



Networking around the Merino sheep breed

The *ad hoc* action on Merino and Merino-derived breeds

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on behalf of the Project coordinator (Fabio Pilla, Università degli Studi del Molise ITALY)

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Virtual event “All you ever wanted to know about ERFP- the European Animal Genetic Resources network”
9th of September 2021

1. WHY MERINO BREEDS?



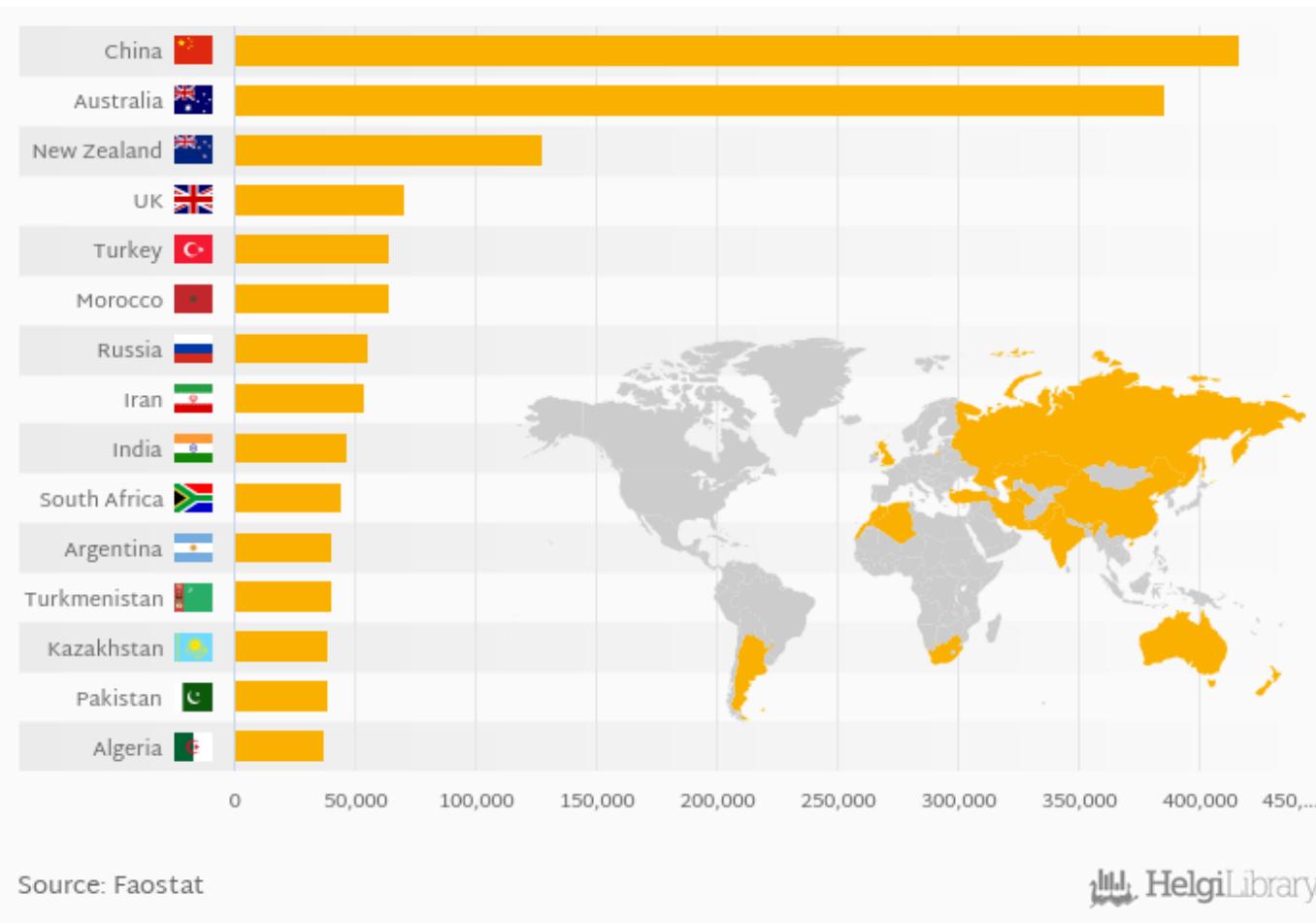
<https://www.icebreaker.com>



MERINO
ULTRA FINE

**MERINO IS AN ICONIC SHEEP
BREED**

Greasy wool production by country (tonnes), 2018



**MERINO IS A
COSMOPOLITE
RESOURCE**

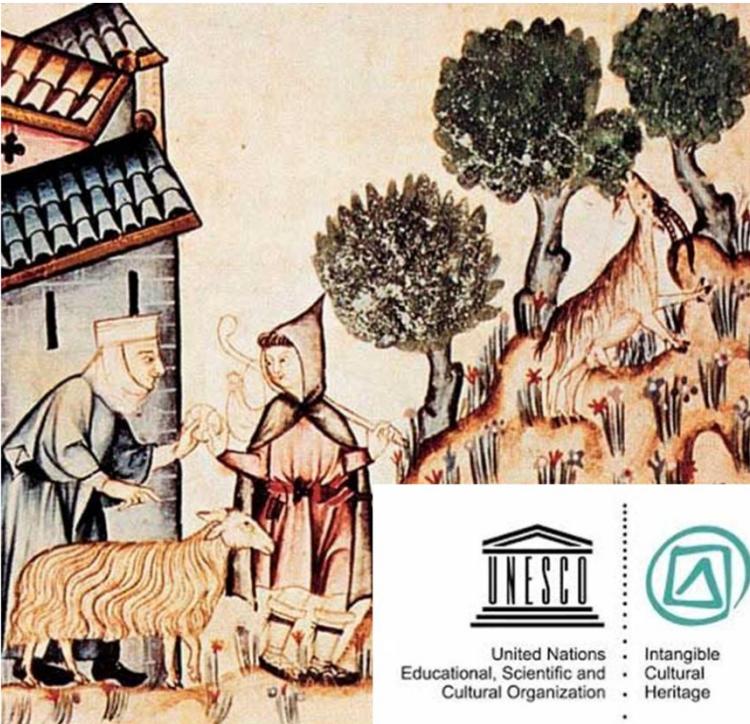
\$2.2
billion turnover for
global wool market
in 2016



