UNIVERSITÀ DEGLI STUDI FIRENZE

DAGRI
DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRARIE, ALIMENTARI, AMBIENTALI E FORESTALI

26th Congress ASPA25 17 / 20 June 2025 | Turin, Italy
Association for Science and Animal Production

Microbiota characterization of four autochthonous Italian chicken breeds

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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

Microbiota characterization

The microbiota

A community of microorganisms - including bacteria, archaea, viruses, fungi, and protozoa - that inhabit a specific environment even inside a host animal

Gut microbiota

The microorganism community of the gastrointestinal tract

The gut microbiota

is responsible for:

- nutrient digestion and absorption
- immune system development
- protection against pathogens
- metabolic and hormonal regulation

! **Each host species has a unique microbiota shaped by genetics, diet, age, and environment**

(Borda-Molina et al., 2018)

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

Experimental design for microbiota evaluation

4 local Italian breeds


Robusta lionata


Ermellinata di Rovigo


Pépoi


Ancona

2 different environment


UNIFI
University of Florence


UNIPI
University of Pisa

Experimental design for microbiota evaluation in both flocks

4 local Italian breeds

Robusta lionata

Ermellinata di Rovigo

Pépoi

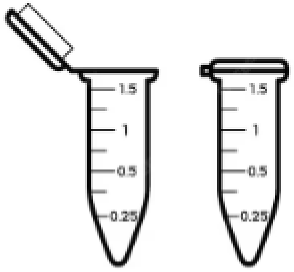
Ancona

Hatched and reared at the same time

Fed *ad libitum* the same diet

140 days of trial

Sampling *in vivo*



