

## Monitoring of the Relic Endemics of Uzbekistan's Flora

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**Abstract:** The results from monitoring of two endemic species of Uzbekistan flora are shown. The first species examined was *Otostegia bucharica* B. Fedtsch. (*Lamiaceae*). This is an endemic species of Uzbekistan which is critically endangered. The second focus of this research was *Thesium minkwitzianum* B. Fedtsch. (*Santalaceae*), also an endemic species of western Tien Shan, that grows in the territory of the Chatcal Reseserve.

**Keywords:** Uzbekistan flora; *Otostegia bucharica*; *Thesium minkwitzianum*

The flora of Uzbekistan consists of approximately 5000 species. More than 500 species are relic and endemic. The present research is devoted to the study and monitoring of the natural populations of two endemic Uzbek species: *Otostegia bucharica*, B. Fedtsch. (*Lamiaceae*); and the sub-endemic *Thesium minkwitzianum*, B. Fedtsch. (*Santalaceae*).

The construction of a new railway, Tashguzar–Baysun–Kumkurgan (250 km long), had placed the survival of the *Otostegia bucharica* population in jeopardy.

The genus *Otostegia* Benth. is one of the ancient and interesting representatives of the *Lamiaceae* family (KUDRYASHEV 1939). As a rare plant, *O. bucharica* is included in the Red Data Book of Uzbekistan.

The genus *Thesium* (*Santalaceae*) has spread into the area around the Mediterranean Sea, and eastward. *Th. minkwitzianum* is a relic representative of ancient African flora, isolated from neighbouring relative species by having lived in the desert lowlands of Tien Shan (ПОПОВ 1958). It is endemic in the western Tien Shan, and a relic of the tertiary period. The species has been described from the variegated lowlands north of Tashkent. Populations of this species from its classical habitat, as well as two other locations (Mashat and Chushkabalak), long ago vanished. KAMELIN and LEVICHEV (1998) found a population in the Chatkal reserve in 1982. The researchers counted only seven individuals. In 1984, information that the population consisted of

17 individuals (in the Red Data Book of Uzbekistan) was published. Since then, there has been no further information about population conditions.

One population of *O. bucharica* is growing on the outskirts of the villages Shurob and Darband. It is of worldwide significance, and occupies a small territory (approximately 2 km<sup>2</sup>). A second one is situated 25–30 km to the north-east of Shurob, in the Machay river basin (on the outskirts of Gurhoji vilage). The species is growing on variegated strata in the most extreme of xerothermic conditions, with abundant gypsum soils, carbonic lime, and soluble salts. Under such conditions, for every individual, the environment is of sole significant and determinative.

Shurob's population of *O. bucharica* is threatened by a list of limiting factors: up to 90% of the seeds are defective or damaged by insects; the plants are adapted to specific conditions of growth; and the low competitive ability of young plants is a conditioned weakness of the population.

According to BELOLIPOV (1980), from an estimation made April to May in 1977, the number of individuals of different ages is equal to 2860. In August 2005, we counted the exact number of individuals (of different ages) to be 1974. In the 30 years that have passed, the forces on this species extinction is increasing.

During the population studies, we collected the seeds of *O. bucharica* and planted them onto ten key sites; with prior soil processing on diffe-

rent ecotopes (limes, red sandstones, fine-grained limes, and others), as well as their situation, within the bounds of the territory, on areas free from human-induced factors. These sites will serve as the subjects of further monitoring investigations. We have planted the seeds in a habitat with a rare presence of the species, on unprocessed soils. The area of the population is 1.5–2 ha.

BELOLIPOV (1980) did not find renewal from seeds during the past 15 years. From unpublished work at Levichev's Botanical Institute about crucial research on the seed renewal of a population grown along a pedestrian route of 5 km length in 1987, not one seedling was shown. However, the 3 to 4 year old individuals were detected as obviously being of seminal origin. According to our data, a small number of young individuals are now growing within the population.

The southern part of the population, which was found growing along the proposed route, was expected to suffer when the construction work began. Here, one fifth of the whole of the Shurob population is concentrated. In order to prevent any negative influence on the conditions of the population from large human-induced factors, the transplantation of these special *O. bucharica* research bushes (found along the railway construction route) was carried out. After analysis of the habitat, 90 bushes of different aged plants, growing directly in the construction zone, were transplanted by us inside the Shurob population.

Transplantation of the bushes was done for all known ecotopes of the existing species in November 2005. At the present time, these habitats are free of human-induced factors and the railway construction does not present a threat to the plants. The monitoring efforts of the transplanted bushes was carried out in May and April 2006, April 2007 and 2008. Summarising the results, we can report that 35 bushes out of 90, mostly young plants, are acclimatised and growing. Fifteen bushes have dried out. Within the transplantation area, 16 bushes were not found. Apparently, they were dug out by local herders after their transplantation. The condition of the other bushes remains unknown, because their transplantation locations were not found.

The introduction of *O. bucharica* into the Botanical Garden in Tashkent was not successful, even when the plants were placed in similar edaphic conditions, as in nature (BELOLIPOV 1980). Evidently, *O. bucharica* is a stenobiont, and therefore, plants may be saved only in *in situ* conditions.

An investigation was carried out on *Th. minkwitzianum* at the known Bashkisilsay site of the Chatkal Natural Reserve in 2001. The population is in the isolated portion between Sohtagon and Issiksay. Counting of the individuals showed that at present there are 29 individuals. This proves progress in the population and conservation conditions. We unexpectedly found another local population. At this new site, we found 16 individuals with a low share in vegetation (scaled 1 by 7 points Drude scale). Since 2001, monitoring of the population conditions has been carried out.

An increase in population numbers was revealed in 2002. The first population consisted of 38 individuals, and the second of 21. In 2003, counting was carried out by researcher Muhammedjanova. According to her data, the first population consisted of 56 individuals, whereas the second was 18. Only 8 bushes out of 56 fully bore fruits. In 2004, a decrease in the number of bushes in the first population was recorded as down to 51. The second population showed progression on frequency and fruiting. There were 21 bushes. On the soil surface, mature seeds and juvenile plants were found. In June 2008, the first population consisted of 58 individuals, and the second of 22.

At the present time, *Th. minkwitzianum* is known from three habitats in the western Tien Shan. A scientific research program has been worked out for further study and the conservation of the species populations. In particular it is designed to: continue documentation of the populations, create a seed bank, create artificial garden nurseries in two natural reserves (Chatkal and Besharal), as well as the planting of seed both *in situ* and *ex situ* (in the Botanical Garden, Tashkent).

## References

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