Date: June 30, 2021

Title: Effect of a precondition on accelerated aging and bulk electrical conductivity on *Phaseolus Vulgaris* spp.

Purpose of Study: Develop an Accelerated Aging (AA), Bulk Electrical Conductivity (EC) vigor test for Red Kidney and Cranberry beans to assess seed quality. Also, investigate the impact of adding a precondition step to raise seed moisture on seed vigor response. The result of this study may provide a better vigor test assessment for dry beans and reduce imbibitional damage to the membrane.

Justification: Dry beans have lower moisture contents compared to wheat, corn, and soybean. The addition of a precondition to increase seed moisture of dry beans before seed vigor testing for accelerated aging and electrical conductivity may provide a better assessment of seed vigor for dry beans.

Research Design: A randomized block design of two replicates from two seed lots of Red Kidney and Cranberry Beans will be analyzed for accelerated aging and bulk electrical conductivity. Subsamples of each seed lot will be preconditioned to increase seed moisture by placing seed in a humid chamber for 24 hours at 20°C or processed directly upon arrival. Replicate size will be one hundred (100) and fifty (50) seed for AA and EC tests, respectively.

Research Method: Two seed lots of Red Kidney and Cranberry Beans will be tested for Accelerated Aging (AA) and Bulk Electrical Conductivity (EC). Subsamples of each seed lot will be preconditioned to increase seed moisture for 24 hours in a humid chamber at 20°C or processed directly. For the AA test, four screens with 30 grams of each subsample will be placed above 40 mL of water and maintained at 41°C for 72 hours. Seed weights will be recorded at arrival, after precondition, and after the 72-hour incubation. Replicates will then be planted on moistened crepe cellulose paper and covered in 25°C sand. Samples are then maintained at 25°C for 7 days before initial evaluation and then extended 2 days for final evaluation. For the EC test, fifty seeds of each subsample will soak in 75 mL of water at 20°C for 24 hours. EC readings (uS/cm/gram) will be recorded at 3, 6, and 24 hours. Statistical analysis for LSD and significant differences ($P<0.05$)

Publication of Results: Study description and results will be presented as a paper at the annual AOSA/SCST meeting to provide additional knowledge on dry beans vigor testing.

Budget: AA testing: $500.00, EC testing: $250.00, Data analysis and reporting: $250.00
Total: $1000.00

Estimated Completion Date (Note: A report is due 12 months after funding): May 2022.

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