



DIVERSITY OF GAZELLE SPECIES BELONGING TO THE GENUS *GAZELLA* AND MEASURES FOR THEIR CONSERVATION

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Abstract: Gazelles possess a high capacity for adaptation to arid and semi-desert conditions. Their body structure, sense organs, modes of movement, seasonal coat changes, and water-conserving physiological mechanisms enable them to survive in a harsh environment. The behavior, seasonal movements, and feeding habits of gazelles are also important components of these adaptations. As an important component of Azerbaijan's natural fauna, they play a significant role in preserving biodiversity and ensuring the stability of semi-desert and steppe ecosystems. This article summarizes the biological, ecological, morphological, physiological, and behavioral characteristics of gazelles, as well as their distribution, habitat, diet, population dynamics, the threats they face, and conservation measures. Research indicates that gazelles have inhabited the territory of Azerbaijan since ancient times. However, since the mid-20th century, gazelle populations and their distribution have declined significantly due to illegal hunting, habitat loss, agricultural expansion, and other anthropogenic factors. The expansion of protected areas, population monitoring, reintroduction programs, and public awareness initiatives—both globally and in Azerbaijan—have had a positive impact on the recovery of gazelle populations. Thus, the long-term conservation of gazelles requires a comprehensive approach that integrates habitat protection, the prevention of illegal hunting, scientific monitoring, the restoration of ecological connections, and international cooperation. The ecological, historical, and cultural significance of gazelles makes their conservation a priority in the protection of biodiversity.

Keywords: biodiversity, distribution range, habitat, migration, population dynamics, ecological adaptation, anthropogenic factors, reintroduction.

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Introduction

The Antilopini include true gazelles (genera *Eudorcas*, *Gazella*, and *Nanger*), *Procapra* (which, like gazelles, differ from dwarf antelopes), *Saiga*, and dwarf antelopes (*Dorcatragus*, *Madoqua*, *Ourebia*, and

Raphicerus).

Gazelles are antelopes belonging to the genus *Gazella* and the order Artiodactyla. There are also seven species belonging to the genera *Eudorcas* and *Nanger*, which

were previously considered subgenera of the genus *Gazella*. The third subgenus, *Procapra*, comprises three extant species of Asian gazelles.

Taxonomically, antelopes belong to subclass Theria, Superorder Eutheria (Placenta), Order Artiodactyla, Suborder Ruminantia, Family Bovidae, Subfamily Antilopinae, and tribe Antilopini (Castelló 2016).

Gazelles are divided into three genera and numerous species (Khaleel & Salih 2017). According to Lydekker's catalogue, numerous forms of gazelles include 27 species (Blank 2025). It is found in Miocene, Pliocene, and Pleistocene deposits across Eurasia and Africa, indicating a wider distribution than that of the genus's modern members. The earliest members of the genus are known from the Middle Miocene of Africa (approximately 14 million years ago), and members of the genus lived in Europe from the Late Miocene until their extinction during the Early Pleistocene, approximately 1.8 million years ago. Gazelles are known as fast-running animals. Some can run at

speeds of 100 km/h (60 mph) or at a sustained speed of 50 km/h (Pas 2014). Gazelles are primarily found in the deserts, grasslands, and savannas of Africa, but they also occur in Southwest and Central Asia and on the Indian subcontinent. They tend to live in herds and feed on tender, easily digestible plants and leaves.

Gazelle Species

1) *Gazella dorcas* L.

Dorcas gazelle (*G. dorcas*), also known as the Ariel gazelle, is a small-sized gazelle species (Figure 1). Both males and females have horns, but the horns of the females are thinner, lighter, and less curved. Its color varies depending on the habitat; the white underside is bordered by a brown stripe, while the upper part is predominantly sand-colored. Its body length is 90–110 cm, and its weight is 15–20 kg. The species is distributed across the grasslands, deserts, valleys, mountain deserts, and semi-desert areas of Africa and Arabia. It is estimated that there are approximately 35,000–40,000 individuals in the wild (Grubb 2005).



Figure 1. Dorcas gazelle (*Gazella dorcas*) and its distribution.

Lifestyle and population: In unfavorable conditions, they live in pairs, whereas in more favorable environments, they live in groups consisting of one male, several females, and their offspring. It is well adapted to desert conditions and is

primarily active during the evening and night hours (Lafontaine et al. 2006).