**SIGNIFICANTLY CONTRIBUTING TO THE GLOBAL
WOOL MARKET VALUE GENERATION**

2. WHY (EUROPEAN) MERINO BREEDS?

I. HISTORY & CULTURAL HERITAGE



United Nations
Educational, Scientific and
Cultural Organization



Intangible
Cultural
Heritage



A LONG HISTORY OF POLITICAL, ECONOMIC,
SOCIO-CULTURAL & ECOLOGICAL RELEVANCE

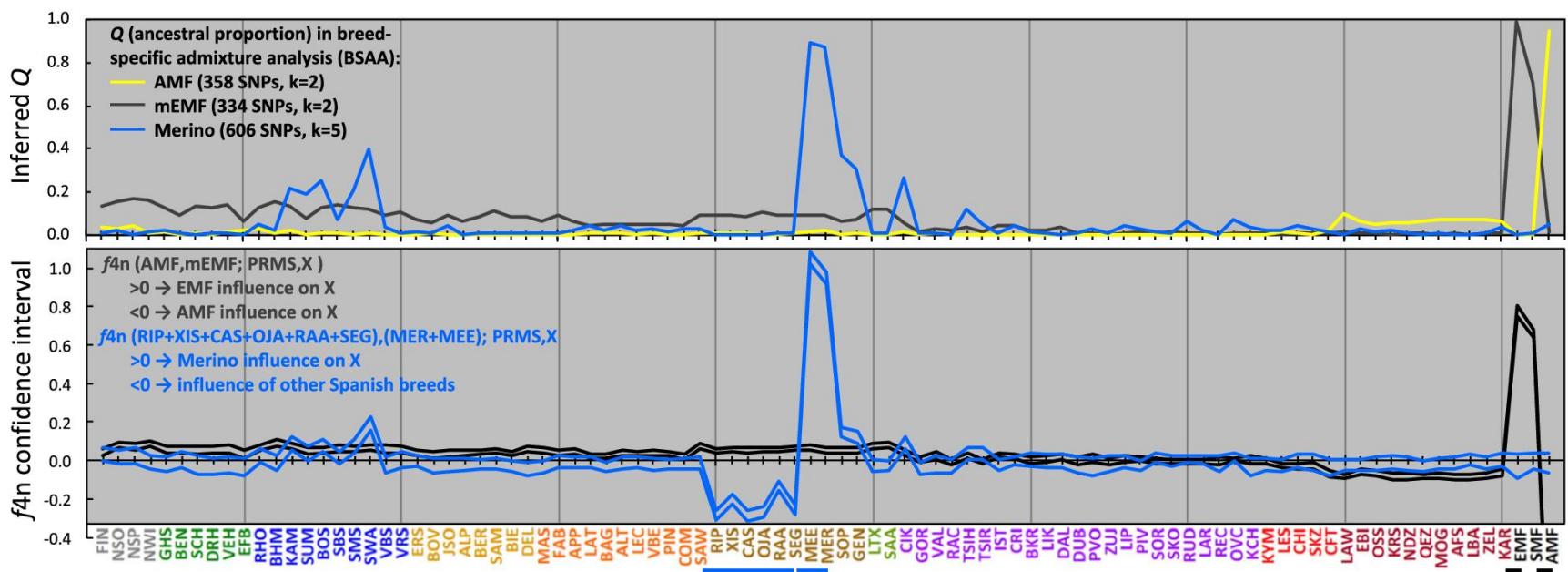
I. HISTORY & CULTURAL HERITAGE

MERINO INTROGRESSION INTO MANY LOCAL SHEEP BREEDS AROUND THE WORLD

On the origin of European sheep as revealed by the diversity of the Balkan breeds and by optimizing population-genetic analysis tools



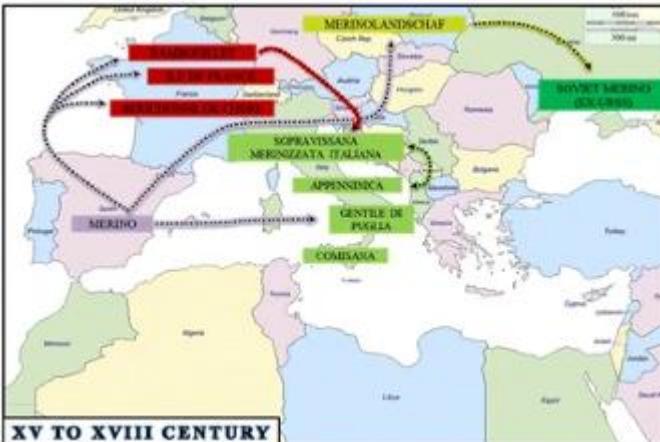
Ciani et al. *Genet Sel Evol* (2020) 52:25
<https://doi.org/10.1186/s12711-020-00545-7>



Merino and Merino-derived sheep breeds: a genome-wide intercontinental study



Ciani et al. *Genetics Selection Evolution* (2015) 47:64
 DOI 10.1186/s12711-015-0139-z



Viaje a los orígenes del merino

V. Heras



THE HISTORY OF MERINO
IS STRICTLY RELATED
WITH THE HISTORY OF SPAIN



Paular - Negrete - Escurial

EARLY CONTRIBUTION FROM MEDITERRANEAN STOCKS (NORTH AFRICA & ITALY) IS ASSUMED



29. Juvenalis, Satirae, 6. 149-150.

*Interea calet et regnat poscitque
maritum
pastores et ouem Canusinam ul-
mosque Falernas, (...)*

