



The Effect of Temperature on Seed Germination of *Nyssa javanica*, *Ficus callosa* and *Ficus semicordata*

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Abstract

Climate change has resulted in rising temperatures across many regions, particularly in mountainous areas. This may affect plants that have distribution ranges at high elevations. This study aims to examine the impact of temperature on the seed germination of three evergreen plant species: *Nyssa javanica*, *Ficus callosa* and *Ficus semicordata*. Seed germination was assessed under four different temperature regimes in a controlled plant growth chamber, with each temperature level featuring distinct daytime and nighttime temperatures of 20°C/10°C, 25°C/15°C, 30°C/20°C, and 35°C/25°C. Each temperature condition was conducted in three replicates. The results showed that *Nyssa javanica* seeds failed to germinate under all temperature conditions. *Ficus callosa* seeds exhibited the highest germination rate at 25°C/15°C, while *Ficus semicordata* seeds germinated best at 20°C/10°C, with germination rates of 66.66% and 53%, respectively. These findings indicate that temperature significantly affects the germination of these two plant species. The data obtained can be used to predict the potential impacts of climate change on their future distribution.

Introduction

Climate change is causing a continuous rise in temperature, Thailand expected to be significantly affected, especially in the central and northeastern regions. By 2070, average temperatures will increase notably, impacting high-altitude ecosystems. Many plants in these areas, which have adapted to cooler conditions, may struggle to survive. Temperature plays a crucial role in seed germination, affecting metabolic processes and enzyme activity. Extreme temperatures can slow or prevent germination, or even damage seeds. This study focuses on three high-altitude plant species *Nyssa javanica*, *Ficus callosa*, and *Ficus semicordata* which are likely to be directly affected by climate change.



Nyssa javanica
(800-1,000 meters)



Ficus callosa
(400-600 meters)

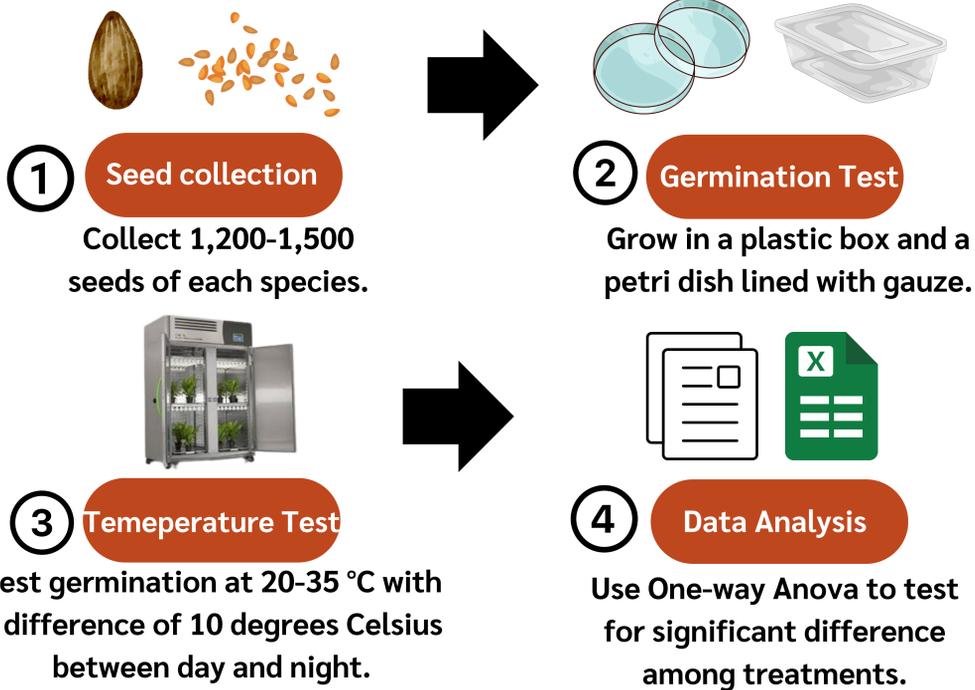


Ficus semicordata
(1,600 meters)

Objective

To study the effects of different temperatures on seed germination.

Methodology



Results & Discussion

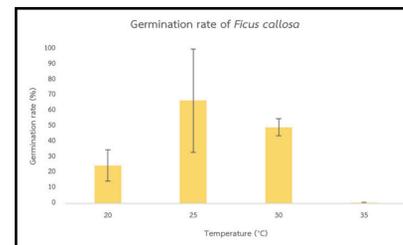


Figure 1 Germination rate of *Ficus callosa*

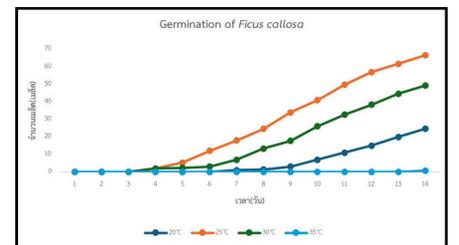


Figure 3 Germination of *Ficus callosa*

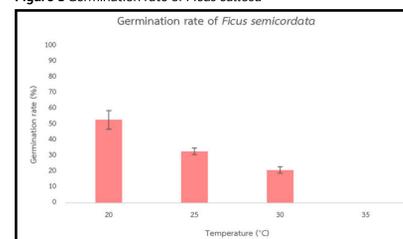


Figure 2 Germination rate of *Ficus semicordata*

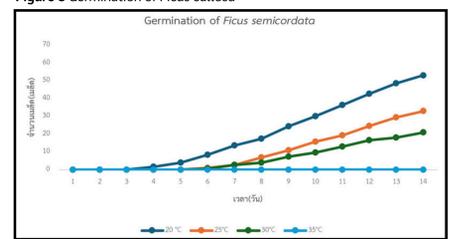


Figure 4 Germination of *Ficus semicordata*

- Nyssa javanica* did not germinate under all four temperature conditions due to the absence of germination-stimulating factors and the seed age after storage before planting.
- Ficus callosa* and *Ficus semicordata* germinate well at temperatures that correspond to their distribution areas and elevation levels.
- The highest germination: of *Ficus callosa* and *Ficus semicordata* were 25 °C and 20 °C respectively.

**Nyssa javanica* did not germinate under all four temperature conditions.

Conclusions

- Extreme temperatures 35°C significantly reduce germination for both species.
- Mid-range temperatures 25°C-30°C are generally favorable but vary between species.
- The germination of *Ficus semicordata* was more affected by higher temperature than *Ficus callosa*

Acknowledgments

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