

## CHAPITRE II. GOAT ETHNOLOGY

Goat (*Capra hircus* ; 2n = 60 chromosomes)

### 1. ORIGIN, DOMESTICATION AND EVOLUTION

- **ORIGIN AND EVOLUTION**

Several authors state that the ancestor of the domestic goat is a 'wild goat from the **Near (middel) East** «*Capra hircus aegagrus*», which was found in Asia (Iran, Turkey, Caucasus) and in **East Africa**, and which begins the series of domestic goats grouped under the name *Capra hircus*. The wild bezoar goat of southwestern Asia could be considered the ancestor of most domestic goats. Meanwhile, the **Ibex abyssinian** goat is likewise associated with the bezoar goat in the ancestry of many goats from North and East Africa. Other populations of wild goats belonging to the genus **Capra**, such as the **Ibex** and the **Markhor** goats, have also contributed, and the indigenous goats of North Africa originated from Nubia (Epstein 1971; Esperandieu, 1975; Mason, 1984; Vigne, 1988; Lauvergne (1988) cited by Embarek et al., 2022)

- **DOMESTICATION**

The goat is most likely the first ruminant to have been domesticated. The domestication of **small ruminants** (goats and sheep) was recorded **9,000 to 10,000 years** ago in the highlands of western Iran. The domestication of **ruminants** appeared **around 9,000 years** before Christ in the Near East and Central Asia. That of bovids, which followed shortly after the domestication of sheep and goats, is attested around 8,000 years before Christ. Most authors consider that domestication took place in the Fertile Crescent (Iran, Iraq, Turkey, and Palestine), which is the origin of Western European agricultural civilization. In Algeria, the caprids represented by *Capra hircus* were introduced from the Neolithic period. The beginnings of domestication on the coast and in the Algerian Tell started during the Neolithic. (Manallah, 2012).

### TAERMINOLOGY

Head (Tête), Back (Dos), Ventr(Ventre), Throa(Gorget), Dewlap(Fanon ), Shoulder(Epaule), Chest(Poitrine), Ribs (Cotes), *Bridge of nose*( Chanfrein ), *ear*(Oreille),

poll(Chignon), horn(Corne),nape(Nuque), forehead(Front), eye(oeil),  
 Coude(Elbow),Arms(Brs), Forearm,(AvantBras), Rump(Croupe),Loin(Lombe),  
 Thigh(cuisse), Leg (Membre) ,Hock(Jarret), Knee(Genou), Fetlock(Boulet),Cannon(Canon),  
 Pastern(Paturan), Hoof(Sabot ),Floor(Sole ), Udder(Mamelle), Teat(Trayon) , (queue(Tail)

