Brief information about the project

Name of the project	AP15473136 «Multi-vector study of a rare relict species Rheum compactum L. - scientific approach to species conservation of Kazakhstan Red Book»
Relevance	Species included in the Red Book of Kazakhstan are of the greatest interest as vulnerable elements of biodiversity. The study of rare elements of the flora of Kazakhstan corresponds to the objectives 5 of the Global Strategy of the Convention on Biological Diversity, ratified by Kazakhstan in 1994 to ensure the conservation of areas that are priority for conservation and protection. In addition, endangered species are endemic and relicts, serving as the basis for studying the evolutionary process of speciation. The idea of the project is an ecological and biological study and population assessment of the state of the relict Rheum compactum, a species on the Red Book of Kazakhstan. Due to the high anthropogenic load on the resource stock of the species, existing populations are rapidly declining and its current state and distribution are unknown. Urgent, high-quality research and conservation measures are required.
Purpose	The purpose of the study is to study the current state, economic resource reserves and distribution of the relict species: Rheum compactum L., included in the Red Book of Kazakhstan, to map the growing areas, study the morphological features of intraspecific taxa, identify limiting factors, develop effective protection and restoration measures, justify the required security measures.
Objectives	1. Analysis of the current distribution based on literary data and herbarium collections of domestic and foreign repositories. Planning botanical trips through the territory of the Kazakhstan Altai. 2. Study of the distribution of a rare species in the geographical regions of the Kazakhstan Altai. Determination of the ecological and phytocenotic conditions of growth of the species in order to determine the ecological optimum of the species. 3. Study of population-quantitative, morphological, ontogenetic characteristics of Rheum compactum. Establishment of vitality, age composition and reproductive characteristics. 4. Establishment of limiting factors and circumstances that determine the rarity of the species. 5. Construction of maps of the actual distribution areas and places of growth of Rheum compactum in the ArcGis graphic editor. 6. Publication of research results. Development of high-quality measures for the conservation of rare species. Development of recommendations for the inclusion of additional territories in the network of protected areas of the Republic of Kazakhstan.
Expected and achieved results	Data on the distribution of the economically valuable species Rheum compactum L will be summarized. Routes for botanical expeditions through the territory of the Kazakhstan Altai will be developed.

	Botanical expeditions will be carried out to the geographical areas of the Kazakhstan Altai. The actual places of growth will be identified, the ecological and phytocenotic conditions of the cenotypes will be established. The ecological optimum of the species for the Kazakhstan Altai will be determined. Natural populations of Rheum compactum will be studied. Vitality and age structure will be established. The number, density, features of vegetative and seed propagation will be established. The reasons for the rarity of the species will be determined. Limiting stress factors will be identified. Pests and diseases will be identified. Distribution maps of the species Rheum compactum will be developed and created in the ArcGis graphic editor. A monograph with recommendations for the protection of Rheum compactum will be published. High-quality measures will be developed for the protection and renewal of species, the inclusion of new growing areas in the network of protected areas of Kazakhstan and for the regulation of human economic activities. At least two articles will be published in journals from the first three quartiles by impact factor in the Web of Science database or having a CiteScore percentile in the Scopus database of at least 50 (fifty), as well as 3 scientific articles within international conferences. The implementation of the declared project will contribute to improving the qualifications of the postdoctoral fellow, as well as the development of a specialized area at the scientific institute. Popularization of the results of scientific research will form among the population environmental awareness and careful attitude towards the biodiversity of the Republic of Kazakhstan. The publication of materials obtained during the project will make it possible to familiarize a wide range of the population with the problem of preserving rare species, showing their vulnerability and economic value. Carrying out activities within the framework of this project will reduce the anthropogenic impact on the vegetation of the region. The results of the implementation of the project's objectives will allow us to expand the list of environmental sites in the region. The scientific findings of the work will be used to monitor the condition of the rare species in its natural habitat. The results obtained will be used to identify specially protected natural areas, as well as to regulate human economic activities. The developed recommendations for the conservation of the studied populations of Rheum compactum will be used in the future during introduction in order to preserve a unique rare plant species. Carrying out activities within the framework of the declared project is the initial stage of re-issuing the Red Book of Kazakhstan, which will preserve the biodiversity of Kazakhstan and reduce damage from anthropogenic impact on the vegetation of the region.
Research team members with their identifiers (Scopus Author ID,	1. Sumbembayev Aidar, PhD, Hirch index (Scopus) – 3, ORCID: https://orcid.org/0000-0003-0682-9162, Scopus Author ID: 57207914850

Researcher ID, ORCID, if available) and links to relevant profiles	2. Kurmanbayeva Meruert, доктор биологических наук, доцент, Hirsch index – 8, https://orcid.org/0000-0002-5050-9142, Scopus ID 56029519900, Web of Science Researcher IDO-1562-2016
List of publications with links to them	1 scientific article was published in a peer-reviewed scientific publication with a CiteScore percentile in the Scopus database of at least 50 (fifty): Sumbembayev A.A., Lagus O.A., Nowak S. Seed morphometry of Rheum L. (Polygonaceae) species from Kazakhstan and its implications in taxonomy and species identification// Biodiversitas. Vol. 24, Number 9, September 2023, pages 4677-4692. (Scopus Q2, percentile 56) DOI: 10.13057/biodiv/d240908 A scientific article was published in a collection of publications within the framework of the international conference: Sumbembaev A.A., Aitzhan M.A., Maratkyzy N. Distribution of species of the genus Rheum L. in Kazakhstan // Materials of the XV international scientific and practical conference "Actual problems of ecology". January 20-21, 2023, Karaganda. pp. 106-110.
Patents	-