Only caecal feaces were considered for analysis

Experimental design for microbiota evaluation

Robusta lionata

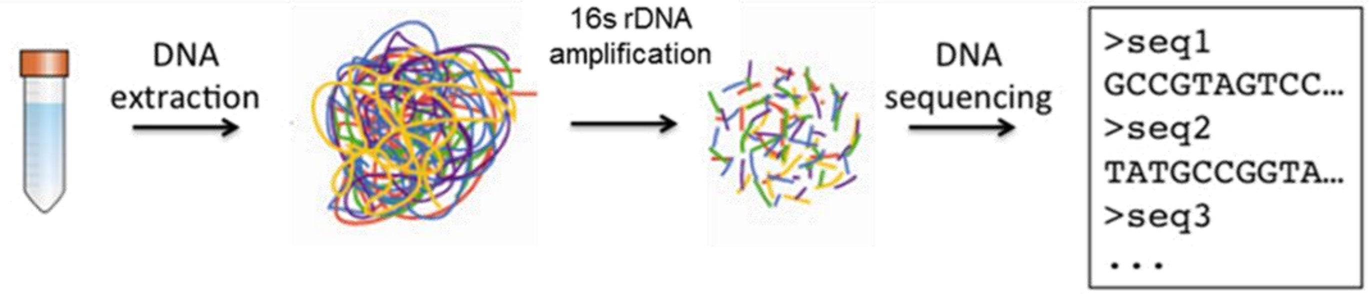
Ermellinata di Rovigo

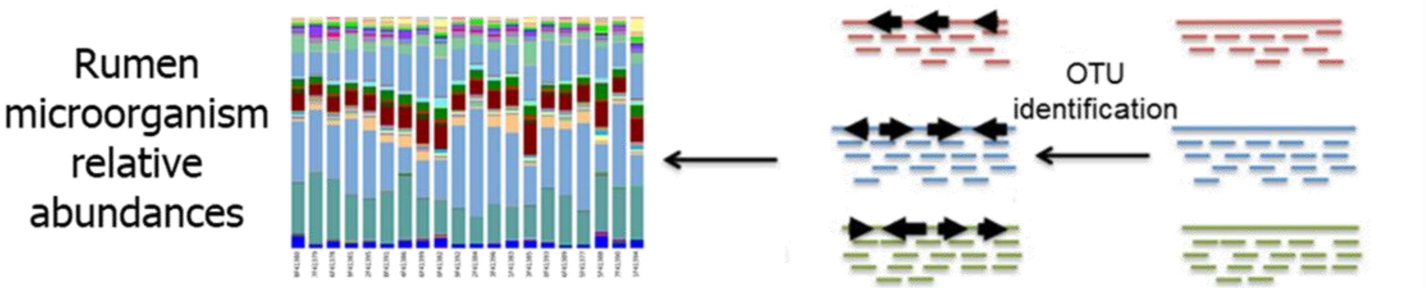
Pépoi

Ancona

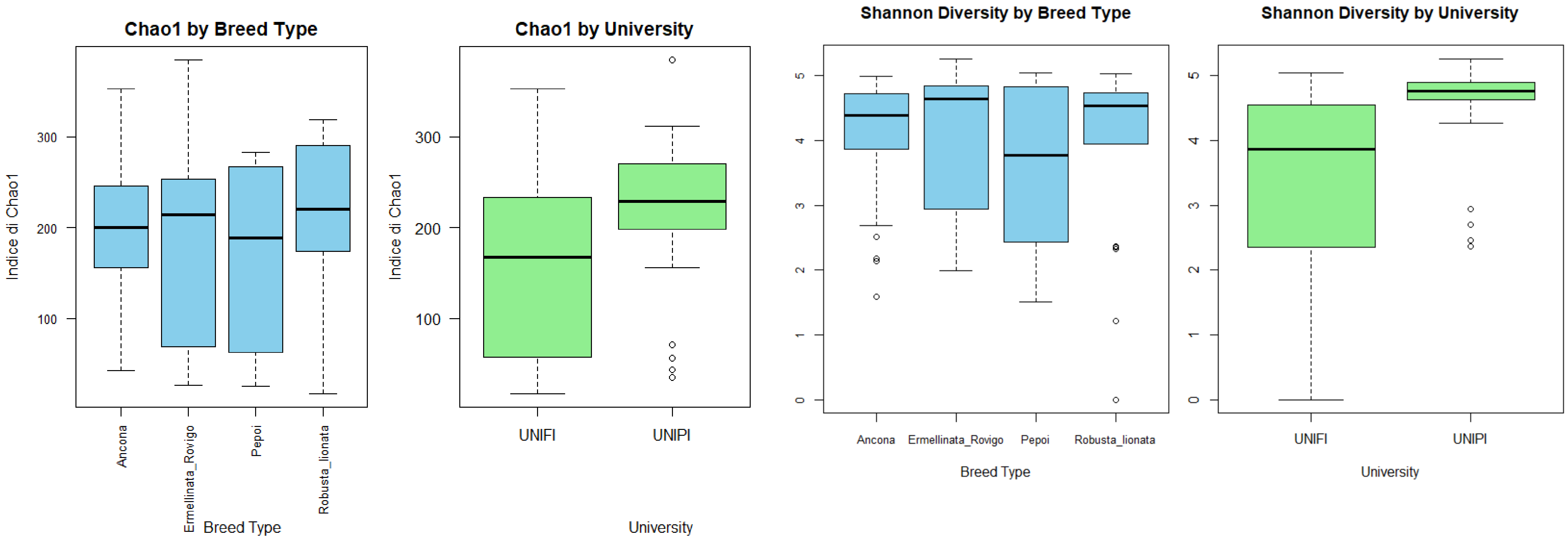
4 local Italian breeds

Caecal faeces samples *in vivo*





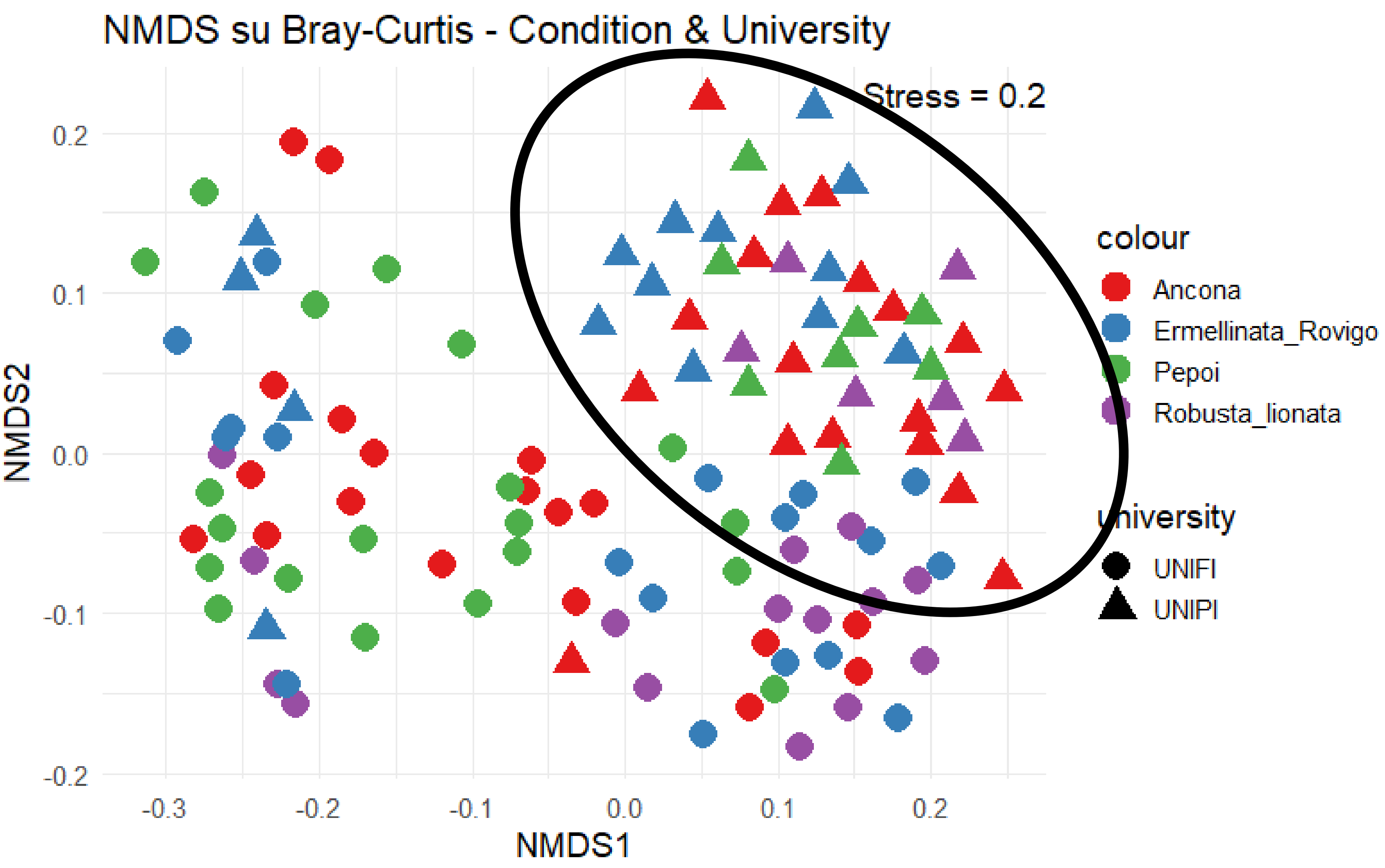
Results α-diversity



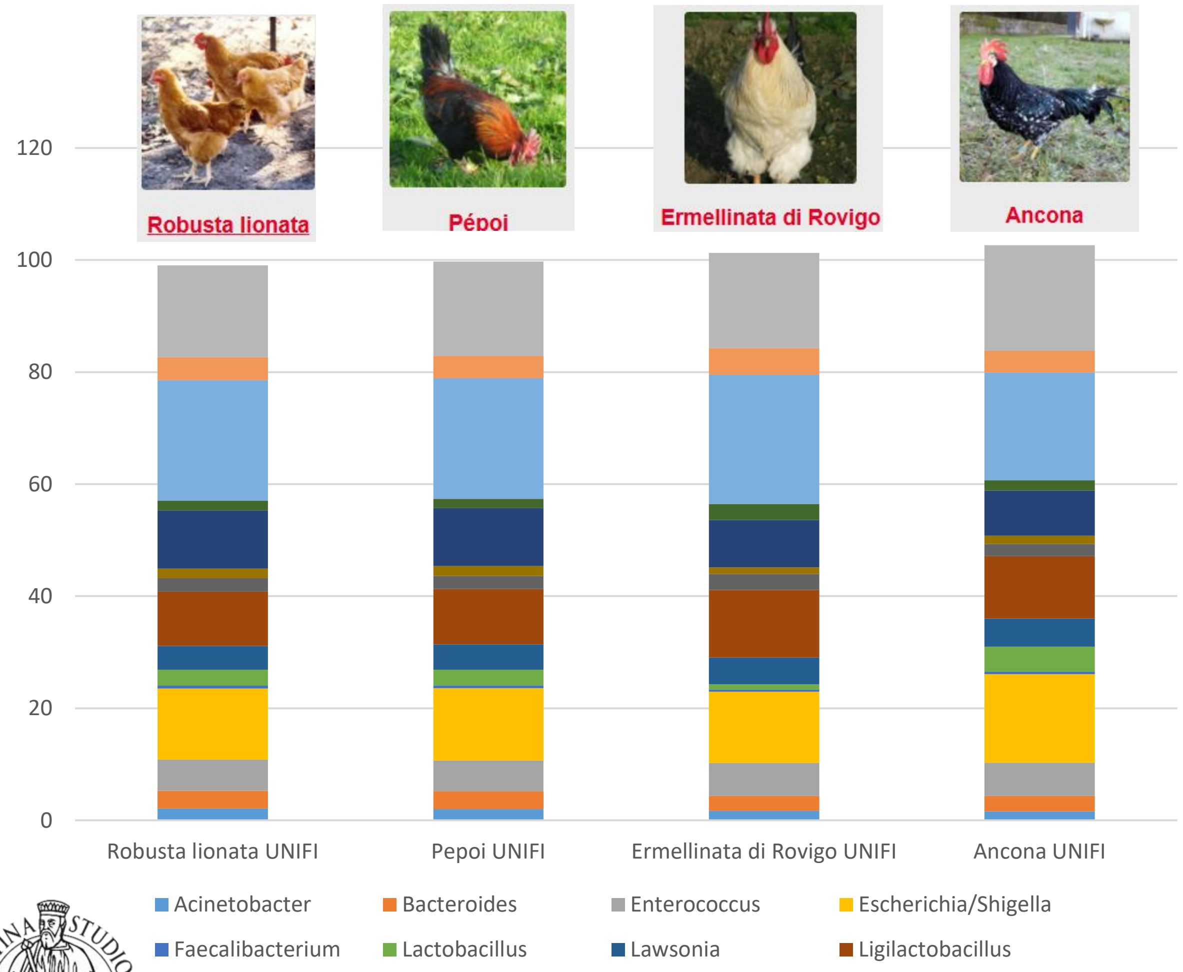
- **Greater differences emerged when comparing environments rather than breeds**