The main threats to the species are overhunting, habitat destruction, agricultural expansion, and competition with domestic animals (Bergin & Nijman 2014; 2015).



Population figures for individual countries are reported as follows: 800–2,000 in Morocco, fewer than 2,000 in Israel, 1,000–2,000 in Egypt, and approximately 3,000 individuals in Niger. The Dorcas gazelle is classified as "Vulnerable" (VU) by the IUCN.

2) *Gazella leptoceros* F. Cuvier

The slender-horned gazelle (*G. leptoceros*), also known as the Rhim gazelle, is found in the sandy and rocky deserts of Algeria, Egypt, Sudan, and Libya (**Figure 2**). It has long legs and a slender build; its fur is light brown, while its underparts are white. Its long, slightly curved horns, large ears, and keen hearing and eyesight are adapted for life in the desert. The head and body length of adult individuals ranges from 76 to 165 cm, and the tail length is up to 31 cm. Males are larger than females. Well-adapted to dunes, this species rarely needs water, obtaining the necessary moisture primarily from the plants it feeds on. Its diet includes grass, succulents, and shrubs'

leaves; it feeds primarily at night and during the early morning hours ([Huffman & Leslie Jr 2023](#)).

Lifestyle and population: Goitered gazelles are active during the cooler parts of the day, while during the hottest hours they rest in shaded, low-lying areas. They live in small family groups, while males are encountered singly or in pairs. It has adapted to the high temperatures of the desert through a mechanism of heterothermy: it reduces water loss by raising its body temperature during the day and normalizes its temperature by dissipating heat at night ([Babor et al. 2014](#); [Dittmann et al. 2015](#)).

The species' population has declined sharply since the 1970s. While hunting for meat, horns, and decorative purposes was previously the primary threat, poaching, human activity, and habitat loss are currently the main risks. According to IUCN data, approximately 300–600 mature individuals remain worldwide. The species falls into the "Endangered" (EN) category, and its population is declining.



Figure 2. *Gazella leptoceros* and its distribution.

3) *Gazella gazella* Pallas

The mountain gazelle (*G. gazella*), or Palestinian mountain gazelle, is a widely distributed gazelle species (**Figure 3**). Both

sexes have horns, but the males' horns are larger and ringed, while the females' are shorter and thinner. The weight of males

ranges from 17 to 29.5 kg, while that of females ranges from 16 to 25 kg. This species can reach speeds of 80 km/h (Castelló 2016; Quliyev 2008).

Lifestyle and population: Mountain gazelles are diurnal and typically live in herds of 3 to 8 individuals. These herds consist of maternal groups, male groups, or solitary territorial males. During the hottest hours of the day, they rest on hill and

mountain slopes and forage at dawn and dusk.

The main threats are poaching, habitat loss and fragmentation, road accidents, as well as predation by feral dogs and jackals in certain areas. According to the IUCN Red List, the population consists of fewer than 3,000 individuals, and the species is classified as Endangered (EN).



Figure 3. *Gazella gazella* and its distribution.

4) *Gazella arabica* Lichtenstein

The Arabian Gazelle (*G. arabica*) is distributed across the Middle East, particularly in the Arabian Peninsula, Palestine, and Sinai (Figure 4). It has a slender build, a long neck and hind limbs, dark brown fur, a white belly, and a short black tail. Both sexes have horns and can run at a speed of 80 km/h. A keen sense of sight, hearing, and smell is crucial for their survival (Al Hikmani et al. 2015).

Lifestyle and population: This

species inhabits mountainous, hilly, and desert plateaus; it moves in groups, rests on hills during the day, and feeds in the morning and at night (Al Hikmani et al. 2015).

The main threats to the Arabian gazelle are illegal hunting, habitat destruction, predation, competition, and climate change. According to the IUCN Red List, the population consists of fewer than 10,000 mature individuals, and the species is classified as Vulnerable (VU).

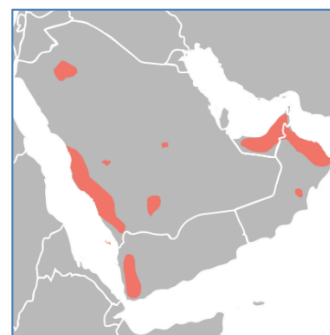


Figure 4. *Gazella arabica* and its distribution.



