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# Genetic characterization of indigenous chicken breeds of Italian North-central region

Francesco Perini, Filippo Cendron, Emiliano Lasagna, Martino Cassandro



Risk  
status

Genetic  
reservoir

Conservation  
plans

Tubavi  
project



LOCAL

# Tubavi Project

- Conservation of biodiversity in Italian poultry breeds.
- MIPAAFT – National Rural Development Programme 2014/2020 – Conservation, use and sustainable development of genetic resources in agriculture.
- Funded with the support of the European Agricultural Fund for Rural Development (FEASR)”
- Genetic characterization



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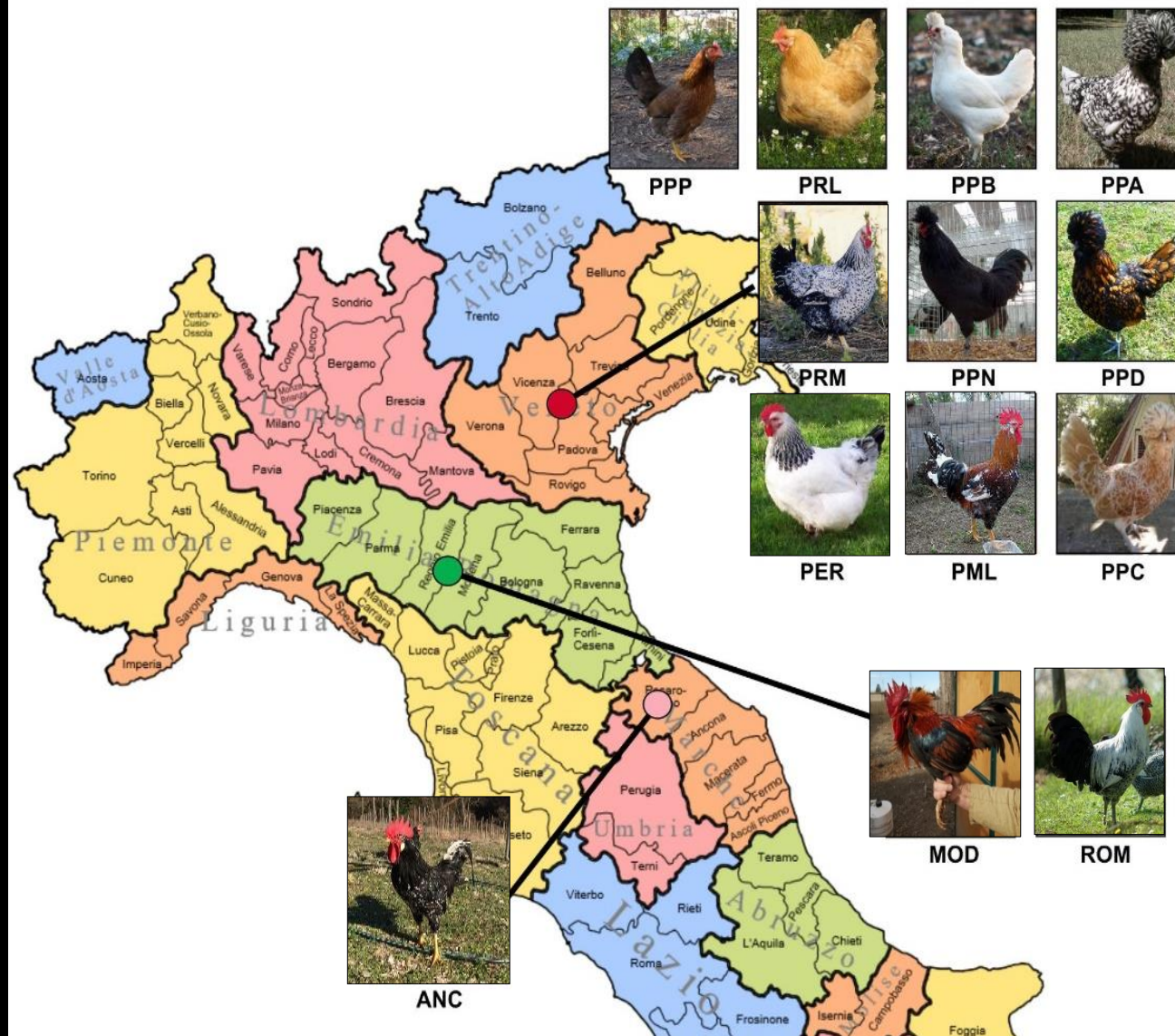
FONDO EUROPEO AGRICOLO  
PER LO SVILUPPO RURALE:  
l'Europa investe nelle zone rurali

