Il microbiota intestinale può essere un tratto distintivo delle razze autoctone?

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TUTELA BIODIVERSITÀ AVICOLA ITALIANA

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Background

PRIORITY LEVELS OF IMPLEMENTATION OF THE STRATEGIC PRIORITIES (SPS) OF THE GLOBAL PLAN OF ACTION

	STRATEGIC PRIORITY AREA 1 CHARACTERIZATION, INVENTORY AND MONITORING OF TRENDS AND ASSOCIATED RISKS	STRATEGIC PRIORITY AREA 2 SUSTAINABLE USE AND DEVELOPMENT	STRATEGIC PRIORITY AREA 3 CONSERVATION	STRATEGIC PRIORITY AREA 4 POLICIES, INSTITUTIONS AND CAPACITY BUILDING
NATIONAL	**SP 1** Inventory and characterize AnGR, monitor trends and risks associated with them, and establish country-based early-warning and response systems	**SP 3** Establish and strengthen national sustainable use policies **SP 4** Establish national species and breed development strategies and programmes **SP 5** Promote agro-ecosystems approaches to the management of AnGR **SP 6** Support indigenous and local production systems and associated knowledge systems of importance to the maintenance and sustainable use of AnGR	**SP 7** Establish national conservation policies **SP 8** Establish or strengthen in situ conservation programmes **SP 9** Establish or strengthen ex situ conservation programmes	**SP 12** Establish or strengthen national institutions, including national focal points, for planning and implementing AnGR measures, for livestock sector development **SP 13** Establish or strengthen national educational and research facilities **SP 14** Strengthen national human capacity for characterization, inventory, and monitoring of trends and associated risks, for sustainable use and development, and for conservation **SP 18** Raise national awareness of the roles & values of AnGR **SP 20** Review and develop national policies and legal frameworks for AnGR
REGIONAL			**SP 10** Develop and implement regional and global long-term conservation strategies	**SP 17** Establish Regional Focal Points and strengthen international networks

The first step of the FAO Global Plan of Action is the inventory and characterization of national AnGR

In this context was set up the TuBAvI project to carry on the conservation of biodiversity in Italian poultry breeds

(Ministry of agriculture, food sovereignty and forestry – National Rural Development Programme 2014/2022 – Measure 10.2 – Conservation, use and sustainable development of genetic resources in agriculture. A collective project within the poultry sector funded with the support of the European Agricultural Fund for Rural Development (EAFRD))

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TuBAvI (2017-2020) and TuBAvI-2 (2021-2024) projects

- Surveys on local farmers
- Animal characterization
- Rearing management and feeding strategies set up
- Mating plans
- Counceling, support and formation programs for farmers

Regional germplasm bank for two Tuscany poultry breeds: Mugellese and Valdarnese bianca

Breeds

The Mugellese chicken is a **brachimorphic breed** with a medium neck, broad shoulders, long and horizontal wings, wide, and well-developed breast (especially in the hen) with a typical brooding capacity (Mannelli et al., 2023)

The Valdarnese Bianca breed is a **dolicomorphic breed** considered the only original Italian meat-type breed of the national genetic heritage with a long neck, broad shoulders, long and horizontal wings, and long legs and shanks

Both these breeds show frugality, resilience and resistance to diseases and are particularly suitable for free-range farming

These two breeds were characterized for morphological, productive and reproductive traits and at the end of the trial, for caecal microbial community profile

Experimental design for growth evaluation

Mugellese

Valdarnese bianca

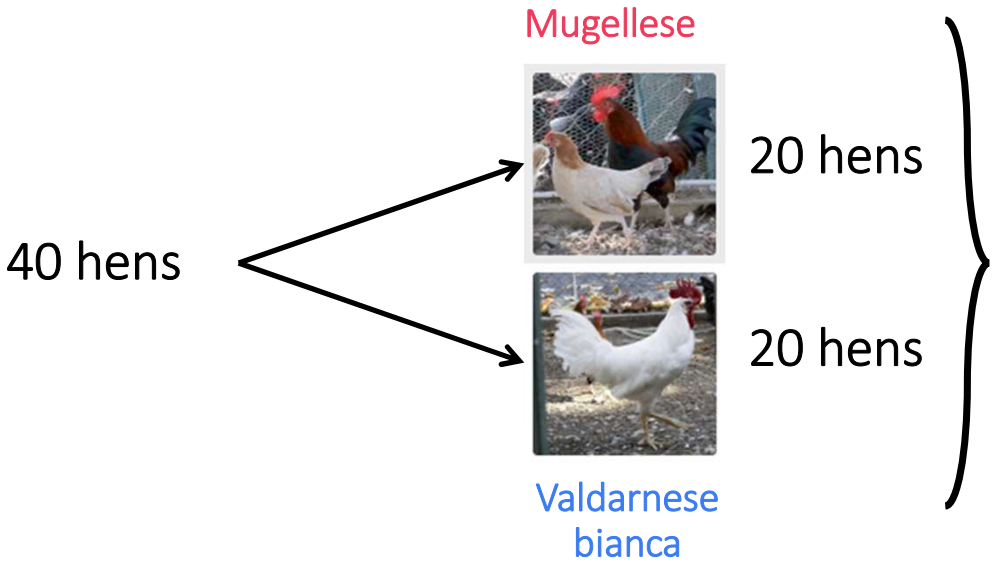
50 % male + 50 % female

50 % male + 50 % female

- Animal growth
- Morpho-functional traits growth (body length, chest circumference, wing span, shanks length)
- Microbiota profile

