

CONTINUED RESULTS OF THE SEEDS IN SPACE EXPERIMENT

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SUMMARY

Two million seeds of 120 different varieties representing 106 species, 97 genera and 55 plant families were flown aboard the Long Duration Exposure Facility (LDEF). The seed were housed on the Space Exposed Experiment Developed for Students (SEEDS) tray in the sealed canister number 6 and in two small vented canisters. The tray was in the F-2 position. The seed were germinated and the germination rates and the development of the resulting plants were compared to the performance of the control seed that stayed in Park Seed's seed storage facility.

The initial results were presented in a paper at the First LDEF Post-Retrieval Symposium. There was a better survival rate of the seed in the sealed canister in space than in the storage facility at Park Seed. At least some of the seed in each of the vented canisters survived the exposure to vacuum for almost six years. The number of observed apparent mutations was very low. In the initial testing, the small seeded crops were not grown to maturity to check for mutations and obtain second generation seed. These small seeded crops have now been grown for evaluation and second generation seed collected.

INTRODUCTION

The purpose of the experiment was to evaluate the effects of prolonged space exposure on the survivability of a diverse group of seed stored in space under sealed and vented conditions and to determine possible resulting mutations and changes in mutation rates. Both flower and vegetable seed were represented in the experiment. Seed have been flown in space a number of times, but not in these quantities and not with maximum exposure for the duration that LDEF was in space.

MATERIALS AND METHODS

The basic materials and methods were discussed in a previous

paper (ref. 1). Fourteen of the smaller seeded items (table I) that had flown in space were sown in the spring of 1992. Since germination rates had already been established, this aspect of testing was not redone at this sowing. The plants were grown to maturity for the purpose of evaluating the populations for mutations and to collect second generation seed. Second generation plants of two items, Zea mays and Allium cepa, were grown for observation.

RESULTS AND DISCUSSION

With three exceptions which will be noted, all the plants grew normally and produced seed. The space seed of the Petunia x hybrida produced more robust plants than the control seed. This is probably a result of the aging process of the control seed. One plant of the Sedum supurium was dwarfed but otherwise like the other plants. One Lobelia Erinus plant had a chlorophyll deficiency.

The abnormalities observed in the Sedum and the Lobelia were likely the result of mutations since the phenotypes have not been observed in any populations that we have grown.

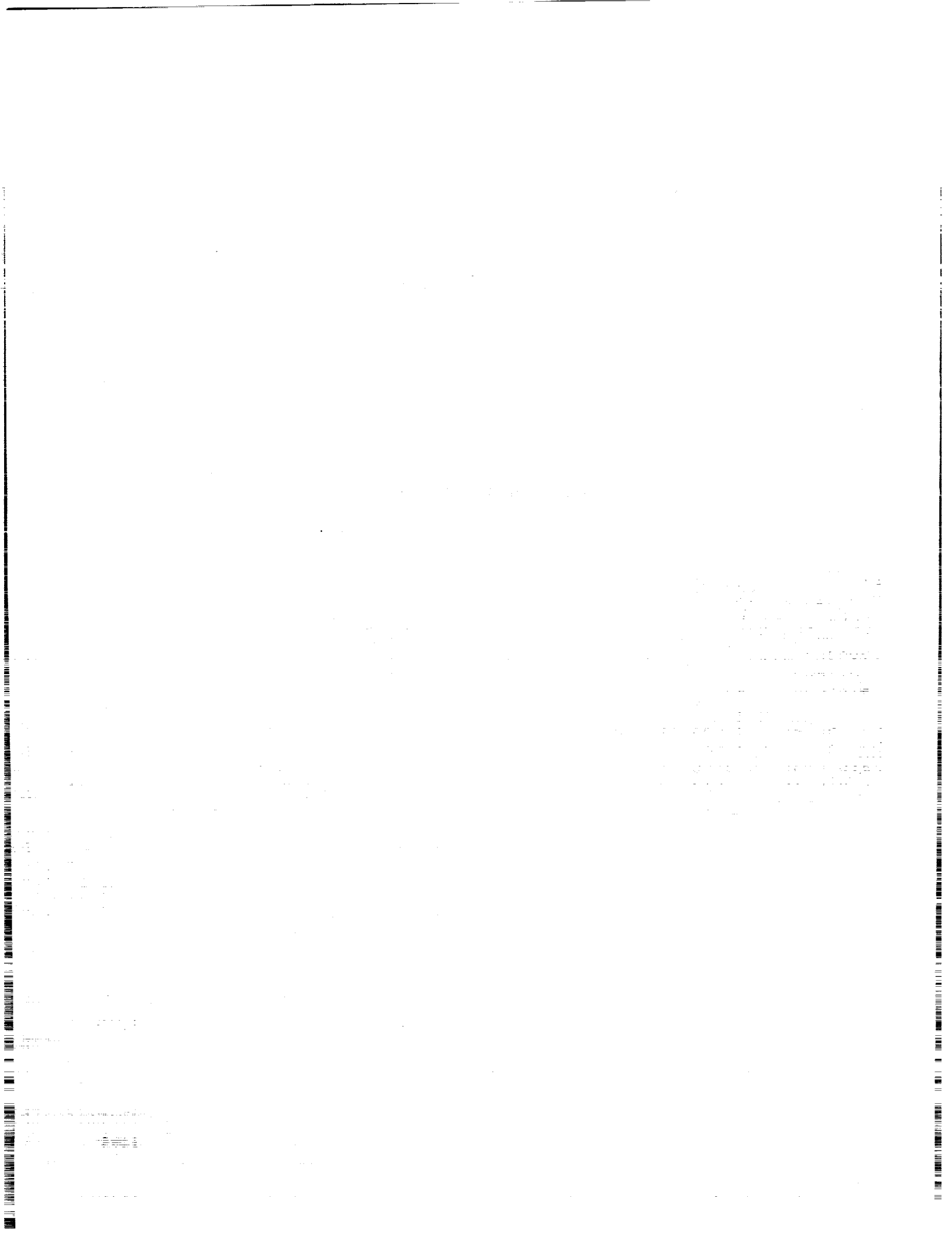
It is our conclusion that the mutation rate of the seed that flew in our experiment is very low, occurring less than one in a thousand.

