

Ensuring the Reproduction of Gazelles, Whose Numbers are Decreasing in Türkiye and Whose Habitats are Confined to a Narrow Region, in New Habitats

Adil Uztemur¹, Abdulkadir Orman^{2*}

1 Republic of Türkiye Ministry of Agriculture and Forestry General Directorate of Nature Conservation and National Parks, Şanlıurfa, TÜRKİYE

2 The University of Bursa Uludag, Faculty of Veterinary Medicine, Department of Animal Science, Bursa, TÜRKİYE

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Abstract

The aim of this study was to resettle *Gazella Marica*, whose habitats are declining in Türkiye, to the foothills of Cudi Mountain, which is connected to the Silopi District of Şırnak Province, which was previously located within the natural habitat zone. The gazelles obtained from the 75th Year Gazelle Production Station were placed in individual crates of 100x36x90 cm made of plywood, with 51 numbers (24 females, 27 males) gazelles in 2020 and 40 numbers (19 females and 21 males) in 2021. Mass releases were made with a ceremony in an area with similar climatic characteristics, which is approximately 380 km away. 1 gazelle died in 2020, 6 gazelles died in 2021. During the post-release monitoring activities, the first reproduction records of gazelles released in 2020 were successfully recorded in 2021 and 23 new individuals were obtained. The current number of individuals reached 106. It has been observed that gazelles have adapted to the area in the 2 years. Illegal hunting is prevented as the region is within the borders of military security. Monitoring studies continue for the long-term management plan.

Key words: *Gazella marica*, habitat, reintroducing, breeding, observation

Introduction

Gazelles, which have a wide taxonomy and distribution area, are decreasing in number every day. *Gazella Marica*; It spreads from Yemen, Oman, Syria, Iraq, Saudi Arabia to Türkiye. Their number has been reported to be around 1750-2150 adults.¹ Two gazelle species have been reported in Türkiye. One of them is *Gazella Marica*, a subspecies of Goitered Gazelle, and the other is *Gazella gazella*, Hatay Mountain Gazelle.^{2,3,4} At the beginning of the 20th century, it stretched from Çukurova to Eastern Anatolia (İğdir and the Ararat Plains), but today, although its numbers are high in Şanlıurfa, it has remained in a narrow and limited area starting from Hatay and extending to Cizre along the southern border of Türkiye.^{5,6} *Gazella Marica* females are hornless, males are horned. Adult females average 13.86 kg, males 19.39 kg. From the second birth of females, the rate of twin births is high according to the season and nu-

tritional status.⁷ The birth weight of the offspring is between 1.84 for females and 1.95 kg for males.⁸ Birth seasons vary according to climate and species. Depending on the photoperiod, the mating season in our country is in the months of October-November-December, since it is located in the northern latitude. Births occur in late April and early May.^{9,10} In the first weeks after birth, the cubs mostly hide under a stone or in the grass.¹¹ When baby gazelles start walking and socializing, they gradually begin to communicate with their peers and later with the herd.¹² For gazelles grown indoors, alfalfa as roughage, black barley as concentrated feed, wheat, barley, superlac concentrate, etc. is given as ad libitum.¹³ Diet in gazelles living wild in nature; They are the plants in the region and the season. The main forage sources are Chenopodiaceae, Poaceae plants belonging to the family wheatgrass. In addition, it consumes Ephedraceae, Tamariaceae, Zygopllaceae, Haloxylon, Ammodendron families.^{14,15} Vegetation periods vary

