

Seed Dormancy-Breaking in *Plantago Ciliata*

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Abstract:

Practical and low-cost pre-sowing treatments are important for improving nursery production in arid regions. In this study, we tested simple treatments to improve germination of *Plantago ciliata*. Seeds were collected from Qa' al-Haj, AlUla (June 2025), stored in a freezer for one month, and then sown in 90-mm Petri dishes in the laboratory at room temperature.

We used 4 replicates of 10 seeds for each treatment (40 seeds per treatment). The treatments were: (1) untreated control, (2) soaking in distilled water for 24 hours, and soaking for 24 hours in gibberellic acid (GA_3) at three concentrations: 500, 1000, and 2000 ppm. Germination was monitored for 30 days, and final germination percentage was calculated.

Final germination (%) was control 40, water soak 100, GA_3 500 ppm 93, GA_3 1000 ppm 73, and GA_3 2000 ppm 86. The 24-hour water soak gave the highest and most uniform germination and did not

require any chemicals. GA₃ at 500 ppm improved germination compared with the control, but higher concentrations did not give better results.

For nursery practice, the 24-hour water soak is a simple and low-cost pre-sowing step for *P. ciliata*. It is easy to apply, reduces the need for training, and can help with planning production for restoration projects. However, this study used only one seed lot and did not test the viability of ungerminated seeds. We recommend further trials with different seed lots, temperature and light conditions, and intermediate GA₃ concentrations (around 250–750 ppm) to confirm these results.

Keywords:

Plantago ciliata, seed priming, water soaking, GA₃, arid nursery, pre-sowing treatment, germination.