THREATENED PLANT SPECIES IN THE FLORA OF THE TAMDY RELICT MOUNTAINS

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Abstract. The paper analyses the composition, conservation status and spatial distribution of plant species from the Tamdy relict mountains listed in the Red Data Book of the Republic of Uzbekistan (2026), as well as the main threats affecting them. The study recorded 17 threatened species across 11 families and 15 genera. Grid mapping (5×5 km) showed that these species are highly concentrated in the Aktau relict mountain, which is simultaneously exposed to strong anthropogenic pressure.

Keywords: Kyzylkum, relict mountains, Red Data Book, IUCN, grid mapping, Aktau, conservation.

Introduction. About 39% of vascular plant species worldwide are estimated to be threatened with extinction, and habitat loss and fragmentation are among the main drivers of this crisis [1]. The relict mountains of the Kyzylkum Desert serve as natural refugia for relict, endemic and narrow-range plants; however, in recent years they have been increasingly affected by livestock grazing, mining and infrastructure development. The Tamdy relict mountains are among the floristically richest of these areas, with 388 vascular plant species. In our previous study, we described the morphological and ecological characteristics of 11 Red Data Book species from this area [2]. The present study aimed to assess the full complement of threatened species in the area according to the new edition of the Red Data Book, reveal their spatial

concentration, and identify the main threats at the locality level.

Materials and methods. The study is based on field surveys conducted in 2022–2026, specimens deposited in the TASH, MW and LE herbaria, and literature data. We assign species conservation status according to the 2026 edition of the Red Data Book of the Republic of Uzbekistan, in which taxa were reassessed using the IUCN Red List Categories and Criteria [3, 4]. We georeferenced and analysed all occurrence records in a GIS environment using 98 5×5 km grid cells covering the study area (Fig. 1).

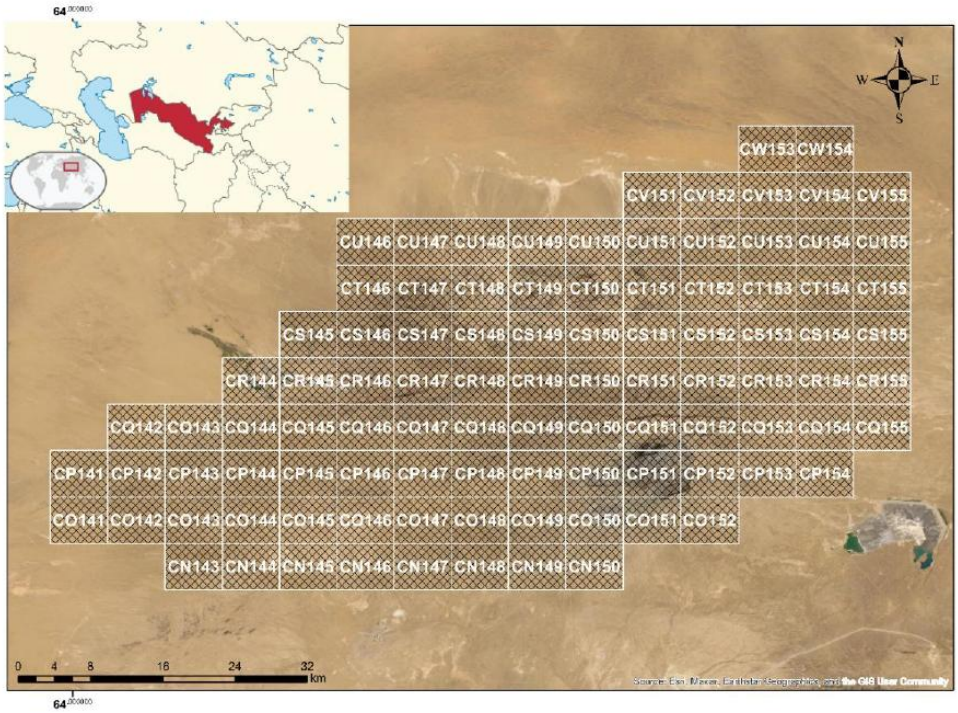


Fig. 1. Indexed grid map of the study area

Results and discussion. In the flora of the Tamdy relict mountains, 17 species from 11 families and 15 genera, included in the 2026 edition of the Red Data Book of the Republic of Uzbekistan, were recorded. They account for 4.4% of the local flora and 5.4% of the plant taxa listed in the national Red Data Book. Asteraceae and Lamiaceae are represented by three species each, Fabaceae and Caryophyllaceae by two species each, and the remaining seven families by a single species. This indicates

that the area's conservation value is not limited to a single taxonomic group.

According to the IUCN categories, two species are Critically Endangered (CR: *Astragalus adylovii*, *A. centralis*), nine are Endangered (EN: *Acanthophyllum cyrtostegium*, *Cousinia umbilicata*, *Jurinea psammophila*, *Lagochilus vvedenskyi*, *Phlomoides aralensis*, *Rhamnus erythroxyloides* subsp. *sintenisii*, *Scorzonera bungei*, *Silene tomentella*, *Stipa aktauensis*), four are Vulnerable (VU: *Ferula kyzylkumica*, *Halimocnemis lasiantha*, *Lagochilus inebrians*, *Lepidium subcordatum*), one is Near Threatened (NT: *Tulipa lehmanniana*), and one is Data Deficient (DD: *Lappula aktaviensis*). Thus, 64.7 % of the threatened species fall into the CR and EN categories. The number of Red Data Book species in the Tamdy relict mountains exceeds that recorded in the floras of the Bukantau (9 species), Sultanuvays (11 species) and South-Eastern Kyzylkum relict mountains (10 species) [5–7].

