

CHAPTER 5 :AVIAN ETHNOLOGY

Female = Hen; Male= Rooster (*Gallus gallus domesticus* ; 2n=78 chromosomes)

1. ORIGIN, DOMESTICATION AND EVOLUTION

1.1. ORIGIN AND DOMESTICATION

More than a **million years** ago, the genus *Gallus* probably formed a single population that occupied the Eurasian continent, but glaciation periods divided this genus into three groups: the Mediterranean or Middle Eastern group, the Indian group, and the Asian and Eastern group. **4 Four species** are currently recognized. 1- *Gallus varius*: characterized by its greenish plumage. It is found along the coast of Java. 2- *Gallus sonneratii*: it has silvery gray plumage on part of its body and hackle feathers. It is widespread in the forts of the southwestern Indian continent. 3- *Gallus lafayettii*: it has light orange-brown plumage on the chest with a violet spot at the top of the neck and a yellow spot on the comb. It is found in the wooded area of Ceylon. 4- *G. gallus* or *G. bankiva* (red junglefowl): it is the most widespread species today, divided into 5 subspecies: - *G. g. gallus*: has white earlobes, it is widespread in Thailand. - *G.g. spadiceus*: widespread in Myanmar and China. It has red earlobes. - *G.g. jabouillei*: widespread in southern China and Vietnam. It has white earlobes and feathers more red than golden. - *G.g. murghi*: it is widespread in India and has white earlobes. - *G.g. bankiva*: widespread on the island of Java. It has red earlobes and red to golden feathers. Most authors, including Darwin, believe that *Gallus gallus* is the ancestor of the domestic chicken named *Gallus gallus domesticus*.

1.2. DOMESTICATION

Archaeological excavations reveal that there were domesticated chickens in China 8,000 years ago and that they later spread to Western Europe, probably

passing through Russia. In India, domestication took place independently or domesticated birds came from Southeast Asia.



Figure1 : Hen species : *G. Varius* & *G. Sonneratii* (Fabrice Stoger ,2017)



Figure 2 : Species *G. Lafayettii* (Garvie and Junglefowl, 2009) & *G. Gallus* (Subramanya, 2012)

2. CLASSIFICATION

The domestic chicken (*Gallus gallus domesticus*) is a bird that belongs to the order of 'galliformes'. Because of the specific characteristics of females or males, the species is often defined by the name rooster or hen, but in most cases, the name hen refers to both sexes. The table represents this classification.

Table 01- Classification of Gallus gallus domesticus (COI)

Kingdom	Animalia
Phylum	Chordata
Sub-Phylum	Vertebra
Class	Birds (Aves)
Order	Galliformes (5 families, 86 genera, 308 species)
Family	Phasianids (partridges, pheasants, chickens, quails, peacocks, turkeys, grouse, ptarmigans, hazel grouse, etc... 180 species)
genus	Gallus
Species	<i>domesticus</i>
<u>Biological Parameters</u>	
RT= Chicken: 40,5 ⁰ C- 42 ⁰ c - pigeon : 42 ⁰ C-43 ⁰ c HR= Hen : 180-440 Beats/Mn- pigeon : 140-400 Beats/Mn RF=15-30 Mvnt/Min- pigeon : 20-40 Mvnt/Min Incubation : Chicken : 21days - Geese : 28-33days -Pigeon : 17-19-Turkey : 28days -Guinea fowl : 26-28days -Quails : 21-28days- Duck : 28days- Pheasant : 21-28days	

•Here are the **4 other families** of the Galliformes

1- genus: **Megapodiidae**: megapodes, leipoa, megapodes (about twenty species);

2-**Cracidae**: chachalacas, guans, curassows, hoccas (about fifty species);

3-**Numididae**: guinea fowl (6 species);

4- **Odontophoridae**: quails, bobwhites (about thirty species).

3. EXTERIOR AND PLASTIC VARIATIONS

According to a tradition dating back to the early 20th century, it is convenient to retain the classification system known as the "Baronian coordinates," which distinguishes between "plastic" (roughly, the shape), "phaneroptic" (or "decoration of the shape"), and "energetic" (essentially abilities). Aside from taking variations into account, it is possible to use two other rational

classification systems for chicken breeds: geographical origin (which is not unrelated to the supposed phylogenesis) and abilities, with breeds being classified as laying, meat, or mixed.