(FAO, 2012 protocol)

Experimental design for deposition evaluation (365 days)



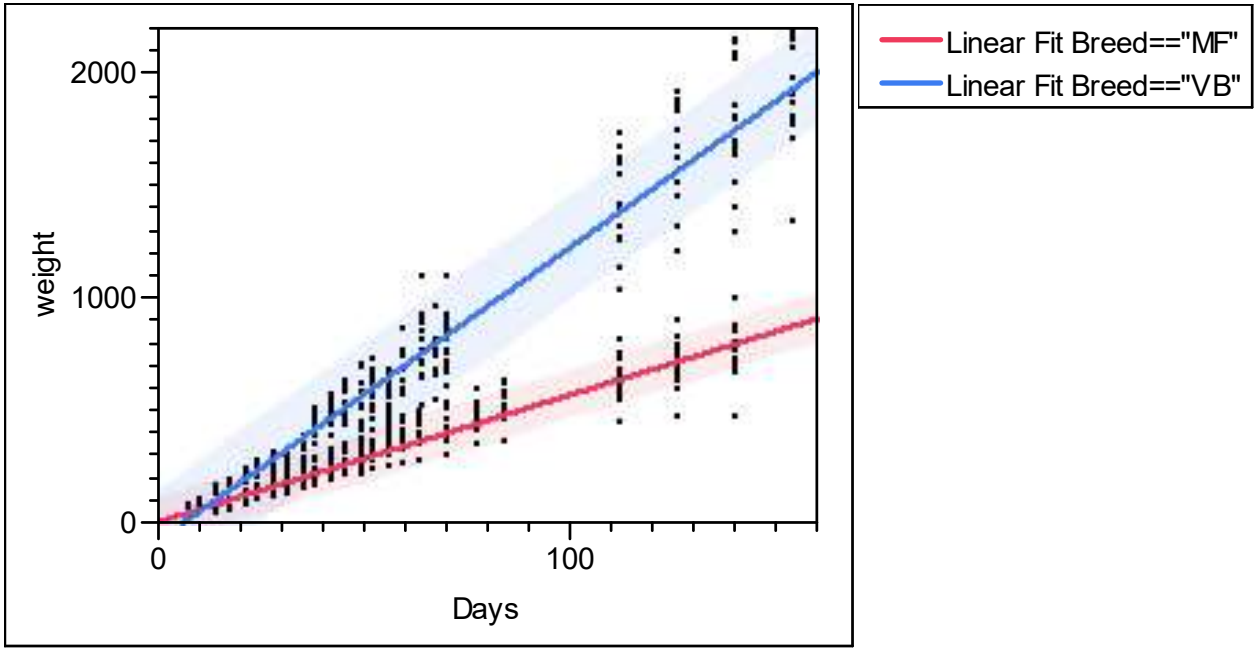
- Evaluation of the deposition curve based on the calculated HDP% (hen-day production %)

(FAO, 2012 protocol)

