Distribution and Diversity of Chenopodiaceae (Amaranthaceae s.l.) Species in Kazakhstan



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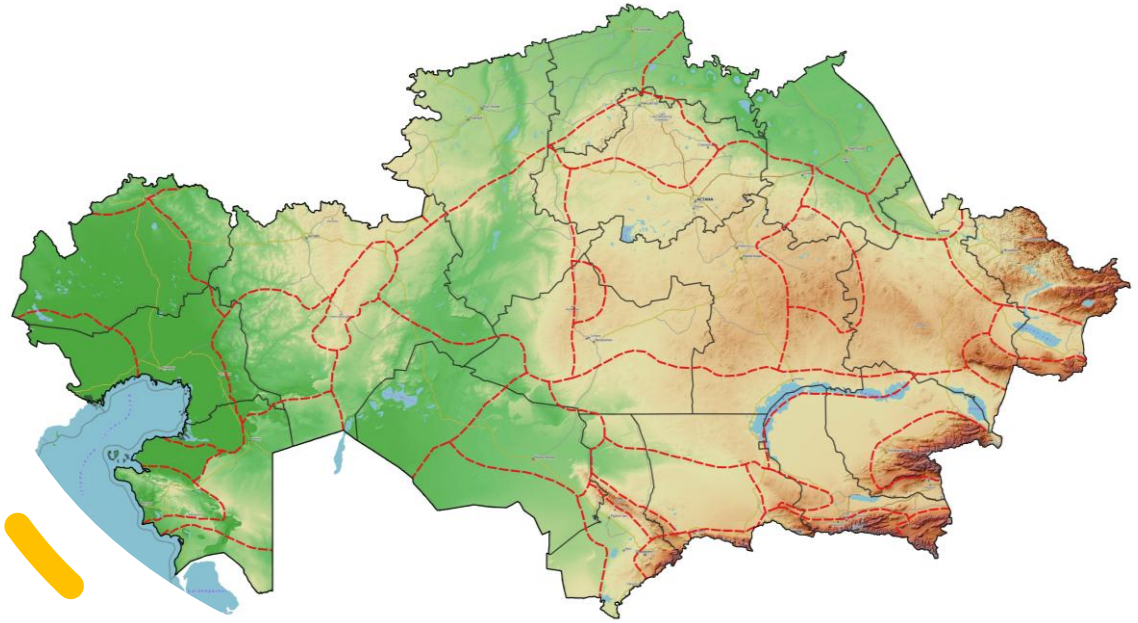
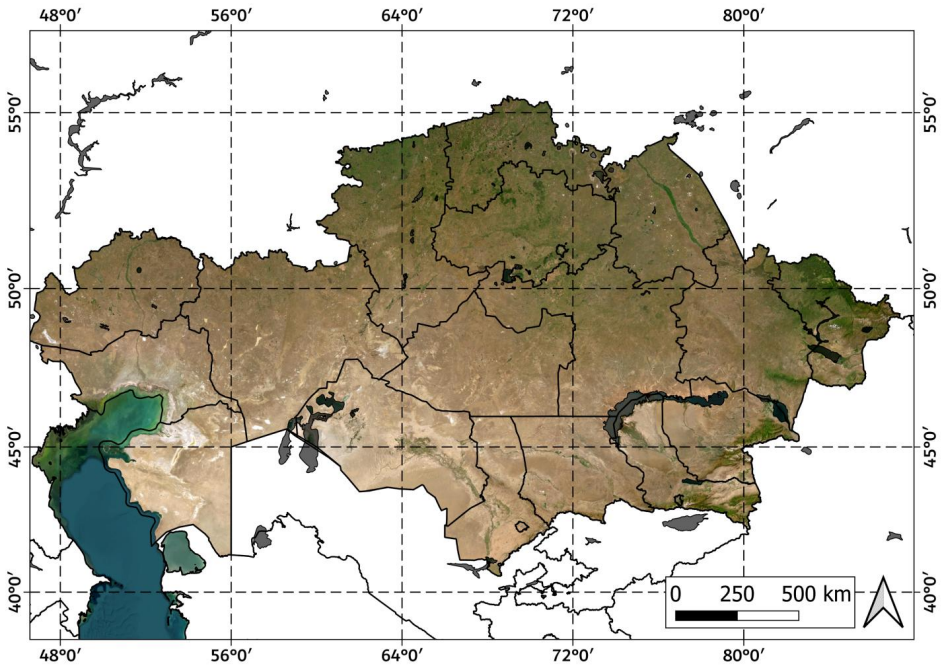
Kazakhstan as one of the major centers of plant diversity in arid regions.