5) *Gazella cuvieri* Ogilby

The Cuvier's gazelle is a medium-sized antelope species distributed across North Africa, primarily in Morocco, Algeria, and Tunisia, and shares the same habitat as the dorcas and slender-horned gazelles (**Figure 5**). The shoulder height is approximately 68 cm, and the weight reaches 25 kg for females and 35 kg for males. It is characterized by a dark, long, and coarse coat, and dark-brown side stripes that contrast with the white belly and back area. Both males and females possess horns 25–37 cm in length, featuring thick rings and tips that curve forward ([Bounaceur et al. 2016](#); [Lee 2003](#)).

Lifestyle and population: Cuvier's

gazelles spend the greater part of the day feeding. Depending on the season, they feed on grasses and shrubs. Dew and bodies of water are the primary sources of water. Under high-temperature conditions, they are active primarily during the night and morning hours ([Bounaceur et al. 2016](#)).

Since the early 20th century, the population has undergone a significant decline due to overhunting, and habitat loss resulting from agriculture and livestock farming remains one of the primary threats. According to IUCN data, the species' total population is approximately 1,750–2,950 individuals, and it is classified as "Endangered" (EN).



Figure 5. *Gazella cuvieri* and its distribution.

6) *Gazella saudiya* Carruthers & Schwarz

The Saudi gazelle is an extinct species of gazelle that once ranged across the northern and western parts of the Arabian Peninsula, in areas extending from Kuwait to Yemen (**Figure 6**). It lived primarily on gravelly and sandy plains where acacias are distributed, either singly or in groups of up to 20 individuals. It was last observed in the wild in 1970, declared extinct in the wild in 1996, and officially assessed as "Extinct" (EX) on the IUCN Red List in 2008 ([Carruthers & Schwarz 1935](#)).

7) *Gazella bilkis* Groves & Lay

The Queen of Sheba's gazelle, or the Yemen gazelle, is a species considered endemic to the Taiz region of Yemen and currently regarded as extinct (**Figure 7**). The last confirmed sightings were recorded near Taizz in 1951, while surveys conducted in 1992 revealed no trace of the species. Urbanization and the loss of habitat, overhunting, and the lack of effective conservation measures are considered the primary reasons for the species' extinction. There is currently no protected area for the species, and no confirmed observations have been recorded in recent years ([Mallon & Kingswood 2001](#)).



Figure 6. *Gazella saudiya* and its distribution.

G. bilkis was distinguished by its dark-brown fur, white belly, and characteristic blackish-reddish stripes. The straight horns of the males, featuring 12–15 rings, reached a length of up to 229 mm. The species inhabited hills covered primarily with Euphorbia plants, at elevations of 1,230–

2,150 meters above sea level. Its ecological requirements were similar to those of *G. saudiya* and *G. arabica*, and the Arabian leopard and Arabian wolf were considered its primary predators (Mallon & Kingswood 2001).

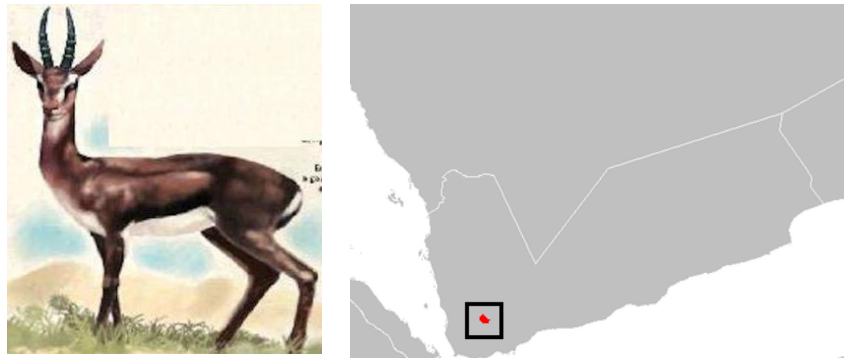


Figure 7. *Gazella bilkis* and its distribution.

8) *Gazella bennettii* Sykes

The chinkara (*Gazella bennettii*) is also known as the Indian gazelle (**Figure 8**). The species is distributed primarily in India, Iran, Pakistan, and Afghanistan (Dookia et al. 2009). Currently, the following 6 subspecies are considered valid: *G. bennettii* subsp. *bennettii* (Southern and Central India); *G. bennettii* subsp. *christii* (Pakistan and West India, Gujarat); *G. bennettii* subsp. *fuscifrons* (Eastern Iran, southern Afghanistan, Pakistan, and northwestern India; it is the darkest-colored subspecies); *G. bennettii* subsp. *karamii* (southwestern Iran, near Bushehr; it is the smallest subspecies); *G. bennettii* subsp. *shikarii*

(Northern and central parts of Iran; it is the lightest-colored subspecies); *G. bennettii* subsp. *salinarum* (Pakistan's Punjab region and the northwestern part of India) (Mallon & Kingswood 2001).

