

History and Future Prospects of Gazelle (*Gazella Subgutturosa* Guld, 1780) Population on the Island of Khara Zira

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Abstract

The article considers the history of development of gazelle population released on the island of Khara Zira in 1965. Natural forage resources of these antelopes were estimated, factors influencing the dynamics of the gazelles population are studied, future prospects of this population are discussed and finally suggestions are made.

Keyword: Gazella, Khara Zira, reintroduction, European rabbit, biomass

Introduction

The distribution and number of gazelles in the south-east Caucasus depends on a number of natural and anthropogenic factors such as: fluctuation of the Caspian Sea level, expansion and shrinkage of Kura-Araz riverbeds, changes in vegetation, economic and hunting activities of nomadic and local tribes, etc. (Vereshagen, 1959).

Number of gazelles, counted in thousands at the end of 19th century, declined tenfold towards the beginning of 20th century. The number of gazelles decreased tragically after the advent of motorized transport and the cultivation of gazelles' habitats in the Kur-Araz lowlands for agricultural purposes and the occupation of habitats by human settlements. According to records of the 1960s, less than 200 gazelles remained in our country (Safarov, 1961).

One of the first steps taken by the government to save this species was the establishment of the Bandovan sanctuary and the establishment of a gazelle breeding center on the Khara Zira island (formerly Bulla). Due to the reserves, sanctuaries and

national parks were created later, and the number of gazelle herds increased to 7-8 thousand (Sarukhanova, 2016, 2017, 2019). In addition, the government started the process of returning the gazelle to its historical habitats, and the process of reintroduction is successfully continuing in several parts of the country (Sarukhanova, 2017). In this regard, the gazelle population on the island of Khara Zira retains a potential natural nursery role in the process of restoring the historical range of this species.

The purpose of the study was to monitor the population dynamics of gazelles on the island of Khara Zira, their forage base and accordingly, how many gazelles can live on the island in natural conditions, and the prospects for future use of this population in the restoration of the historical habitat of gazelles.

Study area



Figure 1. Satellite image of the Khara Zira island

Khara Zira Island is the largest of the Baku archipelago and covers an area of 400 hectares (N 39°59'43" and E 49°38'38"). The island is of volcanic origin, consisting of a volcanic crater, a crater dam and a 1.5 km extension southwestward (Figure 1). The crater area is 30 m above the sea level. The edges of the mountain consists of

small hills, and the middle part is flat. The plain is bare as a result of volcanic activity, and it is surrounded by sparse bushes. The main vegetation of the island is semi-desert type, and the areas are not covered by volcanic mud along the coast, there is a unique desert vegetation. The island is home for wormwood, wormwood-halophytes, halophytes, ephemeral communities and their different combinations.

Materials and methods

In order to study the forage base of gazelles, the island was visited 7 times in different seasons between 2017-2020, and observations were made on routes throughout the whole island. Some plant species were identified on the site, herbariums were prepared to identify suspected species, and species affiliation was determined later.

During the counting of gazelles, the research team was divided into two groups and moved from the opposite borders of the island to the center, recording all animals encountered and taking their photos for further identification. Although it was not possible to determine the exact number of fleeing gazelles with binoculars (Nikon 10x42), further clarifications were made on the photos taken applying the computer techniques.

Results and Discussion

During our research, a clear seasonality was observed in the development of vegetation on the Khara Zira island, i.e. intensive spring vegetation disappears in early May and stops completely in summer. After the rains in the fall, there is a revival and vegetation is restored, and this lasts all winter due to the mild and snowless winter (average temperature is 8-10⁰C). The vegetation of the coastal strip and the island is sparse and consists of halophyte groups, especially the Herbaceous sea-blite (*Suaeda maritima* ssp. *Rostrata*). In some humid sands *Juncus littoralis* grows.

Wormwood semi-desert phytocenosis is observed at intervals along the coast. These phytocenoses represented by *Artemisia lercheana* (synonymous is *Artemisia fragrans*), with halophyte - *Salsola nodulosa*, and ephemeral plants - Cereals, Brassicaceae, Boraginaceae, Asteraceae, etc.

