

# The camel in Eritrea: an all-purpose animal

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## LE DROMADAIRE EN ERYTHRÉE: UN ANIMAL POLYVALENT

*Le dromadaire est un animal très important en Erythrée, notamment pour les populations des basses terres de l'est et de l'ouest du pays qui, bien qu'occupant une grande partie du territoire, vivent toutefois dans des zones dont l'aridité limite sérieusement leurs choix en matière de production agricole. Au fil des générations, ces populations ont mis au point des systèmes de production alliant élevage et déplacements. Les camélidés se sont révélés un élément fondamental de ces systèmes d'élevage en raison des divers produits qu'ils fournissent et de leur capacité unique d'exploiter un milieu aride. Grâce à sa mobilité et à sa capacité de paître et de brouter une grande variété de plantes, le dromadaire survit et produit sans pour autant contribuer à la désertification. Ses habitudes alimentaires lui permettent d'intervenir dans des systèmes pastoraux mixtes sans entrer en compétition, notamment avec les petits ruminants dont les modes de pacage et de broutage sont différents, rendant ainsi possible une utilisation maximale d'un environnement fragile sans risquer de le dégrader. Il est également à espérer que les propriétés de cet animal continueront d'être exploitées et qu'une place lui sera réservée dans les programmes de développement des basses terres chaudes et arides, afin qu'il puisse continuer à contribuer, en les améliorant, à la richesse et au bien-être des éleveurs de l'Erythrée et des régions similaires, qui lui reconnaissent une si grande valeur.*

## EL CAMELLO EN ERITREA: ANIMAL POLIVALENTE

*El camello es un animal muy importante en Eritrea, en particular para la población de las tierras bajas orientales y occidentales que, aunque ocupa una gran parte del país, vive en zonas en las que el medio ambiente árido limita gravemente sus opciones de producción agrícola. A lo largo de muchas generaciones han hecho evolucionar sistemas de producción que dependen de la cría y los desplazamientos de ganado. El camello ha resultado el componente más importante de sus sistemas pastorales, debido a sus características, que le permiten proporcionar diversos productos, y a su capacidad única para aprovechar un medio árido. Gracias a su movilidad y su capacidad para utilizar una variedad amplia de plantas mediante el pastoreo y el ramoneo, sobrevive y produce sin contribuir a la desertización. Sus hábitos de ramoneo le permiten tomar parte en sistemas de pastoreo mixto en los que no es competitivo, particularmente con los pequeños rumiantes, que tienen sistemas distintos de pastoreo y ramoneo, permitiendo así utilizar al máximo un medio ambiente frágil sin degradarlo. Es de esperar que sus características se sigan aprovechando y que se mantenga*

*para él un puesto en los programas de desarrollo de las tierras bajas áridas y calurosas, a fin de permitirle seguir contribuyendo a la riqueza y el bienestar de los pastores de Eritrea y de otras zonas semejantes en las que se le atribuye un valor muy elevado.*

## **GENERAL INTRODUCTION**

Although camels are found in Africa, Asia and the Arabian Peninsula, the family Camelidae probably originated in North America during the Eocene period (about 50 million years ago) before spreading towards either South America, where the family evolved as llamas, alpacas, guanacos and vicuñas, or across the Bering Strait into Asia, the Near East (Arabia) and Africa via North Africa (Higgins, 1984). In the Old World there are two types of camel: the one-humped (*Camelus dromedarius*) or dromedary, and the two-humped (*Camelus bactrianus*) or bactrian.

