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NUROTA BOTANIKA-GEOGRAFIK OKRUGIDA TABIIY POPULYATSIYALARI KENGAYIB BORAYOTGAN FERULA HELENAE, ALLIUM SVETLANAE VA PARRYA NURATENSIS TURLARI

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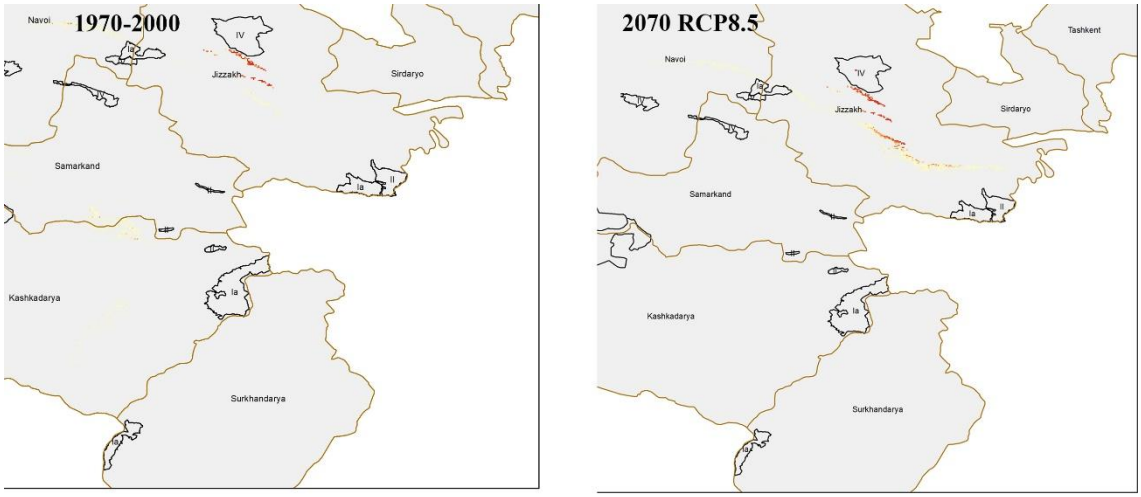
Abstract
The article presents information about the species Ferula helenae, Allium svetlanae and Parrya nuratensis whose natural populations are expanding in the Nurota botanical-geographical district.

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

Annotatsiya
Maqolada Nurota botanika-geografik okrugida tabiiy populyatsiyalari kengayib borayotgan Ferula helenae, Allium svetlanae va Parrya nuratensis turlari haqida ma’lumotlar keltirilgan.

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

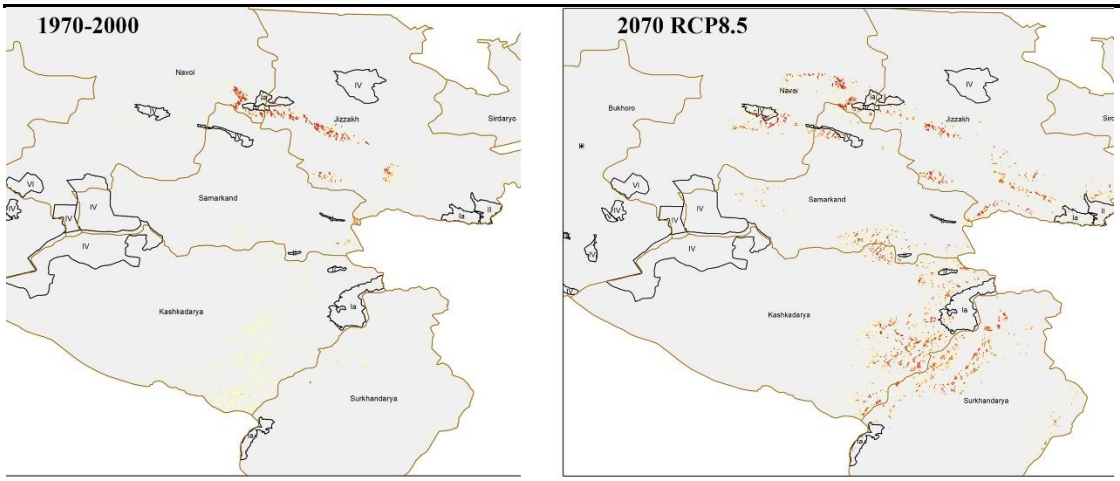
The historical distribution of Ferula helenae from 1970 to 2000 and the predicted distribution area for 2070 under the RCP8.5 scenario, based on the MaxEnt model. The distribution area from 1970 to 2000 (left map) shows that the species is restricted to its natural habitats in Jizzakh region. The most suitable areas, represented by red and yellow, are located in the foothills and highlands. The distribution area is very narrow, and the population appears to be very limited.
According to the RCP8.5 scenario projection for 2070 (right map), the distribution area of the species has remained almost unchanged, but a slight expansion to the east has been observed. The distribution area has been preserved within the Jizzakh region.