Intanto è tutta calda, è lei che comanda e chiede al marito pastori e pecore di Canosa e vigneti di Falerno. (trad. ACRI 1980-81, p. 181)

Una serie di elementi cronologici presenti nella satira si riferisce agli anni 114-116. In essa

si prende di mira la donna e chi intende sposarsi.

30. Strabo, Geographica, 6. 3. 9.

*Ἴπποις δὲ καὶ προβάτοις ἀρίστη-
η δ' ἔρεια μαλαχωτέρα μὲν τῆς
Ταραντίνης ἐστί, λαμπρὰ δὲ ἡτ-
τον.*

(La zona) è eccellente per i cavalli e per le pecore. La lana è più morbida di quella tarantina, ma meno lucente. (trad. ACRI 1980-81, p. 182)

Il passo straboniano (cfr. *supra*, n. 5), la cui fonte è Posidonio, si riferisce al Gargano, di cui si valorizza la vivacità economica, ricor-

dandone anche le attività zootecniche ed artigianali.

31. Horatius, Carmina, 3. 15. 14-15.

*te lanae prope nobilem
tonsae Luceriam, non citharae de-
cent (...)*

A te conviene tessere la lana / che tosano a Luceria rinomata e non il canto della cetra (...). (trad. ACRI 1980-81, p. 183)

Questa ode oraziana, dedicata ad una donna matura a cui non si addicono comportamenti giovanili, è l'unica attestazione letteraria di

lane lucerine; a tale proposito si può ricordare l'epigrafe *CIL 9. 826*, che menziona un *laniarius*.

