National Rural Development Programme 2014-2022
Measure 10.2 – Biodiversity

Project: TuBAvI-2 (2021-2024)
REPORT ON THE ACTIVITIES PERFORMED DURING THE SECOND YEAR

UniFI

The present report describes the activities performed from May 1st, 2023 to April 30, 2024. The activities are described by Action, according to the original programme.

Action 1 – Phenotypical characterisation of autochtonous breeds and species

Task 1.1 - Phenotypic characterization of chickens of the Mugellese, Valdarnese Bianca and Valdarno breeds
The breeders of the Mugellese, Valdarnese Bianca and Valdarno breeds were reared at the Experimental Farms of the Department of Agricultural, Food, Environmental and Forestry Sciences and Technologies (University of Florence). They were divided into 3 families by breed and livery and raised on the ground, in separate boxes on permanent litter. Two additional families for the Mugellese breed (1 x livery) are still reared in natural hatching in an environment that simulates a wild territory (tree and shrub cover). All subjects were bred in compliance with the guidelines of poultry farming and the regulations in force on animal welfare.
Characterization of the breeds:

- Morphological characterization, according to the FAO guidelines (2012) to update and validate what was collected during the first TuBAvI project for the **Mugellese** (Mannelli et al., 2023) and **Valdarnese bianca** breeds (manuscript work in progress; fig. 1.1) and first characterization of the **Valdarno** breed (data elaboration in progress);
- Weight gains (for the **Mugellese** breed shown in Mannelli et al., 2023 and for the **Valdarnese bianca** breed shown in Fig 1.2 compared to Mugellese breed), feed consumption and feed conversion index calculation for the three breeds reared in UniFI farm (for the **Mugellese** breed shown in Mannelli et al., 2023; for **Valdarnese bianca** and **Valdarno** breeds the data validation and processing are in progress), evaluation food consumption with reference to the production of eggs in the families formed after the breeding plan (data collection in progress);
- Daily egg production (for the **Mugellese** breed reported in Mannelli et al., 2023; for the **Valdarnese bianca** breed data reported in Fig, 1.3; for the **Valdarno** breed data collection in progress).

The morphological, growth and deposition data reported for the **Mugellese** breed and published in Mannelli et al., 2023 are under validation through further data collection and, to consider the two liveries as two distinct populations, the families belonging to the two standard liveries have been separated.

Task 1.2 Phenotypic characterization of chickens of the Mugellese, Valdarnese bianca and Valdarno breeds
Following the breeding plan carried out by the consultant UniTO (including samples collected form others breeders), families were formed at the UniFI Experimental farm, following the indications for the mating plans and, starting from these new nuclei, a selection program was started following phenotypic characteristics of the progeny for the **Mugellese** breed in the two liveries, while for the white **Valdarnese bianca** and **Valdarno** breeds the nuclei were formed at the beginning of 2024, also following the breeding plan carried out by UniTO. We are now awaiting for the hatchings to carry out also the phenotypic selection of the progeny on these nuclei.

Action 4 - Estimation of genetic and genomic indices and reproductive management in relation to new purposes

Valdarnese bianca and Valdarno birds were sampled, as planned, to perform genetic characterisation in order to prepare mating plans. Feathers were sampled from 56 Valdarnese bianca birds from UniFI and from 9 breeding farms on the territory and from 52 Valdarno birds from UniFI and from 10 breeding farms on the territory. All the samples were sent to consultant UniTO to evaluate genetic indexes and the results were used to form the new families and were shared with breeders who had participated in the sampling.

Action 7 – Evaluation and identification of genetic resistance characteristics of animals of zootechnical interest to diseases

Regarding breeds under protection at UniFI, **Mugellese** and **Valdarnese bianca** were sampled at the end of 2021 and DNA was extracted from the collected samples, sequenced by third parties and processed to highlight any differences in the microbiota (fig. 7.1).

In this action, in collaboration with the PA UniPI, in 2022, the PA UniFI has evaluated the resilience and resistance to pathologies and environmental stresses of the **Mugellese**, **Valdarnese bianca**, **Livorno** and **Bianca di Saluzzo** breeds in terms of animal welfare and resistance to pathogens, using the response of the intestinal microbiota to environmental stimuli as an information marker. Subjects belonging to these breeds were bred in free-range and fed with the same feed (Monge) at our UniFI headquarters and at the UniPI headquarters, according to the same scheme. At the end of the test, the caecal feces of each test subject were taken from both sites. From the collected samples, DNA was extracted and sequenced by third parties and processed to highlight any differences in the microbiota (for the **Bianca di Saluzzo** breed the data is shown in Fig. 7.2).

