THE ORIGIN, MORPHOLOGICAL VARIABILITY, AND CONSERVATION PROSPECTS OF *PAEONIA HYBRIDA (FAMILY: PAEONIACEAE)* IN NAMANGAN REGION, UZBEKISTAN

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Annotation: *Paeonia hybrida*, a member of the Paeoniaceae family, is a relict and endangered herbaceous plant found sporadically in the foothills of the Namangan region of Uzbekistan. The species exhibits notable morphological variation, which reflects both its evolutionary history and adaptation to changing environmental conditions. This study investigates the taxonomic origin, morphological diversity, and current threats to *P. hybrida* populations in Namangan, providing insight into strategies for its preservation. Field surveys, morphometric analyses, and historical botanical data were utilized to assess the species' status and guide conservation efforts.

Keywords: *Paeonia hybrida, Paeoniaceae oilasi,* NCBI, Central Herbarium

NAMANGAN VILOYATIDA YO'QOLIB BORAYOTGAN *PAEONIA HYBRIDA (PAEONIACEAE OILASI)* TURINING KELIB CHIQISH TARIXI, MORFOLOGIK O'ZGARISH DARAJASI VA ISTIQBOLLARI

Annotatsiya: *Paeonia hybrida* — pionlar oilasiga mansub qadimiy va yo'qolib borayotgan ko'p yillik o't o'simligi bo'lib, u Namangan viloyatining tog' oldi hududlarida parchalangan holda uchraydi. Bu tur sezilarli morfologik o'zgaruvchanlikka ega bo'lib, bu xususiyatlar uning evolyutsion tarixi va atrof-muhitga moslashuvi bilan bog'liq. Ushbu tadqiqot P. hybrida ning kelib chiqishi, morfologik tafovutlari va mavjud xavf omillarini o'rganib, uni saqlab qolishning istiqbolli yo'llarini belgilaydi. Kuzatuvlar, morfometrik tahlillar va tarixiy manbalar asosida turlarning holati baholandi va muhofaza choralari taklif etildi.

Kalit so'zlar: *Paeonia hybrida, Paeoniaceae oilasi,* NCBI, Central Herbarium

1. INTRODUCTION

The genus Paeonia includes approximately 33–35 species globally, primarily distributed across Eurasia and western North America [1]. Paeonia hybrida, endemic to Central Asia and the Caucasus region, represents one of the lesser-studied but biologically significant species within this genus [2]. In Uzbekistan, especially in the

Namangan region, this species is under growing threat due to habitat degradation, overgrazing, and climate-related changes [3].

The species' historical distribution in Namangan dates back to the early floristic explorations of the 19th century, yet comprehensive studies on its local populations remain limited. The need for an in-depth investigation into the origin, morphological variability, and conservation of P. hybrida has become pressing due to rapid environmental changes and its declining population numbers.

2. MATERIALS AND METHODS

2.1 Study Area: Fieldwork was conducted during spring the foothill zones of the Pop and Chust districts of the Namangan region, located between 1000–1600 meters above sea level. The region is characterized by semi-arid climate, brown-calcareous soils, and moderately steep slopes.

2.2 Sampling and Morphological Analysis: A total of 30 specimens were collected and studied in situ. Morphometric traits analyzed included stem height, leaf lobe count, flower diameter, and petal color intensity. Measurements were taken using calipers and image analysis software. Data were statistically analyzed using ANOVA to assess intraspecific variability.

2.3 Historical and Genetic Data Review: Floristic literature, herbarium specimens from the Central Herbarium of Uzbekistan, and genetic data from NCBI GenBank were reviewed to trace the taxonomic origin and genetic links of P. hybrida populations.

3. RESULTS

3.1 Taxonomic Origin and Historical Background; Paeonia hybrida is believed to have diverged from a common ancestor shared with Paeonia tenuifolia and Paeonia officinalis during the late Miocene epoch [4]. Morphological traits suggest an ancient hybridization event, likely between Central Asian peony species, which gave rise to its current intermediate phenotype.

3.2 Morphological Variability: The study revealed notable morphological variation within local populations: Stem height ranged from 25–45 cm. Leaf morphology varied from tripinnate to deeply lobed simple leaves. Flower diameter ranged between 6–9 cm, predominantly pink to purplish-red. Petal count varied from 6 to 10, with rare occurrences of double-flowered individuals. Environmental stress factors such as grazing and soil erosion were correlated with stunted growth and reduced flower size in marginal populations.

3.3 Threats and Decline: Several threats to P. hybrida populations were documented: Overgrazing and trampling by livestock in spring. Collection of plants for ornamental and medicinal purposes. Fragmentation of habitats due to agricultural expansion. Population density was estimated at 5–8 individuals per 100 m², indicating a severely fragmented structure and possible genetic bottleneck.

4. DISCUSSION

The findings suggest that Paeonia hybrida in Namangan represents a genetically and morphologically distinct lineage that has undergone adaptation to dry, rocky slopes of the region. Its historical divergence from related taxa, alongside recent ecological pressures, has led to unique phenotypic traits and high intra-population variation [5].

The fragmentation and decline in population size indicate the species may face reduced reproductive success and lower genetic diversity. Conservation strategies should focus on in situ protection, including grazing regulation and public awareness programs, as well as ex situ propagation in botanical gardens and research stations. Additionally, P. hybrida holds potential as a medicinal and ornamental species, which could aid in promoting its conservation through sustainable cultivation efforts [6].

CONCLUSION

Paeonia hybrida is a biologically and ecologically significant species native to the Namangan region, showing high morphological variability and signs of historical hybrid origin. Its existence is currently threatened by anthropogenic factors and habitat fragmentation. Immediate action is needed to prevent further decline, including conservation zoning, ecological monitoring, and sustainable use. Future research should prioritize genetic studies and restoration ecology to ensure the long-term survival of this emblematic plant.

REFERENCES

1. Hong, D.-Y. (2010). Peonies of the World: Taxonomy and Phytogeography. Kew Publishing.
2. Tojibaev, K.S., et al. (2018). "The wild peonies of Uzbekistan: distribution and conservation status." Turczaninowia, 21(1), 58–65.
3. Abdullaeva, Z. (2021). "Assessment of endangered plant species in Eastern Uzbekistan." Uzbek Journal of Ecology, 2(3), 45–49.
4. Sang, T., et al. (1995). "Phylogenetic relationships and hybrid origins of peonies inferred from ITS sequences." Molecular Phylogenetics and Evolution, 4(1), 56–64.
5. Dzhurakulov, S. (2019). "Impact of environmental stress on endemic flora in Fergana Valley." Central Asian Biology Bulletin, 5(2), 33–40.
6. Komarov, V.L. (Ed.). (1935). Flora of the USSR, Vol. VII. Moscow-Leningrad: Akademiya Nauk SSSR.
7. O'zbekiston Respublikasining Qizil kitobi (2020, 3-nashr). 2-jild: O'simliklar. Toshkent: "Chinor ENK" nashriyoti.
8. Kurbonov, A.J. (2019). O'simliklarning biologik faol moddalari — Toshkent: Tibbiyot nashriyoti.
9. Xusanov, U.X. (2017). Namangan viloyati o'simliklarining bioekologiyasi. — Namangan: NamDU nashriyoti.
10. The Plant List – http://www.theplantlist.org
11. Plants of the World Online (Kew) – https://powo.science.kew.org
12. GBIF (Global Biodiversity Information Facility) – https://www.gbif.org