28. Plinius Maior, Naturalis historia, 8. 73. 190-191.

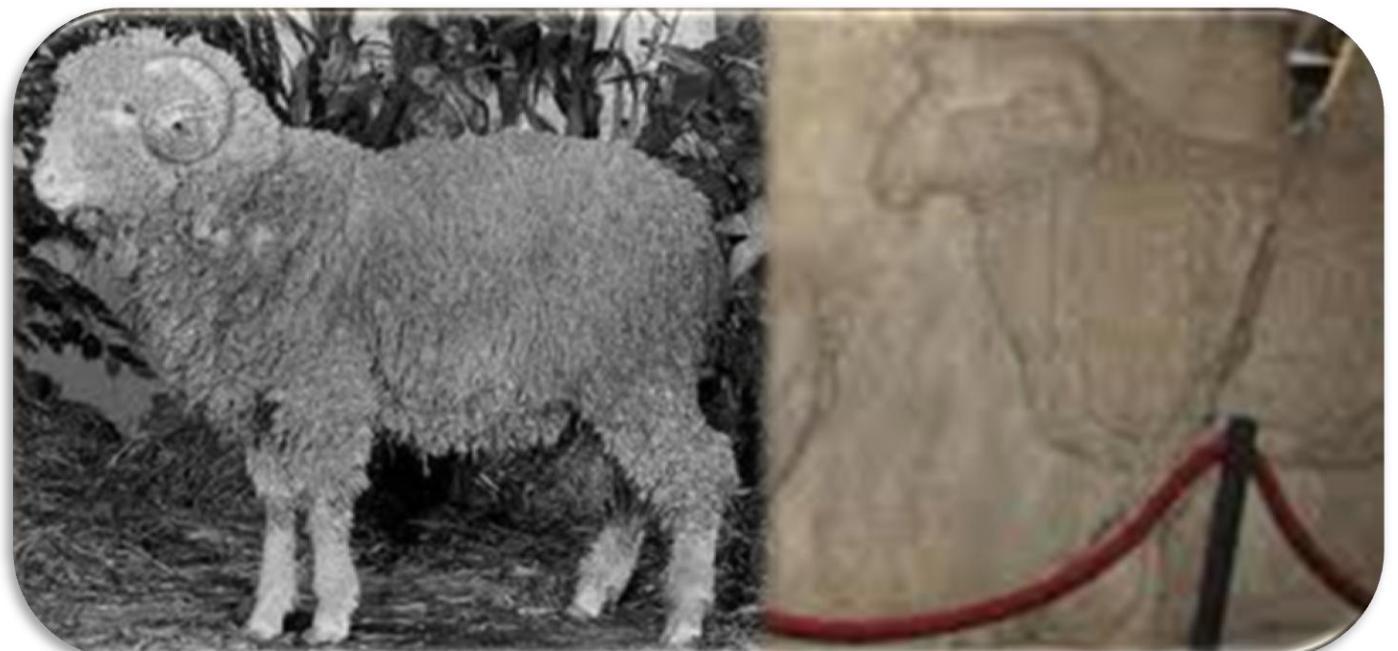
*Lana autem laudatissima Apula,
et quae in Italia Graeci pecoris
appellatur, alibi Italica; tertium
locum Milesiae oves obtinent. Apulæ breues uillo nec nisi paenulæ
celebres; circa Tarentum Canusiumque sumمام nobilitatem ha-
bent; in Asia uero eodem genere
Laudiceæ. Alba Circumpadaniis
nulla præfertur, nec libra cente-
nos nummos ad hoc aeuī excessit
ulla. Oues non ubique tondentur;
durat quibusdam in locis uellendi-
mos. Colorum plura genera, quippe
cum desint etiam nomina iis
quas nativas appellant aliquot mo-
dis: Hispania nigri uelleris præci-
pias habet, Pollentia iuxta Alpes
cani, Asia rutili, quas Erythreas
uocant, item Baetica, Canusium
fului, Tarentum et suaे pulliginis.*

La lana più rinomata è quella apula; in secondo luogo quella che si chiama in lana greca, altrove lana italiana; le pecore di Mileto occupano il terzo posto. Le apule sono di pelo corto e sono rinomate solo per la confezione dei mantelli da pioggia. Le lane dei dintorni di Taranto e di Canosa godono della miglior fama, in Asia quelle di Laodicea che sono dello stesso tipo. Nessuna lana bianca è più a quella della Gallia Circumpadana e non esiste lana fino ad ora che abbia superato il prezzo di 100 sesterzi la libbra. Non si tosano dappertutto le pecore; in alcune regioni persiste l'uso di strappare la lana. Ci sono moltissimi colori di lana, e mancano perfino le parole per qualificare quelle che vengono chiamate lane indiane, le cui varietà sono numerose. La Spagna fornisce principalmente la lana nera; Polignano vicino alle Alpi, la bianca; l'Asia la rossa che è chiamata Eritrea, altrettanto la Bulgaria, Canosa la fulva, Taranto la bruna di un tono particolare. (trad. ACRI 1982-83, pp. 132-133; 1982-83, pp. 190-191)

