

**TuBAvi (2017-20)**  
**TuBAvi-2 (2021-24)**

Collective projects within the poultry sector funded with the support of the **European Agricultural Fund for Rural Development (EAFRD)**

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**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



**Project coordinator**  
Prof. Silvia Cerolini  
Department of Veterinary Medicine and Animal Sciences  
University of Milan  
Email [silvia.cerolini@unimi.it](mailto:silvia.cerolini@unimi.it)  
[www.pollitaliani.it](http://www.pollitaliani.it)

**CONSERVATION OF BIODIVERSITY IN ITALIAN POULTRY BREEDS:**  
deepening and monitoring  
**TuBAvi-2**



**Breed data sheet**

**MUGELLESE**  
*Gallus gallus domesticus Sp.*

**Origin and morphological,  
genetic, reproductive,  
and productive traits**



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



**MINISTERO DELL'AGRICOLTURA  
DELLA SOVRANITÀ ALIMENTARE  
E DELLE FORESTE**





The presented data were registered in the nucleus populations of Wheaten gold and Golden wild-type Mugellese conserved at the University of Florence (UniFI).  
The data are presented by breed and, for some traits, by colour.

Latest update: November 15<sup>th</sup>, 2024



## Mugellese

*Gallus gallus domesticus Sp.*

**Breed data sheet: origin and morphological, genetic, reproductive, and productive traits**

### Breed origin and development

Name of the breed	Mugellese
Synonyms or local names	Mugellina
Geographic origin	Mugello, mountain area in the province of Firenze
Geographic distribution	Tuscany, northern Lazio
Estimated total population size	277 (2021, Castillo et al.)
Extinction risk status (FAO, 1998)	Threatened conserved
Any other specific information	Mesomorphic, dwarf-sized breed

<p><b>Historical origin</b></p> <p>The first references to dwarf-sized chickens date back to the Latin writer Columella who reports that they were known by the Romans even before Julius Caesar, however, they were little appreciated because they produced less meat due to their size. Subsequently, in texts from the 15th and 16th centuries, belonging to the Medici family, reference is made to a "little Javan hen" imported precisely from the island of Java for its beauty. The roosters were exposed to decorate the aviaries of parks and lemon groves while the females were used for brooding the eggs of other poultry such as pheasants and peacocks thanks to their outstanding maternal qualities. Given the characteristics described in the Medici annals and considering that the Medici family was originally from Mugello, one can easily think that these subjects gave rise to the Mugellese breed. Then, testimonies dating back to 1872 mentioned that the prince of Demidoff, Paul II, by purchasing the Medici-Lorraine villa of Pratolino in Mugello, had come into possession with the large aviaries also of the subjects bred there, including the famous "small Javan hens". From this nucleus, the small hens then spread throughout the Mugello area, populating the sharecropping peasant farmyards and contributing to their economy as natural "incubators" for the eggs of various poultry. As reported by the oral traditions of the Mugello inhabitants, the "little Javan hen", which has now become an actual Mugello breed (Mugellese means "from Mugello"), was part of all peasant farmyards, appreciated for its aptitude for brooding and taking care of the chicks and good production of eggs (even if small). However, in more modern times, as it is no longer considered a livestock breed, also supplanted by mechanical incubators for domestic use, it has seriously risked extinction.</p>
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## Qualitative and quantitative morphological traits in adult breeders

### Discrete or qualitative traits

Feather morphology	Normal
Feather distribution	Normal
Plumage structure	Abundant and close fitting to the body, quite soft
Plumage colours	Most common colours: Golden wild type ( <i>Selvatico oro</i> ), Wheaten gold ( <i>Dorata frumento</i> )
Colour features	Bicolour, with sexual dimorphism, with eye-catching colours in males and mimetic females (especially in the Golden wild type, which reminds of the plumage of the wild <i>Gallus gallus bankiva</i> to a greater extent). No eclipse plumage is evident.
Chick plumage colour	<b>Golden wild type:</b> ancestral type with brown mimetic streaks going from head to tail similar to those present in chicks of the wild type <i>Gallus gallus bankiva</i> . <b>Wheaten gold:</b> uniform and very light straw yellow, tending towards white. In males, over time and with the appearance of the adult plumage, the color becomes quite similar to the wild type plumage.
Comb type	<b>Simple comb</b> , upright, firmly set, not too fine in texture, following the line of the neck without touching it. In the female, not too deep serrations, sometimes falling to one side of the head.
Comb points	Four to six points
Ear-lobe colour	Red, sometimes with a slight presence of white; fine texture, without folds
Beak colour	Horn
Iris colour	Orange to red
Muffs	Absent
Beard	Absent
Tuft	Absent
Skin colour	Flesh-coloured
Shank colour	Flesh-coloured
Shank feathering	Free from feathers
Skeletal variants	-
Other specific and distinct visible traits	Dwarf-sized chicken with homeosomic traits, well set and solid, so much that it appears slightly squat. Proud attitude.