REFERENCES

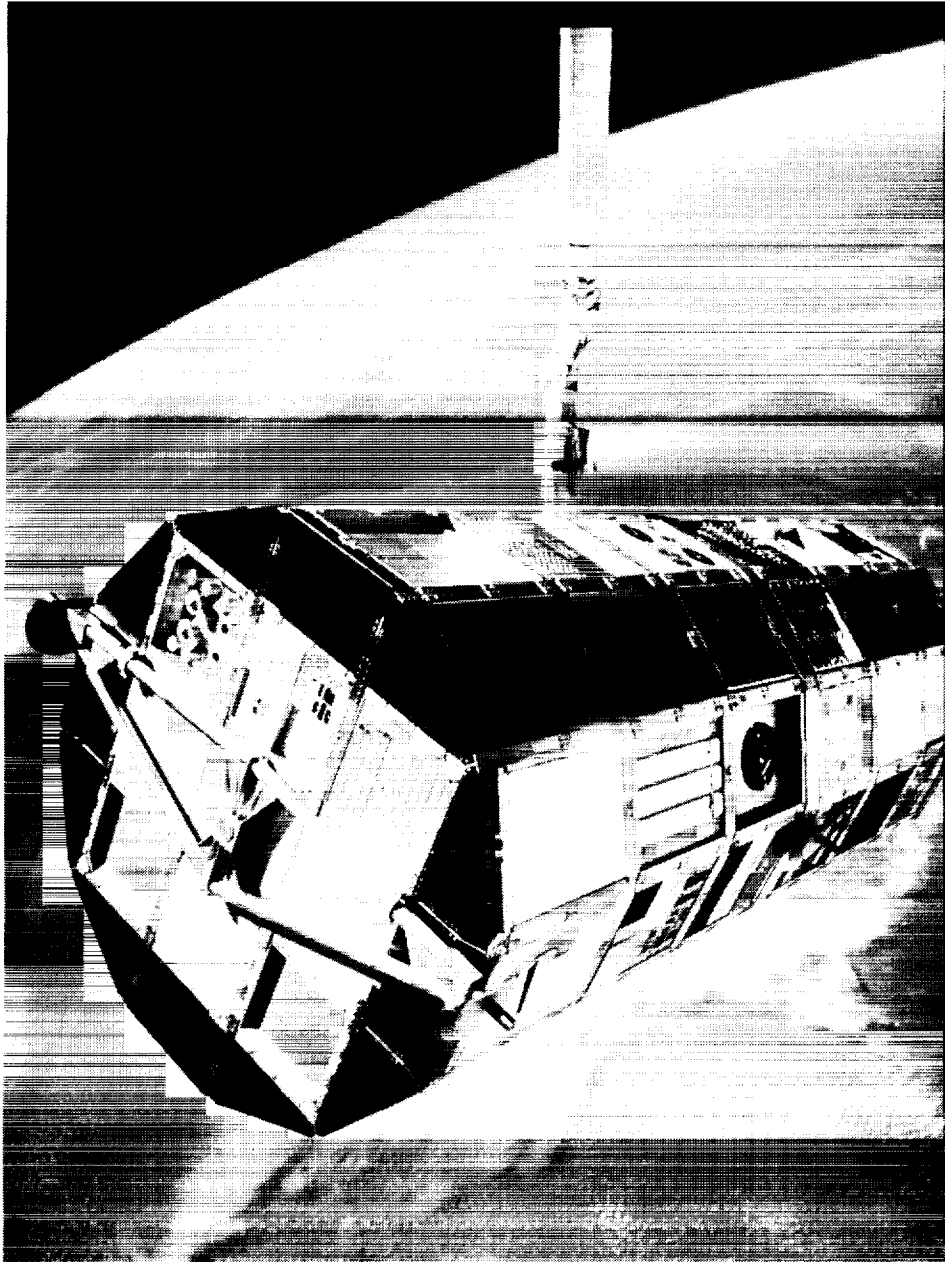
1. Alston, Jim A.: Seeds In Space Experiment. First LDEF Post-Retrieval Symposium, NASA CP-3134, 1992.

TABLE I LIST OF SEED

Lobelia Erinus
Sinningia speciosa
Begonia x semperflorens
Sedum supurium
Lobularia maritima
Cyperus alternifolius
Achimenes hybrids
Saintpaula ionantha
Portulaca grandiflora
Calceolaria crenatiflora
Petunia x hybrida
Salpiglossis sinuata
Lagerstroemia indica
Antirrhium majas



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