The chinkara has a body height of approximately 65 cm and weighs 23 kg. In summer, the coat is reddish-brown, whereas in winter, the belly and throat areas are whiter. Dark stripes extending from the eyes to the mouth, bordered by white lines, are observed on its face. Both males and females have horns, but the females' horns are shorter (Mallon & Kingswood 2001).

Lifestyle and habitat: The chinkara is primarily active in the evening and at night.



It feeds on leaves, grass, and other plants. It usually lives alone, in pairs, or in small groups. Males defend territory, and the species is polygynous. There are two breeding seasons per year, and the gestation period lasts 5–5.5 months. Usually one offspring is born, though sometimes two. The young stay with their mother for about a year. The chinkara primarily inhabits deserts, arid plains, scrublands, and sparse forests. It is distributed across more than 80 protected areas in India, with the densest populations located in the states of Gujarat, Rajasthan, Madhya Pradesh, and Maharashtra (Castelló 2016). In Pakistan, it is found at elevations of up to 1,500 meters,

while in Iran, the largest populations have been recorded in Kavir National Park and other protected areas.

Its main natural enemies are the Indian leopard, Bengal tiger, Asiatic lion, Indian wolf, and golden jackal, as well as, in some cases, the Indian python and the mugger crocodile. Wild dogs also pose a threat to them outside protected areas. In 2001, the population of the species in India was estimated at approximately 100,000 individuals. Populations in Pakistan and Iran have declined due to hunting, while the species has become extremely rare in Afghanistan (Solari & Baker 2007).

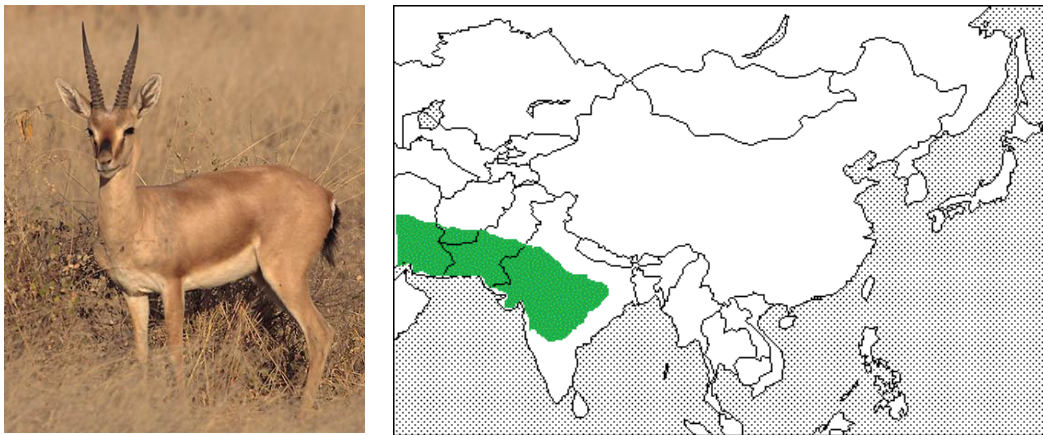


Figure 8. *Gazella bennettii* and its distribution.

9) *Gazella spekei* Blyth

Speke's gazelle (*Gazella spekei*) is the smallest species of gazelle. (Figure 9). This species is sometimes considered a subspecies of the Dorcas gazelle, although this view is no longer widely held. Severe habitat fragmentation indicates that it is no longer possible to assess the natural migration or nomadic patterns of *G. spekei*. Its numbers are at risk, and despite a population increase, the IUCN announced in 2007 that its status had changed from vulnerable to endangered. As of 2008, this gazelle is classified as endangered on the IUCN Red List. Speke's gazelle is named after the British explorer of Central Africa,

John Hanning Speke.

Body length 105 cm, shoulder height 60 cm, weight 25 kg. Slender, vertically oriented, ridged horns. Its color is pale brownish-beige, with dark brown stripes along the sides. It has a white belly and a swollen sac on its snout; it is used during encounters. It is particularly notable for its narrow, pointed face, as well as its large, exaggerated nasal passages (Hsu & Benirschke 1974).