* Corresponding author: Abdülkadir Orman, e-mail: orman@uludag.edu.tr, Tel: +90 5335643086 ORCID0000-0001-9138-4422

depending on the seasons of the plant species that it consumes. Since the plant species in each region is unique, the types of feed consumed by gazelles have a wide place. Since the plants it consumes are similar to other domesticated herbivorous mammals living in the region, the amount of feed consumed by gazelles during intensive grazing activities decreases, causing a lack of food, especially in winter.¹⁴ For the first time, a hunting ban was enacted in 1957 for gazelles, whose numbers are decreasing day by day in Türkiye.^{8,16} Despite the ban, the decline in numbers continued. Due to reasons such as the prevalence of illegal hunting, the opening of agricultural areas to settlement, the opening of pasture areas to agriculture, the living areas and numbers of gazelles have decreased. Due to these reasons, the natural habitats of gazelles have narrowed. In 2005, 86 Ceylan Wildlife Development Areas were released from the area near the Şanlıurfa Kızılkuyu village.⁸ Within the borders of the same region (37°02'N-38°42'E), the 75th Gazelle Breeding Station with an area of 22.72 hectares surrounded by a wire fence was established. The purpose of the establishment of this station: Maintaining the existence of gazelles, increasing their production and releasing them to the Wildlife Development Area, leaving them to new settlement areas with old living areas, protecting cultural values, and bringing them to tourism.¹⁷ Şanlıurfa Central Kızılkuyu Wildlife Development Area was declared on 5 October 2006 and its natural habitats were taken under protection.¹⁸ IUCN¹⁹ guidelines for reintroduction have been followed and efforts have been made to ensure that appropriate taxa of released gazelles are reintroduced and reintroduced in their former historical areas.

The aims of the study here: To ensure the resettlement of gazelles that had previously existed in the region. To examine the areas where the gazelles' biology spread and to protect its habitat in the area where the placement is made. Situations that may pose a threat should be identified and eliminated. To raise awareness of the people of the region. To contribute to ecotourism in the long-term process.

Material and methods

Study area and study group

Gazelles (37°02'N-38°42'E) were obtained from the 75. Year Gazelle Breeding Station, which consists of an area of 22.72 hectares surrounded by wire fences. The altitude varies between 545-600 meters. The average annual temperature is 18.5 °C (highest 46.8 °C lowest -12.4 °C) Annual precipitation average is 463.3 mm.²⁰ Its location was measured using the Magellan explorer 610 model GPS and Google Eart. There are artificial water pools and feeders in both parcels for Gazelles in the Breeding Station. It is

given once a day as 350 g of alfalfa and 250 g of black barley per animal. In 2020, 50 gazelles were released in the region whose first release area is located in the Üçağaç Village Gavita hamlet (37°20'N-42°22'E) of Şırnak Province Silopi District. In 2021, 40 gazelles were released in the area located in the Bestebelaka hamlet (37°17'N-42°23'E) of the second release Üçağaç Village. The average annual temperature is 15.1 C° (highest 40.4 C° lowest -14.5 C°) Annual precipitation average is 719.44 mm.²¹ No predatory wildlife was observed in the region. There are no illegal hunting activities since the region is located within the military security borders.

The aim of this study is to ensure that *Gazella Marica*, which has a natural habitat along the borders of Şırnak province, will continue to exist in the region again. Before the release, feasibility studies were carried out in a 1-year period in terms of the climate of the region, the vegetation and the suitability of the area to be released, and then the placement processes started. The local people's ownership of the work and the government's support increased the chances of resettlement work.

Methods

All transplanted gazelles were obtained from the 75th year Gazelle Production Station. The gazelles were caught in a triangle trap of 2350 square meters, which was set up in an area of approximately 13 hectares of the Breeding Station, which consists of 2 parcels. Capture time We waited for the births to end and the offspring to reach a sufficient size in order to avoid possible abortions or death of the offspring. All inner trap wire walls are covered with a 10 cm thick sponge-covered tarpaulin and a net over the trap. The aim is to minimize trauma and death that will occur during capture. Due to the inclination of the station, a staff group of 15-20 people formed a parallel line from the highest peak of the station, and the animals were supplied to walk slowly from top to bottom, on the gazelles, and enter the trap correctly. This process was repeated several times. Two officers, who were hiding on the edge of the mouth open trap, closed the mouth of the trap with a net and wire wall with a sufficient number of animals entered, and the trapping processes started half an hour after the gazelles began to calm down. The gazelles in the trap were caught manually. Captures were made close to sunrise or sunset in the morning. This process was carried out in cool hours against the negativities that may occur from the heat. Captured gazelles were placed in wooden crates opened from both sides made of plywood 100x36x90 cm, 30-40 holes with 1 cm wide.^{22,23} Individual ear tags were attached and recorded before all animals were caught and trans-

