Combined Workshop 2025 WPSA Working Group 6 (IFRG) and Working Group 12 (Physiology) – 22-24 October – Humbolt-Universitat, Faculty of Life Sciences - Berlin

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

MINISTERO DELL'AGRICOLTURA DELLA SOVRANITÀ ALIMENTARE E DELLE FORESTE

Reproductive traits in traditional Italian light turkey (*Meleagris gallopavo*) breeds reared for biodiversity conservation: a preliminary study

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Italian turkey breeds – Populations at risk

Turkey breeds recognised in the Italian herd book:

- **Brianzolo**
- Bronzato comune
- Bronzato dei Colli Euganei
- Castano precoce
- Ermellinato di Rovigo
- Romagnolo
- **Nero di Italia**
- Tacchino di Parma e Piacenza

All breeds classified at risk (FAO categories)

	All Breeders	
Variable	**n**	**%**
Italian turkey breed	(n = 1010)	
Brianzolo	15 D	1.49
Bronzato Comune	445 A	44.06
Bronzato dei Colli Euganei	50 B	4.95
Castano Precoce	-	-
Ermellinato di Rovigo	425 A	42.08
Nero d'Italia	35 BC	3.47
Parma e Piacenza	9 D	0.89
Romagnolo	31 C	3.07

From Castillo et al., 2021

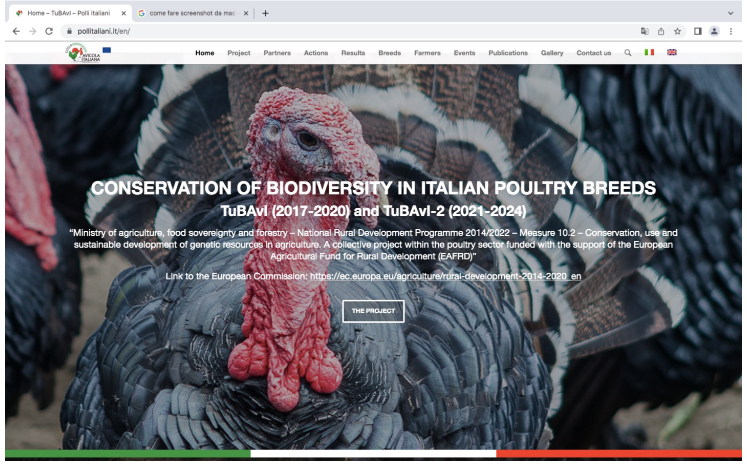
Conservation of biodiversity in Italian poultry breeds – TuBAvI project

General aim

To support the conservation and valorisation of Italian poultry genetic resources providing knowledge and new tools to promote *in situ* and *ex-situ in vitro* techniques for the conservation of biodiversity.

Aim of the study on Brianzolo and Nero di Italia turkeys

- Data collection for phenotipic characterization to overcome a complete lack of information.
- Breeding management and mating plans to safeguard biodiversity and control inbreeding in nucleus populations.



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Conservation of biodiversity in Italian poultry breeds – TuBAvI project

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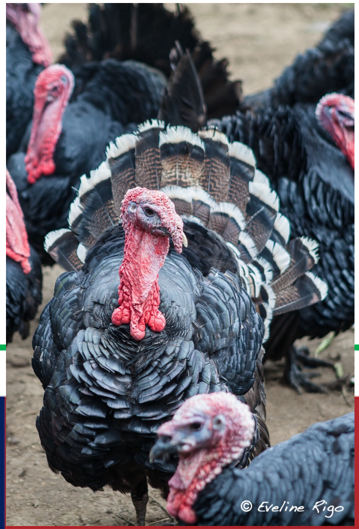
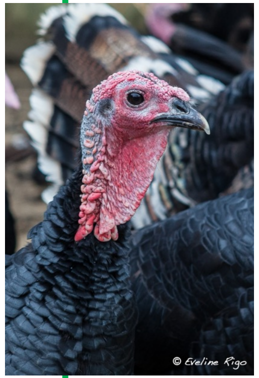
Brianzolo

- Origin: Lombardia region
- Diffusion: rural and fancy farms
- High attitude for grazing and broodiness; high resistance to common turkey diseases
- Plumage colour: white penciled bronze
- Shank colour: pinkish
- Body weight: male 6 kg, female 3-4 kg



Nero di Italia



- Origin: Lombardia region
- Diffusion: rural and fancy farms
- High attitude for grazing and broodiness
- Plumage colour: black
- Shank colour: dark red to purple in adults
- Body weight: male 4-6 kg, female 3 kg