3.1. VARIATION OF FORMS

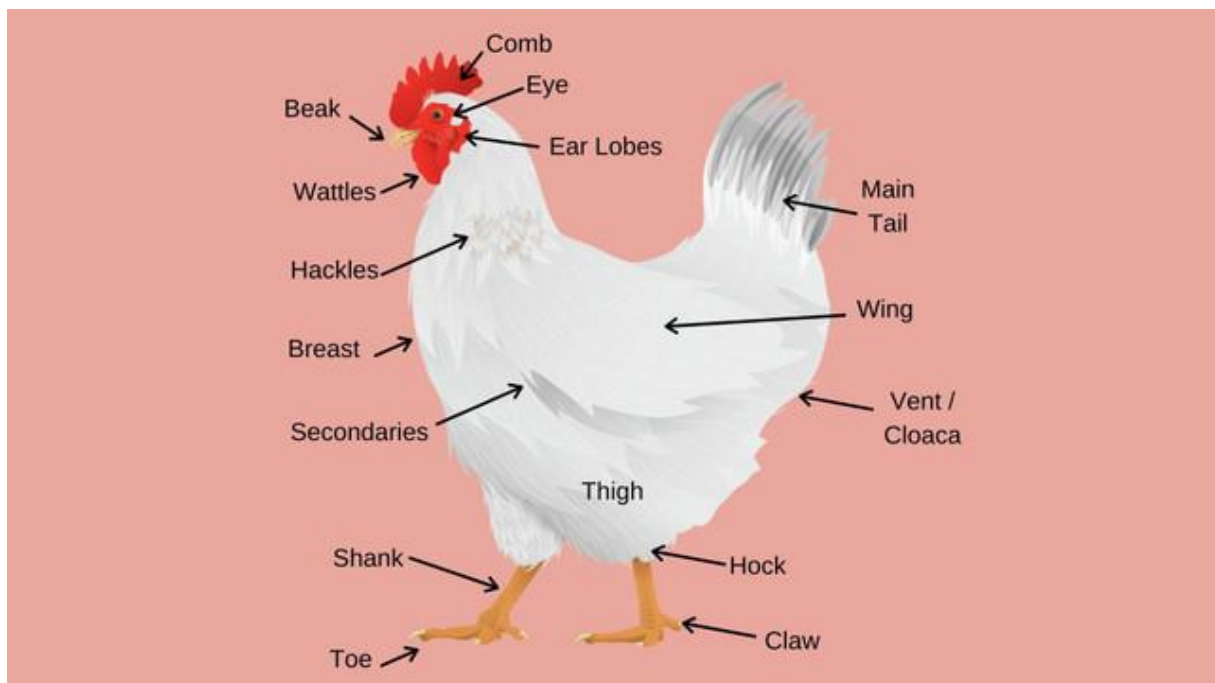


Figure 3 : Morphology (Parts) of the chicken (dineachook.com.au, visited March 24th 2026)

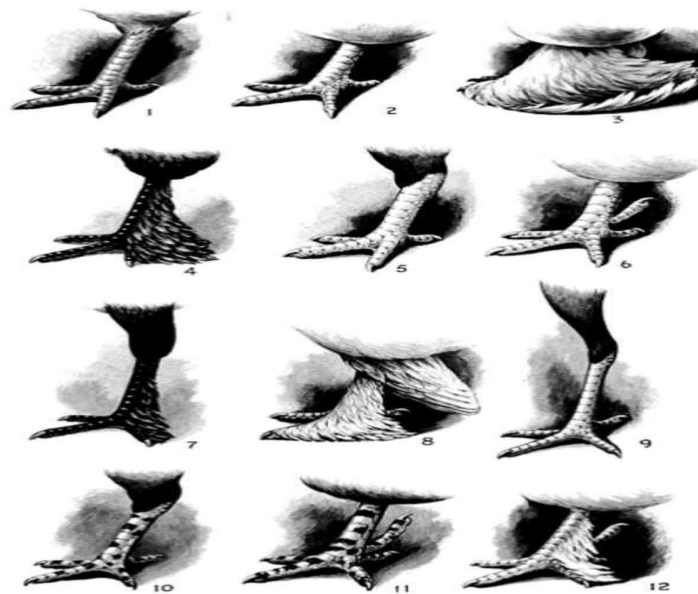
a. Shape

To characterize the shape of an animal, we focus on its proportions (it is long-legged, short-legged, or medium-legged). If the profile (convex, straight, or concave) is very difficult to assess in poultry.

b. Length and color of the tarsi

The thigh, leg, and tarsus, which end in toes each equipped with a strong claw, constitute the hind limbs. The large toes are divided into outer, middle, and inner, and the thumb rises higher than the other toes and moves backward. Consequently, most hens are **tetradactyl**, but some pentadactyl breeds with split

thumbs exist. The spur is attached to the tarsus at the lower back of the bone, just above the toes. The legs can have several appearances in chickens.



A **B** **C** **D**

Figure 4 : Shapes and sizes of chicken tarsi (Robert, 2008 at the top) and tarsus colors: (A) Yellow, (B) Gray, (C) Black, (D) White.

c. The shape of the comb

The characterization of the shape must be completed by taking into account any particularities that may alter the silhouette. This includes the shape of the comb, which is very diverse: Simple, medium, or long, single or double ... etc., of different colors: light pink, light red, dark red ... etc.



A

B

C

D

E

Figure 5: Types of comb observed: (A) Single comb, (B) Double comb, (C) Slightly folded comb, (D) Folded comb, (E) Rose comb. (Ghlib and Tsaki, 2023)

3.2. VARIATION OF THE PHANEROPTIC

This concerns the characteristics of the plumage, much more the texture, extent, and color of the feathers of hens:

• THE TEXTURE

The feathers are: smooth (most often), curly, silky...



Figure 6 : Textur of feathers : smooth on the left , curly on the right (Ghlib and Tsaki, 2023)

•THE EXTENT OF FEATHERING

The **tarsi** are usually **bare** (without feathers) but they can be feathered; the

presence of a **crest** and/or muffs can be noted; there is also a known "naked-neck" mutation. Example: The **Naked-neck breed of Forez**

•FEATHER COLOR

There are very many color patterns, the presentation of which is impossible within the limits of this article. It should be noted that they reduce to **five** basic colors: **white, black, red, yellow (or fawn), blue-gray (or slate blue)**, but with many variations in shades, each having its own name. These colors can appear alone over the entire plumage or combine in various ways, resulting in plumage that is: mottled, speckled, barred, penciled, laced, etc...



Figure 7 : Plymouth Rock hen cuckoo color (Barred) (Personal Photo, 2024)

3.1.4. VARIATION IN SIZE AND LIVE WEIGHT

Which formally results from height, weight, and volume, can be approximated simply by weight in poultry.

- "**Eumetric**" hen The average is between **2-2.5 kg**, for roosters **3-3.5 kg**. Example: **Leghorn hen** (Italian) (photo below)
- Heavy "**hypermometric**" breeds are **2.5-3.5 kg** for hens and **3.5-4 kg** for roosters. Example: the **Mos hen** (Spain - weight 4-4.5 kg for males and 3-3.5 kg for females). **Australorp** (Australia: weight 3.8-4.5 kg for males and 2.9-3.6 kg for females).

. The light "**hypometric**" breeds are below average values. Example: the **Araucana** chicken (Argentina-Chile, weight: 2.2 kg for females, 2.7 kg for males). **Silkie chicken** (Japan: Male 1-1.3 kg - Female 800 g - 1 kg)



Figure8 : Australop male on the left , female on the right (Meyer, 2024 ; cirad)



Figure 9: Silky chicken (Meyer, 2024 ; ciarad)

3.1.5. VARIATION IN THE SHAPE OF SUBJECTS

To characterize the shape of an animal, one looks at its proportions, and three types can be distinguished according to variations in shape:

- **Longilinear** (elongated, narrow, fine animals with relatively long tarsi). The classic longilinear types are found in breeds specialized for laying. The extreme types are spectacular.