ferred to wooden crates. In the preventive drug application, only internal and external parasite applications were made. During loading, the gazelles were loaded onto the transport vehicle with their heads forward. The distance of approximately 380 km was reached in 5 hours. During the breaks, the condition of the animals was checked. All transplanted animals were kept together in the quarantine cage. The cage is 2 meters in height and has an area of 400 square meters, 20x20 meters wide, covered with a sponge canvas. The gazelles were given clover, black barley and water as forensic bitumen. There are natural water sources in the settlement area, and 3 more artificial water sources were built. Due to the steppe vegetation of the region, the need for additional feeding is done in the winter months.

Work plan 2020

First Transportation: The first transplant group consisting of 18 gazelles (11 male, 7 female) took place after the capture on 23.09.2020 in the afternoon. The release area was reached at night, and they were unloaded from the boxes and left in the quarantine cage prepared before release. It was detected that 1 female adult gazelle died after the transportation. (Photo 1), (Photo 2).



Photo 1



Photo 2

Second Transportation: 18 gazelles (8 males, 10 females) were caught close to sunrise on 25.09.2020 and transported on the same day. It is included in the quarantine cage. No deaths were observed during the transportation.

Third Transportation: 15 gazelles (8 males, 7 females) were caught close to sunrise on 28.09.2020 and transported on the same day. It is included in the quarantine cage. No deaths were observed during the transportation.

Release: All gazelles were kept in the same quarantine cage after transportation (Photo 1). In the region located in Üçağaç Village Gavita hamlet (37°20'N-42°22'E), headed by the Governor of Şırnak, on 29.09.2020, together with the Civil Administrative Chiefs, Şırnak University Rectorate, Şırnak Municipality, Ministry of Agriculture and Forestry III Under the responsibility of the Regional Directorate, the doors of the cage were opened with a ceremony 50 gazelles were released into their new habitats at the same time. The release process was successful (Photo 3).



Photo 3

Work plan 2021

First Transportation: 19 gazelles (10 males, 9 females) were caught close to sunrise on 05.10.2021 and transported on the same day. GPS is worn to 4 male gazelles. They were placed in a quarantine cage before release. No deaths were observed during transport.

Second Transportation: 15 gazelles (10 males and 5 females) were caught close to sunrise on 06.10.2021 and transported on the same day. They were placed in a quarantine cage before release. One adult male gazelle was found dead during transportation.

Third Transportation: 6 gazelles (1 male and 5 females) were caught near sunrise on 21.10.2021 and transported on the same day. 1 male gazelle is worn with a GPS. They were placed in a quarantine cage before release. No deaths were observed during transportation.

Release: Thanks to the successful release process in 2020, the same procedures (transfer, cage installation, release)

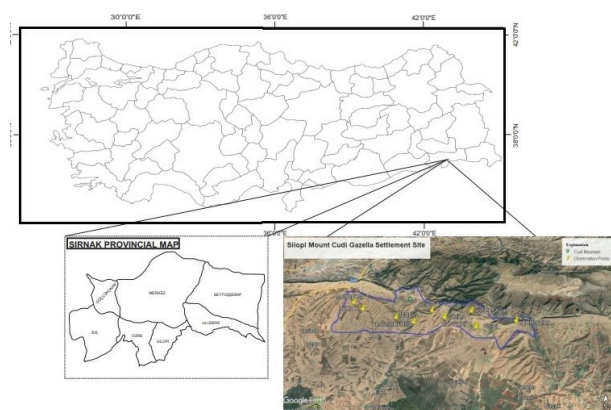
were carried out more practically and quickly in 2021. In the region located in the Bestebelaka hamlet of Üçağaç village (37°17'N-42°23'E), 40 gazelles on 07.10.2021, under the Presidency of the Governor of Şırnak, together with the Local Administrative Officers, under the responsibility of the Ministry of Agriculture and Forestry III. Regional Directorate, the doors of the cage were opened, and all the gazelles were released into the new living areas at the same time. The release processes were successful (Photo 4).