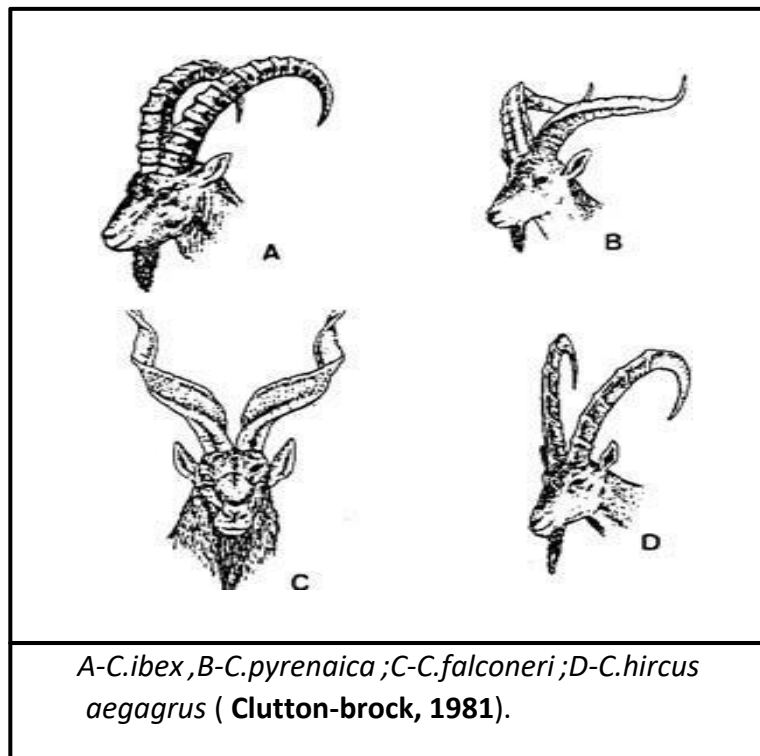
## • CLASSIFICATIONS

Compared to sheep, goats are particularly interesting for increasing animal production due to their adaptation to the environment and have additional advantages for better resistance to different climates and periods of drought. The genus *Capra* belongs to the subfamily Caprinae, of the family Bovidae, derived from the suborder of ruminants, class of mammals with a placenta (placental subclass), and grouped in the phylum of vertebrates of the animal kingdom. The domestic goat, whose scientific name is *Capra hircus*, belongs to:

Table 1: Classification of goats in the animal world (Linnaeus, 1758; Holmes-Pegler, 1966; Babo, 2000; Fournie, 2006 cited by Addouche and Meireche, 2021)

Kingdom	Animalia
Embranchement	Vertebra
Classe	Mammalia
Ordre	Artiodactila
Famille	Bovidae
Sous famille	Caprinae
Genre	Capra
Espèce	<i>Capra hircus</i> .
<b><u>Physiological Parameters</u></b> Rectale Temperature(RT)= 39-40 <sup>0</sup> c Heart Rate (HR) =70-80 Beats /Minute Respiratory Rate (RR) =12-15 Mvnts/Min Spontaneous ovulation ,discontinued cycle , cycle duration : 21 days, Estrous duration 2-3 days .Gestation : 5 months (Villemin, 1984)	

Bomsel (2018) (cited by Addouche and Meireche, 2021) described that goats belong to the genus *Capra*, which includes seven species: *Capra hircus* (domestic goat); the other six are wild: *Capra ibex* (ibex or Alpine ibex); *Capra aegagrus* (wild goat, also called bezoar goat, living in Turkey, Iran, and the Caucasus); *Capra caucasia* (goat living in the western Caucasus, also called western tur); *Capra cylindricornis* (goat living in the eastern Caucasus, also called eastern tur); *Capra*



pyrenaica (Pyrenean ibex); *Capra falconeri* (Kashmir markhor goat), commonly called bique.

*Figure 01: Some representatives of the wild genus of Capra* (Cited by Manallah,2022) According to (Simon, 1999 Cited by Addouche and Meireche, 2021), goats are subdivided into 4 tribes:

- ✧ **The caprines** (Caprini) represented by ibex (*Capra*), of which the goat is only the domesticated form,
- ✧ **The ovines** (Ovini) represented by mouflons (*Ovis*), of which one species gave rise to the sheep,
- ✧ **The rupicaprins** (Rupicaprini), sometimes considered a distinct subfamily (Rupicaprinés) represented by the chamois, and

1.1.1. **The ovibovines (Ovibovini) intermediate between caprines and bovines, represented by the musk ox or ovibos and the takin. (Addouche and Meireche, 2021).**

## 2. GENERAL CAPRINE ETHNOLOGY

### 2.1. VARIATIONS OF THE PHYSICAL FORM

**2.1.1. Variations in size (Hypermorphism)**An adult goat weighs between **50-70 kg** for a height ranging from **70-85 cm**. Three types of body size are distinguished:

- **Eumetric**: an average size. Example: **Murciano** Breed
- **Hypermetric**: a breed that has a weight above the average values of the species (heavy breed).