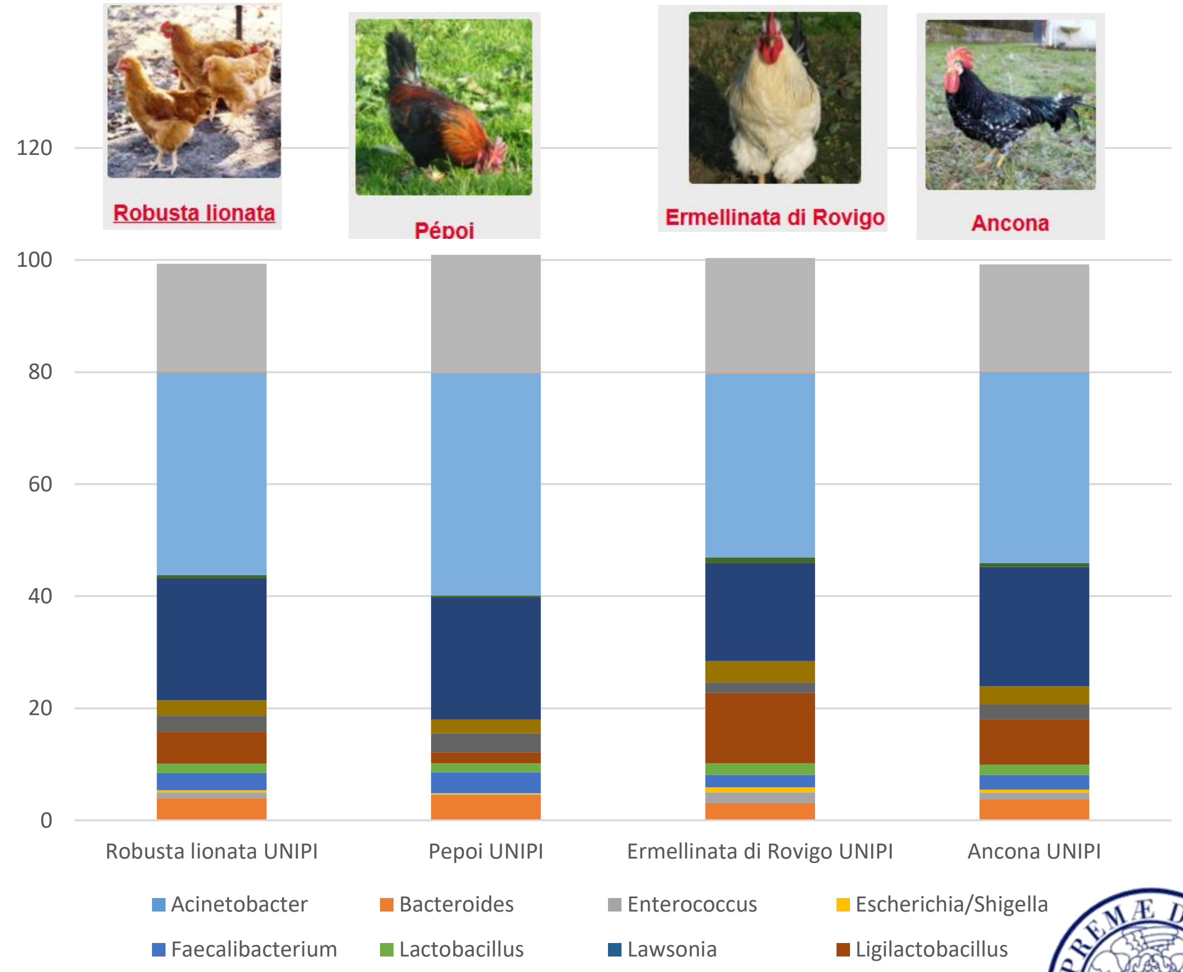
Results

- The UNIPI group formed a tighter cluster compared to the other, which was more dispersed over a larger area