Example the Longilinear type of **English Game (fighting)** and **Malay Game (fighting)**.



Figure 10 : Malay game (**fighting**) fowl (Standard :70-80 cm ; SCAB ; BCF 2024).

•**Breviligne subjects** (animals compact, broad (Large), with relatively short tarsi). The classic breviligne types are found in breeds specialized for meat (Arboracr, Ross, Cobb 500, Isa White...ect). **Indian Game (fighting)** is an example of breviligne.

•**Medioligne.** Many hens fall rather into the category of medioligne.

NB: For the profile of hens (convex-line, concave-line, straight-line), it is very difficult to assess compared to variations in body proportions.

3.1.6. Number of toes

Normally four, but there are so-called **pentadactyl** breeds: **Silkie** (photo above); possesses 5 toes, exceptionally with a very rare absence of the rump. Cases of true "bassetism" are also known, meaning shortening of the limbs. 'Bassets' are mainly known in dogs, but they also exist in other species.

3.2. VARIATION IN ENERGY

Energetics concerns the zootechnical production qualities. Let's just point out that the best meat breeds (for flesh), laying breeds (and, above all, their "hybrids" from industrial crossbreeding) produce about 300 eggs per year. Local

breeds fall within a range of 50 to 150, but some farm breeds significantly exceed these values. There are also ornamental breeds as well as so-called fighting breeds.

a. Use of the breed

There are variations depending on the use of the hens:

- **Laying (Eggs)breeds**

Such as: Leghorn, Rhode Island, Wyandotte, Ancona, Andalusian, Ardennes, Fayoumi, Coucou de Rennes, G line de Touraine, La Fevrolle...

- **Meat breeds**

Such as: Isa White, Broiler, Arbor Acres, Hubbard, Ross, Cobb 500...

- **Mixe Dual-purpose breeds**

Such as New Hampshire, Light Sussex, and the Naked Neck breed

- **Ornamental breeds**

The Padoue is a breed of European domestic ornamental chicken, famous for its large crest, as well as the Dutch crested chicken, which is a breed of domestic chicken originating from the Netherlands, characterized by its crest.

- **So-called fighting breeds**

These are breeds of domestic chickens whose roosters are used in fighting shows across several countries around the world. Cockfighting is a type of animal fight that involves making two domestic roosters prepared for fights confront each other in a circular area designated for this purpose. This ancient practice is controversial due to the suffering and sometimes deaths it causes, so much so that it is banned.

Examples: Bruges Fighter, English Fighter, Indian Fighter, Madagascar Fighter (Large), Li ge Fighter and its sub-breed Tirlemont Fighter (Large and Small size), Platinat Fighter (Germany, Large), Malay Fighter (Large: 70-80cm), Fighter Spanish (Large size), Fighting cocks from the Sunda Islands (Indonesia, Large size), Northern Fighter (Large and small: France), Madras Fighter (India, Large).

b. Number and weight of eggs.

We will mention the breeds of laying hens according to the number of eggs per year: the Marans hen, 150 to 200 eggs/year (75-80 grams), the Red hen, 250 to 300 eggs/year (70 grams), the Bourbonnaise hen, 200 eggs/year (65 grams), the Gâtinaise hen, more than 200 eggs/year (70 grams), the Naked-neck hen from Forez, 180 eggs/year (65-70 grams), Touraine Geline, 170 eggs/year (65-70 grams), the Gournay hen, 170 eggs a year (60 grams), the meat Sussex hen, over 260 eggs/year (55-60 grams), the Harco hen, 280 to 300 eggs/year (45-65 grams), the Vorwerk hen, 170 to 180 eggs/year (55 grams), Brahma, 120 eggs/year of 55 grams, Australorp 300 eggs/year, the Isa Brown hen, 270 eggs of 60 grams free-range and 330 in cages, Rhode Island 25-300 eggs/year (60 grams), Meat Hubbard, 200 eggs of 60-70 grams per year.

c. Growth rate and conformation

These are parameters that characterize the level of feed consumption, its digestibility, feed conversion ratio, and what is called the Average Daily Gain (ADG) of each subject. The growth rate is very variable: on average, the heavier breeds grow the fastest, but in the industrial sector, selection based on this criterion has dramatically changed performance (Hubbard strain, Isa White Broiler, Cobb 500, Ross, etc.).

d. Global (World) distribution

In 2020, according to (FAO-2024), the global chicken population was over **33 billion birds**. About **46%** of these chickens were **in Asia**. Due to their high feed conversion rate, broiler chickens - raised specifically for their meat - are the birds mainly produced by modern integrated facilities. The rural poultry flock is mainly composed of chickens in Africa and ducks in Asia. and of turkeys in Latin America. Family flocks range from **3 to 100 heads** in Africa, **10 to 30 heads** in South America, and **50 to 2000 heads** in Asia.

5.5. BREEDS AND STRAINS IN THE WORLD

More than **1,600** different breeds of chickens are recognized worldwide. They are the result of several centuries of natural selection, improvements, and crossbreeding within the flocks.

5.5.1. STRAINS OF LAYING HEN (EGGS)

A hen that searches for its food alone lays only 30 to 50 eggs per year, or up to 90 under improved feeding and breeding conditions; a commercial breeding hen in optimal conditions lays 280 eggs per year.

a. Leghorn breed chicken

- **Origin**

The Italian name of the Leghorn chicken breed is "livorno," but it is also called the Italian chicken. It is associated with the Tuscan port from which the birds of this breed were shipped to North America. This event occurred in 1828, and in 1870, specimens of Leghorn chickens were brought back to Europe, more precisely to England. From there, they later returned to Italy. However, these already corresponded to the new breed that had emerged.