**Boer** (adult male weighs **110-130 kg** (90 kg average) while adult female weighs between **90-100 kg**)

- **Ellipometric or Hypometric**: a breed that has a weight below the average values of the species (light breed). **Cashmere**

### 1.1.2. Variations in body proportions

These variations result from the harmonies that exist between the length elements and the width (thickness) elements. Three types of animals can be identified:

- **Mediolinear (medioline) type**: normal animals where length elements are in harmony with width elements. **Saanen**.

- **Longilinear (longiline) type**: animals with dominant length elements. Example: **Poitevine Breed** (photo below)

- **Brachylinear breviline) type**: animals with dominant width elements. **Ex.Rove goat**

### 1.1.2. 1.1.3. Variations in Overall Shape

It is especially appreciated at the head level and particularly in the forehead region; it can be:

- **Rectilinear**: this type presents a straight head profile, long and pendulous ears, long hair. The rectilinear type is found in Asian goats: **Cashmere** and **Angora** (see photo below)

- **Convex-lined**: animals of this type have a convex nasal bridge, very long and pendulous ears, and very short hair (shorn). They are represented by African goats: the **Nubian** (see photo below)

- **Concave-lined**: this type presents a concave head profile, ears that tend to stand up, and short hair. The concave type can be found in European goats: **Saanen** (see photos below).

### 1.1.4. Variations in the Phaneroptic

It includes variations in the skin and its appendages:

❖ **Hair length**: especially its length, which varies according to hair: - **Shaved** (a few millimeters) e.g., **Nubian** breed, - **Short** (a few centimeters) e.g., **Saanen, Toggenburg** breeds; **Long** e.g., **Arbia breed, Cashmere** breed, as well as its type, which can be **woolly** (e.g., **Angora** breed).

❖ **Hair color**: There are

- **depigmented** breeds, for example: **Saanen** breed.

- **pigmented** breeds (uniform or mixed), these include:

**Eumelanic:** black, blue, chocolate, brown. Example: **Toggenburg** breed (chocolate to black)

**Phaeomelanic:** yellow, orange, red. Example: **Chamois** Goat

### 1.1.5. Variations in energetic traits (aptitudes))

Goats are characterized primarily by their milk-producing ability, followed by other purposes, such as meat, hair, and leather production. (Boukhechem, 2023).

## 2. BREEDS OF GOATS

According to FAO (2016), there are about 1234 goat breeds. Among these breeds, goat populations are classified into European Goats, Asian Goats, African Goats.

### 2.1. BREEDS OF GOATS THROUGHOUT THE WORLD

#### 2.1.1. EUROPEAN BREEDS

##### a. ALPINE GOAT



Figure 2: Alpine breed goat ( [www.capgenes.com](http://www.capgenes.com) on the left; Meyer, 2024 on the right)

##### •Origin

She originates from the Alpine massif of France and **Switzerland**.

##### •Characteristics

She is of medium size and build, a short-haired animal, with all coat colors: black, white... exist in this breed. Among the most common are: the color "burnt bread" or "chamois" with black legs and dorsal stripe, and a multicolored one with white spots on a black or brown coat. The head, horned or not, with or without tassels, with or without a beard, is of medium length with a broad forehead and muzzle. Her profile is concave; the ears are carried upright in a fairly closed cone. The udder is large, well attached in front and back, retracting well after milking,

with thin and supple skin.

- **Performance**

The Alpine breed is a strong dairy breed. A goat can provide more than 730 kg of milk per year and its lactation period is about 270 days; some goats even produce up to 1000 kg per lactation, which is not uncommon. This milk is particularly sought after for its cheese-making qualities. It has an average butterfat content of 34.2 g/l and a nitrogen content of 31.4 g/l (Mannalah, 2012; Addouche and Maireche, 2021)

## b. SAANEN GOAT BREED



Figure3: Saanen b r e e d (www.capgenes.com to the left, Meyer, 2024 at right)

- Origin

Originating from the Saane Valley in Switzerland

- Characteristics

It is a strong, deep, and thickly built animal with a good bone structure. The coat and hair are uniformly white; the hair is short. The head, with or without horns, with or without wattles, with or without a beard, has a broad and flat forehead. The ears are held at least horizontally, the chest is deep, wide, and long. The udder is globular, very wide at its upper part, giving it a stronger development in width than in depth.