L'analisi che del brano pliniano ha fatto A. Acri, nel suo lavoro sulle lane di Canosa (ACRI 1982-83, pp. 190-191), ha messo in evidenza il carattere contraddittorio delle informazioni in esso contenute: se da un lato le lane apule sono incluse fra quelle più rinomate nel Mediterraneo, dall'altro si dice che esse, di pelo rasato a differenza delle lane tarantine,

sono famose solo per le *paenulæ*, specie di mantelli da pioggia, considerati belli come da Ateneo (cfr. *infra*, n. 36). Comunque da interpretare tale contraddizione, ciò che emerge è il dato relativo all'ottima qualità del prodotto apulo, tarantino e canoso particolare.

MERINO: A DIRECT LEGACY FROM ROMAN TIMES?



2. WHY (EUROPEAN) MERINO BREEDS?

II. GENETICS

- ❑ Common trend of demographic contraction → conservation efforts are needed
- ❑ Trans-boundary native breeds → trans-frontiers strategies and plans for sustainable conservation and utilization are needed
- ❑ “Reservoir” of genetic variability for improved extra-UE stocks

2. WHY (EUROPEAN) MERINO BREEDS?

III. ENVIRONMENT



Mostly reared in semi-extensive habitats, often of high naturalistic value

3. WHY an “ad hoc” ERFP ACTION?

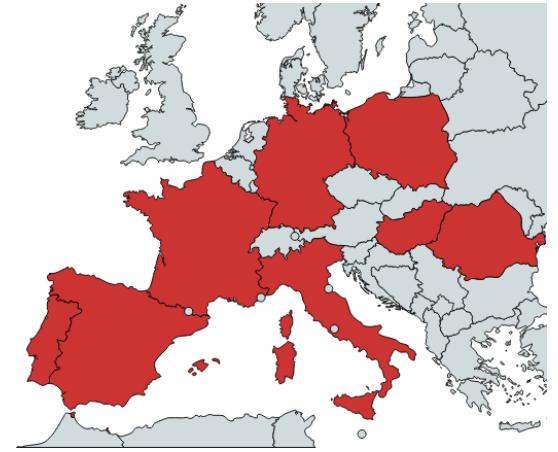


Specific goals:

- Networking
- Monitoring status and genetic diversity
- Promoting conservation via exploitation

I. NETWORKING

- Animal scientists
- Breeders associations
- Breeders
- Institutions
- *Customers/cultural associations.....*
- *Wool and fashion industries...*





European Regional Focal Point
for Animal Genetic Resources

Ad hoc action “Merino network”



Merino
and Merino-derived
breeds in Europe
state of the art - *in situ* valorization

Webinar

Monday 15th February 2021

13.50 (CET)

to be held on



<http://forms.gle/oketyDYoJg8nHA5X6>



adhocmerinonetwork

Sarcophagus from the 2nd century / detail
Alcázar de los Reyes Cristianos (Córdoba / Spain)
editing M. Mancini

14.00 / 14.10
Welcome address
Coralie Danchin
European Regional Focal Point / IDELE Paris / France

14.10 / 14.20
The ad hoc action on Merino and Merino-derived breeds
Fabio Pilla
University of Molise / Italy

FIRST SESSION

The Merino and Merino-derived breeds in Europe:
history, demography, and genetics

chair **Vincenzo Landi**
University of Bari / Italy

14.20 / 16.00 COUNTRY REPORTS

Antonio Granero

Asociacion Nacional de Criadores de Ganado Merino / Spain

Juan Vincente Delgado
University of Cordoba / Spain

Tiago Perlorio
ANCORME / Portugal

Coralie Danchin / Antoine Brimboeuf
IDELE Paris / Bergerie Nationale / France

Silverio Grande / Francesca Maria Sarti
ASSONAPA / Università degli Studi di Perugia / Italy

Christian Mendel
Bayerische Landesanstalt für Landwirtschaft / Germany

Aldona Kawęcka
National Research Institute of Animal Production / Poland

László Sáfár
Hungarian Sheep and Goat Breeders' Association / Hungary

Valentin Balteanu
University of Cluj-Napoca / Romania

16.00 / 16.20 SCIENTIFIC COOPERATION INITIATIVE

Simone Ceccobelli
Università Politecnica delle Marche / Italy

SECOND SESSION

What future for Merino and Merino-derived breeds? A wool perspective

chair **Elena Ciani**
University of Bari / Italy
co-chair **Marco Antonini**
ENEA / Italy