- Kazakhstan is one of the largest countries of Central Eurasia and is characterized by a strongly continental climate and extensive arid landscapes.
- Deserts occupy approximately **44%** of the country's territory, while semi-deserts account for another **14%**. Thus, more than half of Kazakhstan is represented by desert and semi-desert ecosystems.
- Such environmental conditions — low precipitation, high evaporation, strong temperature fluctuations and widespread soil salinity — have created favourable conditions for the development of a highly specialized arid flora.





Chenopodiacea e in the Flora of Kazakhstan

- According to the updated **Checklist of Native Vascular Plants of Kazakhstan**, published in 2026 and currently available through GBIF, the native vascular flora of Kazakhstan comprises:
- **5,710 species**
978 genera
128 families
- Within the traditional taxonomic concept, Chenopodiaceae in Kazakhstan include approximately:
- **218 species**
47 genera
- This corresponds to approximately **3.8% of the total native vascular flora of Kazakhstan**.











Taxonomic Structure and Diversity

A relatively small number of genera contain a considerable proportion of the total species diversity, while many other genera are represented by only one or a few species.
Among the most species-rich and taxonomically complex groups are:

Salsola sensu lato
Atriplex
Suaeda
Anabasis
Climacoptera

These genera represent some of the most successful evolutionary lineages adapted to the arid landscapes of Kazakhstan and Central Asia.



Species-Rich and Polymorphic Genera

- *Atriplex* includes species occurring in saline depressions, river valleys, clayey and sandy deserts and disturbed habitats.
- *Suaeda* is particularly characteristic of saline ecosystems. Recent taxonomic studies indicate approximately **18 species of Suaeda in Kazakhstan**, with a major concentration in the Aral–Balkhash region.
- *Anabasis* represents another important group of perennial herbs, subshrubs and shrubs adapted to dry and often saline substrates.
- *Climacoptera*, represented mainly by annual desert plants, also shows considerable diversity in Kazakhstan, with approximately **14 species** reported in traditional treatments.