Materials and Methods

Birds were housed indoor at the Poultry Unit of the Veterinary Campus in Lodi

Brianzolo

- ✓ 2022 introduced 10 young turkeys and 3M+3F selected for reproduction
- ✓ 2023 first reproductive period, progeny hatched for breeders selection
- ✓ 2024 11 turkeys organized in 3 family groups (1M-2/3 F) in reproduction

Nero di Italia

- ✓ 2023 introduced 10 young turkeys (3M, 7F), all reared for reproduction
- ✓ 2024 first reproductive period, females organized in 3 family groups mated to different males

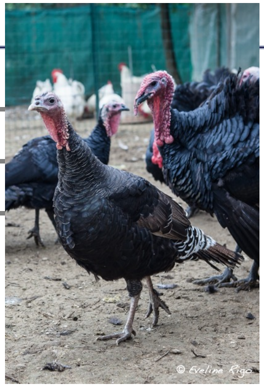
Materials and Methods

- Environmental control was provided (T=18-20°C; 16L:8D; RU=60%)
- Commercial turkey breeder diet and fresh water were fed ad libitum
- Phenotipic quantitative traits (FAO, 2012) recorded in all breeders
- Eggs were collected daily from sexual maturity, labelled per FG and breed
- Eggs were individually weighted, disinfected with 0,2% Steramina G solution and stored until artificial incubation
- Two egg settings were performed in April
- Incubation parameters were recorded per breed and FG within breed: fertility (%), embryo mortality (% on egg set), hatching rate (% on egg set)
- Analysis of variance was performed on egg production data to assess significant differences between breed and FG within breed

Results – Phenotipic traits

Brianzolo

Trait	Males		Females	
	Mean	SD	Mean	SD
Body weight (g)	4907	0.66	2671	260
Body length (cm)	68.37	8.02	53.43	2.45
Shank length (cm)	11.3	1.33	9.06	1.15
Shank diameter (cm)	1.79	0.07	1.47	0.18
Chest circumference (cm)	50.21	3.39	41.04	5.07
Wing span (cm)	66.26	7.35	54.18	5.43



Body weight and size clearly different between breeds and sex

Nero di Italia

Trait	Males		Females	
	Mean	SD	Mean	SD
Body weight (g)	7990	0.78	4195	0.37
Body length (cm)	76.00	5.00	61.00	4.24
Shank length (cm)	11.3	1.33	11.20	1.49
Shank diameter (cm)	2.09	0.06	1.81	0.18
Chest circumference (cm)	69.66	16.32	47.50	4.23
Wing span (cm)	72.66	6.65	59.07	5.63

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Results – Egg production recorded from sexual maturity

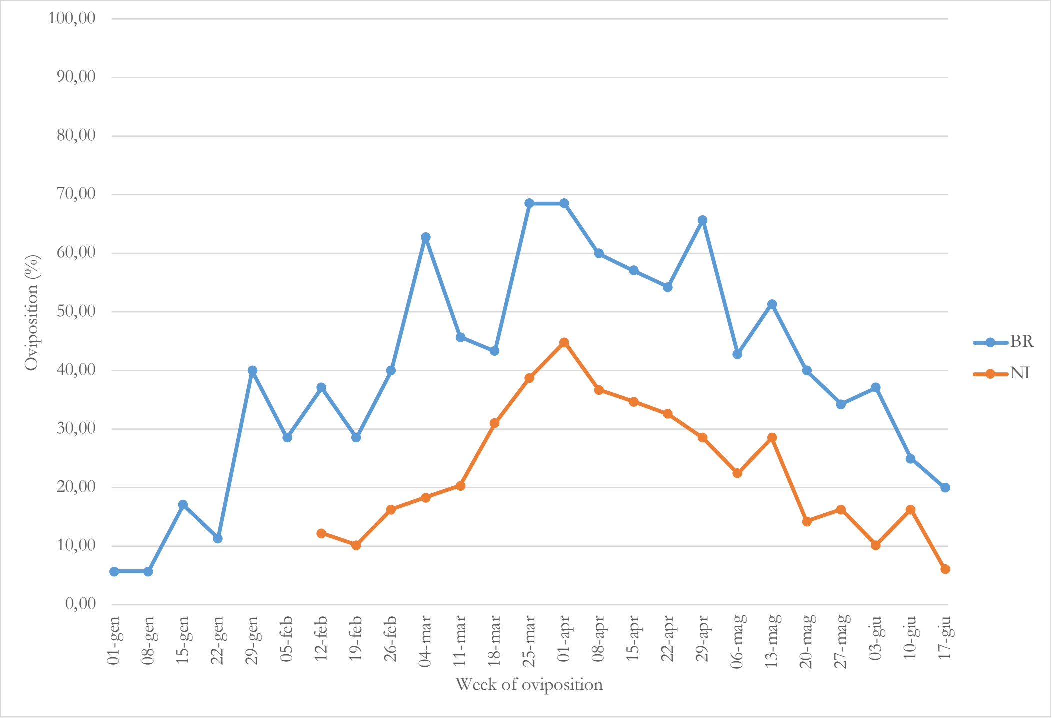
Brianzolo

- First egg on 30 weeks of age
- Weeks of oviposition: 25
- Total egg/female: 71 eggs
- Oviposition rate: 40 %
- Peak of production: 69%