Lifestyle and habitat: It is restricted to the Horn of Africa, where it inhabits rocky scrublands, grassy plains, and semi-deserts. The species ranges across East Africa, primarily in the eastern parts of

Somalia, extending as far as eastern Ethiopia. It inhabits semi-deserts and dry

shrublands featuring acacia trees and small shrubs (Hsu & Benirschke 1974).



Figure 9. *Gazella spekei* and its distribution.

10) *Gazella subgutturosa* **Güldenstaedt**

Gazella subgutturosa is the only representative of the subfamily Antilopinae in the Caucasus. On a global scale, the species is distributed from the Caucasus to Iran and eastward to Pakistan, and across Central Asia (spanning Turkmenistan, Turkey, Georgia, Azerbaijan, Iran, Iraq, Pakistan, Afghanistan, Tajikistan, Kyrgyzstan, Uzbekistan, and Kazakhstan) as far as China and Mongolia. In the Caucasus, this species is widely distributed across the semi-deserts, arid plains, and foothills of Azerbaijan and southeastern Georgia (Figure 10). Herds of goitered gazelles (*G. subgutturosa*) migrated to the Caucasus

from the Iranian-Afghan plateau following the last glacial period, displacing the saiga (*Saiga tatarica*) that had previously inhabited the region. Gazelles inhabited the primarily flat and foothill regions of the Caucasus and were a numerous species (Askerov et al. 2021; Reshag et al. 2021).

Among the animal bones discovered during excavations at the Stone Age human settlement in Gobustan, gazelle remains hold a special place. There is no shortage of petroglyphs belonging to this type among the rock art found here. Stone Age humans carved gazelles onto rocks and performed various rituals around these images before setting out to hunt.



Figure 10. *Gazella subgutturosa* and its distribution.



General Characteristics

Gazelles have a graceful and slender build. The horns are lyre-shaped, curve inwards towards the tips, and are ringed. Horns develop primarily in males. Horn length is 25–43 cm in males and up to 5 cm in females. Their color ranges from sandy to brown, with the belly and the inner parts of the legs being light-colored. Their tails are 15–20 cm long and make the white "mirror" area conspicuous when they move. Their body length is 90–115 cm, shoulder height is 60–80 cm, and weight is 18–33 kg (Castelló 2016). Females reach sexual maturity at 9 months of age, and males at 18 months. Gestation lasts 5–6 months, and usually 1–2 offspring are born. The average lifespan is 10–12 years. The time of birth varies between March and June, depending on climate and weather conditions (Quliyev 2008).

The gazelle's skeleton is strong and well-developed. In males, the skeleton is heavier than in females due to the horns. The strong development of the hind limbs is associated with its long-legged build and ability to run fast. The skull is relatively short, the neck is long, and the thoracic and lumbar regions are short. The vertebral column consists of 7 cervical, 13 thoracic, 6 lumbar, and 4 sacral vertebrae. Sexual dimorphism is observed in the structure of the pelvis. The muscle mass of the hind limbs is approximately 1.5 times greater than that of the forelimbs. The muscle mass of the hind limbs is approximately 1.5 times greater than that of the forelimbs. The primary ossification of the skeleton is completed by approximately age 2 (Blank 2025).

The skull of the goitered gazelle is characterized by well-developed lacrimal fossae, large tympanic bullae, and large horn cores in males. A broad palate and orbital region distinguish it from other gazelle species. The teeth are high-crowned

(hypsodont) and of the selenodont type, and adult individuals have 32 teeth. The young are born with milk teeth; permanent molars develop during the first year, and the replacement of teeth proceeds at approximately 14 months of age (Blank 2025).

Distribution Range and Habitat

Gazelles primarily inhabit semi-desert plains characterized by wormwood and saltwort, as well as rolling steppe areas. For this species, which is well-adapted to arid, clayey, and gravelly soils, landscapes with semi-desert vegetation constitute the primary natural habitat. In addition, gazelles can also be found in foothills and low-mountain areas. During periods of drought, they can travel several kilometers to water bodies and canals to meet their water needs. It is also observed that they move to biotopes with more favorable food and water resources, depending on seasonal conditions.

Gazelles are distributed across Iran, the South Caucasus, Asia Minor, Central Asia, Afghanistan, Pakistan, Mongolia, China, and Azerbaijan. Population numbers have declined in many areas due to the influence of historical-political and anthropogenic factors (Hoath 2009).