16.20 / 17.30

Ivan Aloisio
Fortunale / Italy

Nigel Thompson
Biella The Wool Company / Italy

Paul García de Oteyza
Oteyza / Spain

Jean-Louis Brun
Brun de Vian-Tiran / France

Lesley Prior
Tellenby / UK

Dalena White
International Wool Textile Organisation / Belgium

COUNTRY REPORTS ON HISTORY,
DEMOGRAPHY, GENETICS AND
CONSERVATION ACTIONS OF
NATIONAL MERINO & DERIVED
BREEDS

GENETIC DIVERSITY STUDY
RESULTS

THE OPPORTUNITIES
FOR BREED VALORIZATION
THROUGH WOOL UTILIZATION

II. MONITORING STATUS AND GENETIC DIVERSITY

- **Collection of data/information on the current status of the breeds** (e.g. census, *in situ* and *ex situ* conservation and promotion actions)
- **Genome-wide SNP-based genetic diversity study** (genotype dataset construction; analysis of genetic structure and relationships among world-wide Merino and Merino-derived breeds, with emphasis on European Merino and derived populations, relevant for the preservation, management and exploitation of the Merino genetic variability.)

II. MONITORING STATUS AND GENETIC DIVERSITY

| BREED NAME | BREED CODE | COUNTRY | N | SOURCE |
|---------------------------------------|------------|---------|-----|-------------|
| Australian Industry Merino | AIM | AUS | 86 | Public data |
| Arapawa | APA | AUS | 37 | Public data |
| Australian Poll Merino | APM | AUS | 98 | Public data |
| Australian Merino | AUM | AUS | 50 | Public data |
| Berrichon du Cher | BDC | FRA | 19 | Public data |
| Chinese Merino | CME | CHN | 23 | Public data |
| Ile de France | IDF | FRA | 23 | Public data |
| Macarthur Merino | MCM | AUS | 10 | Public data |
| Merinizzata Italiana | MEI | ITA | 20 | Public data |
| Merino d'Arles | MER | FRA | 18 | Public data |
| Merinolandschaf | MLA | DEU | 24 | Public data |
| Merino de Rambouillet (American type) | RMB | FRA | 101 | Public data |
| Spanish Merino (Andalusia) | SMA | ESP | 7 | Public data |
| Spanish Merino (Estremadura) | SME | ESP | 13 | Public data |
| Sopravissana | SOP | ITA | 24 | Public data |