Nero di Italia

- First egg on 34 weeks of age
- Weeks of oviposition: 19
- Total egg/female: 31 eggs
- Oviposition rate: 23 %
- Peak of production: 45%

Oviposition rate in Brianzolo and Nero di Italia female turkeys



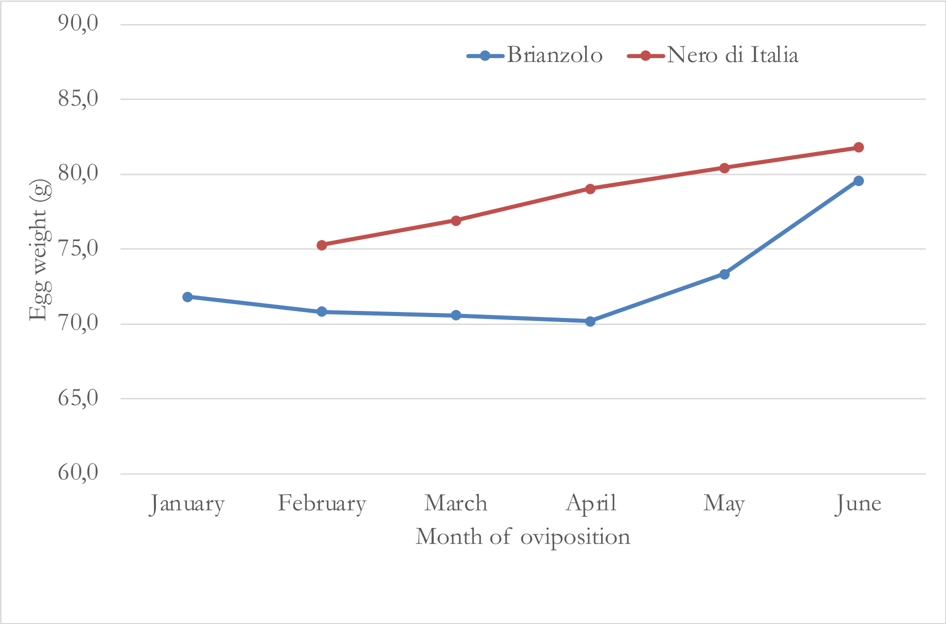
- Significant sources of variation → Breeds ($P < 0.001$)
  → Families within breed in Nero di Italia ($P < 0.001$) → F2=31%, F3=26% > F1=20%

Results – Egg weight

Brianzolo
- Mean egg weight: 72.5 g
- Range egg weight: 58-93

Nero di Italia
- Mean egg weight: 78.2 g
- Range egg weight: 69-92

Mean egg weight recorded during the oviposition period



Results – Fertility and hatchability

Parameters	Brianzolo		Nero di Italia	
	mean	range	mean	range
Fertility (%)	85.5	77-100	76.2	35-95
Dead embryos (%)	23.1	29-52	39.3	18-55
Hatchability (%)	56.4	48-70	36.9	18-58

Large variability between FG within breed

Nero di Italia > Brianzolo

Reproduction in 2025 - Fertility and hatchability

Parameters	Brianzolo	Nero di Italia
Fertility (%)	96.6	75.4
Dead embryos (%)	36.7	24.6
Hatchability (%)	62.2	50.8

Still present large variability between FG within breed

Introduced genetic characterization with microsatellite molecular markers in young turkeys to select breeders and identify mating plans:

a) individual genetic diversity index (H-indiv);
b) conservation index (including both H-indiv and kinship index)

Conclusions

- Phenotipic data recorded to characterize Brianzolo and Nero di Italia turkey breeds
- Brianzolo turkeys showed higher reproductive ability compared to Nero di Italia turkeys
- Large variability was found between family groups in both breeds
- Results are relevant to improve breeding management in future populations
- Molecular genetic indexes will improve breeder selection and mating management to preserve biodiversity and control inbreeding

DIVAS working group

- Luisa Zaniboni, prof
- Stefano Paolo Marelli, prof
- Nicolaia Iaffaldano, prof
- Vera Perricone, researcher
- Silvia Belcredito, post-doc position
- Cristina Tognoli, post-graduated position
- Niko Gioacchino Zeni, PhD
- Nicoletta Cesari, technician
- Paola Bosoni, administrative

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Thank you for your attention