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Space Environment Effects of Ionizing Radiation on Seed Germination and Growth[1] ALEXANDER SOUVALL, Utah State University, TAKUYUKI SAKAI, TAKAHIRO SHIMIZU, YUTA TAKAHASHI, MIDORI MORIKAWA, SHUSUKE OKITA, AKIHIRO NAGATA, TOSHIHIRO KAMEDA, University of Tsukuba, SHAUNDA WENGER, Logan High School, JR DENNISON, Utah State University — An initial limited set of tests of germination rate and seed growth in a controlled environment have identified statistically significant differences between control samples and seed flown in a Russian LEO research flight. Most significantly, average seed germination of space borne seeds was 2 days less than the 6 days for the control seeds. Modification of the seed coat leading to enhanced rate of water uptake, as a result of radiation from the space environment or abrasion due to launch vibrations, is hypothesized to cause early germination. High school students will conduct growth tests on seeds exposed to simulated space environments. The effects of ionizing radiation up to 1 kGy are being studied using a biological exposure test chamber designed by Tsukuba students used in the USU MPG Space Survivability Test (SST) chamber. The SST is a test facility designed to mimic space environments to test environmental-induced modifications to small satellites, or in this case, biological samples. Additional seeds will be exposed to a vibration profile on a shaker table designed to simulate the extreme conditions during flight. Understanding observed space environment effects are important in design of long duration missions, such as to Mars, where food growth is essential.

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