Results genera profile



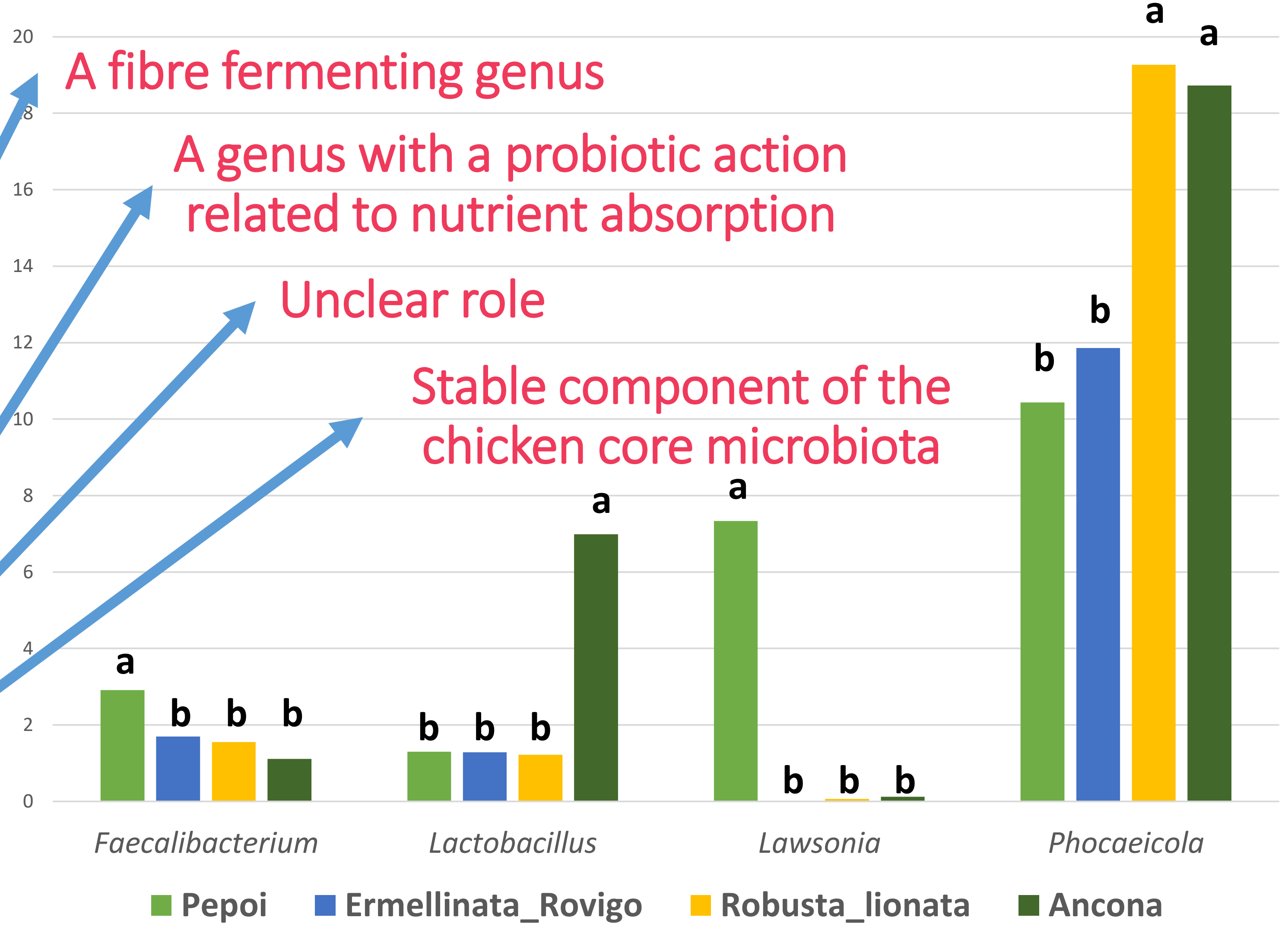


➢ **Under the UNIFI condition, the microbiota of the four breeds appear more similar to one another and display overall greater biodiversity**

Results

➢ **Four bacterial genera exhibit significant variability across breeds**

- *Faecalibacterium*
- *Lactobacillus*
- *Lawsonia*
- *Phoecaeicola*



Conclusions

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

Robusta lionata

Ermellinata di Rovigo

Pépoi

Ancona

however

- UNIFI condition show **more biodiversity** in the 4 breed genera profile than UNIPI
- **Four genera** show significant differences due to **breed effect**