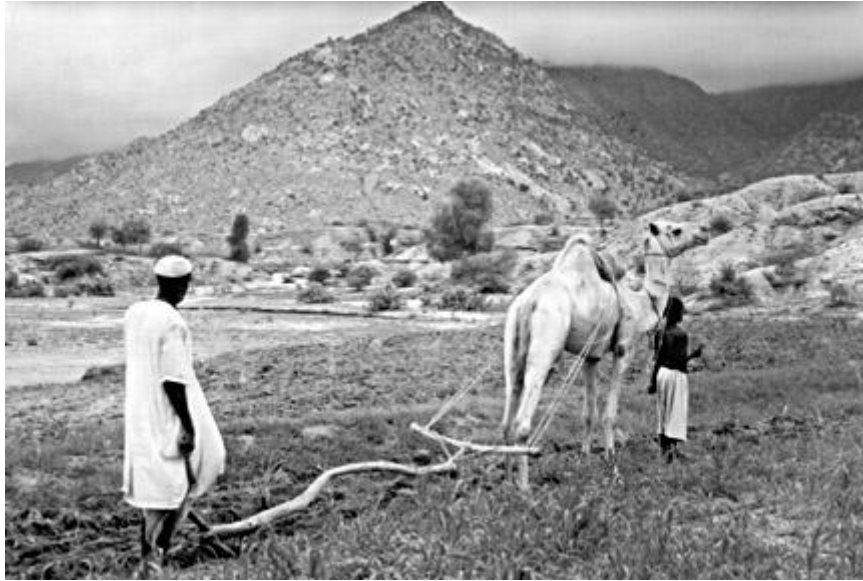
The one-humped camel was probably first domesticated about 3000 bc in southern Arabia. From there it spread throughout its present range in the deserts and semi-deserts of Africa and the Near East. The two-humped camel was probably domesticated on the borders of Iran and Turkmenistan, again about 3000 bc. From there it spread west as far as the Crimea, north as far as southern Siberia and east as far as Mongolia and northern China. In Turkey, Iran, Turkmenistan, Afghanistan and the northwestern region of the Indian subcontinent it was later displaced by the one-humped variety.

## **CAMELS IN ERITREA**

### **Introduction**

Camels in Eritrea are of the dromedary type and are found mainly in the lowlands, although some are being introduced in the highlands for the specific purpose of providing transport. The camels of the western lowlands of Eritrea have much in common with those of the Sudan, while those of the eastern lowlands are identical to camels of the Afar region in Ethiopia.

For pastoralists in the semi-arid regions of Eritrea, camels are the most important animal species. Their milk is highly nutritious and available throughout the year and yields are large in comparison with other domestic species in similar environments. Their unique ability to survive during dry seasons in climatically harsh areas, their adaptability to high temperatures and reduced dependency on water supplies, their mobility and ability to browse and graze a wide range of plant species and their resistance to disease are all attributes that enable them to support pastoralist families without contributing to environmental degradation and desertification. Because of these attributes, they should be in the forefront of long-term considerations to improve the economic situation and welfare of pastoralists in Eritrea.



*A camel being used for ploughing  
Dromadaire utilisé pour les travaux de labour  
Camello utilizado para arar*



*Camels carrying fuelwood for home consumption and for sale  
Dromadaires transportant du bois destiné à la consommation familiale et à la vente  
Camellos transportando leña para el consumo doméstico y para la venta*

### **Classification of camels in Eritrea**

Eritrea comprises central highlands with western lowlands extending to the border with the Sudan and eastern lowlands extending to the Red Sea. The camel population is found mostly in the western and eastern lowlands.

Various classifications of Eritrean camels have appeared, some based on the tribes who own them and some on their colours. They can be divided according to location, tribal ownership, colours and functions as shown in Table 1.

## 1

### Classification of camels in Eritrea

### Classification des camélidés en Erythrée

### Clasificación de los camellos de Eritrea

Region	Location	Tribe	Colour and	Function
Western lowlands: Gash-Barca	Hawashait, Lower Barca, Agordat, Upper Gash	Beni Amer, Tigrina	White and red	Used as pack animals, for riding, draught, milking and producing sesame seed oil
Western lowlands: Anseba	Hagaz, Asmat	Tigre	White and red	Used for riding, milking and as pack animals
Northern Red Sea	Coastal region north of Massawa, Sahel	Rashaida	Sandy, very small	Used mainly as pack animals, some used for riding and milking
Southern Red Sea	Coastal region south of Massawa	Afar	White, very small	Females used for milk production,

### Role of the camel in the economic sector

In Eritrea, camels are frequently used as pack animals, for riding and for ploughing and for driving oil mills known as *assara*. In addition to providing transport during migrations they are regularly used for carrying fuelwood, trade goods and, most important, water for household consumption. Their hides are used for making leather goods. Lactating camels are milked three times a day, producing about nine litres per day in the wet season and six litres in the dry season. The duration of lactation is 12 months, but if the camel does not conceive it will give milk for a second year. Camel milk is sold in small quantities and is also given away or shared with neighbours. The major importance of camel milk is its availability in dry seasons and during times of drought when milk from other livestock is scarce. At such times, camel milk contributes from 50 to 100 percent of the nutrient intake of some of the pastoralist groups.