- **Characteristics**

Slim and with harmonious proportions. The weight of the rooster is **2.4 to 2.7 kg**, while that of the hen is about **2 to 2.3 kg**. The trunk is relatively long with broad shoulders, but it narrows toward the tail. It grows quickly. Head medium-sized and somewhat elongated, the **comb** is **single**, although it is very well developed and more upright in the rooster. The **comb** is **red** in this breed. The beak is yellow and slightly curved, although in some varieties, it may have a black coloration at the tip. Their eyes are large, with red or orange irises. The wattle is well-formed and, in the case of the hen, slightly folded. The earlobes

are red with an oval shape. The face is also red, smooth, and clear. The neck is of medium size, with a vertical position and a layer of feathers that extends to the shoulders. While in the rooster the back is slightly inclined, in the hen it remains practically horizontal. The chest is prominent. In females, the abdominal region is more developed and protrudes more towards the back. The tail is harmonious with upright plumage. The wings are broad, long, and strong, attached to the body. The legs are of medium size, yellow, without feathers, and have **four toes**.



Figure 11: Leghorn breed (Meyer, 2024, Cirad)

b. Rhode-Island breed

- **Origin**

Originally from the **United States**, more precisely from Rhode Island. It was born in this American state in 1860 and is the result of **crossings** between **red Malay black-breasted fighters, Java hens, and Italian Leghorn and Buckeye chickens**. Since the 1940s, it has been an excellent laying hen.

- **Characteristics**

The **comb** is **single** or **frilled**, its eyes are red-orange in color, and its earlobes are red. It has yellow skin, which is also found on its shanks, and its plumage generally displays mahogany and white colors. A rooster will **weigh 4 kg**, a hen

3 kg. The Rhode Island hen is known to lay **250 to 300 eggs per year**, each weighing at least **60 grams**, and in brown to dark brown color.



Figure12: Rhode-Island breed (on the left Female: Decrouy, 2024; on the right Male: Meyer 2024).

c. Wyandotte breed

- **Origin**

She is originally from the **United States**, and she was named after the Huron-Wendat Native American tribe. It is thought that she may be the result of a cross between a **Hamburg chicken** and the **Brahma chicken**. She was recognized in her country of origin in 1883, and her export began in 1890.

- **Characteristics**

This breed has a **frilled**, fine, and pearled comb, with earlobes of a bright red that seem to extend from her reddish-orange/honey brown or honey-colored eyes. It is a chicken with yellow skin, which corresponds to the color of her tarsi, also yellow. The variety of her plumage shows the manifestation of her beauty; the plumage can take any of the following tones according to: "white, blue, fawn, black, red, barred, golden cuckoo salmon, black mottled with white, white laced with black, white laced with blue, fawn laced with black, fawn laced with blue, silver laced with black, gold laced with black, gold laced with blue, gold laced with white."golden partridge, light golden partridge with markings, golden blue partridge with markings, silver partridge, golden partridge with markings, silver partridge with markings, blue silver partridge with markings, red porcelain. It is

described by experts as being a very good laying hen; unfortunately, the number of eggs it lays is not available, but it does lay **55-gram eggs** with shells characterized by a beautiful reddish-brown color.



Figure 13 : Wyandotte breed (Decrouy, 2024)

5.5.2. STRAIBS OF BROILER CHICKEN

a. Hubbard strain

- **Origin**

The Hubbard strain is a European strain selected by the company "**Hubbard**," which in 2018 became a company of the **Aviagen Group**, a company of the German group "Erich Wesjohann Group" (EWG).

- **Characteristics**

The breed was raised for meat production. Hubbard chickens are characterized by a broad back; dense skeleton; small head; yellow skin color; small straight comb; elongated keel; close-set legs; red and pink earlobes; white feathers; low landing; small wings. Up to **2 months**, males **weigh 3 kg**, while females weigh 300 grams less, **ADG: 54.3 g/day** and Feed Conversion Ratio (**FCR**) = **Consumption index CI: 2.4**. However, most often, they are only fed up to 5 kilograms. Adult birds can reach 8 to 10 kilograms. However, they lay up to **200 eggs per year**. Their weight is **60 to 70 Grams**



Figure14: Hubbard starin (Hubbardbreeder.com)

b. Ross starin

- **Origin**

The Ross is a European broiler chicken variety created by the company "Aviagen."

- **Characteristics**

The Ross is characterized by very rapid growth. It is indeed selected to reach its slaughter weight in **41 days**. At 32 days, it weighs on average **1.8 kg** and at **42 days**, it reaches an average body weight of **2.2 kg**. The weight of the eviscerated carcass is then on average 1697 g, with 46.7% muscle, 11% skin and fat, and the bones representing the remaining **42.5%**. Average Daily Gain (**ADG**): **57.9 g/day** Feed Conversion Ratio (**FCR**): **1.99**. Feed intake **115 g/day per bird**.



Figure 15 : Ross strain (Group Aviagen)

c. Cobb 500 starin

- **Origin**

The Cobb 500 is a European broiler chicken variety created by the company "Aviagen".

- **Charactéristiques**

It is an excellent broiler chicken selected by the European group "Aviagen" to achieve the following objectives and performances: day 42; male **3,044 g** and female **2,671 g**. Zaminur Rahman et al., (2018) report the following performances: at the age of **5 weeks** Average weight: **1.78 g/subject**, **ADG: 51.42 g/day/subject**; **CI: 1.25**.



Figure 16 : Cobb 500 strain (Company Aviagen on the left , Groupe Algerian breeders on the right)

d. Sussex breed

- **Origin**

For the origin of the Sussex chicken, it is, as its name indicates, originally from the county of Sussex, located in England. It is the quintessential English laying hen, and it is even considered the flagship of English poultry farming.

- **Characteristics**

The Sussex chicken has a **single comb**, red earlobes that resemble the orange-red of its eyes. Its skin color is white, its **shanks** (Tarsuses) are flesh-colored, and it is distinguished by its impressive variety of plumage, which comes in the

following shades: black-breasted white, tricolor, silver-grey, white, black-breasted red, black-breasted fawn, gold-salmon, and cuckoo. Sussex **roosters** weigh about **4.1 kg**, while **hens** weigh at least **3.2 kg**.



Figure 17 : Sussex breed (Male on the left, Decrouy, 2024 & Female on the right personal photo)

5.5.3. ORNAMENTAL BREEDS (BREEDS OF PLEASURE)

a. Padua

- **Origin**

It originates from Europe (**Italy**). The Padua is a European ornamental domestic chicken breed, famous for its large crest.

