

Seed Dormancy and Germination of *Sinojackia dolichocarpa* C.J. Qi

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Introduction

Sinojackia dolichocarpa, a small ornamental tree known for its loaded white flowers and spindle-shaped fruits, is a threatened species, only distributed in the western part of the Hunan Province in China (Fig. 1). Since no regeneration in the wild has

been observed, reproducing this plant is an essential step in its conservation and cultivation. This research studied the seed germination of *Sinojackia dolichocarpa* under chemical and cold stratification and its dormancy mechanism.

Materials & Methods

Seeds of *Sinojackia dolichocarpa* were collected in Shimen County in Hunan Province, China (Fig. 2). The seed soundness was 91.0% by cutting test. The average weight was 1.45 kg for every 1000 seeds. The experiment was conducted in Nanyue Arboretum (Hunan), located in 27°15' N and 112°45' E. Duration winter months, the temperature stayed lower than 4C for about 10 weeks. Raising beds with 70% shade cloth were prepared for seed germination (Fig. 4). Experimental treatment groups were:

1. Control (no treatment or only sulfuric acid soak).
2. Sulfuric acid (99.9%) soak for 2, 3, and 4 days.
3. Gibberellic acid (500mg·L⁻¹) soak for one more day.
4. GA(250mg·L⁻¹) + 2,000mg·L⁻¹ KNO₃ soak.
5. 2,000mg·L⁻¹ KNO₃ soak only for one more day.
6. All 1-5 under low temperature at 4C for 10 weeks.

The top layer of the seed beds was moisture sand. Tunnels were built on the beds and covered with transparent plastic film for moisture retention. A completely randomized design was employed in this experiment. The 11 treatments were randomly assigned on six beds and each treatment was repeated four times with 30 seeds used for each replication. All data was analyzed using SPSS version 10.1.

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Results & Discussion:

No germination was found for directly sowed seeds (control). All stratification seeds had germination rates from 3.3 to 46.7%. Seeds soaked in 99.9% sulfuric acid for 2 days had much higher germination rates than those that were soaked for 3 and 4 days (Fig. 3). The highest germination rate 46.7% was observed in seeds soaked in sulfuric acid for two days, and then 500mg·L⁻¹ GA₃ for one day. Seeds soaked in sulfuric acid showed at 16.7% germination rate. However, one more treatment of 500mg·L⁻¹ GA₃ soak for one day significantly increased germination rate three times. Potassium nitrate also increased germination rate significantly, but not as well as the GA₃ treatment (Fig. 3). Cold stratification during winter months is required and no seed germination occurred without cold, even if treated with all chemicals (data not presented). The results concluded that seeds of *Sinojackia dolichocarpa* had a combinational dormancy (physical and physiological dormancy). The testa was very thick, which accounted for 91.9% of the seed dry weight. The hardseededness and water-impermeability of the seed could be overcome by sulfuric acid erosion. Seeds soaked in sulfuric acid for four days had 44.5% of its



Fig. 2: Fruit of *Sinojackia dolichocarpa* (Photo by Mr. Jiwu Cao)



Fig. 1: Habit of *Sinojackia dolichocarpa* (by Mr. Jiwu Cao)

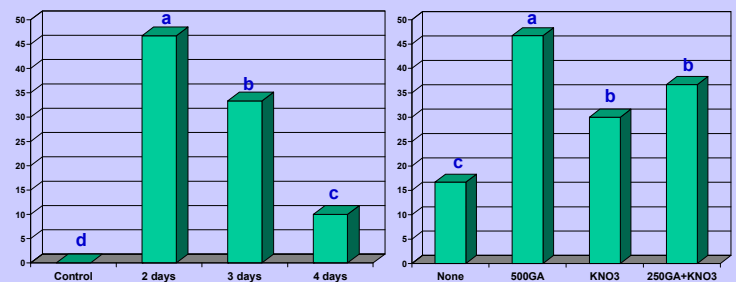


Fig. 3: Germination rates of *Sinojackia dolichocarpa* after soaking in sulfuric acid (99.9%) in 2, 3, and 4 days and 500ppm GA₃ for 1 day (left) and treating with GA₃ and 2000ppm KNO₃ after soaking in sulfuric acid for 2 days (right).



Fig. 4: Germination beds of *Sinojackia dolichocarpa*.

testa removed. Physical dormancy of *Sinojackia dolichocarpa* seeds can be partially released from acid soak. GA₃ and KNO₃ and subsequent lower temperature treatments could partially overcome the physiological dormancy.

Reference:

Shi, X.H., Y.G. Yu, and Z.L. Shi. 1986. Seed dormancy and germination of *Michelia maudiae*. Plant Physiology Communications 3:17~19.