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BIOCLIMATIC MODELING ANALYSIS MAP OF THE ENDEMIC PLANT SPECIES (DIANTHUS HELENAE LAGOCHILUS PROSKORJAKOVII) OF THE NUROTA BOTANICAL-GEOGRAPHICAL DISTRICT

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Abstract
The article presents information about the bioclimatic modeling analysis map of the endemic plant species (Dianthus helenae Lagochilus proskorjakovii) of the Nurota botanical-geographical district.

Keywords: Herbarium, illustration, TASH database, endemic species, morphological characters, botanical-geographical district.

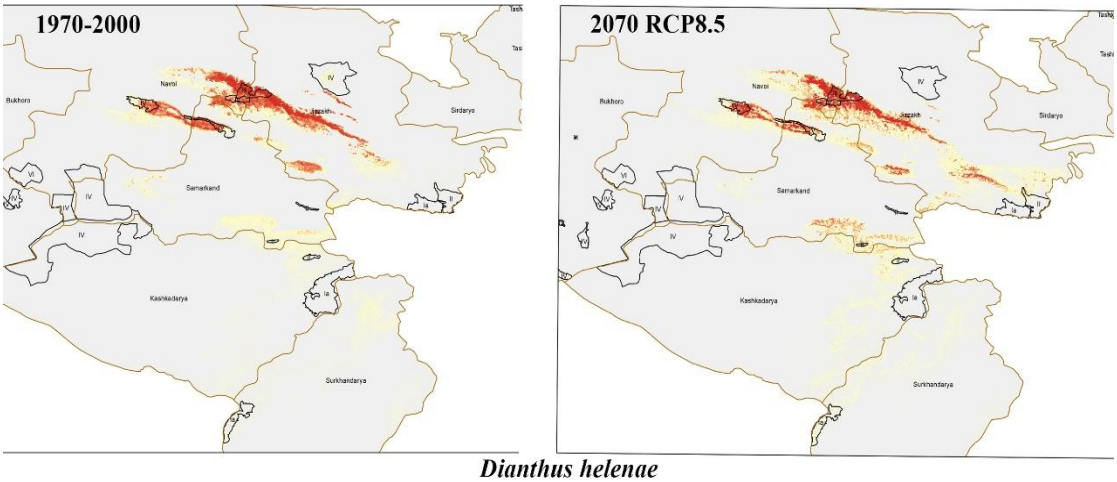
Annotatsiya
Maqolada Nurota botanik-geografik okrugi endem o‘simlik (*Dianthus helenae Lagochilus proskorjakovii)* turlarining bioiqlimiy modellashtirish tahlil xaritasi haqida ma’lumotlar keltirilgan.

Kalit so‘zlar: Gerbariy, illyustratsiya, TASH ba’zasi, endem turlar, morfologik belgilar, botanik-geografik rayon.

In recent years, modern species distribution models (SDMs) have been widely used, serving as an important tool for assessing how species will respond to climate change and predicting current and future distribution patterns [1, 2]. SDMs allow us to identify ecological suitability for habitats and the adaptive strategies developed by species. This allows biodiversity conservationists to identify important areas, develop effective measures to protect threatened species, and formulate management strategies. This approach also provides a basis for preventing species extinctions at the local level and for further strengthening conservation efforts [3].

The historical (1970–2000) and future (2070, RCP8.5) distribution area of Dianthus helenae was analyzed. Model results showed that the main populations of the species are located in the foothills of Navoi, Jizzakh, and partially Samarkand regions.

According to the map predicted for the future (2070, RCP8.5), significant changes in the habitat of the species will be observed as a result of climate change. The distribution area of the species in the Jizzakh and Samarkand regions will decrease, and in some areas it may disappear. The probability of survival of the species in the Kashkadarya region will also decrease. However, the population of the species in the Navoi region is likely to be largely preserved. In the period 1970–2000, the factors bio19 (precipitation in the coldest quarter), bio7 (annual temperature range - BIO5-BIO6), and slope2 (slope from 0.5% to 2%) had a significant impact on the distribution of the species. In 2070, factors such as bio19 (precipitation in the coldest quarter), bio3 (isothermality - BIO2/BIO7 * 100), elevation, and slope2 (slope from 0.5% to 2%) were predicted to have a significant impact on the distribution of the species.