In Azerbaijan, gazelles primarily inhabit semi-deserts and plains. Archaeological and paleozoological findings indicate that this species has existed within the country since ancient times and lived here approximately 2 million years ago. Although they were distributed across vast areas in the mid-20th century, their numbers have declined sharply since the 1950s due to illegal hunting and habitat degradation. A total of 131 individuals were recorded in 1960–1961. Currently, the main areas of distribution are Shirvan National Park and the areas surrounding the Koroghlu River (Quliyev 2008).

In the 20th century—particularly after

the 1930s—its numbers declined rapidly due to overhunting and the loss of habitat caused by the expansion of agriculture and livestock grazing. Studies conducted in the late 1950s determined that there were fewer than 200 gazelles in Azerbaijan, with 77 of them found in the Shirvan Plain. By that time, goitered gazelles had become extinct in Georgia. The measures implemented by the Azerbaijani government in response to this—particularly the establishment of the Shirvan protected area (currently 640 km²), saved this gazelle from extinction in the Caucasus. According to recent surveys, the number in Shirvan has risen to 7,000. This figure accounts for more than 10% of the global gazelle population. Between 500 and 600 gazelles inhabit the low Bozdag Mountains in northwestern Azerbaijan—specifically in the Korchay Protected Areas, south of the Mingachevir Reservoir (Askerov et al. 2021).

The diet of gazelles consists mainly of semi-desert and desert plants. In Shirvan National Park, the primary food plants include *Nitraria* (black boxthorn), *Halostachys*, *Salicornia* (glasswort), *Artemisia* (wormwood), *Salsola*, and various meadow-marsh plants Tamarisk and Shahsevdi are particularly widespread in the area. During the winter months, ephemeral plants and low-growing shrubs are the primary sources of food. 75-80% of the vegetation in residential areas is made up of semi-desert plants. In spring, ephemeral plants develop rapidly, and at the end of summer, they form seeds and dry. From late spring onwards, the importance of bulbous plants in nutrition increases. The drying up of ephemeral plants in summer reduces the forage base. Although Lake Cala and the Shirvan collectors in Shirvan National Park play a significant role in meeting the water needs of gazelles, they do not fully satisfy their water requirements. Therefore, seasonal fluctuations in food and water

resources influence the feeding and movement of gazelles (Dittmann et al. 2015).

Population structure, seasonal adaptation and Migration

The ratio of females to males in gazelle populations varies by area. In the Korchay State Nature Sanctuary, females account for 49.2% and males for 50.8%, whereas males predominate in Shirvan National Park. Differences in age composition are also observed: in Shirvan, adult individuals account for 72%, 1–2-year-olds for 9.6%, and juveniles for 18.4%, whereas in Korchay, the corresponding figures are 63.4%, 12.6%, and 24%.

Seasonal adaptation manifests itself in the choice of habitat and in group behavior. They prefer areas with soft soil in the summer and hard soil in the winter. Although they do not undertake long-distance migrations, seasonal movements do occur. During the autumn and winter months, herds merge to form large groups, whereas in late spring, they split into smaller groups.

Its coat also changes according to the season: sparse and brown in summer, but dense, long, and pale yellowish in winter. Molting occurs twice a year—in spring and autumn—and helps regulate temperature. Gazelles mark their territories by scraping the ground and leaving scent marks.

Gazelles are one of the actively migrating species of even-toed ungulates (Artiodactyla). During the spring and summer months, their activity increases depending on food and water supplies, while they rest in cool, shaded areas during the hottest hours. In winter, cold weather and food shortages compel them to migrate to more favorable areas. They show a preference for areas where water and food resources are more accessible, particularly during the months of March to May.



Keen eyesight, hearing, and sense of smell help gazelles protect themselves from predators. In Azerbaijan, Shirvan National Park and the areas surrounding Kangarli and Korchay are important habitats for gazelles. Food and water shortages and high temperatures affect their movement. The use of feed blocks for supplementary feeding in Shirvan National Park causes gazelles to congregate in specific areas.

Natural Enemies, Diseases, and Parasites

The main natural enemy of gazelles is the wolf. Newborns and cubs aged 15–20 days, however, are easy prey for wolves, foxes, jackals, steppe and jungle cats, stray dogs, and birds of prey. Living in open areas enables gazelles to detect danger in time and flee.