Although ephemeral plants found in the form of islets are not tall due to the high salinity and dryness of the soil, they are the main food for gazelles during the rainy seasons. As wormwood and ephemerals burn completely during the summer months,

they are partially replaced by the camelthorn (*Alhagi pseudalhagi*) and are one of the few forage plants for gazelles. In August, the stems of this plant are completely eaten by gazelles. In times of drought, one of the gazelles' prey is the bark of the *Tamarix ramosissima* shrubs, which are found along the island. After the lifeless area around the volcanic crater, there are small halophytic shrub deserts.

Semisrub species, such as *Halocnemum strobilaceum* and *Salsola ericoides*, were widespread here. Rarely *Salsola dendroides* is also found on the island. Although halophyte formations are low-calorie foods, they are the main nutrition source for animals on the island during the winter. The list of plants identified from the island during previous studies is as follows: *Anisantha rubens*, *Artemisia szovitsiana*, *Suaeda cf dendroides*, *Alopecurus myosuroides*, *Anisantha rubens*, *Artemisia cf lerchiana*, *Artemisia szovitsiana*, *Ephedra distachya*, *Filago pyramidata*, *Herniaria hirsuta*, *Hordeum spec.*, *Koelipinia linearis*, *Lolium rigidum*, *Parapholis incurva*, *Poa bulbosa*, *Sonchus oleracius*, *Suaeda cf dendroides*, *Tamarix hohenackeri*, *Kalidium caspicum*, *Psylliostachys spicata*, *Lycium ruthenicum*, *Salsola dendroides*, *Ephedra distachya*, *Kalidium caspicum*, *Psylliostachys spicata*, *Suaeda cf dendroides*, *Silybum marianum*, *Tamarix ramosissima*, *Tamarix tetrandia*, *Artemisia cf lerchiana*, *Kalidium caspicum*, *Anisantha rubens* (Annett Thiele *et al.*, 2008).

During Soviet period, some attempts were made to calculate the carrying capacity of the island. If we take the biomass of the island's vegetation into consideration, it is possible that 70-80 head of gazelles live here due to natural fodder reserves, and in case of additional feeding, this figure can reach 150-200. Thus, considering the absence of predators on the island and exploiting the area as a natural nursery, it is possible to capture 30-50 gazelles per year and relocate them to other areas within the historical range of gazelle (Jafarov, 2008).

35 gazelles (20 females and 15 males) were first brought to Khara Zira Island in 1965. Due to the island's lack of natural fodder reserves, the number of gazelles has increased up to 120 in 11 years as the result of additional feeding (96 dead individuals are not brought into record). As the supplementary feeding was not economically sustainable, gazelles were caught on the island and taken back. 30 gazelles captured on October 7, 8 and 24 in 1976 were released into the Absheron sanctuary and 70 gazelles into the Shirvan reserve. Thirteen gazelles remained on the island at that time, the number of them reached 18 in 1983 and decreased to 9 gazelles a year later. Poaching has been cited as the reason for the decline (Jafarov, 2008).

Further research on the island of Khara Zira was conducted by the Michael Zukkov Foundation in 2007-2008, and 15 gazelles were still living there (Annett Thiele *et al.*, 2008).

For the first time on August 12-13, 2017, during the trip organized by the Institute of Zoology of ANAS, we studied the number of gazelles that survived on the island, their food reserves, threats to them, and we counted 15-18 gazelles there. At the same time, we have observed a massive increase in the number of rabbits (*Oryctolagus cuniculus*). The introduction of rabbits to the islands in the Caspian Sea was carried out by sailors and lighthouse keepers in the 19th century as a reserve food (Hajiyev, 2000). Although they became extinct on many islands by the end of the 20th century, they were re-released by the inhabitants of the surrounding settlements and fishermen. According to our estimates, there were more than a thousand individuals on the island in 2017, and they were in serious food competition with gazelles.

During the field research (09, Sep 2018), we observed the mass mortality of rabbits, and 30 dead rabbits were recorded along the 8 km transect. The cause of death could be both malnutrition and disease. According to fishermen, one of the main threats to gazelles is still poaching.

