SEED GERMINATION AND INTRODUCTION OF ASTRAGALUS ONOBRYSHIS L. (FABACEAE) IN THE CONDITIONS OF UZBEKISTAN

B.B. Amanturdiev

PhD in Agriculture, head of the Department of selection and seed production of medicinal plants.

E.R. Abdimusaev

senior researcher.

G.M. Sharipbayeva

Scientific and production Center for growing and processing medicinal plants.

ABSTRACT: Astragalus onobryshis L. is one of the most polymorphic species of the genus Astragalus (Fabaceae), widely distributed in Central Asia. It is a valuable source of biologically active substances, including flavonoids with hypolipidemic and antimicrobial properties, making it important for pharmaceutical applications. However, natural resources of this species are limited, necessitating the development of cultivation methods. The present study examines the morphological characteristics of A. onobryshis seeds, their germination biology, and evaluates different scarification methods under laboratory and field conditions in the Tashkent region.

Keywords: Astragalus onobryshis L., seed dormancy, scarification, germination biology, Central Asia, introduction.

Introduction

The genus Astragalus comprises more than 2500 species worldwide, with Central Asia being one of its centers of diversity. Astragalus onobryshis L. is a medicinally valuable species due to its biologically active compounds, but natural populations are sparse and vulnerable to overharvesting. The creation of industrial plantations would provide raw materials for the pharmaceutical industry and ensure the conservation of wild populations. Despite its potential, the biological features of seed germination of this species remain insufficiently studied.

Materials and Methods

Seed material was collected from natural populations in Uzbekistan at altitudes of 400–1000 m a.s.l. during the 2023 vegetation season. Morphological traits of seeds were analyzed, including size, shape, and seed coat characteristics. To overcome physical dormancy (95–100% hard seeds), several scarification methods were tested: (i) rubbing with sand, (ii) rubbing with sandpaper, (iii) boiling water treatment, and (iv) freezing for 24 hours. Germination tests were carried out in Petri dishes at three temperature regimes (+25–30 °C, +18–20 °C, and variable +5–7 to –3–0 °C). Germination energy was

assessed on day 10, and germination rate on day 20. Field sowing trials were conducted in the Tashkent region in spring and autumn of 2024–2025.

Results and Discussion

Laboratory experiments confirmed that untreated seeds failed to germinate within 30 days, confirming the strong physical dormancy of A. onobryshis. Mechanical scarification proved most effective: seeds rubbed with sand reached germination rates of 68–89% at +25–30 °C, with minimal embryo damage. Sandpaper scarification improved germination but increased seed rotting up to 36%. Boiling water treatment was largely ineffective (≤17%), while freezing did not break dormancy. Temperature had a significant influence, with the best germination observed at +25–30 °C. Field trials showed that autumn sowing was unsuitable due to winter seedling mortality, while early spring sowing was hampered by frost. Late March to early April sowing resulted in 51–52% field germination with good seedling survival, making it the optimal period for introduction.

Conclusion

The study demonstrated that Astragalus onobryshis L. seeds exhibit strong physical dormancy, which can be effectively overcome through mechanical scarification, particularly by rubbing with sand. This method is simple, effective, and adaptable to agricultural practice. Optimal germination occurs at +25–30 °C in laboratory conditions, while the most suitable sowing period in the Tashkent region is from late March to early April. The obtained results support the introduction of A. onobryshis into cultivation, ensuring both industrial raw material production and the preservation of wild populations.

References

1. 1. Poptsov A.V. Biology of hard seed. Moscow, 1976. 156 p.
2. 2. Nikolaeva M.G. Physiology of deep seed dormancy. Leningrad, 1967. 206 p.
3. 3. Karshibaev Zh.Kh. Germination of seeds of some Astragalus species in the steppe zone of Uzbekistan. Biological Journal of Uzbekistan, 2013, 3: 19-22.
4. 4. Karshibaev Zh.Kh. Seed yield of some Astragalus L. species in Mirzachul. Biological Journal of Uzbekistan, 2014, Special issue: Botany, 33-34.
5. 5. International Rules for Seed Analysis. Moscow: Kolos, 1984. 310 p.
6. 6. Kolesnikova L.V., Shilova I.V. Germination of Astragalus dasyanthus seeds with different pre-sowing treatments. Bulletin of SSU, 2002, 1: 56-58.
7. 7. Khromtsova E.N., Galkin M.A. Germination and seedling development of Astragalus onobryshis L. Izvestiya Vuzov, 2011, 6: 71-74.
8. 8. Kurbanova E.R., Zakirova R.P., Nurmakhmadova P.A. Complex seed treatment of Astragalus species for improved germination. Agro-Inform, Tashkent, 2021: 121-122.