Camels, especially males and old, unproductive females, may be sold for meat. Camel meat is eaten on ritual or festive occasions. Camels are rarely slaughtered for meat at slaughterhouses. Traditional camel production by pastoralists in Eritrea is characterized by communal use of pastures and seasonal migrations of herds and households. The frequency of migrations might range from once to as much as five times per year and migration distances might be very short or extend to several hundred kilometres. Of crucial importance to this migratory system is the availability of sufficient pack animals for each household. Since seasonal migrations are often only feasible during very limited periods, sharing of animals or borrowing them from other households is rarely possible, and therefore lack of pack animals is a severe handicap.



*Camels can be used for sesame oil pressing in rural areas*  
*Les dromadaires peuvent être employés pour presser l'huile de sésame dans les zones rurales*  
*Los camellos se pueden utilizar para la extracción de aceite de sésamo*



*A large herd of dromedaries at a watering point*  
*Grand troupeau de dromadaires rassemblés autour d'un point d'eau*  
*Grande hato de dromedarios reunidos en un punto de agua*



*Sarcoptic mange (shown as black marks) being treated with a traditional herb, jelwet*  
*La gale sarcoptique, qui apparaît ici sous forme de taches noires, peut être traitée à l'aide*  
*d'herbes traditionnelles (jelwet)*  
*La sarna sarcóptica, aparece en forma de marcas negras, se puede tratar con hierbas*  
*tradicionales jelwet*

## **Ownership**

Ownership of camels by Eritrean pastoralists is not well documented but, although individuals and families own camels, overall they are always considered to be clan property. They are marked with a specific clan brand and a subsidiary mark which is unique to an individual or family. An individual owner has no absolute right to give or refuse to give his or her animals. The clan members decide on the distribution of camels and can also arrange to give them to deprived families or individuals. These will include pregnant, lactating and immature camels. Thus, the clan ensures that members who have lost their animals can recover from the disaster.

Although camels are considered to be clan property, individuals or families have the right to loan camels to relatives and friends who do not have enough for milk supply or transport. Loans are made without payment and the decision to loan is usually made by the head of the family who is always male. When the emergency has passed, these camels will be returned to the individual or family who loaned them. Acquisition of camels starts at the birth of a child: the father gives his son a young or newly born female camel. The child also receives gifts of camels from his close relatives. As he grows, his herd also grows. When he marries, a portion of the family herd is allocated to him and two to seven camels are given to the new father-in-law. The selling of male camels from one family to another is common but females are rarely sold. Camels, or their value in cash, are given as compensation in cases of homicide or when personal injuries are inflicted. While camels are mostly owned by Muslim lowlanders in Eritrea, they were introduced into the highlands during the war of independence for carrying trade goods and for transport.<sup>1</sup> This has led to some camels being owned by Christian highlanders who keep them for transport but do not drink their milk or eat their meat. The exception is the Saho tribe whose members live in the highlands and keep camels for transport, milk and meat.

## **Management**

Camels are usually herded by unmarried men and boys. Women take care of small ruminants, but they may also take care of pack camels in some parts of Eritrea, for example in the Sahel and the southern Red Sea region.

Training of camels for work starts when they are four to five years old and by the age of ten they are fully developed and have attained maximum productivity. On farms, camels may be used for ploughing, especially in the western lowlands of Eritrea, and may be employed in dragging thorn bushes to make enclosures for livestock. When used for transport, male camels may carry nomads' houses and utensils, very young children, weak or sick people and young animals. Since the middle of the day can be very hot, movement is preferred early in the morning or late in the afternoon, or they may travel at night when there is moonlight. Each camel has a rope tied to a halter fitted on its head; the rope of the lead camel is held by a guide man or woman and other camels follow in line with head ropes tied to the tail of the camel in front. In herd management, preferential care is given to female camels. Camel owners may cull male calves to increase the herd reproduction potential and to provide more milk for the family.