[https://ec.europa.eu/agriculture/rural-development-2014-2020\\_en](https://ec.europa.eu/agriculture/rural-development-2014-2020_en)

<https://www.pollitaliani.it/en/>



# BREEDS



Breeds' name	Acronym
Pepoi	PPP
Robusta Lionata	PRL
Robusta Maculata	PRM
Polverara Bianca	PPB
Polverara Nera	PPN
Padovana Argentata	PPA
Padovana Dorata	PPD
Padovana Camosciata	PPC
Millefiori di Lonigo	PML
Ermellinata di Rovigo	PER
Modenese	MOD
Romagnola	ROM
Ancona	ANC

### Sample collection

Blood from 24 animals per breed

01

### DNA extraction

DNA was extracted by Neogen (Scotland) using a commercial kit

02

### Genotyping

It was performed by Neogen (Scotland) using Affymetrix Axiom 600 K Chicken Genotyping Array

03

### Plink 1.9 pruning

(i) SNPs with a call rate  $< 95\%$  and (ii) minor allele frequency  $< 5\%$ , and (iii) animals with more than 10% of missing genotypes were removed

After filtering the number of SNPs was 474,412

04

### Genetic diversity indices

PLINK 1.9 software was used to estimate observed ( $H_o$ ) and expected ( $H_e$ ) heterozygosity, inbreeding value ( $F_{hom}$ ), and average minor allele frequency MAF.