- **Characteristics**

This breed is **medium-sized**, upright in posture; females weigh between **1.5 and 2 kg** and males between **1.8 and 2.3 kg**. It has a medium-sized head, without a comb, but with a fairly large crest, very characteristic of the breed. Its eyes are generally large and round, most often brownish in color, but in some specimens, especially the white ones, they take on an orangish hue. Its nostrils are also wide. Moreover, it has a strong and somewhat curved beak. The Padua or Padovana hen has little or no visible wattles. The Padua hen reaches sexual maturity at 5 to

6 months for females, while the rooster reaches it at 6 to 7 months. Additionally, these hens lay a large number of eggs per year, which are white and weight to **50-60 grams**.



Figure 18 : Padua breed (Meyer, 2024 ciarad ; Standard : SCAB ; BCF 2024).

b. Dutch Breed

• Origin

The Dutch crested hen is a breed of domestic chicken originating from the Netherlands.

• Characteristics

It is characterized by: **Comb: nonexistent**, Earlobes: white, Eye color: reddish-brown, Leg color: gray. For the different plumage varieties: Black with white crest, white with white crest, blue-laced with white crest, chamois laced white with white crest, cuckoo with white crest, black mottled white with white crest, fawn with white crest, red with white crest, khaki with white crest, dun with white crest, white with black crest. Curly plumage is allowed. Weight: For the large breed: Cock: 2 to 2.5 kg; Hen: 1.5 to 2 kg. Laying eggs: 45 g, white shell. Bantam breed: Cock: 800 g; Hen: 700 g. Laying eggs: 35 g, white shell.



Figure 19 : Dutch ornamental breed (Meyer, 2024 ; cirad)

.5.6. FIGHTING BREEDS (GAME BREEDS)

a. Indian Game (Fighter)

•Origin

It is from **England**

•Characteristics

Large head. **Triple** or **curly crest**. Curved horned beak. Bare legs. Tetrapentadactyl race, yellow. The male weighs: **4.5-5 kg**, the female weighs: **4 kg**. It lays between **100-140 eggs per year** (55-60 g/egg)



Figure 20 : Indian Fighting breed (Standard : SCAF, BCF 2024).

b. English Game (Fighter)

•Origin

The English Game (both old and modern) is a breed of domestic chicken of English origin.

•Characteristics

It is of **medium** or **bantam** size, with a **single comb**, red earlobes, sturdy, and short, variously colored plumage. There are 2 types: old (Old English Game) and modern (Modern Game) with an upright posture and long thighs. Average weight: 2.5 kg (medium) or 550 g (bantam).

Abilities: ornamental.



Figure 21 : Old english game (fighting) and modern english game(fighting)breed (Standard : SCAB; BCF 2024)

.5.5.4. GEESE BREEDS (*Anser anser domesticus*)

Domestic geese

They belong to the class Aves, family Anatidae, order Anseriformes, and genus *Anser*. Geese are mainly raised for their meat; they also produce quality feathers. Domestic geese descend from the **European gray wild** goose and the **swan goose of Asia**. Domestic geese are much larger than their ancestors and they no longer fly. Geese are exceptional grazers that can eat enormous amounts of grass and herbaceous plants; as a result, they are useful in developing countries where they graze in places where animals like goats would damage crops. In Egypt, they contribute to the cleanliness of villages by eating refuse; they ensured the weeding of cotton fields before the use of pesticides. The main breeds of geese

raised for their meat are the Toulouse goose, the Landes goose, the Embden goose, the Roman goose, the American Buff goose, and the Pilgrim goose, which descends from the Greylag goose. The Chinese breed probably descends from the Swan goose; it is well suited to hot climates and can lay up to 100 eggs per year.

a. Toulouse geese

- **Origin**

As its name indicate it , it's from france, originally of southwestern France.

- **Caractéristiques**

It is massive and stocky with an overweight (Weight 10-14 kg). There are two varieties: one with a double fold of skin between the jaws (industrial, heavy: 9-10 kg for gander and 8-9 kg for goose) and another without a dewlap (agricultural, slender: 8-10 kg for gander and 6-8 kg for goose). The plumage is gray and white. The beak color is red-orange, eyes with dark brown iris, tarsi mandarin red (with dewlap) or orange (without dewlap). Some have a wattle, a fold of skin between the legs, or both. It is a poor layer: 30-40 eggs (160 grams) per season. By gavage, fat and foie gras (up to a kilogram and more) are obtained in addition to the meat. For this, they are fed with corn.



Figure22 : Toulouse geese (Meyer, 2024 ; Cirad)

b. Landes geese

- **Origin**

She originates from the southwest of France, selected from the Toulouse breed, with the aim of breeding a small-sized breed offering better performance for producing foie gras.

- **Characteristics**

A fairly **strong body**, ganders weigh up to **7 kg**, geese **6 kg**. Long and wide back, well-developed chest, and a rather short tail. No dewlap, chestnut eyes bordered with a light orange rim, medium-sized beak higher than wide, orange with a pink tip, reddish-orange leg color, medium-length strong neck carried upright. Low laying hen: **30-35 eggs/year, 150 grams**.



Figure 23: Landes geese (Web.com)

c. Embden geese

- **Origin**

Breed of domestic goose originating from Friesland (Germany), from Emden, place name, port in Lower Saxony, northern Germany.

- **Characteristics**

It is hardier (strong) than the Toulouse goose, very large and overgrown (**up to 18 kg**). It has white plumage and fine, silky down. It can produce **livers** reaching **800 g**. The **incubation** of the eggs is **30 days**



Figure 24: Embden geese (Meyer, 2024, Cirad)

d. The greylag goose (*Anser anser*)

- **Origin**

It is the **wild form**, the **ancestor of the domestic goose**. The greylag goose is a very emblematic waterbird species in Europe and some regions of Asia.

- **Characteristic**

It can **measure** up to **76 to 89 cm** and can reach a **wingspan** of **2 meters**. The usual color is **brownish-gray** on the back and breast, white on the (venter) belly. The **beak** and **legs** are **flesh-colored** to **bright orange**, with a black head and neck. It also has a beautiful distinctive pattern on the chest.