## Reproduction and breeding

Camel owners in Eritrea control the breeding of their camels by supervision of the breeding males. The breeding season starts at the beginning of the rainy season in July and continues throughout, but if camels are in good condition and plenty of forage is available breeding males can become sexually active and females fertile and receptive at any season. During the rainy season and when environmental conditions are good, the male displays sexual activity (rutting) by becoming aggressive, extending an air-filled bladder of oral mucosa and bellowing. The female responds by sitting in front of the male, after which mating takes place. If there is no drought, female camels are selected for breeding twice a year. A herd of 95 camels was observed by the author for two years from 1985 and the herd's owners were interviewed to ascertain their traditions and methods of management. The majority of the females in the herd were mated in the summer (rainy season, commencing in July) and the rest in the winter (short rainy season, commencing in January) when forage was plentiful, following traditional practice. Calf mortality was high: 13 died during the study, eight were male and five were female. A survey of the reproduction parameters of 27 female camels was conducted and the results are shown in Table 2. The camels covered by the study calved between September and May.

## 2

### Reproduction parameters of 27 camels observed

### Paramètres de reproduction relatifs aux 27 dromadaires observés

### Parámetros de la reproducción de 27 camellos observados

Parameter	Mean	Range
Age at first heat ( <i>years</i> )	4.6	3.9 to 5.3
Age at first calving ( <i>years</i> )	6.9	6.1 to 7.6
Gestation period ( <i>days</i> )	383.5	376 to 392
Annual birth rate (%)	48.6	43.9 to 53.3
Number of services/male/season	49	43 to 56

Selection of future breeding males starts at birth. It is based on the history of the performance of the dam, the length and width of the hump and the colour. Two to four camels are selected and they are given special care. Their owners try to protect them from parasitic diseases and ticks and provide them with enough milk to ensure their development. If possible, they are not used for transport because owners believe this weakens them; they are subsequently less sexually active and their life span is reduced. When males are five to six years old, they are allowed to mate a few six-year-old females. If the offspring are good, the number they are allowed to mate is increased to 40 females of all ages per breeding season when they are seven to eight years old. Female camels can be bred until they are about 21 to 25 years old, during which time they can produce about 12 or 13 calves. At the end of the breeding period, the owner terms the camel *awidet*, meaning that its reproductive cycles have stopped and it is no longer productive. A pack male may be used for mating but during the breeding season it will rarely be used for work. When used in this dual capacity, the life of a pack male is reduced to 22 years. It is termed *angheloy* when it is no longer fit for breeding or work. The breeding male will mate females day and night throughout the rutting season. Pastoralists can detect pregnancy within 15 days of mating by observing the following signs: coiling of the tail towards the hump; frequent urination; the head is raised with the ears pointed straight and the long neck is curved back to the shoulder when a male camel or a man approaches. The gestation period of a camel is 13 months. Breeding animals are selected for the following attributes: productivity, physical strength, colour and resistance to disease. Castration of camels was not practised in Eritrea until 1982 when the author demonstrated open and closed methods of castration at farmers' training centres. Since then, castration of camels has become popular.

## **Herd structure**

Herd structure depends on environmental conditions and family requirements for milk, labour and breeding animals. If labour is available and forage is adequate, larger herds may be managed for prestige and to provide camels for sale. The herd of 95 camels observed by the author was divided into male and female calves and immature and mature males and females. The percentages in each group are shown in Table 3.