- Performance

The Saanen is the best milk producer in the world and also gives excellent kids whose meat is highly appreciated. It produces **800 liters** (900 kg) of milk per lactation, and lactation lasts on average 280 days. It has a **butterfat** content of **32 g/liter** and a **protein content** of **29 g/liter**. (Mannalah, 2012; Addouch and Merieche 2021).

### c. POITOU GOAT



Figure 04 : Poitou breed (www.wikipedia.org at left ; Meyer,2024 to the right)

- **Origin**

Breed of rustic goats originating from the Deux-Sèvres (Vienne) in France, spread in Poitou-Charentes (Meyer, 2024).

- **Characteristics**

It is a **medium-sized** goat with a slender appearance. The coat is **brown** in varying shades up to black, with **white** on the **lower limbs** and **underside** of the **tail**. The hair is short on the head and neck, but long on the back and thighs. The head is triangular, with or without horns, with or without a beard. The face is black with two white stripes on the bridge of the nose. Considered rustic and producing milk particularly suitable for cheese making, its production performance, although on average lower than that of the Alpine and Saanen, can be considered satisfactory (Jean, 2005 cited by Embarek, 2020). **3.57% fat content** and **3.09% protein content** (Meyer, 2024)

### d. RACE MALTAISE

- **Origin**

This breed is mostly found in coastal regions.

- **Characteristics**

It is an animal characterized by a **medium size** (65 - 70 cm), **convex-line body**, and milk potential altered by the effects of environmental changes and diet, as well as their interaction. The coat is generally white, the head is light and elongated, usually hornless, with globular udders.

•**Performance**

Good milk producer (**up to 6 liters/day** (Meyer, 2024)), widespread in the Annaba, Skikda, and Algiers regions, and even in the oasis palm groves. The Maltese goat is a good milk producer (Manallah, 2012).



Figure 05 : Maltese breed goat (Associazione nazionale della pastozia Associazione italiana allevatori -Dr Andrea Rosalti ).

e. **MURCIA-GRANADA BREED GOAT**

•**Origin**

Breed of goats originating from the **southeast of Spain** (Meyer, 2024)

•**Characteristics**

It is characterized by a fine, concave-shaped head, horizontally carried ears, rare horns, a long neck, a long rounded body with short hair on the body and limbs, the coat is mahogany varying from chestnut to burnt, sometimes black; it is a hardy animal.

•**Performance**

It is very well known for its highly developed dairy qualities, producing an amount of milk around **500 kg** during a **lactation** period of **210 days** (Manallah, 2012).



Figure 06 : Murcia granada breed goat (Minister of agriculture and fisheries –MADRID at left ; Embarek, 2020 to the right)

#### f. TOGGENBURG GOAT BREED

##### •Origin

The Toggenburg is a Swiss dairy goat from the Toggenburg valley in **Switzerland**, in Obertoggenburg. They are also credited as being the oldest known dairy goat breed.

##### •Characteristics

The hair is **short** or **medium-length**, soft, fine, and elongated. Its color ranges from **light fawn** to **dark chocolate**, with no preference for shades. Distinct white markings are as follows: White ears with a dark spot in the middle; two white stripes on the face from the top of each eye to the muzzle; white hind legs from the hocks to the hooves; white front legs from the knees down, with a dark link (stripe) under the knee acceptable; white triangle on each side of the tail; a white spot may be present at the base of the wattles or in this area if there are no wattles. The ears are erect and carried forward. The facial lines can be convex or straight, never Roman. (Addouche and Marieche, 2021). The withers height (**WH**) averages **75 to 83** cm for males, and **70 to 80** cm for females, with the average mature live weight reaching **63 kg** for males, and **45 kg** for females. Toggenburg goats are good milk producers, but the yield is lower than that of Saanen (Embarek, 2020).