**GENOTYPE DATASET
CONSTRUCTION**

42 breeds/populations

1636 sheep samples

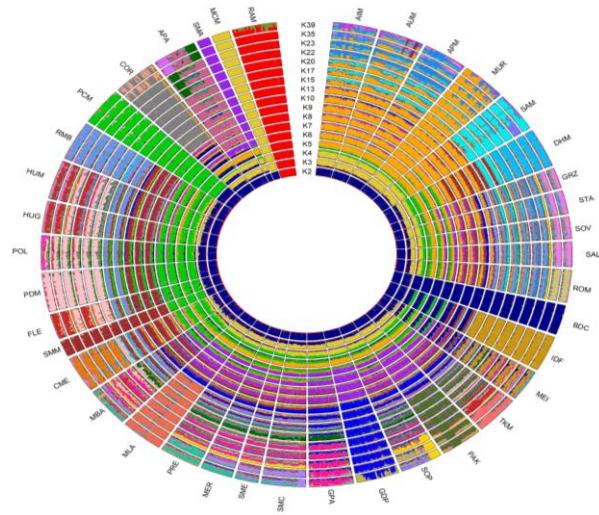
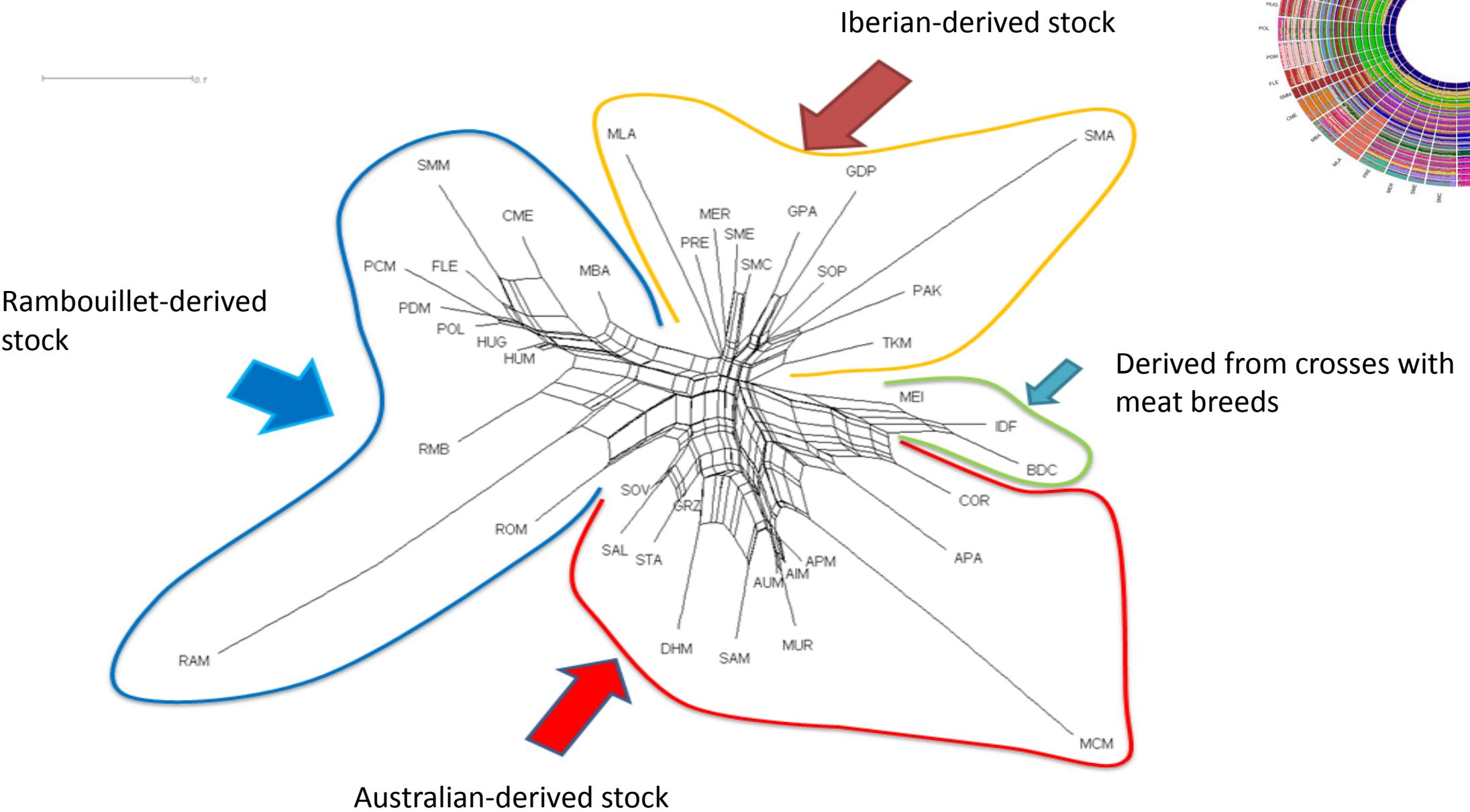
14K to 40K SNP data

| | | | |
|---|-------------|-----|-----|
| Corriedale | COR | AUS | 105 |
| Dohne Merino | DHM | ZAF | 10 |
| Merinofleischschaf | FLE | DEU | 16 |
| Gentile di Puglia | GDP | ITA | 109 |
| Groznensk | GRZN | RUS | 13 |
| Hungarian Merino | HUG | HUN | 60 |
| Merino Branco | MBA | POR | 28 |
| Merino Uruguay | MUR | URU | 98 |
| Paska | PAK | HRV | 25 |
| Polish Merino | POL | POL | 22 |
| Polish Coloured Merino | POL_COL_Mer | POL | 25 |
| Polish Old Type Merino | POL_OLD_Mer | POL | 25 |
| Merino Preto | PRE | PRT | 34 |
| Merino de Rambouillet (France type) | RAM | PRT | 46 |
| Palas Merino | PAL. | ROU | 21 |
| Salsk | SALS | RUS | 16 |
| South African Merino | SAM | ZAF | 23 |
| South African Merino (sampling 2020) | SAM | ZAF | 10 |
| South African Mutton Merino | SMM | ZAF | 10 |
| Spanish Merino Cordoba (Registered flock) | SPA_COR_RH | ESP | 48 |
| Spanish Merino Cordoba (Registered animals) | SPA_COR_RA | ESP | 24 |
| Spanish Merino Official association | SPA_OFAS | ESP | 24 |
| Soviet Merino | SOVM | RUS | 14 |
| Stavropol | STAV | RUS | 15 |
| Transilvanian Merino | TRA | ROU | 24 |
| Trimeticcio di Segezia | TRIM | ITA | 24 |
| Turkish Merino | TKM | TUR | 27 |