In the following year 2023, the same experimental design was repeated but with **Pepoi**, **Robusta lionata**, **Ermellinata di Rovigo** and **Ancona** breeds. DNA sequenced by third parties was extracted from the collected samples. We are awaiting for the sequencing results.

FIGURES AND TABLES

Figure 1.1 – Regression curve for the morphological traits of the Valdarnese bianca breed compared to the Mugellese breed (Mannelli et al., 2023)

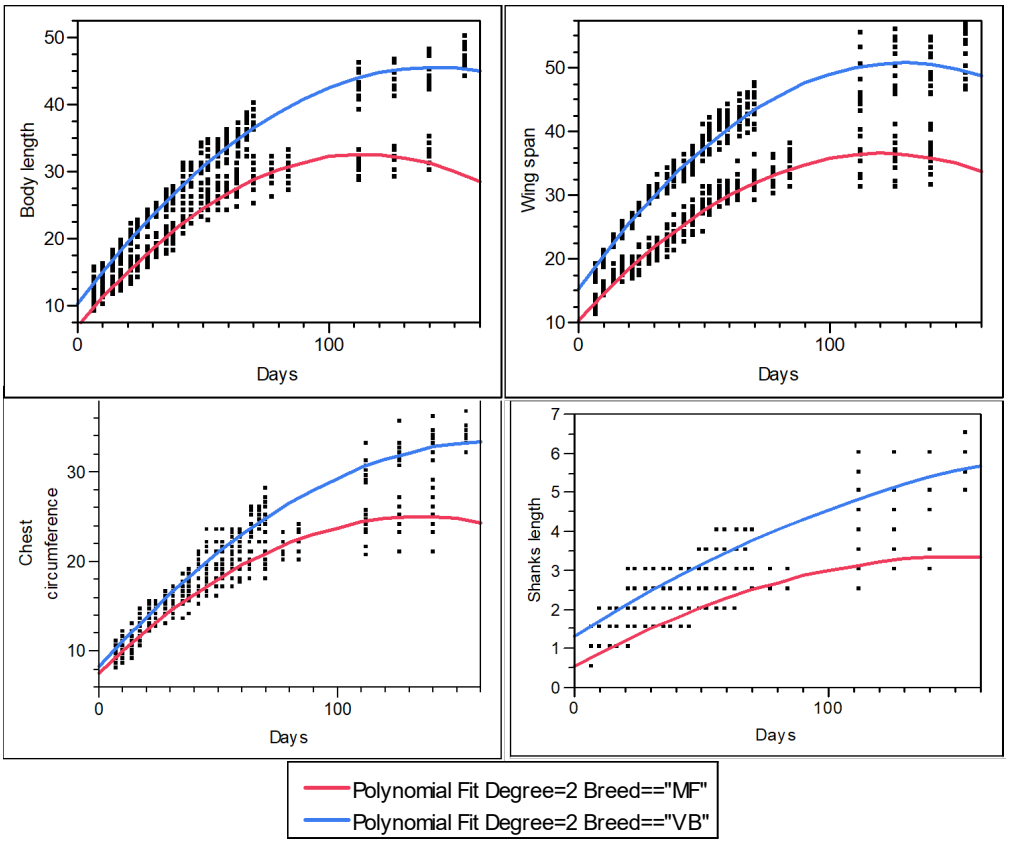

Figure 1.2 – Weight gain of the Valdarnese bianca breed compared to the Mugellese breed (Mannelli et al., 2023)

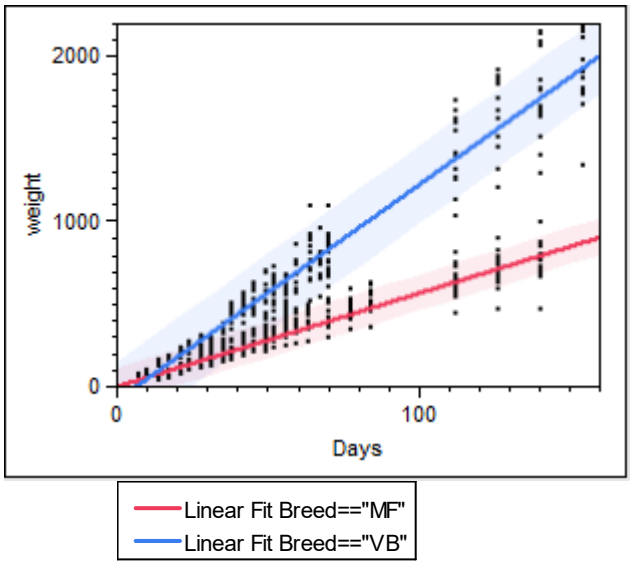

Figure 1.3 - Deposition regression curve for Valdarnese bianca breed at first oviposition cycle compared to other oviposition cycles (VV)