Animal growth – body weight

Mugellese

Valdarnese bianca



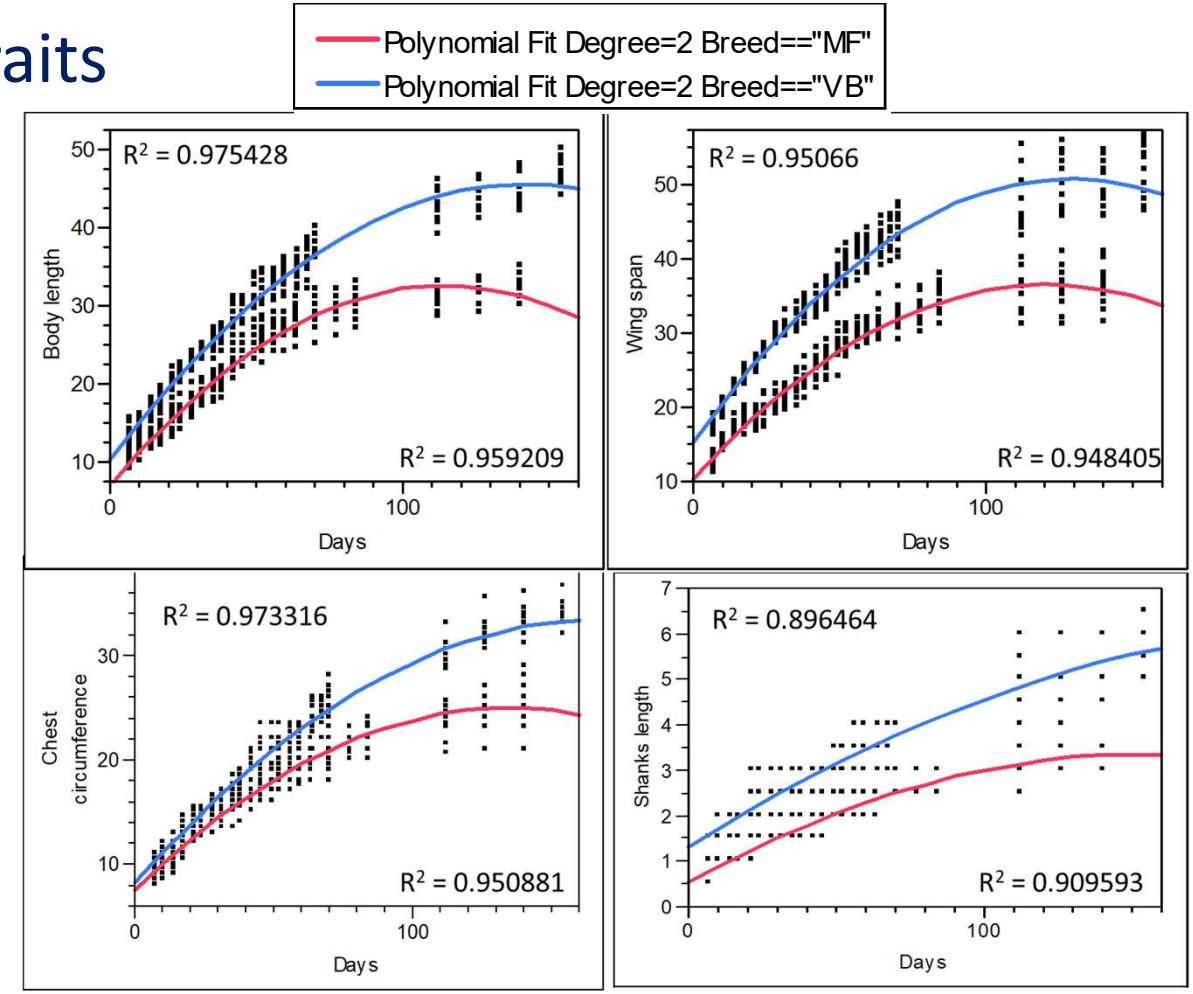
Growth rate was observed different between the two breeds

