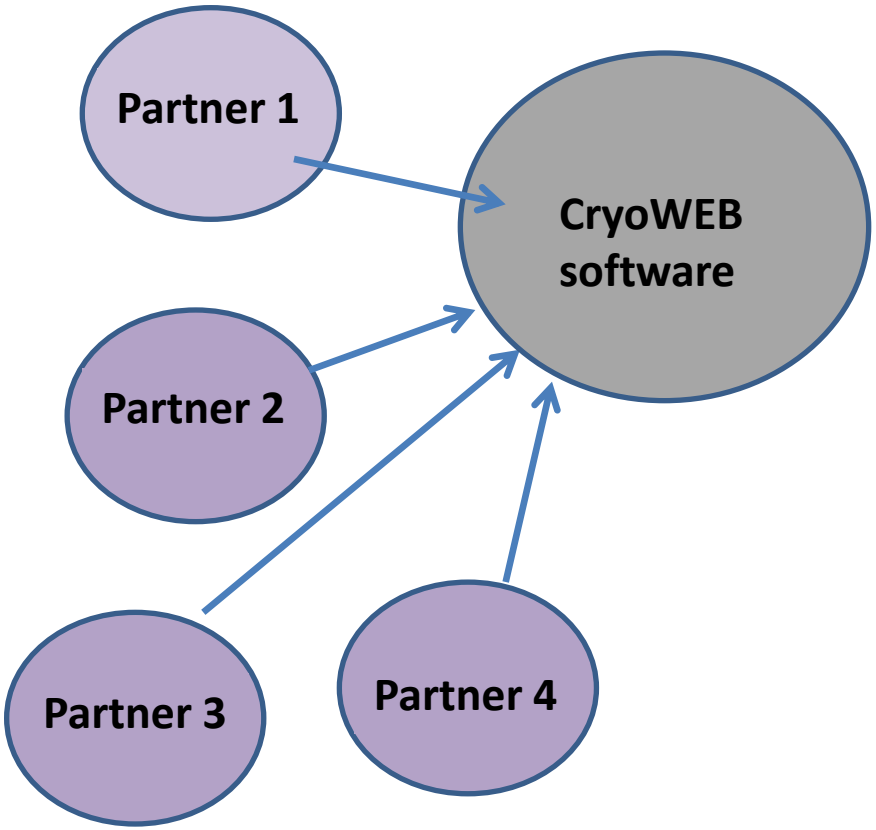
Created in 2010 in collaboration with the Department of Veterinary Science and Technology for Food Safety (UNIMI) in order to:

- Share, through a virtual bank, the information concerning cryo-preserved genetic material of farm animals breeds

- Create a network of institutions involved in cryo-preservation of local breeds.

EX SITU CONSERVATION STRATEGIES

Network of the Italian Animal Genetic Resources Cryobanks
CRIONET-IT



Main features

- Single database
- Partners feeds the database with the information of their collection
- Partners are responsible for the information of the collection not necessary the owners of the materials
- Only dose stored as genetic reserve are recordered in the network