Ferula helenae

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

The distribution dynamics of Allium svetlanae were assessed for the years 1970–2000 and 2070 (RCP8.5 climate scenario). The results obtained showed the following: Historical distribution (1970–2000): The main populations of Allium svetlanae are located in the Jizzakh and Navoi regions, with limited occurrences in the Samarkand and Kashkadarya regions. During this period, the plant's range was relatively narrow, limited to foothill and semi-desert areas. Future distribution (2070, RCP8.5): Under the high-emission climate change scenario, the distribution of Allium svetlanae will undergo significant changes. In particular, the plant's distribution area will shift towards southern regions, especially towards Kashkadarya and Surkhandarya. New suitable areas may also appear in the Samarkand and Jizzakh regions. Populations are likely to remain stable in some areas of Navoi region. The plant's migration to southern regions probably means that favorable conditions will form for Allium svetlanae in these regions in the future. The shift in distribution to higher altitudes may be one of the migration strategies of relict plants in response to climate warming.



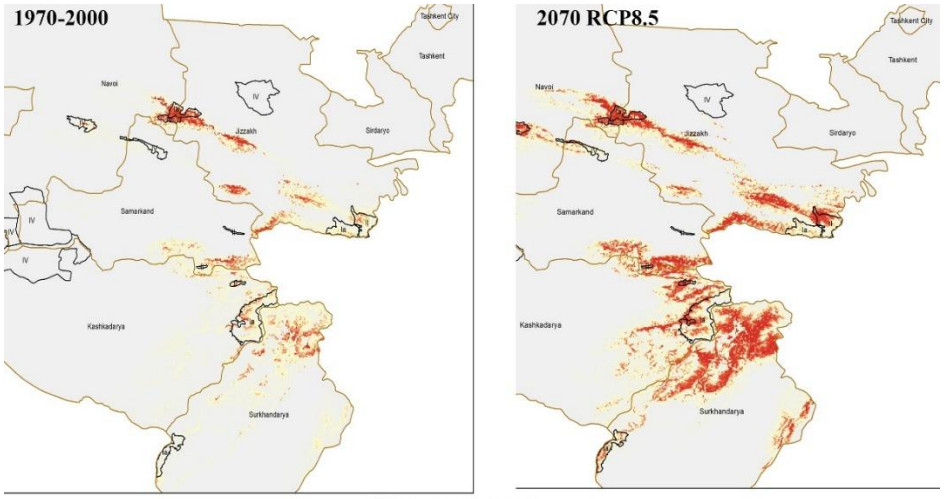
Allium svetlanae

Figure 2. Bioclimatic modeling map of the Allium svetlanae species for the historical period 1970–2000 and the RCP8.5 scenario for 2070.

According to the model results for the period 1970–2000, the factors that had the greatest impact on the distribution were: Bio 4 - seasonality of temperature, Bio 7 - annual temperature difference (i.e., the difference in temperature between the warmest and coldest months - BIO5-BIO6), as well as the categories GloSlopesCl1 (0 % ≤ slope ≤ 0.5 %) and GloSlopesCl2 (0.5 % ≤ slope ≤ 2 %), which represent the degree of slope of the land. In the forecast for the 2070s, in addition to the above factors, it was found that the category GloSlopesCl6 (15 % ≤ slope ≤ 30 %) also has a significant impact. This indicates the increasing importance of different slope levels for the distribution of species under climate change.

The distribution of Parrya nuratensis in 1970–2000 and its predicted range for 2070 based on the RCP8.5 climate scenario are described. Distribution in 1970–2000. The main populations are located in Jizzakh, Navoi, Kashkadarya and Surkhandarya regions. The most densely populated areas of the species are Surkhandarya and Kashkadarya regions. Relatively small populations are recorded in Jizzakh and Navoi regions. The prediction for the 2070 RCP8.5 scenario predicted an expansion of the species' range, especially in Surkhandarya, Kashkadarya and Jizzakh regions. There is also a possibility of the formation of new populations in Navoi region. It is assumed that the living conditions of the species may improve in some areas as a

result of climate change. While bio4, bio7, slope2, and slope1 contributed significantly in the 1970s–2000s, this did not change in the 2070s.



Parrya nuratensis

Figure 14. Bioclimatic modeling map of Parrya nuratensis species for historical periods 1970–2000 and 2070 under the RCP8.5 scenario.

In conclusion, it can be said that at the same time, the species Ferula helenae, Allium svetlanae, and Parrya nuratensis, whose natural populations are expanding in the Nurota botanical-geographical district, can be cited.

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