### **3**

#### **Structure of a herd of 95 camels**

#### **Structure d'un troupeau de 95 dromadaires**

#### **Estructura de un hato de 95 camellos**

Category	Percentage
Male calves	12.4
Female calves	11.6
Immature males	5.6
Immature females	15.8
Mature males	9.5
Mature females	45.1

## **Feeding**



Camels live under semi-wild conditions, browsing and grazing all the year round, without any supplementary feeding. The exceptions are working camels, especially those used in an *assara* which feed on sesame oilseed by-products. Camels can very efficiently get at the small annual grasses found on clay soils that are seasonally flooded, as seen in the Tesenei district of the Gash-Barca region of the western lowlands of Eritrea. The leaves of evergreen bushes and smaller trees are important sources of browse during the dry seasons. Eritrean pastoralists start moving their camels to areas where these are found from November onwards and stay there until the end of June. They return to their base from the beginning of July and stay there for three to four months. However, if there is sufficient rainfall to support the trees and bushes in the areas of dry season browse the owners may decide to keep their animals there.

## **Watering**

The ability to move long distances and find green forage minimizes the camel's need for water. During wet seasons, the camels studied did not drink water since their needs were satisfied by the lush plant species they consumed. Camels are constantly moved to where the best forage is available and are normally kept at a distance to water of no more than a two-day walk. Permanent water sources are located in the areas between the grassland plains and river basins. During the dry season, a number of 14 to 30 m deep wells provide watering points, some with earthen reservoirs around them while others have tree trunks placed in a rectangle to form reservoirs. These will accommodate about nine to twelve camels at any one time. A camel drinks a minimum of 20 to 25 litres a day.

Pastoralists prefer to water their camels between 6 a.m. and 9 p.m. When there is insufficient forage available, they are watered in the early morning to give them more time to find browse. Owners believe that camels consume less water in the cool hours of the day and also that it is not good for their health to drink too much on an empty stomach. However, when plenty of forage is available they are allowed to drink as much as they can so long as this does not interfere with the feeding time which, in turn, would affect their food intake. In the middle of the dry season, camels often refuse water in the morning but will drink large quantities during the hot hours of the day. This is due to the fact that during the cool hours the camel's skin may become wet because of overnight dew or light showers which occasionally occur. Evaporation of this water helps to cool the animals without loss of physiologically stored water. One farmer interviewed reported that camels may not be watered for up to 40 days under these conditions.

## **Work capacity and production parameters**

At the age of ten years the camel is fully developed and can carry about 150 litres of water for five to six hours, or 200 kg of sorghum for five to eight hours, covering 25 to 35 km in one day. When camels are used in an *assara*, they can extract and crush 30 to 40 litres of sesame oil in a working day of seven to eight hours.

A survey was conducted of the production parameters of 27 camels and the results obtained are shown in Table 4.

### **4**

#### **Production parameters of 27 camels observed**

#### **Paramètres de production relatifs aux 27 dromadaires observés**

#### **Parámetros de la producción de 27 camellos observados**

Parameter	Mean	Range
Daily milk yield ( <i>litres</i> )	4.7	3.6 to 5.8
Lactation period ( <i>months</i> )	14.4	12.0 to 16.8
Mature body weight ( <i>kg</i> )	410	357 to 463

## Diseases

Diseases affecting camels in the western lowlands of Eritrea were surveyed during a field study lasting one year (June 1984 to May 1985). Sixteen camel herds belonging to different tribes were selected for this investigation. Out of 15 518 camels examined, 5 952 (38.8 percent) showed signs of disease. Disease prevalence was higher in the summer (47.7 percent) than in the autumn (40.6 percent) and was lowest in the winter (19.2 percent). The ten most common disease conditions observed, in order of prevalence, are shown in Table 5.

### 5

**Common disease conditions of camels, in order of prevalence, observed in the western lowlands of Eritrea (June 1984 - May 1985)**

**Etat pathologique des dromadaires, par taux de prévalence, observé dans les basses terres de l'Ouest de l'Erythrée (juin 1984 - mai 1985)**

**Situación de las enfermedades comunes de los camellos, en orden de prevalencia, observadas en las tierras bajas occidentales de Eritrea (junio de 1984 - mayo de 1985)**

Disease	Camels affected (%)
Sarcoptic mange	12.1
Helminthiasis	6.4
Wounds and abscesses	5.0
Ringworm	2.6
Night blindness	2.1
Chronic cough and pneumonia	2.0
Neck pain	1.9
Mastitis	1.6
Contagious skin necrosis	0.7
Lameness	0.6

There were also cases of abortion and infertility, and brucellosis was suspected but not definitely identified. Although it was not observed in the western lowlands, camel owners in the eastern lowlands recognized cases of surra (*Trypanosoma evansi*) and complained that it seasonally affects their camels. Cases of rabies were particularly searched for but were not detected.