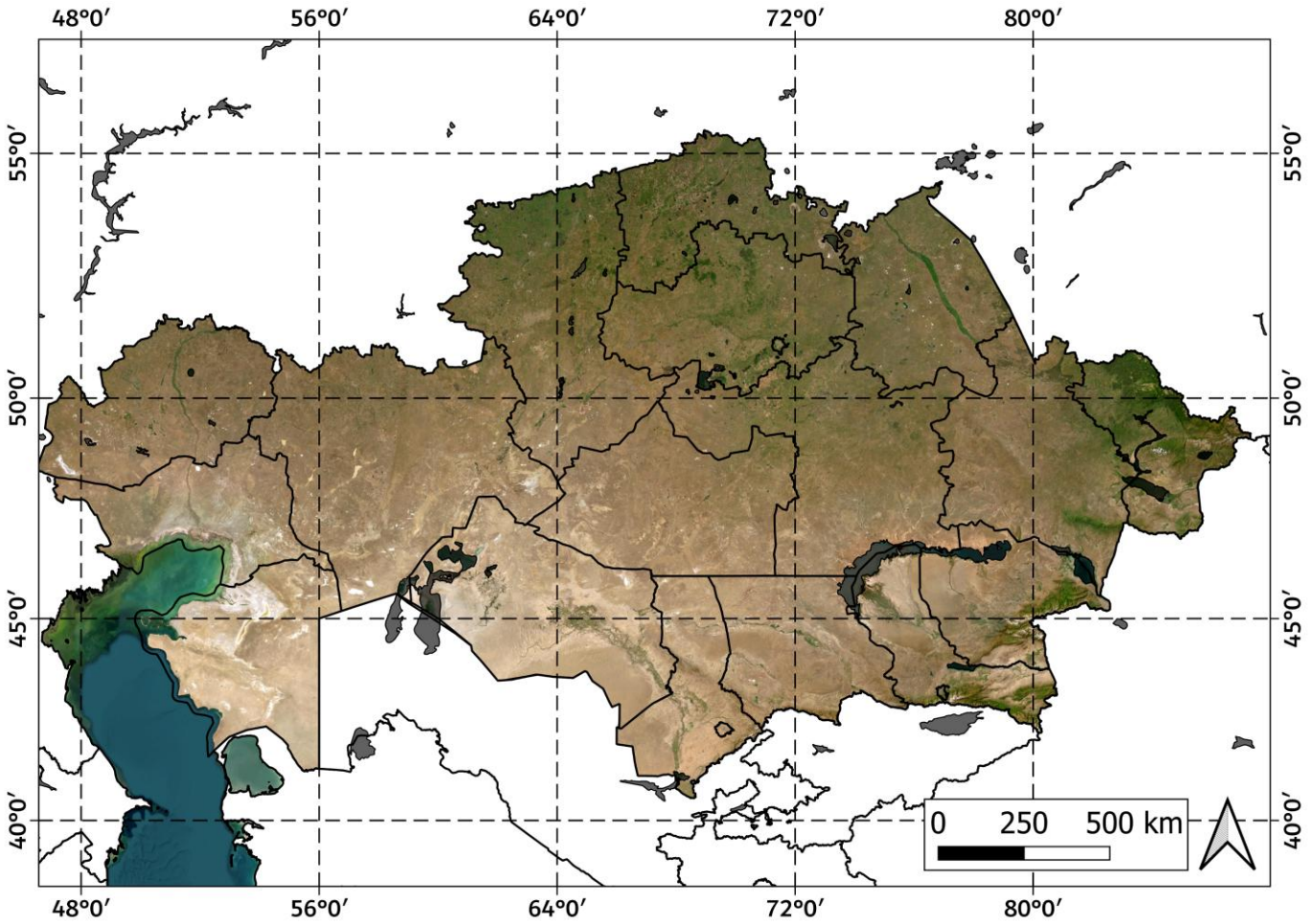


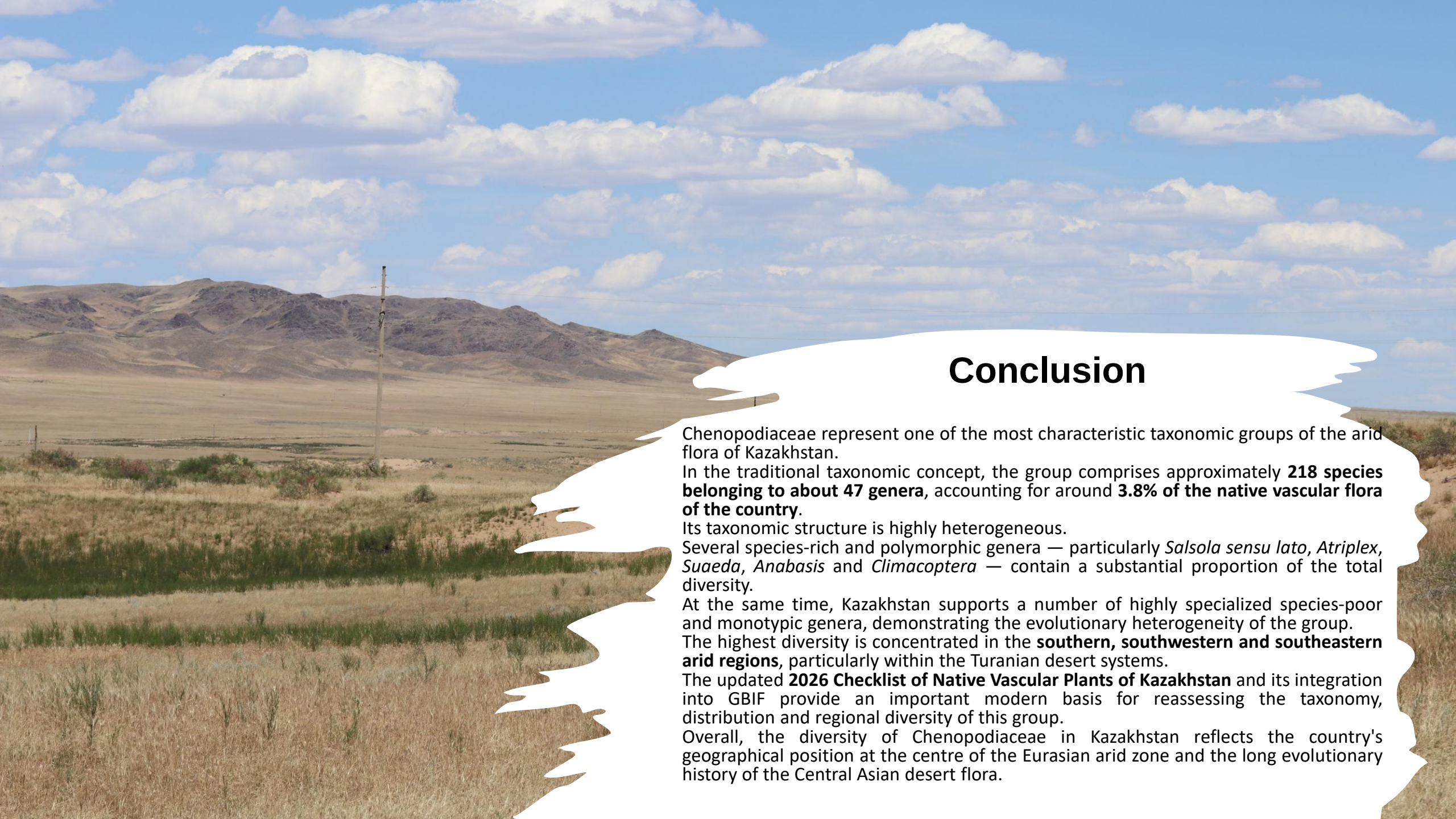
Species-Poor and Monotypic Genera

- *At the same time, the family contains another contrasting component — genera represented by only one or a few species.*
- *Examples of highly specialized monotypic or species-poor lineages occurring in Kazakhstan include:*
- *Halostachys — Halostachys caspica*
  Ofaiston — Ofaiston monandrum
  Iljinia — Iljinia regelii
- *These taxa are particularly interesting because they represent evolutionarily isolated lineages with relatively narrow ecological specialization.*

Distribution of Chenopodiaceae in Kazakhstan

- Chenopodiaceae occur throughout a large part of Kazakhstan, but their species diversity is clearly **geographically uneven**.
- The greatest concentration of species is associated primarily with the **southern, southwestern and southeastern regions of the country**.
- The most important areas include:
- **Mangystau and the Ustyurt Plateau**
  the Aral Sea region and Kyzylorda Region
  Kyzylkum
  Betpak-Dala
  Moiynkum
  the Balkhash–Alakol depression
  the desert and foothill regions of southern and southeastern Kazakhstan
- These territories form part of, or are closely connected with, the **Turanian floristic region**, one of the major centres of arid plant diversity in Central Asia.





Conclusion

Chenopodiaceae represent one of the most characteristic taxonomic groups of the arid flora of Kazakhstan.

In the traditional taxonomic concept, the group comprises approximately **218 species belonging to about 47 genera**, accounting for around **3.8% of the native vascular flora of the country**.

Its taxonomic structure is highly heterogeneous.

Several species-rich and polymorphic genera — particularly *Salsola sensu lato*, *Atriplex*, *Suaeda*, *Anabasis* and *Climacoptera* — contain a substantial proportion of the total diversity.

At the same time, Kazakhstan supports a number of highly specialized species-poor and monotypic genera, demonstrating the evolutionary heterogeneity of the group.

The highest diversity is concentrated in the **southern, southwestern and southeastern arid regions**, particularly within the Turanian desert systems.

The updated **2026 Checklist of Native Vascular Plants of Kazakhstan** and its integration into GBIF provide an important modern basis for reassessing the taxonomy, distribution and regional diversity of this group.

Overall, the diversity of Chenopodiaceae in Kazakhstan reflects the country's geographical position at the centre of the Eurasian arid zone and the long evolutionary history of the Central Asian desert flora.

THANK YOU FOR YOUR ATTENTION!



Caroxylon nitrarium (Pall.) Akhani & Roalson