Figure 07 : Toggenburg breed goat (www.wikipedia.org on the left ; Embarek, 2020 on the right)

## 2.1.2. BREES OF ASIA

### a. ANGORA BREED GOAT

#### •Origin

The name Angora originates from a Turkish province located in Anatolia, which is today the Ankara region, and it is known for mohair breeds.

#### •Characteristics

A **small-sized** animal, **60 to 65 cm** at the withers (HW), with a rather stocky build, the Angora goat is clearly lighter than French dairy breeds (**30 to 60 kg** for **does**, and **50 to 70 kg** for **bucks**) (Embarek, 2020).

It is mainly characterized by its mohair coat. This hair grows at a rate of about **2.5 cm** per **month**, so after six months a coat with hairs **13 to 14 cm long** and weighing between 2 and 2.6 kg is obtained. The hair has a fineness ranging from 26 to 30 microns. Males have horns that curve in an outward spiral. It is a fairly calm and docile goat, which is easy to raise. Their life expectancy reaches about ten years. Raised exclusively for their coat, males (usually castrated at around 4-6 weeks of age) are raised in groups just like the females. A male goat produces **5.2 kg** of **wool / year** in two shears, compared to 4.5 kg per year for a female, but with lower fleece quality. (Addouche and Maeriche, 2021).



Figure08 : Angora breed goat (National Association of Angora Goat Breeders Les NAUZES on the left; Embarek, 2020 on the right).

#### a. CASHMERE GOAT

- **Origine**

Elle est originaire de Cachemire (entre **l'Inde et le Tibet**)

- **Caractéristiques**

La race Cachemir est une race rustique, qui a un **petit format** et elle se caractérise par sa résistance au climat froid et la **qualité supérieure de sa toison**. Cette race est facile à élever et nécessite une gestion minimale. Parce qu'ils ne sont pas agiles, ils sont faciles à contenir mais ont besoin d'abri en raison de la nature isolante de leur double pelage qui est versé en été.

- **Performances**

Cette race connue pour la qualité supérieure de sa toison, Ils sont cisailés une fois par an, et un mâle adulte tondra environ **1,1 kg de toison**, qui contient des poils de protection et environ **20% de cachemire**. (Addouche et Maeriche, 2021)



Figure 09 : Race Cashemere breed goat (Mayer, 2024 ; cirad)

### 3.1.2. BREEDS OF AFRICA

#### a. NUBIAN GOAT BREED

##### •Origin

This breed, originating from Nubia (Africa), has an excellent group temperament. Composite breeds with Nubians as ancestors include the Zaraibi, Sudanese Nubian, Damascus or Shami, Kilis, Mzabite, Mishri, and Anglo-Nubian.

##### •Characteristics

It is **medium-sized**, 60 to 70 cm: the skeleton is fine, and the muscle mass is underdeveloped. The head is relatively light, dolichocephaly is moderate, the **forehead** is narrow and **convex**, curved in both directions. The **ears** are **long**, wide, and pendulous, the neck is thin and long, the body is not thick, and the limbs are long and thin. The coat is covered with short hair, reddish in color, more or less dark.

##### •Performance

It is recognized for its prolificacy (**2 to 4 kids per litter**), its high fat and protein contents in milk, and its meat qualities. However, it is the breed that produces the least amount of milk. Nubian ears are pendulous and the profile of its head. It is convex. It is then said that it has a "Roman" nose. It can take any colors or combinations of colors. It is a large dairy breed, graceful with long drooping ears and a Roman nose. Mainly horned, they can also be polled. They always have short hair. The adult **male** usually weighs at least **80 kg** and the adult **female** more than **61 kg**. (Mannalah, 2018; Addouche and Marieche 2021).