Gazelles are affected by external parasites, such as ticks, botflies, lice, and chewing lice, as well as internal parasites, primarily gastrointestinal helminths. Around 20 species of helminths have been recorded in Azerbaijan, and diseases such as tularemia, foot-and-mouth disease, fascioliasis, avitellinosis, and haemonchosis have been observed. Sharing pastures and water sources with livestock increases the risk of disease transmission.

Competition for food is also one of the factors affecting the population. Livestock and rodents can limit the gazelles' food supplies. Therefore, the protection of the habitat, the prevention of illegal hunting, the proper management of water and pasture resources, and the monitoring of diseases are essential.

The Economic and Cultural Significance of Gazelles

As an important part of Azerbaijan's biodiversity, gazelles play a role in maintaining the natural balance of ecosystems. Their elegant appearance and

distinctive behaviors have made them objects of human attention and interest for many centuries.

Gazelles are widely reflected in Azerbaijani poetry, art, and cultural heritage as symbols of natural beauty. Their economic, as well as potential biotechnological and breeding, significance is also noted. Historically, the gazelle has been considered a sacred and inviolable animal, and hunting it has been regarded as a sin. For this reason, the gazelle has been regarded as a symbol of kindness, peace, and reconciliation.

Conservation measures have been implemented worldwide. Gazelles are herbivorous mammals distributed primarily across Africa, Asia, and the Middle East, inhabiting arid and semi-desert environments. In recent decades, their natural population has declined sharply. Key factors contributing to this decline include habitat loss, illegal hunting, the expansion of agricultural areas, climate change, and natural barriers created by infrastructure (roads, fences, etc.). For example, the dama gazelle (*Nanger dama*) was formerly widespread across the Sahel zone. Currently, however, with fewer than 100 individuals remaining in the wild, it has been classified as "Critically Endangered" by the IUCN.

Restoration of goitered gazelles in Azerbaijan and Georgia

In the early 20th century, approximately 60,000 goitered gazelles (*Gazella subgutturosa*) lived in Azerbaijan. However, by the 1960s, this number had dropped below 200. Currently, as a result of reintroduction programs implemented through the joint initiative of WWF and IDEA, the number of gazelles exceeds 6,000 ([Askerov et al. 2021](#)).

Since 2013, under this program, more than 80 individuals have been translocated from Shirvan National Park to Georgia (the

Samukh Plain and the vicinity of Vashlovani Reserve), and nine generations of newborn gazelles have already been produced.

The goitered gazelle (*Gazella subgutturosa*) experienced a sharp decline in Azerbaijan during the 20th century as a result of agricultural expansion and intensive hunting. The species is classified as Vulnerable (VU) on the IUCN Red List and is included among the species requiring special protection in the Red Book of Azerbaijan (Askerov et al. 2021).

Approximately 160 gazelles have been relocated from Shirvan National Park to their historical habitats within the framework of a reintroduction program involving the Heydar Aliyev Foundation, the Ministry of Ecology and Natural Resources, IDEA, and the WWF. Approximately 160 gazelles have been relocated from Shirvan National Park to their historical habitats within the framework of a reintroduction program involving the Heydar Aliyev Foundation, the Ministry of Ecology and Natural Resources, IDEA, and the WWF. Conservation measures include population monitoring, ranger training, the use of modern surveillance equipment, and awareness-raising activities (Groves & Grubb 2011).

Conclusion

The genus *Gazella* consists of species with diverse morphological, ecological, and geographical characteristics, most of which are adapted to arid and semi-arid environments. However, habitat loss, illegal hunting, agricultural expansion, livestock grazing, competition for resources, and climate change have caused a significant decline in the population and, in some cases, its extinction.

Effective protection requires the conservation and restoration of the habitat, the prevention of illegal hunting, the monitoring of populations and diseases, the

sustainable management of food and water resources, and the maintenance of ecological corridors. Reintroduction and translocation programs can also contribute to the restoration of populations within their historical ranges. The recovery of the goitered gazelle (*Gazella subgutturosa*) in Azerbaijan demonstrates the effectiveness of coordinated conservation efforts. The protection of Shirvan National Park, population monitoring, anti-poaching measures, and reintroduction programs have contributed to the recovery of this species. Ongoing scientific research, public awareness, and national and international cooperation are essential to ensure the long-term survival of gazelles and to preserve their ecological and cultural significance.

Conflict of Interest

The authors declare that there is no conflict of interest.

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