Animal growth – body main traits

Mugellese

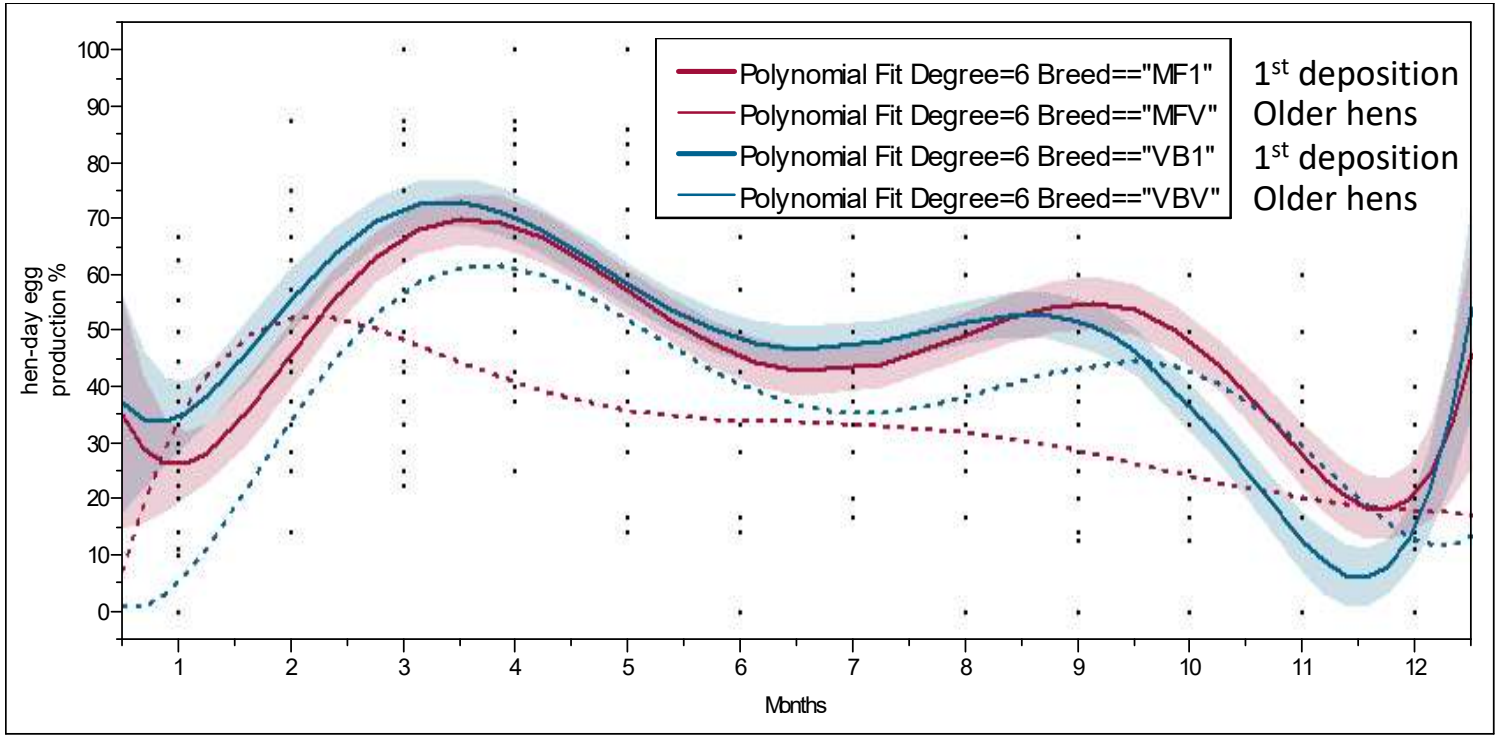
Valdarnese bianca

The difference in the growth rate reflected also on body main traits



Egg laying

HDP% curve was similar between the two breeds for the 1st year of deposition but they differ most when older hens were considered