## Mugellese male and female

### Wheaten gold



Experimental Animal Farm, UniFI



Experimental Animal Farm, UniFI

### Golden wild type



Experimental Animal Farm, UniFI

### Body weight and growth data

Wheaten gold				
Age (weeks)	Male weight (g)		Female weight (g)	
	Average	SD*	Average	SD*
0 (hatching)	24.28	1.67	23.48	4.54
8	321.00	33.20	256.67	19.18
12	603.75	35.91	484.09	43.52
18	826.25	57.21	675.45	50.32
26	931.25	81.05	805.35	53.33
30	1105.00	50.35	910.25	51.75

\*SD: standard deviation

### Mortality

Age (weeks)	Male		Female	
	Average (%)	Min-max	Average (%)	Min-max
0-1	1	0-2	1	0-2
1-8	0	-	0	-
8-20	0	-	0	-
20-30	0	-	0	-

### Rearing traits

Breed type	Rustic breed with a lively temperament, suitable for country farming and frugal diets.
Growth speed (precocious vs tardive)	Tardive
Feathering speed (precocious vs tardive)	Medium
Broodiness	Excellent (also for eggs of other breeds or species)
Parental care attitude	Excellent (parental care sometimes present also in the male)
Ease of breeding	Yes
Male:female ratio for breeding	1:10
Tolerance or resistance to diseases and parasites	Good
Tolerance to extremes of temperature	Good
Reported uses (meat, eggs)	Primary: eggs Secondary: meat Further use: brooding

Colour pattern
<p><b>Golden wild type (<i>Selvatico oro</i>):</b> in the <b>male</b>, intense golden yellow head, golden yellow cape slightly lighter in the terminal part, with black flames with green sheen; back, shoulders and wing coverts bright dark red; golden yellow lanceolate feathers on the rump with black flames and green sheen; large wing coverts black, with metallic blue-green sheen; primary flight feathers black with narrow brown outer border; secondary flight feathers with black inner web and tip, brown outer web forming the wing bay; chest black with green sheen without traces of brown; black belly and legs; black tail with strong green sheen; grayish down. In the <b>female</b>, golden yellow head; golden yellow cape with black flames with green sheen; remainder of plumage brown with fine regularly distributed black peppering, shaft slightly paler permitted; primary flight feathers black with narrow peppery brown outer edge, secondary feathers black inner web and peppery brown outer web, the two large upper coverts drawn like the rest of the plumage; salmon chest, grey/brown belly and legs; black tail with green sheen and large sickles, sometimes with brown edging.</p> <p><b>Wheaten gold (<i>Dorata frumento</i>):</b> in the <b>male</b>, golden orange head; golden orange cape which becomes lighter in the terminal part (absent flames), back and shoulders and coverts of the wings bright brown; lanceolate feathers golden orange in the rump, absence of flames, large black coverts with green sheen, primary flight feathers, chest, belly and legs black; secondary flight feathers with black inner web and brown outer web to form a brown wing bay; black tail with green sheen and large sickles, with brown edging permitted. Gray down. In the <b>female</b>, light golden head, golden brown cape, small opaque black flames permitted; plumage generally wheaten including primaries, secondaries with black inner web and outer wheaten web; light wheaten chest, belly and legs, tail with dull black rectrices and buff sheen, wheaten tail coverts.</p>