EX SITU CONSERVATION STRATEGIES

Homepage Network

http://www.genrescryonet.unimi.it

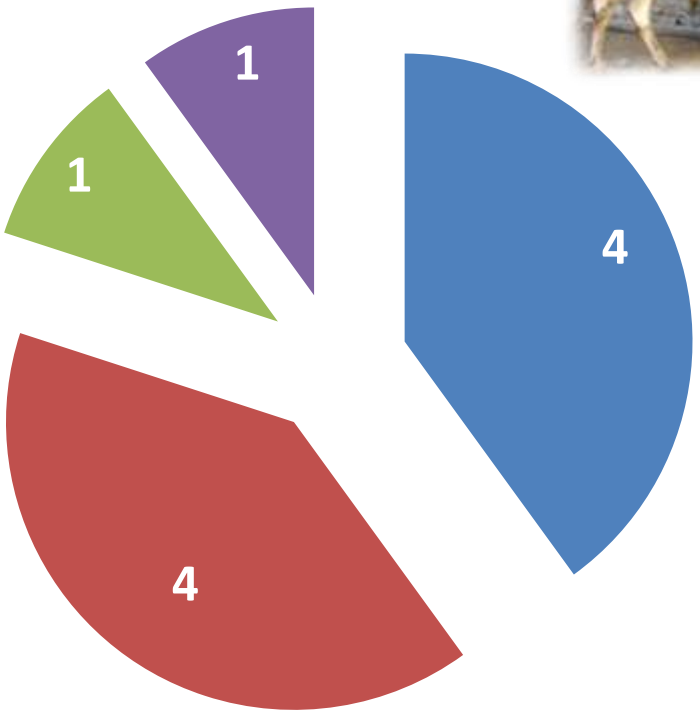
EX SITU CONSERVATION STRATEGIES

Network of the Italian Animal Genetic Resources Cryobanks
CRIONET-IT

Verzaschese

Brianzola

- Burlina
- Varzese
- Pezzata Rossa d'Oropa
- Cabannina



- Casertana
- Cinta Senese
- Mora Romagnola
- Nero Siciliano

✓4 species

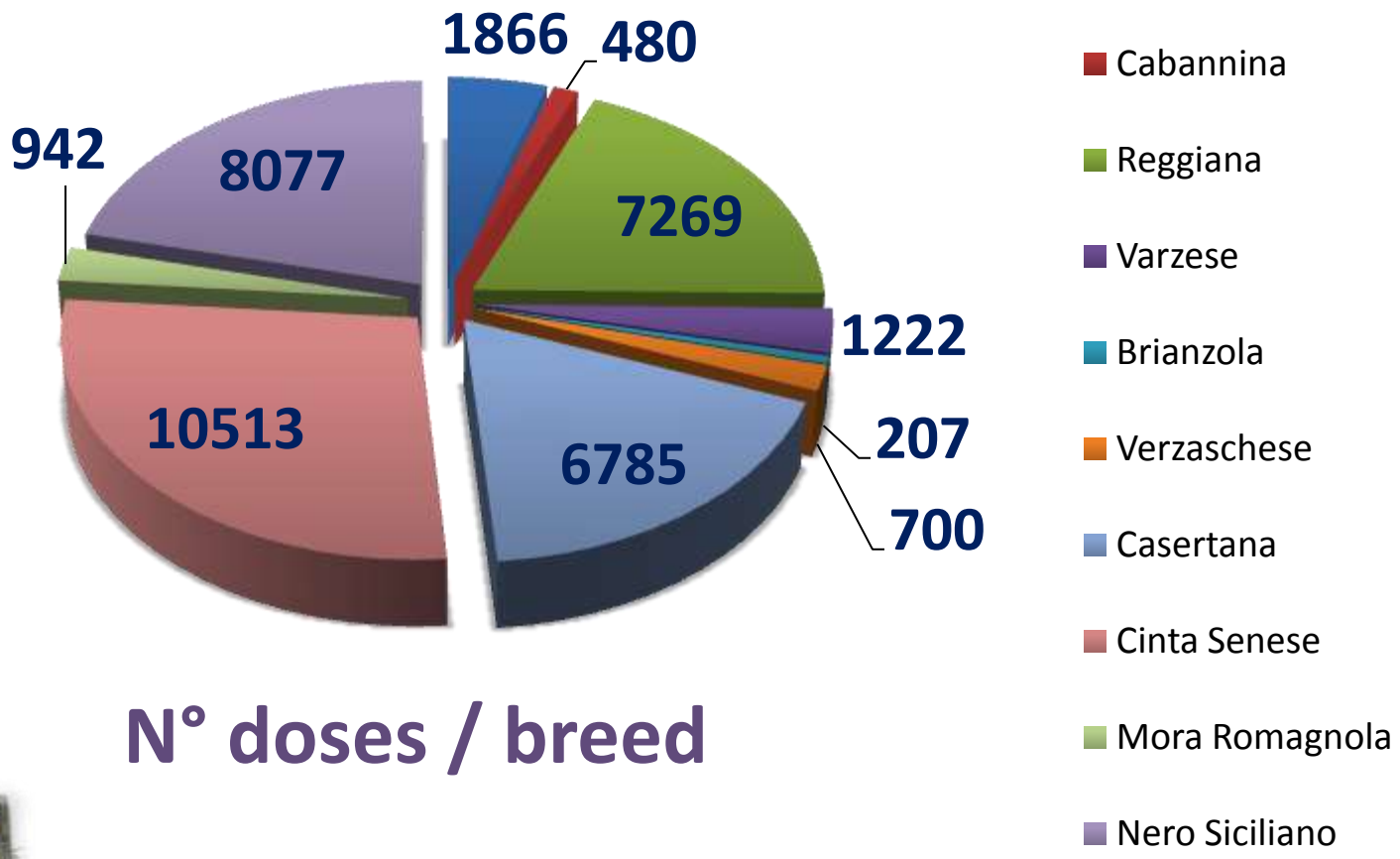
✓10 breeds

Material stored: n of breeds for species

EX SITU CONSERVATION STRATEGIES

Network of the Italian Animal Genetic Resources Cryobanks

CRIONET-IT



N° doses / breed

✓**38061 paillettes**

✓**Bovine: 10837 paillettes**

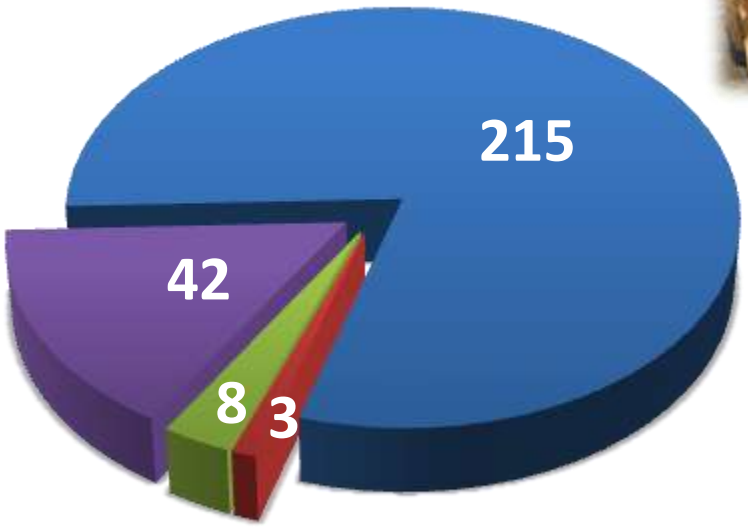
✓**Sheep: 207 paillettes**

✓**Pig: 26317 paillettes**

✓**Goat: 700 paillettes**

EX SITU CONSERVATION STRATEGIES

Network of the Italian Animal Genetic Resources Cryobanks
CRIONET-IT



Bovini
Caprini
Ovini
Suini

✓**268 donatori**

Material stored: n of donors for species

Grazie per l'attenzione!

In ricordo di un maestro di signorilita'

L'attivita' del prof. Giuseppe Rognoni nella Pezzata Rossa Italiana

In Friuli V.G. si fece conoscere ed apprezzare già dalla fine degli anni '40 per aver sperimentato il vaccino contro la Brucellosi (BUCK 19). Ha presieduto la CTC ANAPRI dal gennaio 1979 fino al 2007, in qualità di esperto zootecnico di nomina ministeriale. Durante questo lungo periodo si è distinto per la capacità di saper ascoltare tutte le istanze, anche se contrastanti tra loro, stando sopra le parti, con l'unico scopo di poter prendere le decisioni migliori a beneficio della maggior parte degli allevatori di Pezzata Rossa. Questa sua virtù gli ha consentito di guidare l'ANAPRI per un così