Department of Agriculture and Fisheries

High Soil Temperature Reduces Hemp Germination: Preliminary Laboratory Findings from Northern Territory

Induni Vijaya Kumar

Research Scientist

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Introduction

- High temperature negatively affects seed germination.
- It disrupts metabolic processes, depletes energy reserves, and compromise seed viability and seedling establishment.
- Understanding the impact of high temperatures on seed germination is crucial for developing strategies to achieve optimal seedling vigour, population, and growth.
- This study aimed at identifying the optimal temperature range for hemp seed germination.
- The long-term goal of the study is to identify optimal soil temperatures and sowing windows for enhanced hemp seedling establishment in the NT.
- There is limited data on the impact of high temperature on hemp seed germination in Australia, emphasizing the need for further research.

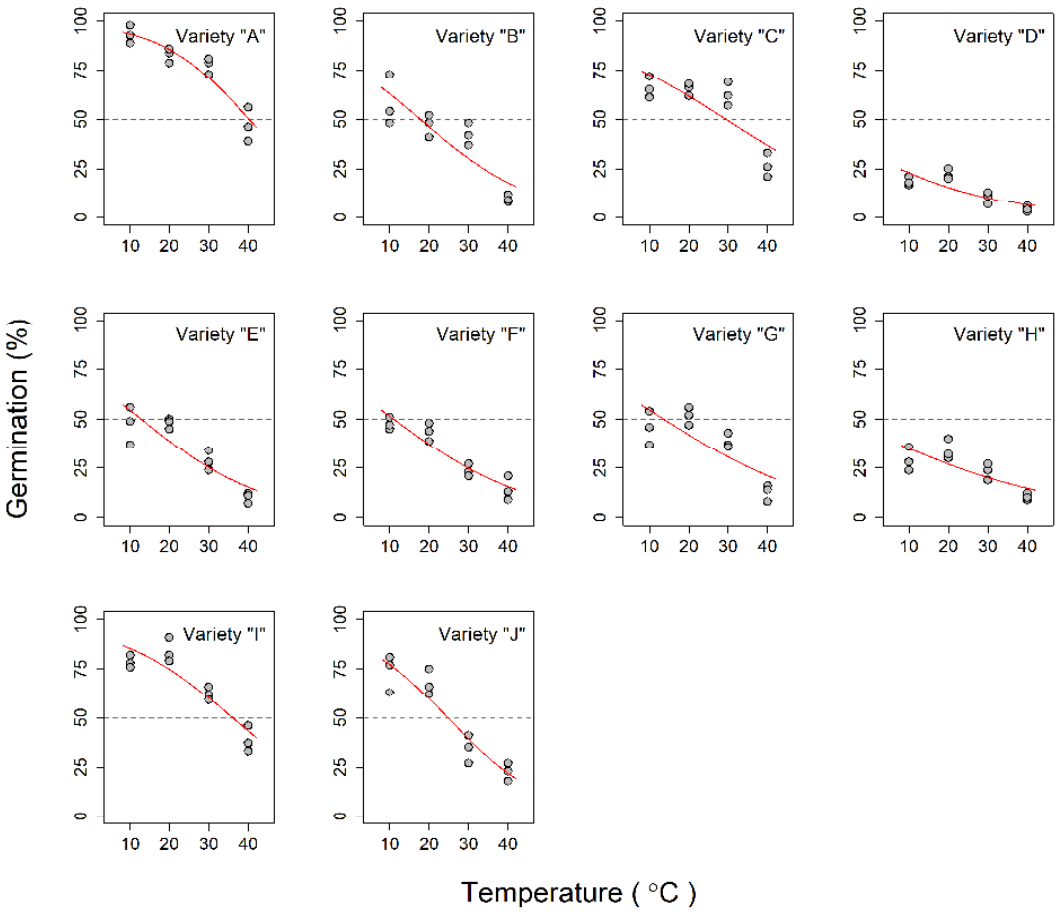
Method and Materials

- Ten varieties from the 2022/2023 Industrial Hemp Varietal Trial (IHVT) project evaluated for production performance at KRS, were utilized.
- The varieties originated from different regions (Europe, North America and Asia-Pacific) and coded.
- Four temperature regimes of 10, 20, 30, and 40 ^{0}C in 3 replicates.
- Twelve-hour daylight period (from 6 am to 6 pm) and Humidity 70 % maintained in incubators.

$$\text{Germination percentage} = \frac{\text{Total number of seeds germinated}}{\text{Total number of seeds incubated}} \times 100$$

- Data analysis; R statistical programme.