Mugellese Valdarnese bianca

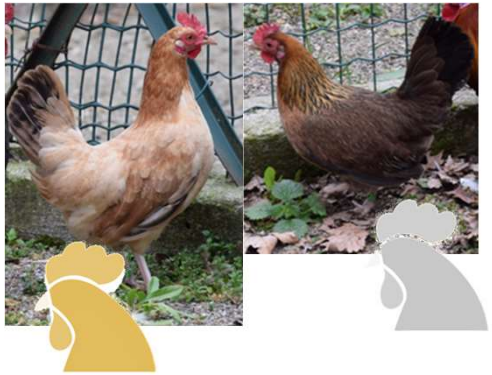
Ceacal microbiota

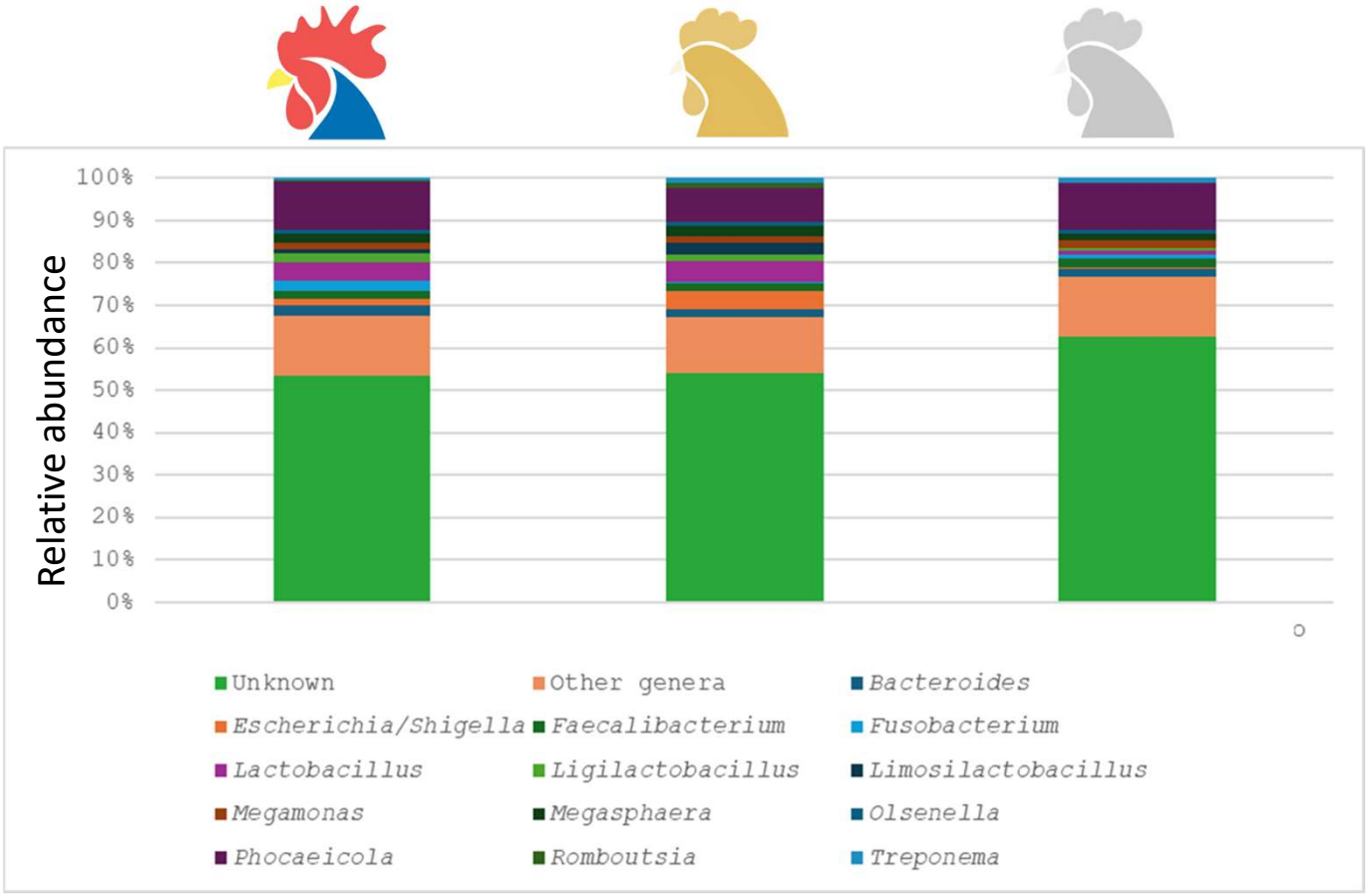
Mugellese

Valdarnese bianca

Golden wheat type

Wild type



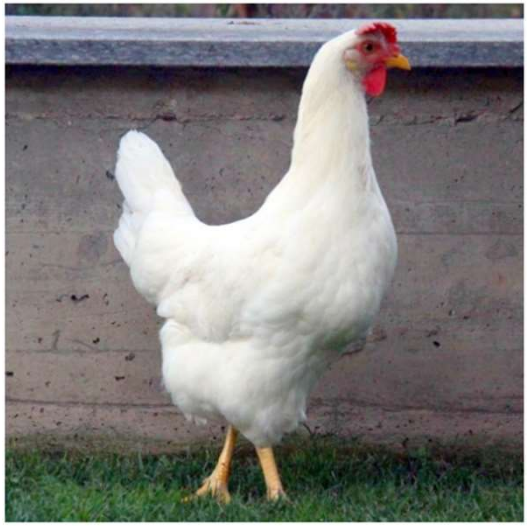


Ceacal microbial community of Mugellese wheat type found more similar with Valdarnese Bianca than to the Mugellese wild type

Breeds

Livorno bianca – gallina (UniPI)

The Livorno breed is a **mesomorphic breed** widely appreciate for its egg production, spreading allover Europe



Bianca di Saluzzo – gallina (UniTO)

The Bianca di Saluzzo breed is a **mesomorphic breed** from Piedmont region, used since the 19th century for meat production and as family sustenance for eggs.

These two breeds were characterized for caecal microbial community profile considering breed and environment effects

