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RED BOOK SPECIES OF PLANT TYPES OF EASTERN CHINK KARAKALPAK USTYURT

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ABSTRACT
This article presents the results of a study of rare plant species of the Eastern Chink of the Karakalpak Ustyurt Plateau included in the Red Data Book of the Republic of Uzbekistan. During 2020–2024, field surveys, geobotanical descriptions, and floristic analyses were conducted on populations of Malacocarpus crithmifolius, Scorzonera bungei, and Capparis rosanowiana. The distribution patterns, habitat conditions, and associated plant communities of these species were investigated. The studied species were found to be characterized by low population density and restricted distribution. Capparis rosanowiana was not recorded during the field surveys, indicating the need for further monitoring and additional research. The obtained results provide a scientific basis for the development of conservation measures aimed at preserving rare plant species and maintaining biodiversity in the ecosystems of the Ustyurt Plateau.

KEY WORDS: *Rare Plant Species, Red Data Book of Uzbekistan, Eastern Chink of Ustyurt, Biodiversity, Plant Communities, Monitoring, Plant Conservation.*

INTRODUCTION

In today's rapidly developing industrial and agricultural environments, and with increasing anthropogenic pressure on the natural environment, the problem of preserving biological diversity has become especially pressing. Human economic activity significantly impacts natural ecosystems, altering vegetation structure, reducing populations, and shrinking the distribution ranges of many plant species. As a result, individual species are threatened with extinction, leading to a decline in floristic diversity and a disruption in the stability of natural ecosystems [2, 8, 10, 11].

The primary causes of the decline in rare plant species are the destruction and alteration of their natural habitats due to anthropogenic factors, including land cultivation, land reclamation, construction, and environmental pollution. The use of plants for food, medicinal, ornamental, and forage purposes also has an impact. Rare and endemic species, characterized by limited ranges and low population sizes, are of particular importance for the conservation of flora.

The aim of the study was to investigate the current state of rare plant species of the Eastern Chink of the Karakalpak Ustyurt, listed in the Red Book of the Republic of Uzbekistan, to determine the characteristics of their distribution, habitats and plant communities with their participation in order to assess the need for further environmental measures.

MATERIALS AND METHODS

The study focused on rare plant species of the Eastern Chink, Karakalpak Ustyurt, which are of scientific interest in terms of their distribution, ecological characteristics, and the current state of their natural populations. The research was conducted between 2020 and 2024 and covered various areas of the Eastern Chink, characterized by distinct topography, soil cover, and vegetation. Field data were collected using a route-based method, which allowed for the examination of the main plant community types in the study area. During the fieldwork, observations were made of the floristic composition, distribution patterns, growing conditions, and plant community characteristics. Particular attention was paid to identifying rare plant species, determining their occurrence, and assessing the state of natural populations. Geobotanical descriptions were carried out according to the generally accepted methodology outlined in the manual "Field Geobotany" [7], taking into account the species composition, projective cover, life forms, and ecological characteristics of plants. To determine the species affiliation of the studied plants, the multi-volume publication "Key to Plants of Central Asia" [5, 6] was used, which ensured the accuracy of the systematic identification of species. Data from the "Illustrated Key to Higher Plants of Karakalpakstan and Khorezm" [3] were also used.

RESULTS AND DISCUSSION

The floristic composition of the Eastern Chink of the Ustyurt Plateau is very diverse. The ratio of plant species indicates the desert nature of the flora. The vegetation of the Eastern Chink, compared to the plateau, is characterized by significant complexity. In the course of the study, we studied the rare plant species of the Eastern Chink of the Ustyurt Plateau. Here, the vegetation cover is characterized by a wide variety of phytocenoses, which is explained by the heterogeneity of the environment [1, 8, 9, 11]. The work characterizes the distribution of some rare plant species growing in the territory of the Eastern Chink of the Ustyurt Plateau (*Malacocarpus crithmifolius*, *Scorzonera bungei*, *and Capparis rosanowiana*), listed in the Red Book [2], provides geographic

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coordinates of the occurrence of these species, information on the habitat, and the species composition of communities with the participation of these species.

Malacocarpus crithmifolius is a rather rare, relict plant of the mountains and lowlands of Central Asia from the family Peganaceae Tiegh. The main locations of natural populations are concentrated on the eastern coast of the Caspian Sea (rare in all locations and, as a rule, in a depressed state (Fig. 1).

Rice. 1. *Malacocarpus crithmifolius (Retz.)* C.A. Mey.

Research has established that Malacocarpus crithmifolius is found in the Eastern Chink in small groups and as solitary individuals, primarily along the bottoms of karst depressions and on the slopes of the Chink. The species is characterized by low abundance and a limited distribution.