Our surveys on September 13, 2019 showed that the number of gazelles is already around 25-30. During our study, a significant decrease (about 10 times) in the number of rabbits were observed by us. We assume that the frequent visits to the island in the last two years and the enlightening conversations with the fishermen who have temporarily settled here have also had a positive impact and poaching was decreased.

During our last survey conducted on July 2, 2020, it was estimated that only 11 gazelles remained on the island. Another disappointment was that a single offspring was observed that year. The reason for the fact that the number of gazelles has more than halved in the last year can be explained by the drought observed in recent years (Fig. 2). Vegetation on the island has actually been reduced and destroyed by drought. It has been observed that there is still no increase in the number of rabbits and that they are rare along the transects. During the quarantine period declared in the country due to the COVID-19 pandemic, outsiders (fishermen, poachers, etc.) were not allowed on the island, and the role of the human factor is unlikely in such a sharp decline in the number of gazelles.

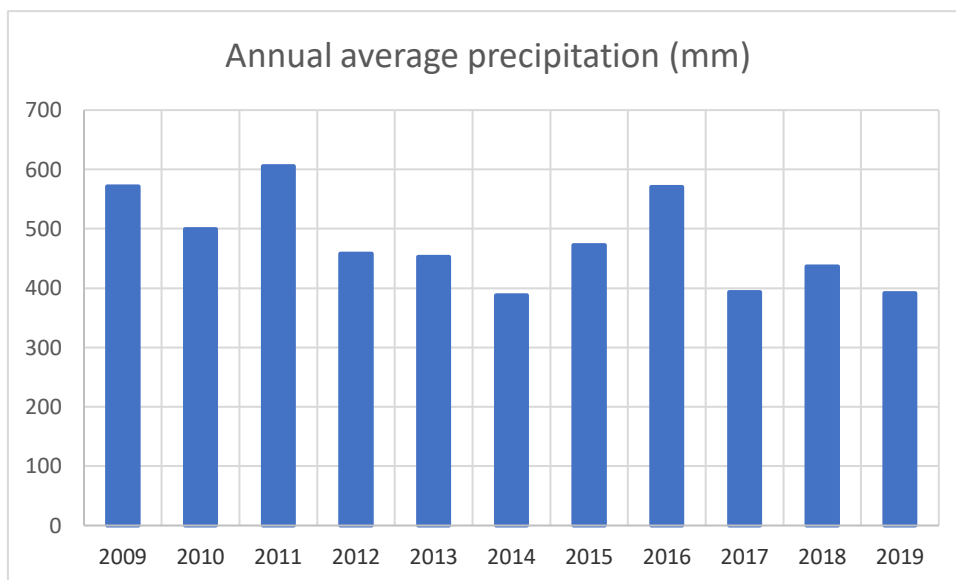


Figure 2. Annual average precipitation in Azerbaijan
(www.stat.gov.az/source/environment/)

Conclusions

We agree with conclusions of Soviet scientists stating that the natural resources of Khara Zira Island can allow up to 70-80 gazelles to live here. With additional feeding conditions, the number of gazelles can be increased up to 150, where they do not have any natural enemies. Later, at least 25-30 individuals can be reintroduced to other parts of the country within the programs on restoration of gazelle's historical range. The reason for the decline in gazelle food stocks is the massive increase in the number of rabbits introduced here and also an arid climate.

Therefore, the following further actions are strongly recommended:

- to establish a real protection regime on the Khara Zira island,
- to plant the seeds of the species on the island which can serve the main food and water source for gazelles (cereals, wild watermelons etc.)
- to introduce common weasel (*Mustella nivalis*) individuals in order to control the rabbit population. Bringing larger predators to the island can be dangerous for newborn gazelles.

- in order to fertilize the soils on the island, it is necessary to introduce coprophage insects (dung beetles - *Geotrupes* spp). Our observations show that since the excrements of rabbits does not mix with the soil, they are crumbled by the sun and rain, and then blown into the sea by the winds, and the soil of the island is not fertilized. Dung beetles cause soil fertilization because they bury manure masses.

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