Thank you

GENEXPRESS team

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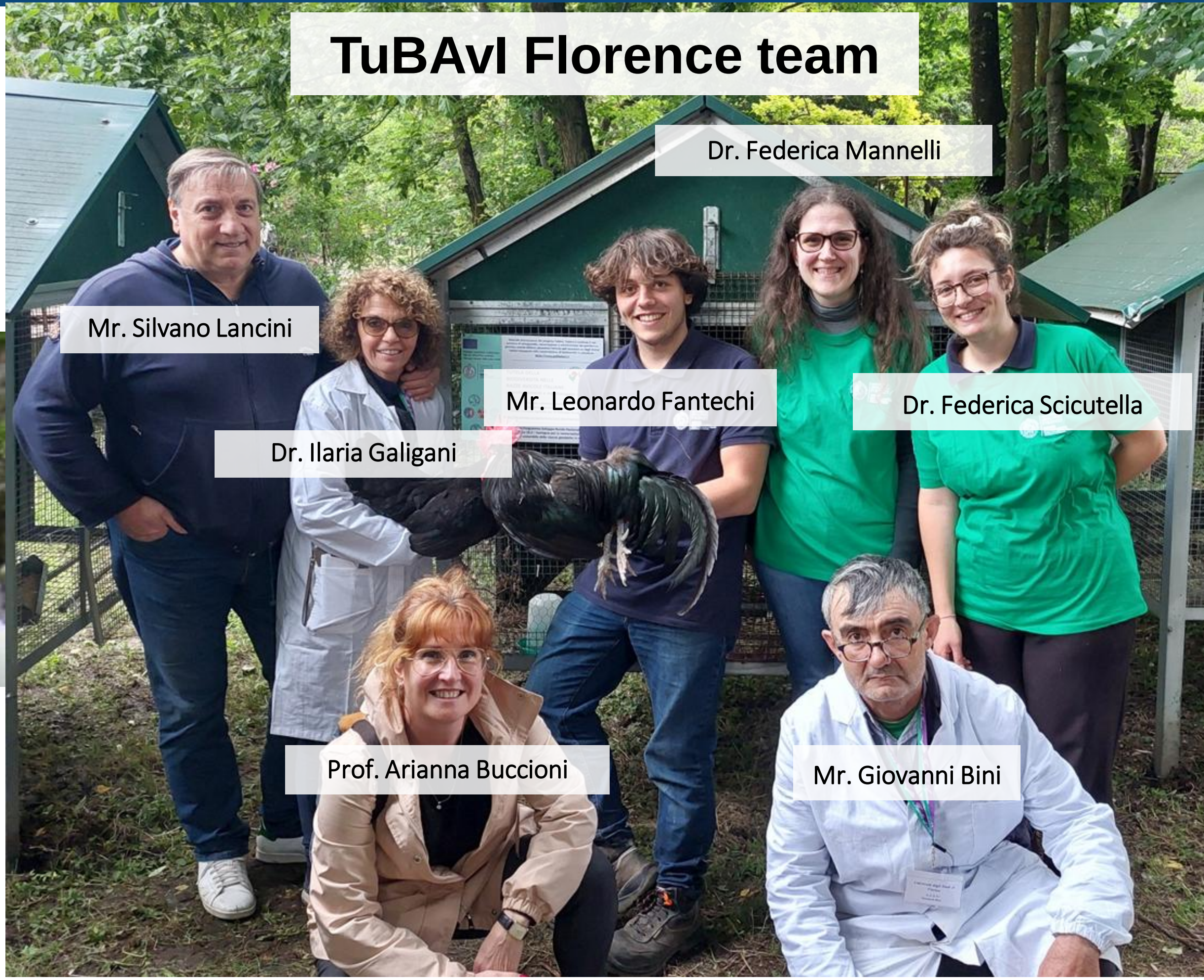

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