Results



- Hemp seed germinated even at low temperatures of 10 ^{0}C.
- Germination percentage was highest and stable between 10-20 ^{0}C.
- Significant decline in germination percentage observed when temperatures exceed 30 ^{0}C in all varieties.
- The lowest average germination was observed at 40 ^{0}C in all varieties.
- Varieties B, D, E, F, G and H exhibited very low germination percentages across all temperatures.

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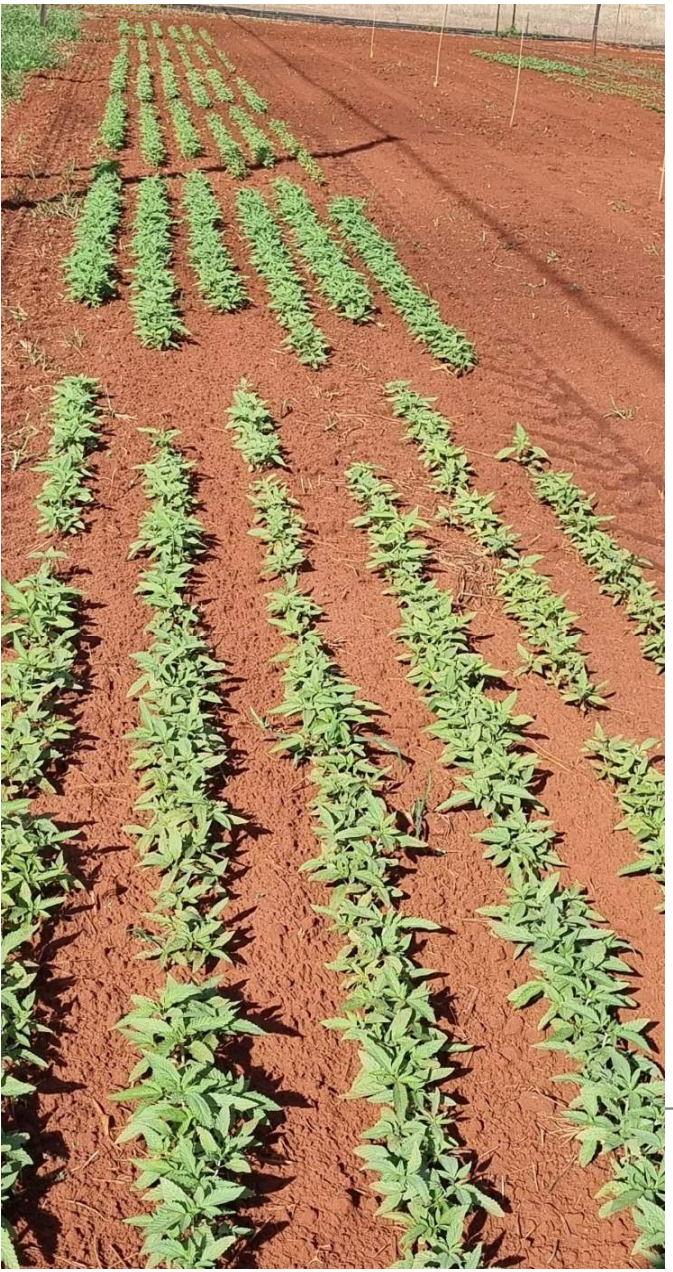
Conclusion

- Avoid temperatures above 30 ^{0}C when sowing hemp seeds for better germination.
- 10 ^{0}C and 20 ^{0}C are the optimal temperatures for hemp seed germination.
- Different varieties have varied tolerance to high temperatures at germination stage: varieties B, D, E, F, G, and H showed very low germination, further research required.
- Sowing Recommendations: Manage soil temperature and schedule sowing carefully to optimize germination and crop establishment in the NT.



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Thank You