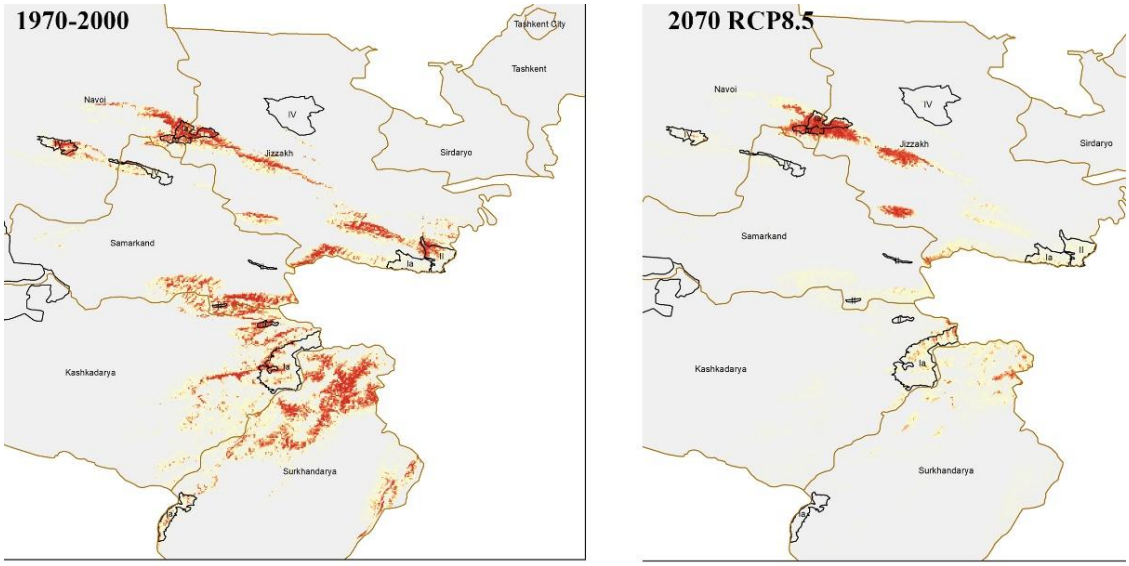
Dianthus helenae

Figure 1. Bioclimatic modeling map of the species Dianthus helenae for the historical period 1970–2000 and the RCP8.5 scenario for 2070.

The results of the study showed that the distribution areas of endemic and rare plant species are likely to change significantly under the RCP8.5 scenario predicted for 2070. As a result of climate change, some species may move south and east from

their traditional habitats, and their populations may shrink or become less dense. Also, the identification of optimal habitats and the changing role of important ecological factors indicate the need to reconsider species conservation and ecological management strategies in the future.

Distribution of Lagochilus proskorjakovii in 1970–2000 (left map): The main distribution areas are located in Jizzakh, Navoi, Kashkadarya and Surkhandarya regions. The most common areas of the species are clearly shown in Jizzakh and Surkhandarya. Predictions under the RCP8.5 scenario for 2070 (right map): The species' habitat has significantly decreased in the Navoi and Jizzakh regions. The distribution area has sharply decreased in the Kashkadarya and Surkhandarya regions. Due to climate change, the total habitat of the species has significantly narrowed, which increases the risk of extinction of the species.



Lagochilus proskorjakovii

Figure 2. Historical distribution of Lagochilus proskorjakovii in 1970–2000 and predicted distribution area in 2070 under the RCP8.5 scenario

In conclusion, the analysis of habitat changes through bioclimatic modeling of the endemic plant species (Dianthus helenae Lagochilus proskorjakovii) of the Nurota

botanical-geographical district revealed that the natural populations of Dianthus helenae and Lagochilus proskorjakovii will decrease in future bioclimatic scenarios.

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