Malacocarpus crithmifolius is a weakly competitive species and is found in depressed conditions. Natural regeneration of the species occurs from stumps. Reproduction by seeds is observed only in years with favorable precipitation and sufficient light. However, in nature, a small number of individuals survive by self-seeding [4]. In the Eastern Chink, it is found in small groups and as solitary individuals along the bottoms of karst depressions and on the slopes of karst depressions.

Malacocarpus crithmifolius was listed in 2008 on the International Union for Conservation of Nature (IUCN) Red List as a vulnerable species, category III (VU), with low populations and a limited range. It is also listed in the Red Data Book of the Republic of Uzbekistan. No specific conservation measures have been developed. The establishment of a nature reserve and the study of its biological characteristics in nature and cultivation are needed. Among the rare plant species of the Eastern Chink is the Bunge Goat's-foot (*Scorzonera bungei*). It is distributed throughout the Kyzylkum Desert, the Sultan-Uizdag remnant mountains, and the Eastern Chink of Ustyurt. It grows on the rocky slopes and cliffs of the remnant mountains (Fig. 2).

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Rice. 2. Scorzonera bungei. Krasch. & Lipsch.

Scorzonera bungei has been found in a number of plant communities on rocky areas of the Eastern Chink of Ustyurt [2, 11]. The species is confined to specific habitats, which determines its local distribution and vulnerability to environmental changes. During our expeditions, we found only four plant communities with Malacocarpus crithmifolius: Anabasis-wormwood, forb-wormwood, black saxaul, and forb-couch grass. According to B. Sarybaev (1987), on the eastern cliff, the species under study was previously found in forb-rosehip, hawthorn-rosehip, rosehip, and reed-rosehip associations [9]. Due to the drying up of the sea, rosehip and hawthorn thickets have practically disappeared. Small populations of these species can be found only under cliffs or in shallow gorges protected from direct sunlight [9]. Also, in the territory of the Eastern Chink, we found Bunge's goat's-foot (Scorzonera bungei) in seven plant communities: wormwood-keyreuk with ephedrone, wormwood-keyreuk with ephedrone and with shrubs, wormwood with shrubs, and forb-wormwood with ephedrone (Table 1).

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Table 1.
Coordinates of occurrence of rare plant species Malacocarpus crithmifolius and Scorzonera bungei on the Eastern Chink of Ustyurt

Species names	Vegetation	Coordinate
Malacocarpus crithmifolius	Biyurgun-wormwood	58.2993645 43.3933152
	Forb-wormwood	58.3793985 44.1187729
	Black saxaul	58.3842995 44.1518293
	Forb-wheatgrass	58.2627389 44.2557787
Scorzonera bungei	Wormwood - Keyreukovo with ephedra	58.3247243 43.7757440
	Wormwood - Keyreukovo with ephedra with shrubs	58.3274279 43.8282596
	Wormwood with shrubs	58.3654129 44.8807348
	Forb-wormwood	58.3731489 44.0896745
	Ephedra	58.1875480 44.4616000
	Blackroot-alfalfa	58.2844615 44.5928127
	Biyurgun with shrubs	58.2348613 44.9608720

Of particular interest is *Capparis rosanowiana*, a rare endemic species previously recorded in the Eastern Chink of Ustyurt. According to literature [3], the species has been encountered in this region; however, it was not detected during field research from 2020 to 2024. This may indicate an extremely low population size or a reduction in the species' range and highlights the need for further monitoring of its locations.

Thus, the obtained results showed that rare plant species of the Eastern Chink of Ustyurt are characterized by low abundance and limited distribution. Malacocarpus crithmifolius is highly vulnerable to environmental changes due to low competitive ability [4], while *Scorzonera bungei* depends on the preservation of natural habitats [11].

The absence of *Capparis rosanowiana* finds in 2020–2024, despite previously published data [3], may indicate a reduction in its abundance or range. A comparison with literature data [9] also indicates changes in the plant communities of the Eastern Chink associated with climate aridization and habitat degradation. The obtained data confirm the need for further monitoring and protection of rare species of Ustyurt flora.

CONCLUSION

These studies allowed us to assess the current status of rare plant species in the Eastern Chink of Karakalpak Ustyurt, listed in the Red Data Book of the Republic of Uzbekistan, and to determine their distribution and habitat characteristics. The locations of *Malacocarpus crithmifolius* and *Scorzonera bungei* were established, their coordinates were determined, and the plant communities containing them were characterized.

The results indicate low abundance and limited distribution of the studied species, indicating the need for their further study and conservation. The absence of *Capparis rosanowiana* during the field research confirms the need for additional research and monitoring. The data obtained can serve as a basis for further study, monitoring, and the development of conservation measures aimed at preserving the biodiversity of Ustyurt's vegetation.

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