lungo periodo, durante le scelte selettive più importanti, in nome del progresso scientifico ma al tempo stesso rispettando la dignità delle tradizioni. Non si possono dimenticare alcune delle decisioni tecniche più importanti prese dalla CTC ANAPRI durante la sua presidenza:

- Utilizzo del Performance test nel programma di selezione (1980)
- Prima valutazione genetica in Italia con il metodo BLUP (1984)
- Cambio del nome della razza da FRIULANA ad ITALIANA (1985)
- Adozione del programma di selezione GIOVANI TORI (1990)
- Utilizzo del metodo BLUP ANIMAL MODEL nella valutazione genetica (1991)
- Adozione del sistema lineare di valutazione morfologica armonizzato a livello europeo (1997)
- Definizione dell'indice di selezione IDA (1998)
- Test Day Model (2005)

Un ringraziamento a nome di tutti i componenti della Commissione Tecnica, del Comitato Direttivo, del Direttore e personale Anapri, nonché degli allevatori di Pezzata Rossa Italiana.

Il Prof. Rognoni interviene durante l'Assemblea Anapri

Al mio professore

Riservato ed accogliente,
coraggioso eppur prudente,
campagnolo e gran signore,
genetista e allevatore.

Lui, maestro da imitare,
....pronto sempre ad imparare!
Sguardo attento a tutto il mondo,
per andare fino in fondo
della vera Consistenza
che fa lieta l'esistenza.

"Siate sempre generosi!"
"State attenti a figli e sposi:
la famiglia innanzi tutto!"
"Se volete portar frutto,
fate tutto con bontà
e cristiana carità!"

Ci riechaggian nella mente,
ed ancor ciascuno sente,
quelle semplici parole
che diceva alla sua "prole"
di discepoli ... maldestri
nel cercar d'esser maestri!

Ci rimane dentro il cuore
il suo sguardo indagatore,
la sua innata simpatia,
la sua timida allegria.

Anna