Grid mapping revealed an uneven distribution of threatened species across the study area. The highest numbers were recorded in cells CT149 (11 species) and CT148 (9 species), which cover the Aktau relict mountain: 11 of the 17 species (64.7 %) occur in this massif with an area of only 42 km² (Fig. 2). *Ferula kyzylkumica* and *Lepidium subcordatum* are relatively widespread (recorded in 12 and 13 cells, respectively), whereas *Astragalus adylovii*, *Halimocnemis lasiantha* and *Jurinea psammophila* are known from single localities only. During the study, we discovered new localities for *A. adylovii* (southern foothills of Shushaktau) and *Scorzonera bungei* (Yamantau and Shushaktau).

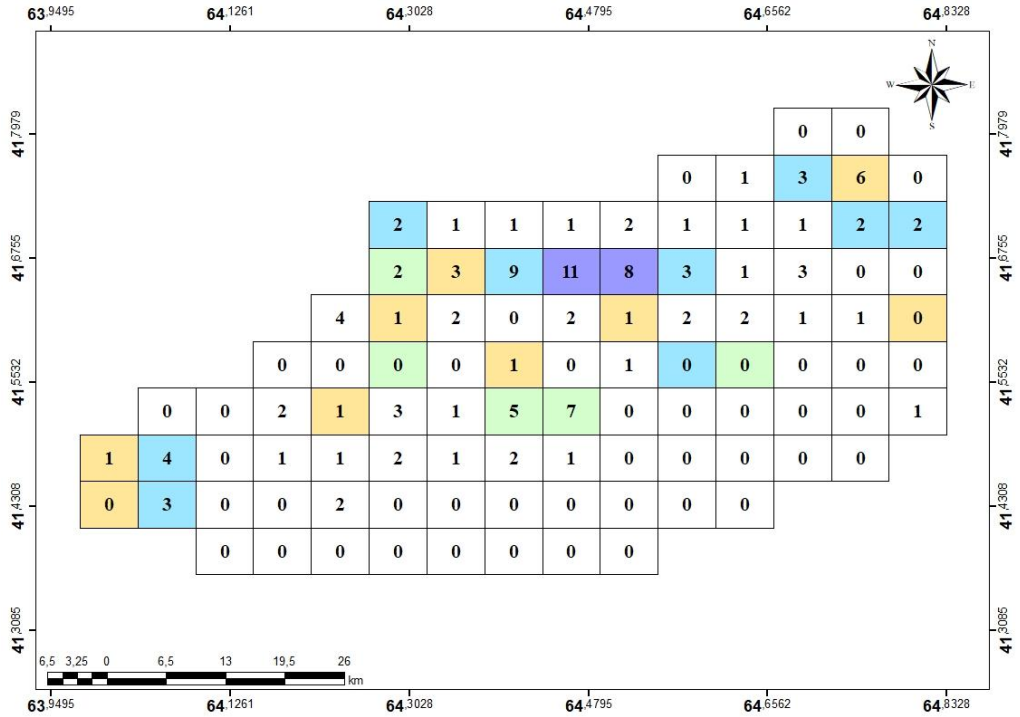


Fig. 2. Spatial structure of the species listed in the Red Data Book of Uzbekistan in the study area

Field observations showed that the main threats directly overlap with the localities of threatened species. Active marble quarries in the Aktau Mountain are located within the habitats of *Astragalus centralis* (CR), *Rhamnus erythroxyloides* subsp. *sintenisii*, *Phlomoides aralensis*, *Silene tomentella*, *Stipa aktauensis* and *Acanthophyllum cyrtostegium* (all EN). Gold mining in the Kynyr and Balpantau area occurs near the localities of *Cousinia umbilicata* and *A. adylovii*. At the same time, geological prospecting near the Charykty relict mountain affects areas where *P. aralensis* and *J. psammophila* occur. Year-round uncontrolled grazing reduces the frequency of occurrence of *Scorzonera bungei* and *Tulipa lehmanniana*. In addition, since 2022, a wind farm with a total capacity of 500 MW, consisting of 111 turbines and covering 9,600 ha, has been under construction approximately 3.5 km from Aktau. Although Aktau has been recognised as a Key Biodiversity Area (KBA) and an Important Bird Area (IBA) since 2007, it has not been included in the protected area

network.

Conclusions. The Tamdy relict mountains harbour 17 threatened plant species, two-thirds of which belong to the CR and EN categories, and the Aktau relict mountain is their main centre of concentration. The overlap of the localities of these species with mining and grazing areas calls for urgent conservation measures: designation of Aktau as a specially protected natural area, establishment of a seed bank for CR and EN species, differentiated regulation of pasture use, environmental impact assessment of mining activities and long-term monitoring of populations of narrow-range species.

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