05

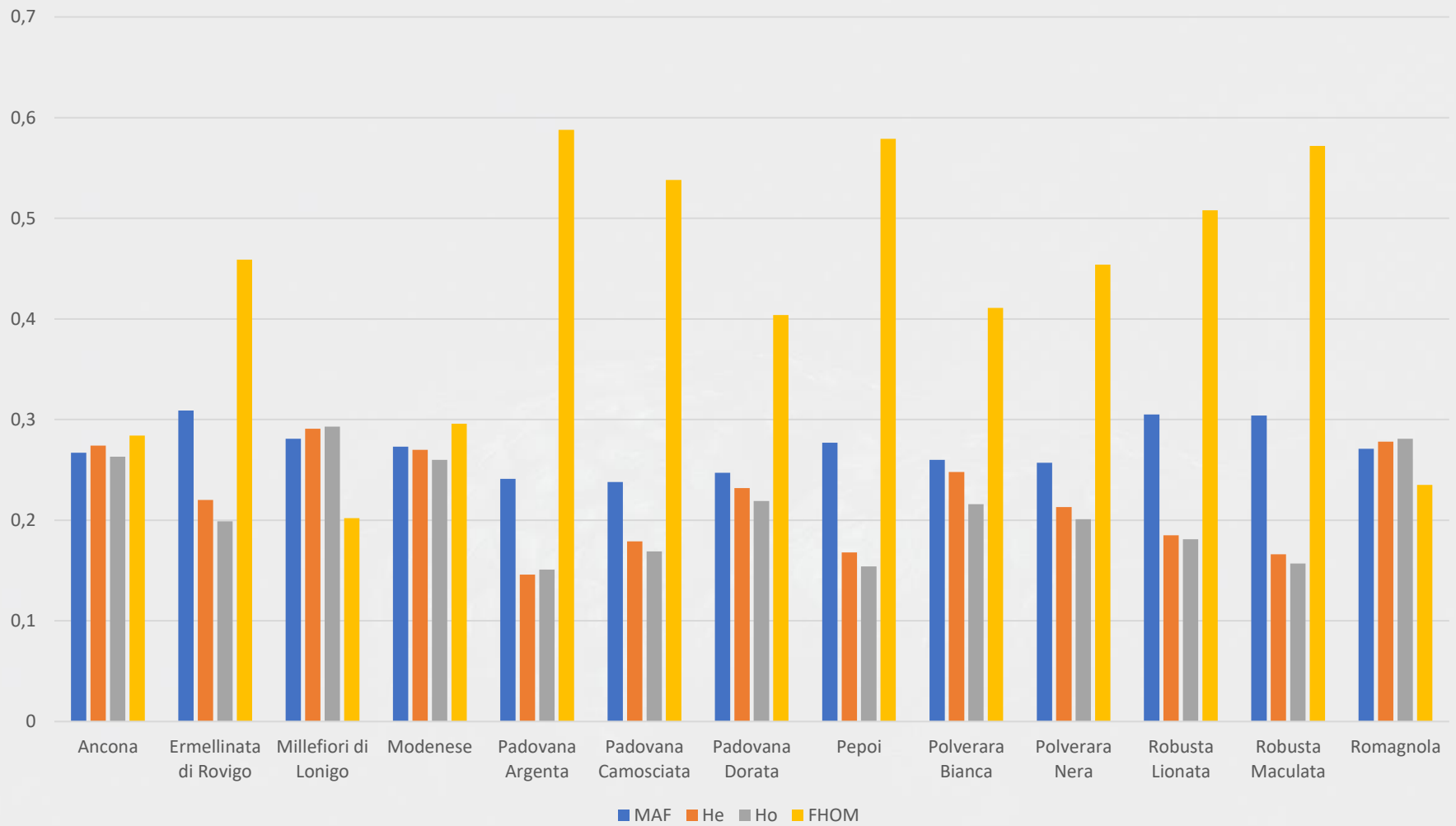
### Genetic distance

PLINK 1.9  $\rightarrow$  MDS-plot

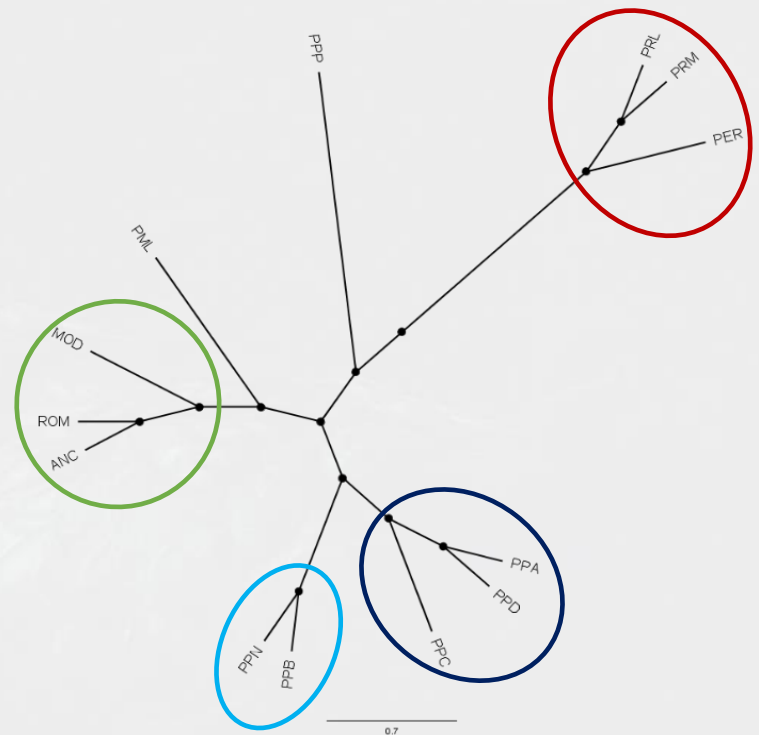
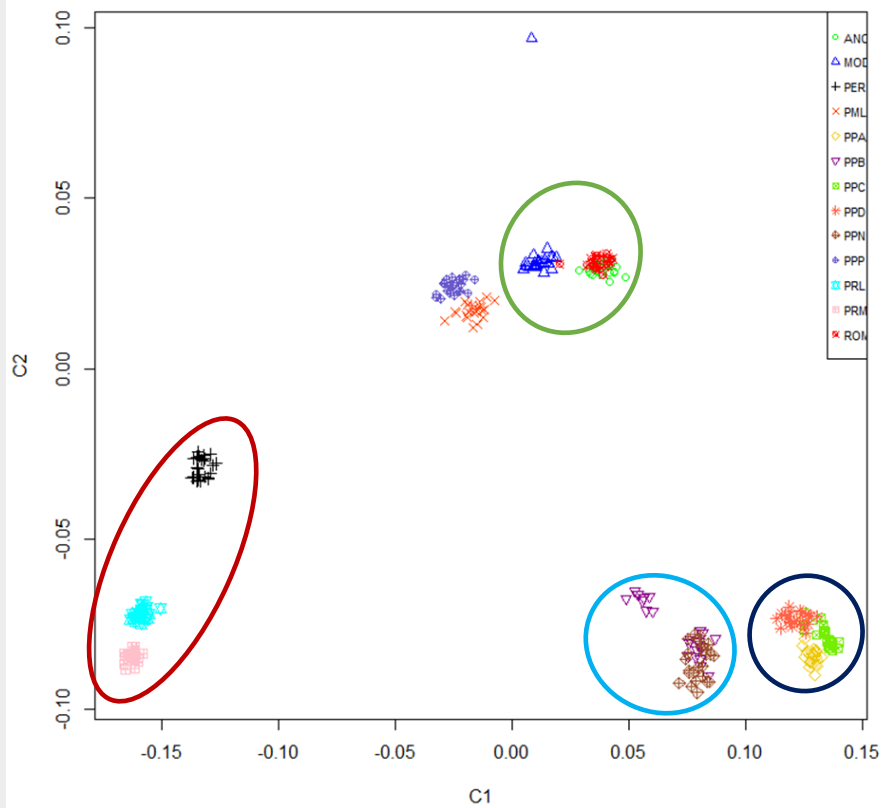
06