Experimental design for microbiota evaluation

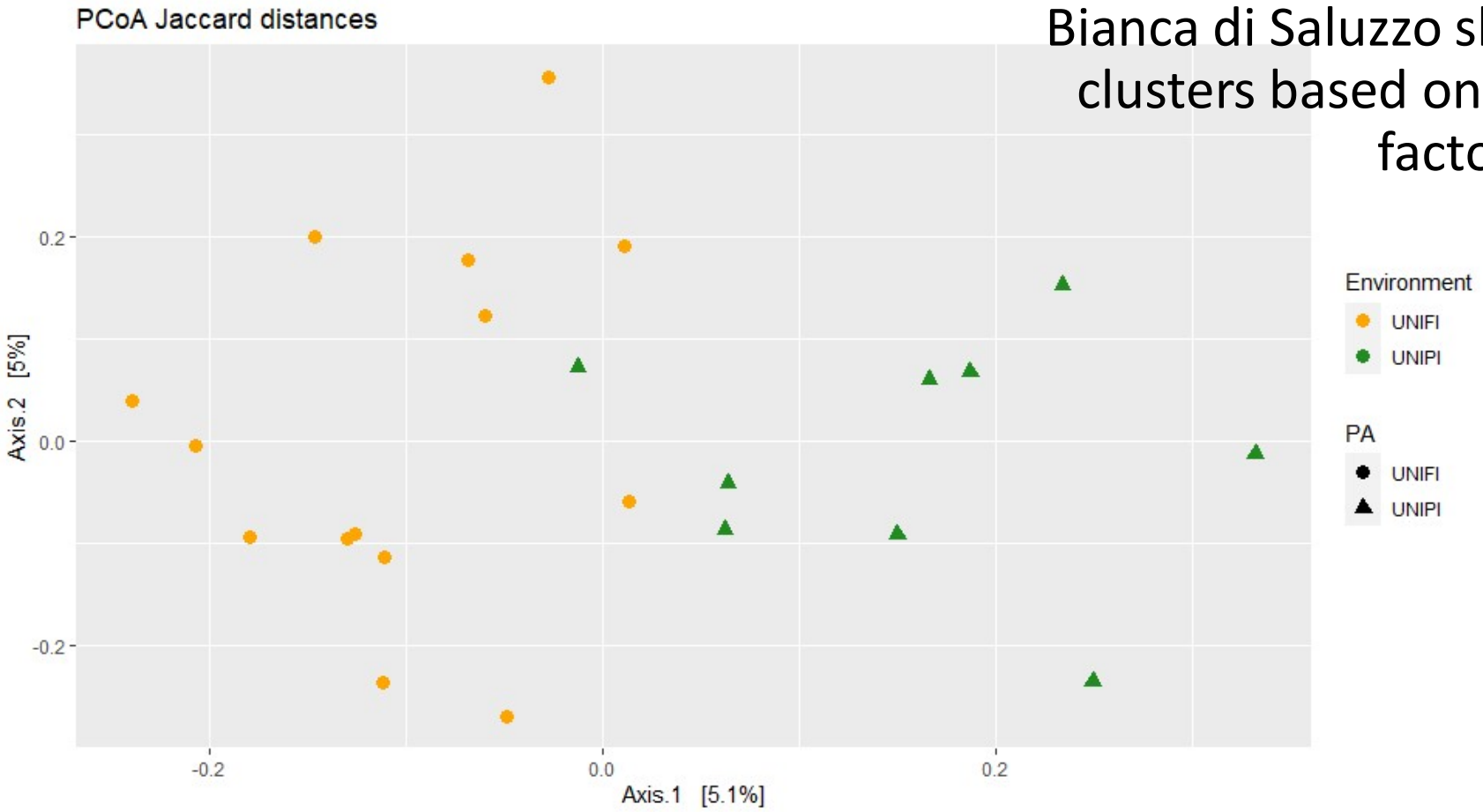
Livorno

Bianca di Saluzzo

- Microbiota profile

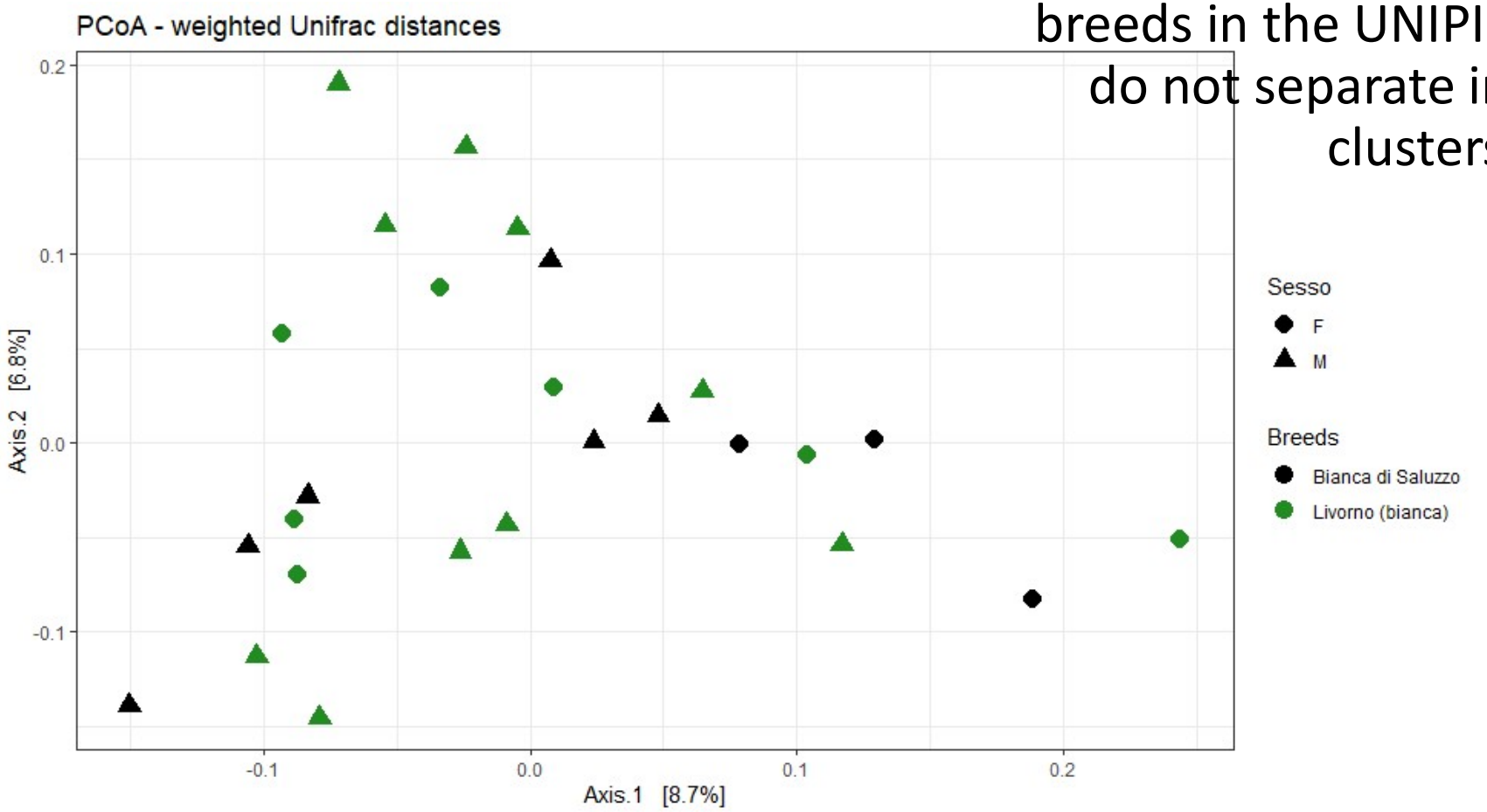
Environment effect

The cecal microbial community of Bianca di Saluzzo show two distinct clusters based on environmental factors



Breed effect

Bianca di Saluzzo and Livorno breeds in the UNIPI environment do not separate into distinct clusters



Breeds

Ancona (UniPI)

The Ancona breed originates from central Italy (Ancona province) and gained international recognition around the mid-19th century when was imported to England in 1848 from the port of Ancona

Ermellinata di Rovigo