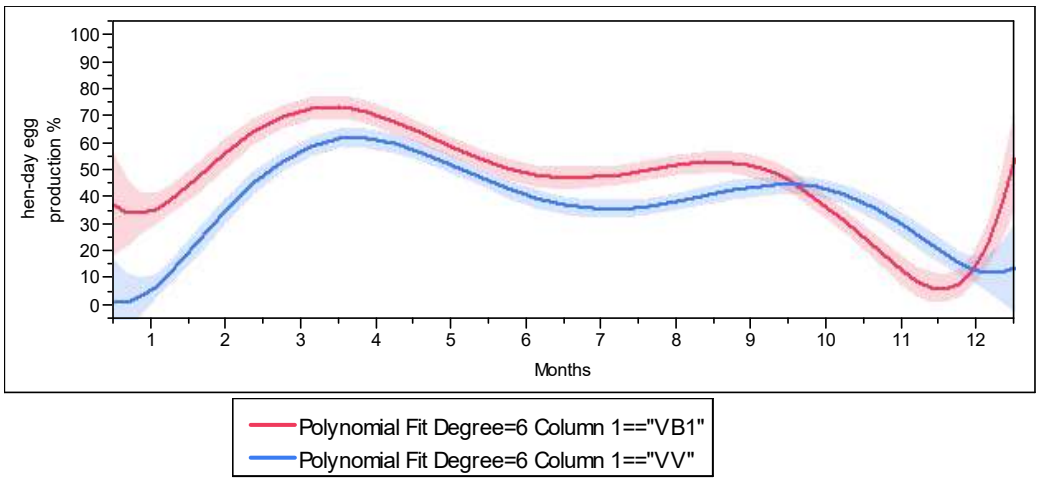

Figure 7.1 - β-diversity of Valdarnese bianca and Mugellese

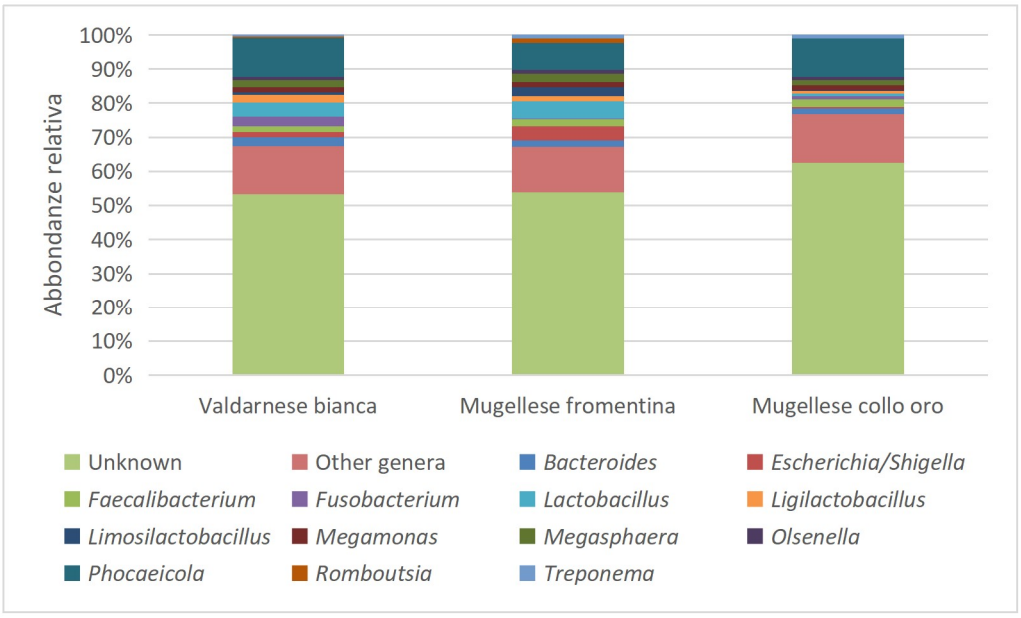

Figure 7.2 - NMDS analysis for Bianca di Saluzzo breed in the two environments UniFI and UniPI