FigTree  $\rightarrow$  Neighbor-network of Reynolds' distances.

# Material & methods



# Genetic diversity indices

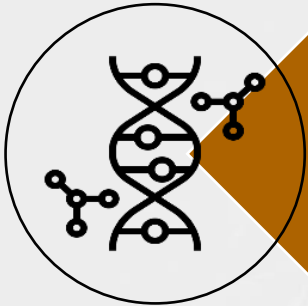


# Genetic distance results

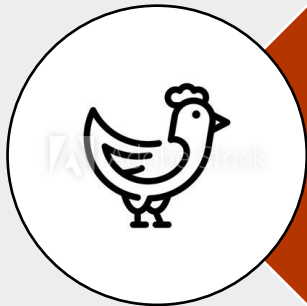




Population structure and genetic distances showed a clear separation among the breeds with some particular clusters related to the region of origin and their own history.



The results show the existence of genetic variability. Heterozygosity values higher in central region breeds, and homozygosity coefficient more in Veneto region breeds.



Design new conservation programs.  
Available genetic traceability method according to the excellent ability to distinguish between the various breeds.

# Conclusions

- This work was supported by the project: “Protection of biodiversity of Italian poultry breeds” - TuBaVi - 2014 – 2020. PSRN - Support for the conservation use and sustainable development of genetic resources in agriculture, sub-measure 10.2.
- We would like to thank:
  - conservation centers I.I.S. “Duca degli Abruzzi” Padova (Italy),
  - I.S.I.S.S. “D. Sartor” Castelfranco Veneto (Treviso, Italy),
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  - Experimental farm “Sasse Rami” Ceregnano (Rovigo, Italy),
  - STUARD farm (Parma, Italy),
  - University of Bologna (Bologna),
  - “Il Gallolarino” farm by Dalia Roberto (Monte S. Giovanni Campano, Frosinone, Italy),
  - Acquaroli Gabriele farm (Monteprandone, Ascoli Piceno, Italy)for supplying blood samples of chicken breeds.

# Acknowledgement



Thank you

Questions?