Figure 10 : Nubian goat breed (Land of goats from Charentes and Poitou Nubian Breed Society of NZ on the left; Embarek, 2020 on the right).

### a. BOER GOAT BREED

#### •Origin

It is a meat goat breed originating from **South Africa** with a red pied coat (Meyer, 2024), improved with some infusion of European, Angora, and Indian goats many years ago. Several researchers agree that the indigenous populations probably came from the Namaqua Hottentots and the migrating Bantu tribes to the south. The current Boer goat appeared in the early 1900s when breeders in the Eastern Cape Province began selecting a meat goat.

#### •Characteristics

It is a large, heavy breed, white in color with brown spots. The **height** of an adult can reach **80 cm**, the adult **male** weighs **110–130 kg** (average 90 kg), while the adult **female** weighs between **90–100 kg** (average 70 kg).

#### •Performance

The population of this breed is capable of **average daily gains** (ADG) of more than **200 g/day** in feedlots. A standard higher performance would be **150 to 170 g/day**. The ovulation rate of Boer goats ranges from **1 to 4 eggs/female**, with an average of **1.7**. A **fertility rate of 200%** is common for this breed. Puberty is reached early, usually around 6 months for males and 10-12 months for females. The Boer goat also has an extended breeding season, allowing for 3 kids every 2 years. (Anonymous2).



Figure 11 : Boer breed goat (Smartrepro.com)

- **LOCAL SHEEP BREEDS**

The racial composition of goat populations includes local goats and improved breed goats, in addition to the individuals resulting from crossbreeding. Table 1 shows the abilities of each breed:

Table 2: Performances of some populations in Algeria (Kerba, 1995 cited by Sadaoui, 2018).

Breeds (Races)	Duration of lactation (Days)	Milky Production per lactation ( Kg)
La Arabia	150	220
La Makatia	120	80
La Kabyle	150	105
La Mozabite	180	460

The local population is divided into three sub-populations:

- The Arab goat divided into two breeds: the Arabia and the Makatia.
- The Kabylie dwarf
- The M'zabit

To which are added the imported livestock and the crossbred products, depending on the breeding environment, size, and morphology.

### 1. ARBIA BREED



Figure 12 : Arbia breed goat (ITELV, Ksar Chellala. Departement of goats species conservation in Algeria)

This is the most dominant population, which **belongs to the Nubian** race. It is mainly located in the **highlands, steppe, and semi-steppe** areas. It is characterized by a **short height of 50-70 cm**, a head without horns with long, wide, and pendulous ears. Its coat is **multicolored** (black, gray, brown) with **long hair of 12-15 cm**. The Arab goat has an average milk production of **1.5 liters/day**. There are two types: sedentary and transhumant.

- **Sedentary type**: Its average **height** is **70 cm** for males and **63 cm** for females, while their respective **weights** are **50 kg** and **35 kg**. The body is elongated with a straight dorsal line and a straight muzzle. The **hair** is **long, 10 to 17 cm**, and polychrome: white, black pied, and brown. The head may be a solid color or have stripes, bears moderately long horns directed backward, and fairly long ears (17 cm). Milk production is **0.5 liters/day**.

-**Transhumant type**: according to the same author, its **average height** is **74 cm** for the male and **64 cm** for the female, their respective **weights** are **60 kg** and **32 kg**. The body is elongated, back straight to rectilinear, but convex in some subjects. **Long hair of 14 to 21 cm** where the black-and-white pie color dominates. The head bears fairly long horns directed backward (especially in the male) whose ears are very wide, milk production is **0.25-0.75 liters/day** (Addouche and Maireche, 2021).

## 2. EL-MEKAT GOAT BREED



Figure 13 : El- Mekat breed local goat (ITELV, Ksar Chellala. Departement of goat species conservation in Algeria)

- **Origin**

It originates from Ouled Nail and is found in the Laghouat region. It is undoubtedly the result of crossbreeding between ARABIA and CHERKIA, and it is generally raised in association with the sedentary ARABIA goat.