GENOTYPE DATASET CONSTRUCTION

PUBLISHED &
ORIGINAL DATA

PRELIMINARY RESULTS:



III. PROMOTING CONSERVATION VIA EXPLOITATION

- A key issue is to preserve genetic resources also by the valorisation of their typical products (wool)
- Transfer the intangible values of the breeds to the wool

VALORIZATION EXAMPLES FROM PORTUGAL



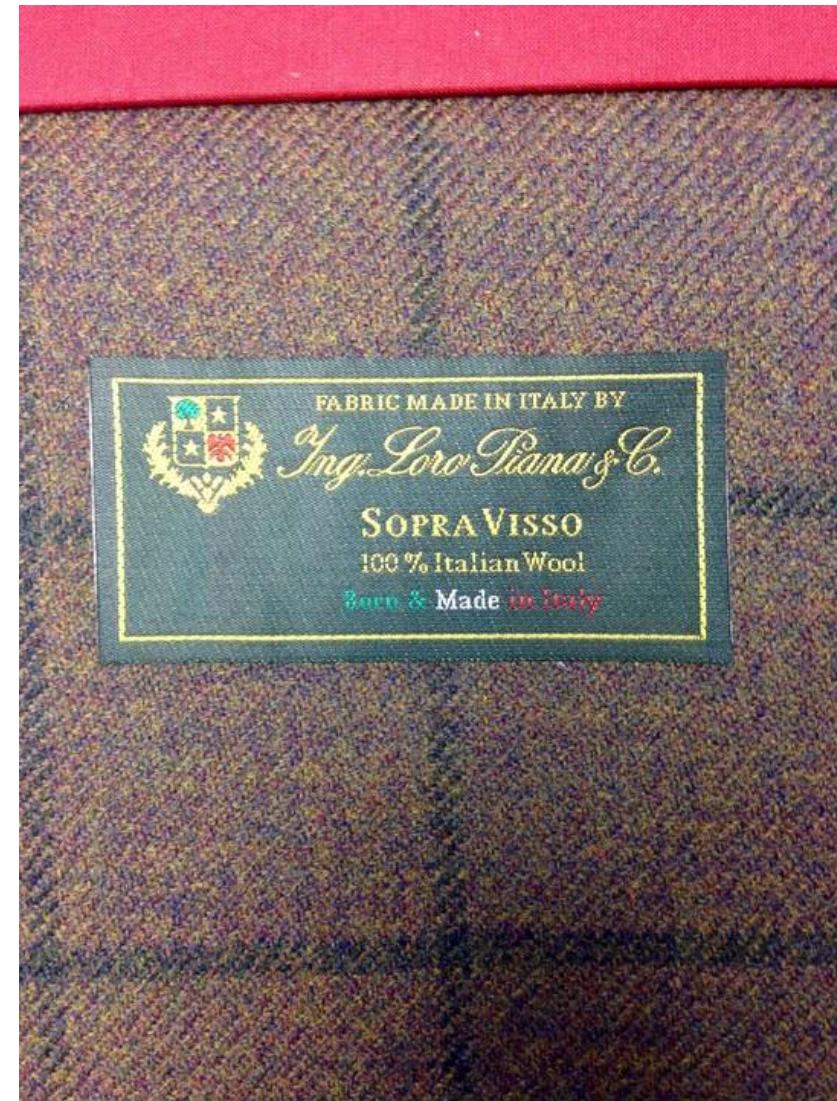
BRUSCA

A breed and flock specific yarn.

Made of 50% Saloia and 50%
Merino Branco & Merino Preto
wool.

VALORIZATION EXAMPLES FROM ITALY

100% wool from the
Sopravissana (Merino-derived)
sheep breed



LORO PIANA
Luxury textile & fashion



Mercedes-Benz Fashion Week
MADRID

VALORIZACION EXAMPLES FROM SPAIN

Paul Garcia de Oteyeza
Fashion designer



3. NEXT STEPS?

Specific goals:

- Networking

Enlarge country and stakeholder typology representativeness

- Monitoring status and genetic diversity

Formatting and dissemination of the country reports on the Merino & derived breeds

Publication of the scientific results from the genome-wide analysis

Addressing further scientific studies on landscape genomics and epigenomics

- Promoting conservation via exploitation

- **Strengthen the relationship with the wool and fashion industry (2nd open meeting)**



A photograph of four sheep standing in a dirt enclosure with a stone wall in the background. Three adult sheep are visible, and one smaller lamb is in the foreground. All sheep have thick, light-colored wool and yellow ear tags. A grey rectangular box is positioned in the upper right corner of the image, containing the text.

THANKS FOR YOUR ATTENTION!