The Ermellinata di Rovigo breed develops in 1959 at the Rovigo Poultry Experimental Station, aiming to produce chickens with a strong aptitude for high-quality meat production. The Sussex and Rhode Island breeds contributed to its creation

Pépoi – gallina (UniPD)

The Pépoi breed have origin in the Veneto region and the few small-sized breeds available on the market

Robusta Lionata – gallo (UniPD)

The Robusta Lionata breed was selected in 1965 at the Rovigo Poultry Experimental Station, the breed was developed using the Orpington Buff and White American breeds

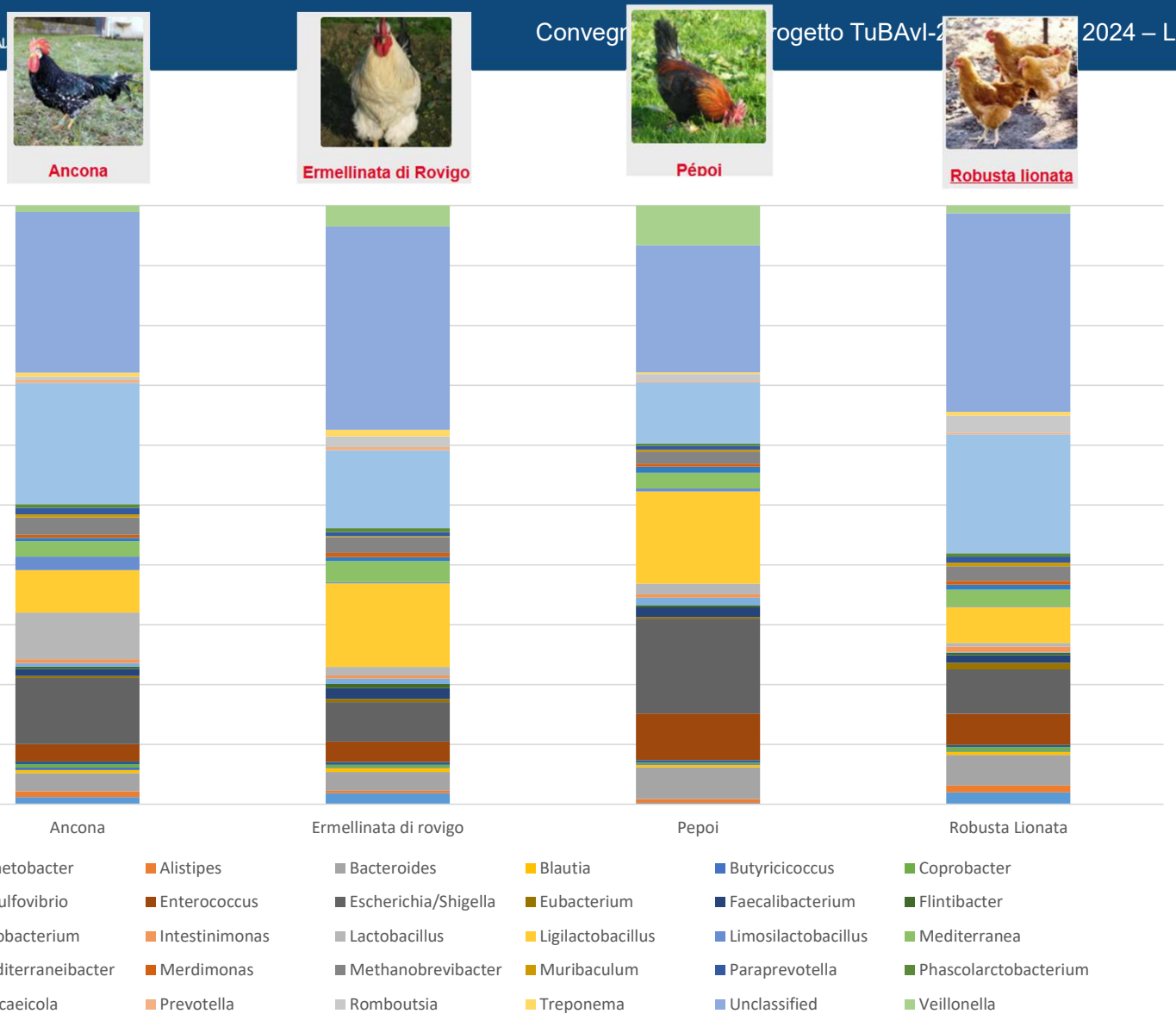
These four breeds were characterized for caecal microbial community profile considering breed effect in the same environment