- **Characteristics**

The MAKATIA goat has an **elongated body** with a **straight back**, a **slightly convex** nasal bridge in some individuals, and a coat that varies in color including **gray, beige, white, and brown** with **short, fine hair**, measuring **3-5 cm** in length. The head is strong in males, while in females it has backward-pointing horns, a beard, occasionally two tassels (less frequent), and **long drooping ears** that can reach **16 cm**. The weight is **60 kg** for males and **40 kg** for females, while the height at the withers is **72 cm** and **63 cm** respectively. The udder is well-balanced, square-shaped, high, and well-attached, and 2/3 of females have large teats. Milk production is **1 to 2 liters per day** (Mannallah, 2012; Addouche and Maireche, 2021).

### 3. Dwalf of Kabylia Breed



Figure 14 : Dwalf Kabylia breed local goat (ITELV on left ; Embarek, 2024 on right)

- **Origin**

It is considered a descendant of the **Pamel capra promaza goat**, an indigenous goat that inhabits the mountainous regions of Kabylie and the Aurès.

- **Characteristics**

It is robust, massive, and **small in size** (66 cm for males, 62 cm for females), hence its name

"Naine de Kabylie." The **body length** is **65-80 cm**, with respective weights of **60 kg** and **47 kg**. The body is elongated with a straight back, the head is fine, carrying horns that point backward. The coat color varies, but the dominant colors are **beige, reddish-brown, white, red pied, black pied, and black**. The ears are small and pointed for white-coated individuals, and moderately long for beige-coated individuals. The **hair** is **long** (46% of individuals between 3-9 cm) and short (54% of individuals) not exceeding 3 cm.

- **Performance**

Its milk production is poor; it is generally raised for meat production, which is of good quality. appreciable (Mannallah, 2012; Addouche and Maireche, 2021)

#### 4. M'ZABITE BREED LACAL GOAT

Also called 'the red goat of the oases'.



Figure 15 : Mozabite breed goat (atmzab.net. June 13, 2016 cited by Beletreche, 2012; ITELV, Ksar Chellala. Department of goat species conservation in Algeria)

- **Origin**

It originates from **Metlili** or **Berriane**.

- **Characteristics**

It is characterized by an elongated, straight, and **rectilinear body**; the **height** is **68 cm** for males and **65 cm** for females, with respective **weights** of **50 kg** and **35 kg**. The coat comes in three colors: fawn, which predominates, brown, and black. The **hair** is **short (3-7 cm)** in most individuals. The head is fine, with horns that curve backward when present; the **muzzle** is **convex**, and the ears are long and drooping (**15 cm**).

- **Performance**

The Mozabite is very interesting from the viewpoint of milk production: **2.56 kg/day**.

### 3. IMPROVED BREEDS

These are breeds introduced in Algeria since the colonial period, as part of a strategy for the genetic improvement of the goat herd. They include the Maltese, Murciana, Toggenburg, and more recently the Alpine and Saanen. The Maltese and Murciana goats were established in Oran and along the coast during colonization. Other attempts to introduce high-performing animals were carried out in the national territory after independence, in Mitidja, Tizi-Ouzou, Sétif, and in the upper Chélif. The Maltese goat was very widespread along the Algerian coast. The Maltese is found in the coastal areas of Annaba, Skikda, Algiers, as well as in the oases. In Algeria, the introduction of the first Alpine goats dates back to 1924-1925 during an experimental trial (Mannallah, 2012; Addouche and Maireche, 2021).

### 4. THE CROSSBRED POPULATION

It consists of individuals resulting from uncontrolled crossings between the local population and other breeds, but the trials are very limited, the products have a remarkable size, a full frame, often twin pregnancies, and appreciable milk production, the hair is generally short. These products are mainly found within state farms. (Mannallah, 2012; Addouche and Maireche, 2021).

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