Figure25 : greylag goose (*Anser anser*, Meyer, 2024 Cirad)

e. Chinese geese

- **Origin**

The domestic swan goose (*Anser cygnoides domesticus*) originates from Manchuria, China, descended from the swan goose (*Anser cygnoides*).

- **Characteristics**

The average weight is **5 kg** for males and **4 kg** for females, having a tubercle above the beak and a long neck. Abilities: roasting goose (very good meat), good layer. It cries easily, hence the nickname "guard dog".



Figure 26 : Chinese (domestic swan) geese (Meyer, 2024, CIRAD).

5.5.5. DUCK BREEDS (*Anas platyrhynchos domesticus*):

$2n = 78$ chromosomes.

There are about **300 duck breeds** worldwide. (FAO, 2024). Duck breeds belong to the order Anseriformes, family Anatidae (which includes three genera: Aix, Anas, and Cairina), genus Anas. The wild duck (*Anas platyrhynchos*) is usually considered the ancestor of the domestic duck, except for the Muscovy duck in South America (*Cairina moschata*). Among the 500 million ducks in the world, 430 million are in Asia. Commercial ducks, such as Aylesbury and Pekin ducks, are primarily raised for their meat, while ducks like the Khaki Campbell are raised for eggs. Local duck breeds are of great value in many countries. The Muscovy duck is an excellent forager and well adapted to life in the wild, as it does not require much water; its meat is less fatty.

a. The Aylesbury Duck

•Origin

The Aylesbury duck is a breed of domestic duck of **English** origin.

•Characteristics

This breed is mainly raised for its **meat**. It is a large duck, with **white plumage**, a pink (beak) bill, and orange feet and legs. It has a particularly well-developed breastbone and holds its body well parallel to the ground. Eggs are white (**65-80**

grams, 40-120 per year). Male weight: 5 kg, female weight: 4.5 kg at 12 months.



Figure 27: d'Aylesbury duck (Escent, 2017)

b. The Pekin Duck

• Origin

It originates from **China**, and it was introduced in 1873 to the United States and also to England, where it was improved with the Aylesbury duck mainly for its meat and eggs.

• Characteristics

Male weight: **4 kg**, female: **3.5 kg**. It is a heavy, short-legged bird, its color is white with yellowish sulfur reflections. The bill is orange to pale yellow, with a white nail. Dark brown iris. Tarsi are dark yellow to orangish red, the body is broad and rectangular. It is a breed raised for meat and egg production. Lays **80/100 eggs (white, 70 grams)**



Figure28 : Pekin duck (Backert, 2013)

c. Le Campbell kaki duck (eggs)

- **Origin**

C'est une race It is English breed result of the crossing between ; Indian runner fawn and white with Rouen breed from France.

- **Caractéristiques**

Plumage color: khaki, white, wild brown. Weight: 2.3-2.5 kg for the male and 2-2.3 kg for the female. Produces up to 300 eggs (white, green, 65 grams) per year.



Figure 29 : Campbell kaki duck (Tim, 2015)

d. South American Muscovy Duck (*Cairina moschata*)

- **Origin**

It is native to **Central and South America**. It mainly lives in tropical and subtropical regions, from Mexico to Argentina and Uruguay. In general, they prefer places where vegetation is abundant and where there are sources of fresh water. It is also capable of adapting to altitudes up to 1,000 meters above sea level.

- **Characteristics**

Massive **large-sized** breed: 84 cm, Wingspan: 120 cm. Male weight: **4-5 kg**, Female weight: **2.5-3 kg**. **Bronze-black plumage** with greenish reflections, black and white, white, blue and gray, the last two colors corresponding to

secondary or ornamental varieties, straight low and elongated. Caruncles red-wine colored, very developed in the male. This breed is raised for the quality of its meat.



Figure 30 : 2 Varieties South American Muscovy Duck (*Cairina moschata*).

e. Rouen duck

- **Origin**

This duck breed originates from France

- **Characteristics**

For the weight of the animal, it is **3, 4, 5 kg** for the female and **4 kg** for the duck.

Plumage: wild, speckled, wild blue, dark wild blue. Laying: **50 eggs** (white, green). Used for meat production.



Figure 31 : Rouen duck male on the left and female on the right (Tim, 2015)

f. Indian runner

- **Origin**

It does not originate from India but from oriental India (Malaysia, Java and Lombok).

- **Caractéristiques**

The size of this breed is eumetric (male: **1.6 to 2.3 kg**; female: between **1.4-2 kg**). Slender (longiline) bird, its posture is upright (an angle of 70° to 80°). Color is very variable: speckled, black, blue, chocolate, fawn, fawn and white, mallard, silver, white. They are prolific egg layers: **200 eggs of 70 to 80 g/year**.



Figure32 : Indianrunner (Tim, 2015)

5.5.6. OTHER POULTRY

According to FAO, 2024, there are more than **115 breeds** of turkeys and **200 breeds** of geese worldwide.

DOMESTIC TURKEYS (Eng. Turkey)

Belongs to the Class Aves, Order Galliformes, Family Phasianidae, Genus *Meleagris*: 2 species: *Meleagris gallopavo* (Wild Turkey) and *Meleagris ocellata* (Ocellated Turkey) (COI, 2024). The turkey was probably domesticated in Mexico. It was used as domestic poultry by Native American communities in what is now the southwestern United States. Turkey meat is very high in protein and low in fat; its nutritional value is consequently very high. Turkeys were introduced to Europe in the 1500s following European colonization of Central America. Farms now exist worldwide; more than 50 percent of production comes from developed countries.

MAIN BREEDS (Breeds)

The main breeds according to FAO are the Norfolk Norfolk, the American Bronze turkey, and the Broad-breasted Bronze turkey. The lighter breeds give good results under dry tropics when they are allowed to roam freely and have access to enough shade and food.

a. The Norfolk Black

•Origin

Originating from England, in the county of Norfolk.