Experimental design for microbiota evaluation

- Microbiota profile

Breed effect

The microbiota profiles of the four breeds differ in their composition



Conclusions

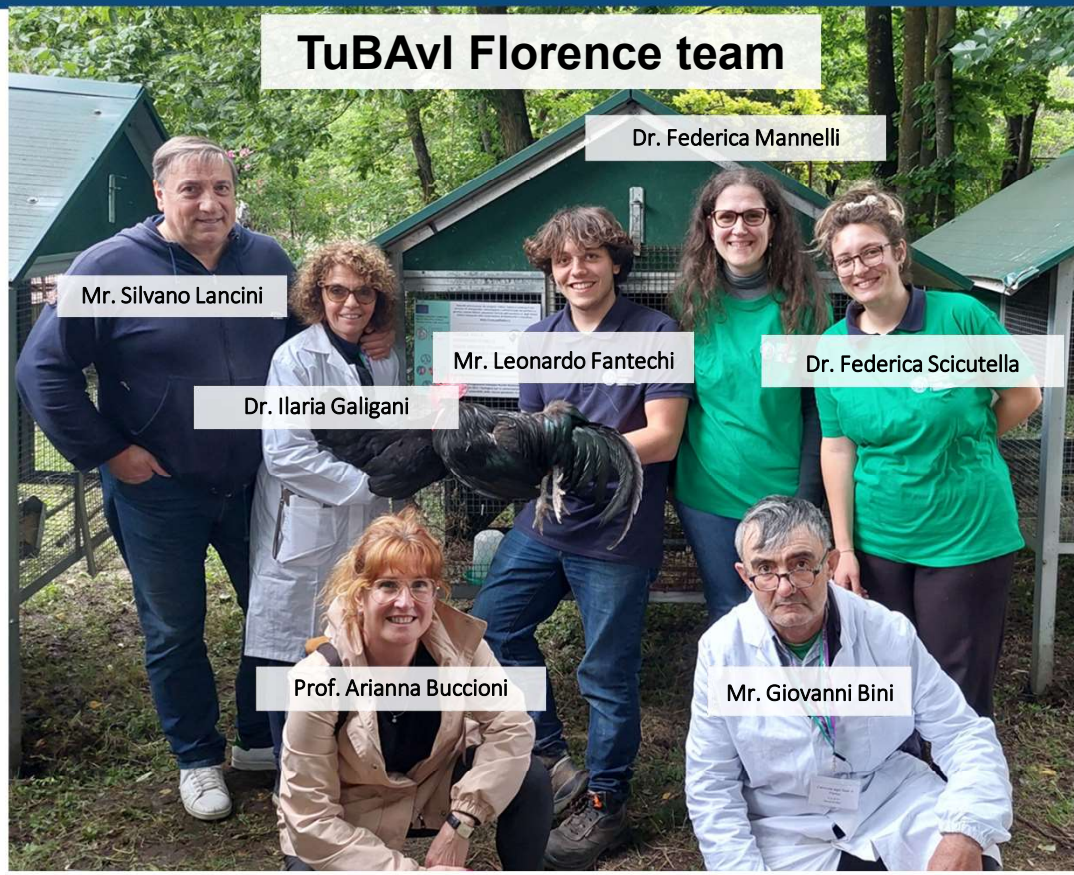
As aspected

- An **environment effect** was observed considering different breeds
- Breeds with **different genetic lines** have **different microbial profile** in the same environment

Instead, completely unespected

- Microbiota community of two breeds genetically distant, Valdarnese bianca and Mugellese, show similarity when the Mugellese wheat type is considered and differences with respect to Mugellese wild type

Thank you



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