### Quantitative traits

Parameters	Wheaten gold			
	Male		Female	
	Average	Min-max	Average	Min-max
Body weight (g)	1095	990-1200	704	550-800
Body length (cm)	30.00	29.00-32.00	25.86	22.00-29.50
Chest circumference (cm)	27.13	25.50-29.00	24.82	23.00-27.00
Shank length (cm)	5.38	4.50-6.50	4.71	4.00-5.00
Shank diameter (cm)	N.a.*	N.a.*	N.a.*	N.a.*
Wing span (cm)	62.25	58.00-67.00	56.39	51.00-59.00

\*\*N.a.: Not available information

## Genetic traits

### Characterisation of the breed with Single Nucleotide Polymorphisms (SNPs)

Molecular marker	Affymetrix Axiom 600K Chicken Genotyping Array
Laboratory that performed the analyses	Department of Agronomy, Food, Natural Resources, Animals and Environment (DAFNAE) University of Padua
Analysed parameters	MAF: minor allelic frequency Ho: observed heterozygosity He: expected heterozygosity F <sub>HOM</sub> : inbreeding coefficient

Year		N**	MAF	Ho	He	F <sub>HOM</sub>
2019	Mean	24	0.284	0.281	0.300	0.236
	SD*		0.231	0.182	0.175	0.115

\*SD: standard deviation; \*\*N: number of samples

### Characterisation of nucleus populations with microsatellites and mating plans

Molecular marker	Microsatellites (26 markers)
Laboratory that performed the analyses	Laboratory of Animal Molecular Genetics Department of Veterinary Science (DSV) University of Turin
Analysed parameters	Ne: effective number of alleles Na: observed number of alleles I: Shannon diversity index H-Ind: individual variability index Ho: observed heterozygosity (average H-Ind) He: expected heterozygosity F: fixation index P: average kinship index
Indexes used to schedule mating plans	H-Ind P

Year		N**	Na	Ne	I	Ho	He	F	P
2020	Mean	22	4.00	2.43	0.97	0.47	0.52	0.09	0.56
	SE*		0.47	0.27	0.12	0.05	0.05	0.06	0.01
2022	Mean	49	4.31	2.43	0.95	0.47	0.50	0.05	0.56
	SE*		0.44	0.21	0.10	0.05	0.05	0.03	0.01

\*SE: standard error; \*\*N: number of samples

## Reproductive and productive quantitative traits

### Oviposition, brooding and incubation data

Age at sexual maturity of hens (weeks)	26
Length of first oviposition cycle (weeks)	N.a.**
Annual egg production per hen (min-max)*	110-120
Average clutch size (min-max)	8-12
Clutch interval (days)	50
Incubation length (days)	20-21

\*As measured during the first year of age, min-max of family line

\*\*N.a.: Not available information

### Egg-quality traits

Wheaten gold				
Parameters	First oviposition cycle*		Second oviposition cycle**	
	Average	Min-max	Average	Min-max
Egg weight (g)	31.79	22.50-42.00	31.28	23.60-42.50
Shell colour	Cream white			
Golden wild type				
Parameters	First oviposition cycle°		Second oviposition cycle°°	
	Average	Min-max	Average	Min-max
Egg weight (g)	32.20	28.40-36.40	37.40	32.47-40.36
Shell colour	Dark cream white			

\*Total n. of measured eggs: 340; \*\*Total n. of measured eggs: 364

°Total n. of measured eggs: 235; °°Total n. of measured eggs: 255

Parameters (sample measurement)	Wheaten gold		Golden wild type	
	Average	Min-max	Average	Min-max
Egg weight (g)	36.60	26.60-35.30	37.20	33.54-43.34
Shell weight (g)	7.82	5.29-11.70	6.26	4.29-7.70
Albumen weight (g)	20.49	16.31-25.72	19.95	16.79-22.85
Yolk weight (g)	15.69	12.18-22.46	11.00	9.52-13.21
Egg Shape Index*	74.12	65.16-80.30	76.03	65.24-83.15

\* Egg Shape Index (ESI) = short diameter/long diameter x 100

### Reproductive traits

Incubation parameters	First oviposition cycle	
	Average	Min-max*
Fertility (% produced eggs)	94.09	92.00-100
Hatchability (% fertile eggs)	74.44	65.22-85.71
Hatchability (% produced eggs)	70.04	60.94-81.35

\*Per family line