•Characteristics

Raised for its meat. Male weight: **10 kg**, female: **6 kg**. The plumage of this turkey is glossy black with metallic sheens. The beak is black and the caruncles are red and well developed. The shanks are bluish and turn red with age. Its eggs are cream-colored or slightly brownish with spots. It is a small to medium-sized turkey. FAO status (conservation): Endangered. Black



Figure33 : Norfolk Black (Carly & Art, 2009)

b. African bronzed Turkey

• Origin

The Bronze Turkey of America or Bronze Mammoth is a breed of turkey native to America and introduced to Europe. It has since been crossbred with several French breeds to increase their size, making it the heaviest of French domestic poultry.

- **Characteristics**

It is the heaviest of domestic poultry. Male weight up to 13 kg, female 7-8 kg. The plumage is dark with greenish or bronze reflections, giving a coppery bronze appearance. This turkey is raised for meat and eggs. The turkey is a good sitter..



Figure 34 : The Bronze Turkey of America or Bronze Mammoth (Meyer, 2024)

c. Local African Turkey. (*Meleagris gallopavo*)

- **Origin**

Native to Africa, Location: Turkeys are found throughout Africa, but in limited numbers. Their breeding is more expensive and they require more care than chickens. In West Africa, they are mainly raised in Côte d'Ivoire and Burkina Faso.

- **Characteristics**

Large size (6.8 - 11 kg for males, measuring 100 to 125 cm), recognizable by its featherless head which is reddish and blue, and covered with caruncles. The plumage is dark and iridescent; wings are rounded and short with brown and

white bands. Long, fairly strong legs, color ranging from pink to gray. Its tail is fan-shaped. The female weighs only between 3.6 and 5.4 kg. Their plumage is generally duller, and their head is gray with a feathered neck. The African turkey has nothing particularly distinctive. That of Mandelia (Chad) is red, with speckled feathers. The color of the skin and tarsi.it 's used for meat production.



Figure35 : African turkay breed (Meyer,2024 cirad)

d. Red Ardennes turkey

- **Origine**

Frensh breed from Ardennes, massif and departement northeastern of France.

- **Caractéristiques**

Weight : male 10 kg, female 6-7 kg. Thighs are very strong. Plumage fawn-redouge, more light in females. Rustic, ornamentals, This turkey product both eggs and meat.



Figure 36 : Red Ardennes turkey (Meyer, Cirad, 2024)

e. Beltsville small white

- **Origin**

From the satation of Avian research in Beltsville, Maryland, United states

- **Charactéristiques**

A breed of turkey of fairly small size, with a broad (large) chest, entirely white plumage, Weight: Male: 8 to 10 kg and Female: 4.5 to 8 kg, raised for meat and easy to roast in small ovens.



Figure37 :Beltsville small white(Meyer, 2024-Ciard)

GUINEA FOWL (*Numida meleagris*); domestic guinea-fowl or helmeted guinea-fowl

From the class Aves, order Galliformes, family Numididae (sometimes placed in the family Phasianidae), species meleagris. Average size: 53-63 cm. Average weight: Male: 3.3-4 kg; Female: 2-3.3 kg. Guinea fowls originating from West

Africa are now raised in many regions of the world but, with the exception of West Africa, these are only small farms. In France and Italy, farms are of a commercial and intensive type, focused on the production of eggs and meat. In villages, guinea fowls generally do not brood their eggs; they are brooded by domestic hens. The three well-known varieties are: pearl gray, white, and lavender.

a. common guinea fowl

•Origin

Originating from **West Africa**, raised in many regions of the world but, with the exception of West Africa

• Characteristics

Bare-headed, with a caruncle (red crest) and dark plumage dotted with small white spots. In this species, the male is lighter than the female. Without spurs, a strip of skin hangs from each side of the beak. The chest and the feathered part of the neck are lilac in hue; the bare part is red shaded with bluish; the wattles are broad, bright red; the callous tubercle is reddish blue; the beak is yellowish-red; the legs are slate gray. The female is distinguished from the male by having less developed and less rounded wattles, and a slightly weaker head tubercle. Skills: Meat and eggs. The eggs are smaller and less white than those of hens. The eggshell is thick, which makes it easier to transport. The guinea fowl lays **12 - 15 eggs. Incubation: 27 to 28 days..**



Figure 38 : Domestic Guinea fowl = Pintade = pearl hen (*Numida meleagris* ; Meyer, 2024 ; Cirad)

DOVES AND PIGEONS (2n=80 chromosomes)

Pigeons belong to the order Columbiformes, the family Columbidae, genus Columba, and include some **369 identified species**. The main breeds are: Rock Pigeon (*Columba livia*) well known in Africa and Europe, Silver Pigeon (*Columba argentina*), Jamaica Pigeon (*Patagioenas caribaea*), Violet Dove (*Geotrygon purpurata*), Grenada Dove (*Leptotila wellsi*), Blue-eyed Dove (*Columbina cyanopsis*), Geoffroy's Dove (*Paraclaravis geoffroyi*), Otidiphaps

insularis, Pickering's Fruit-Dove (*Ducula pickeringii*), New Zealand Pigeon (*Hemiphaga novaeseelandiae*), White-faced Pigeon (*Aplopelia larvata*), Rufous-headed Ground-Pigeon (*Macropygia ruficeps*), Diamond Dove (*Geopelia cuneata*), Jamaica Dove (*Leptotila jamaicensis*), Snow Pigeon (*Columba leuconota*), Pink-breasted Turtle Dove (*Streptopelia lugens*), Madagascar Pigeon (*Nesoenas picturatus*), Black-tailed Dove (*Columbina passerine*), Passenger Pigeon (*Ectopistes migratorius*): extinct Galapagos Dove (*Zenaida galapagoensis*).

a. The Rock pigeon (*Columba livia*)

•Origin

The rock pigeon is native to Africa, Asia, and Europe.

•Characteristics

Medium-sized, average **weight** of **360 g**, and a **wingspan** of **63 to 70 cm**. Typical gray color, with green, reddish, or purple tones on the chest and neck. It has 2 black bars on the wings and possibly a blue band on the tail. It is present worldwide and has developed a close relationship with humans due to domestication, which has led to a variety of breeds with multiple characteristics and colors. The International Union for Conservation of Nature (IUCN) has classified it as a species of least concern.



