Novel, single treatment application to seeds increases germination and positive impact on crop growth and development under both optimum and stress conditions

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ABSTRACT

- Early seed germination and seedling establishment, enhanced root development under low temperature (LT) stress are all critical factors to increasing yield through advanced flowering and avoidance of heat/drought stress in mid-summer in Canada and globally.
- This novel, inexpensive, single treatment application to seeds has significant effect on all three critical factors and can be applied in both developed and developing countries through soaking, priming or spray.
- Over 30 crops/cultivars have been assessed under optimum and LT stress. While further research is required, sufficient evidence indicates significant short and long term effect on plant growth and development in a range of crops.

OBJECTIVE

To determine if a single seed treatment can advance germination under low temperature stress conditions and evaluate impact on subsequent plant growth and development across a range of crops.

MATERIALS & METHODS

MATERIALS: Over 30 crops/cultivars were tested from cereals, pulses, oilseeds, forage, to horticulture crops.

TREATMENT: The seed treatment is based on a catalytic reaction (CAT™) using a transition metal catalyst combined with H2O2.

METHODOLOGY: Seed treatment was optimized for each crop based on concentration, soaking time (1 – 4 hrs), spray (0 to 3X the dose). Germination, root and shoot growth under 20, 15, 10, and in some cases, 5°C under controlled environment conditions, as well as nodulation and yield of specific crops has been assessed. Results presented based on 5 – 10 replications.

CONCLUSIONS

A single application of a seed treatment can induce enhanced germination under both optimum and LT conditions and has long term impact on increasing root and shoot growth and nodulation in certain legumes. Distinct cultivar-dependent responses are apparent.

FUTURE WORK

- Field-based responses should be evaluated for emergence, plant growth and development and yield.
- Treatment effects under salinity stress validating initial results and moisture stress should be evaluated.
- Mechanism of the observed seed treatment should be investigated.