Results

Post-release tracking

In 2020, 1 female gazelle was found dead on 29.09.2021. In 2021, 6 gazelles (2 females and 4 males) died due to various reasons [1 (male) after being hit by a car, 2 (1 female 1 male) attack by a stray dog, 3 (2 male 1 female) gazelle found dead in the region]. Monitoring studies were carried out using camera traps and focal animal observation.²⁴ During the inventory work, it was observed from a distance with binoculars at 9 different locations by the same personnel between 06:30-08:30 in the morning and 16:00-18:00 in the afternoon. The width of the released area was approximately 6000 hectares, and the average distribution of the animals equipped with GPS was determined as 200 hectares. In the inventory studies, a total of 106 individuals were identified, of which 37 males 32 females 23 juveniles, 14 of which were uncertain. (Figure 1).(Table 1).



(Table 1: Some breeding characteristics in 2020 and 2021 of *Gazella Marica* reintroduced on the slopes of Mount Cudi in Şırnak's Silopi District in Türkiye.)

Breeding records of gazelles

	2020		2021	
	Male	Female	Male	Female
Transportation	27	24	21	19
Death		2	4	2
Newborn			23	

Births have been determined by observations made since May. In 11.12.2021, 9 observation points were made with 7 watchmen in an area of 5270.51 hectares, and as a result of the inventory study, 23 juvenile individuals were determined. There is a 10% margin of error in inventory studies.

Feed and Water source

It was observed that the freed gazelles consumed the grasses in nature, since the vegetation of the area where they were placed was steppe. Gazelles have a wide variety of diets as grass and shrub. ^{14,23} The presence of arable agricultural lands (grain forage crops, leguminous forage crops) and pastures within the borders of the area where they spread meets the feed requirement. Depending on the climate of the region, with the much rainfall in February - March and April the greening of the pastures is abundant with the compared to other months.²¹ Accordingly, it ensures that there is an abundant variety of plants. It provides access to abundant food at the beginning of the calving period. Supplementary feeding is done in times of snowfall in winter.²⁵ Dry baled alfalfa (*Medicago sativa*) is given as feed. In addition to the region's natural water resources, 3 artificial water troughs were built at points far from the water source.

Discussion

In the resettlement study located in this study, the presence of animals of the same breed that previously existed in the region will facilitate the adaptation of the animal in the region. Compared to this study²⁶ a study for the same purpose was conducted. In order for the study to be successful, it should be investigated why the number of gazelles that previously existed in the region disappeared, and possible threats should be eliminated. The reintroduction of *Gazella Marica* in Şırnak province and its close follow-up over a two-year period will ensure that the management is successful and sustainable in long-term processes. When compared with the study²³ the number of animals sent to Şırnak province is higher, but the number of baby gazelles received is also higher. However, the spreading area is less.

On the other hand, it will make tracking the animals easier. Observation and follow-up performed by adequate and experienced personnel will provide more reliable data. Monitoring of animals attached with GPS will provide more information about their distribution within the region. Making a suitable grazing plan so that the rangelands it spreads will be productive, will ensure the continuity of the vegetation of the pastures. Raising the awareness of the local people and increasing the relations with the local people will have a great role in preserving the Ceylan existence. It has been suggested by the Governor's Office and the Ministry to increase the number of gazelles and to be a place where local and foreign tourists can visit.

Conclusion

No illegal hunting took place during the 2-year management period. The local people's adoption of the work done and their protection of the gazelle will increase the current population in a long-term process. In particular, Labor is regularly monitored by the Ministry of Agriculture and Forestry III. Regional Directorate and Şırnak Provincial Branch Directorate, and the studies are followed. Feeding studies and artificial water troughs are arranged according to the needs of the animals and their distribution areas.

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