Figure 39: Rock pigeon (*Columba livia*) (Delso, 2014)

b. Domestic turtledove (*Streptopelia roseogrisea*, *Streptopelia risoria*; Barbary dove, eastern turtledove)

•Origin

Species of the family Columbidae, order Columbiformes. Its origin is uncertain;

it probably descends from the Turkish turtledove (*S. decaocto*, native to the Balkans). There are 2 other species: 1- **European turtle dove** (*Streptopelia turtur*) (breeds in Algeria: *arenicola*, *hoggara*); 2- **Palm (Speckled) pigeon** (*S. senegalensis*)

- **Caractéristiques**

- **Common turtle dove: Length 28 cm. Weight 150 g.** The tail is relatively long. Ornamental plumage is more developed on the neck. The plumage is albino or pale brown on the back, the belly white and yellow-brown, the tail white.

- **Turtle dove:** Tail layered, blackish, with white corners. It lives in Central Europe, Western Asia, and Northern Africa. This wild pigeon comes to spend the winter each year in tropical Africa. In Algeria: *S. turtur arenicola* nests in wooded habitats from the sea to the Sahara; for *S. turtur hoggara*, it is migratory and nests in Hoggar, Tassili, and Timimoune.

-**Collared dove (Turkish Dove) : Length between 28-30 cm.** Beige in color, with a pinkish breast, with a half black and white collar on the nape, the tips of the wings are black. Speckled dove: Long tail. Wide reddish pectoral band spotted with black. Visible area in flight pale blue-gray in the middle of the tricolored wing. Towns and villages (Africa including Algeria where it lives in urban and suburban areas, Southwest Asia), nests on buildings.

- **Palm Dove (laughing dove; *Spilopelia senegalensis*)** nests on buildings. The collared dove is the size of a small pigeon, with a **BL: 28 - 30 cm**. Long tail. Fawn-colored plumage. A half black collar on the top of the neck. The eye is light red. Legs crimson red. Visible area in flight pale bluish-gray in the middle of the tricolored wing. It tames very well and is easy to raise. It can have eight broods per year of one or two eggs at a time. **Incubation** lasts **2 weeks**. But the dove does not reproduce in captivity in Africa. In Algeria, it is found in peri-urban areas.s.



Figure 40 : Turtledove: left to right: domestic, Turkish, wood, and netted (Meyer, 2024)

5.6. BREEDS AND STRAINS IN ALGERIA

Until very recently, the local chicken in Algeria had not been subject to either census or genetic characterization. The classification is very diverse depending on each study; chickens in Algeria can only be classified according to their plumage patterns and colors. According to their plumage colors, following the classification of the French Federation of Poultry (FFV), 8 phenotypes are determined: black, mottled, golden, decorated fawn, splashed fawn, silver wheaten, splashed white, and pure (white):

a. Alhamra (golden, fawn) phenotype



Figure 41 : Alhamra (A gauche : Tair, 2012, A droite Ghlib et Tsaki, 2023)

- **Caractéristiques**

Silky red-colored plumage. Curved brown-colored beak. Moreover, egg production has varied, according to the study, from **60 to 170 eggs per year**. The eggs were richer in yolk and less endowed with albumen.

b. Mazlout (Bare Neck) phenotype

- **Characteristics**

It is a phenotype characterized by a bare neck, silky and varied colored plumage (black, white, fawn, etc.), small and orange comb, orange beak, weight: **0.83-1.3** kg for females and **0.95-2 kg** for males. Legs without feathers BL: **33-38 cm** for females, **43-44 cm** for males.



Figure 42 : Mazlout (Bare Neck) phenotype breed (Tair, 2021)

c. La Noire - Alkahla phenotype

Silky black plumage, brown curved beak, weight 1.5-1.6 kg female and 2.1-2.36 kg male, single red comb, black unfeathered legs. LC: 42-46 cm female; 46.3-48 cm male.



Figure 43 : The Black (Al Kahla) local phenotype breed (Ghlib et Tsaki, 2023)

d. Crested Head phenotype

Silky plumage. Beak slightly curved and yellow in color, brown eyes, legs

without feathers, small simple red comb. Brown plumage, **0.9-1 kg** for the female, **1.8-1.83 kg**. Body length: **31-35 cm** for the female and **45-48 cm** for the male.



Figure 44 : Crested Head Phenotype breed (Tair, 2021; Ghlib and Tsaki, 2023)

e. The White - El Baydhaphenotype

- Characteristics

Silky white plumage. Small, **simple comb** of pink color (darker in the male). Slightly curved beak of brown color. Brown eyes (orange in the male). Small dark pink wattles in the male. Small oval earlobes of pink color (round and dark pink in the male). Neck without plumage. Body length **40 cm** for the male, **38 cm** for the female. Weight around **1.3 kg** for the male. Yellow legs without plumage (Tair, 2021)



Figure 45 : The White (Albaydha) phenotype breed (Ghlib and Tsaki, 2023 on the left on the right; Tair, 2021 on the right)

f. Curly Local phenotype

- Characteristics

Curly plumage, gray or black in color in the male; the female can have a lighter color (orange or beige). Comb of light pink color, length 2.3-2.8 cm in the female and reaching 4 cm in the male. Beak beige and black, length: 1.4 cm. Eyes red. Small wattle, pink in color. Light pink, small, oval earlobe. Body length 31 cm in the female and 40 cm in the male. Weight: 0.53-0.9 kg in the female and 1.8 kg in the male. Legs generally feathered (sometimes not: Tair, 2021), gray, length 5.3-7 cm in the female and can reach 8 cm in the male.



Figure 46 : Curly local breed (on the left Ghlib and Tsaki, 2023 ; Tair, 2012 on the right)

i. Faba Bean (El-Foul's Flower) phenotype

•Characteristics

White plumage with some black spots (faba beans) **Simple** and **small crest** of light pink color, Straight beak of beige color. Orange eyes. Small waddles of light pink color. Small and oval earlobes of light pink color. Legs without feathers. Body Length (**BL**): 34cm 43.4 weight 1.3-1.31 kg female and 1.7-2 kg male.



Figure 47 : Faba Bean local breed (Ghlib and Tsaki, 2023)

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