***Sarcoptic mange.*** Because of the high prevalence of sarcoptic mange in the camels studied, the severe lesions it causes and the lack of literature on the disease in the camels of Eritrea, apart from its mention in reports of the Eritrean Veterinary Services, the author made a particular study of the disease in the western lowlands. In this study, 28 000 pack camels were surveyed, 20 000 in moving herds observed at water points and 8 000 at *assara*. The study

was conducted over a period of six years during the summer (rainy season), autumn and winter.

Sarcoptic mange was present in 15 110 camels (54 percent of those examined), indicating the widespread prevalence of the disease in Eritrea. It was observed to be highly contagious, becoming generalized on the body of affected camels and readily infecting healthy animals. The highest incidence of sarcoptic mange was during the summer rainy season. Incidence was also relatively high in the autumn but low during the winter. The affected camels became gradually emaciated and milk production from affected females was reduced by 38 percent in the dry season and by 44 percent in the rainy season. A comparative study of male pack camels affected and unaffected by sarcoptic mange demonstrated that the disease reduced their work performance by more than 50 percent (Table 6).

## 6

### **A study over a six-month period of the working performance of male pack camels affected and unaffected by sarcoptic mange**

**Une étude des travaux accomplis au cours d'une période de six mois, par des dromadaires mâles de somme, selon qu'ils étaient atteints ou non de gale sarcoptique**  
**Estudio del rendimiento en el trabajo, durante un período de seis meses, de camellos machos de carga afectados y no afectados por la sarna sarcóptica**

Disease status	Number of movements	Distance travelled (kg)	Amount of fuelwood carried per movement (kg)
Unaffected	24	72	100
Affected	9	27	40

Treatment of naturally infected field cases and experimentally infected animals with 3 to 7 ml of 12.5 percent deltamethrin per litre of water produced excellent clinical recovery (Gebrehiwet, 1997). This was achieved after first washing the skin with 0.1 percent HCH (Gamatox) suspension and removing the crusts and detritus (Gebrehiwet, 1997).



***Camel infected with sarcoptic mange, showing numerous papules and nodules on its head ...  
 Dromadaire atteint de gale sarcoptique, dont la tête présente un grand nombre de papules***

*et de nodules ...*

*Camello infectado por la sarna sarcóptica, con numerosas pápulas y nódulos en la cabeza ...*



*... and a thick crust on the neck because of the advanced stage of the disease*

*... avec des croûtes épaisses dans le cou, à un stade avancé de la maladie*

*... y una gruesa costra en el cuello debido a la fase avanzada de la enfermedad*

## CONCLUSION

The camel is a very important animal in Eritrea, particularly for the people of the eastern and western lowlands who, although occupying a large part of the country, live in areas where the arid environment severely limits their options for agricultural production. Over many generations they have evolved production systems reliant on livestock keeping and pastoral movement of animals. The camel has proved to be a most important component of their pastoral systems because of its attributes of providing a variety of products and its unique ability to make use of an arid environment. By reason of its mobility and ability to utilize a wide variety of plants through grazing and browsing, it survives and reproduces without contributing to desertification. Its browsing habits enable it to take part in mixed grazing systems where it is not competitive, particularly with small ruminants, which have different grazing and browsing patterns, thus enabling the most efficient usage of a fragile environment without causing degradation. It is to be hoped that the camel's attributes will continue to be exploited and that a place will be kept for it in development programmes for hot, arid lowlands so that it can continue to support and improve the wealth and well-being of the pastoralists of Eritrea and similar areas where it is so highly valued.

<sup>1</sup> *During Eritrea's war of independence, the camel was essential for transporting, often carrying loads of 200 kg for more than ten hours a day and thus was adopted as the country's national emblem.*

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