SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Living In Space - Education And Outreach In Space Life Sciences and infrastructure development for capacity building (7.-A1.8)

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ISS EDUCATION PROGRAM "JAXA SEEDS IN SPACE I"

Abstract

PURPOSE In order to have students experience the Science, participate in the real scientific investigation, we have begun the "seeds in space" education programs. Concretely, the main purpose of JAXA Student experiments is for them to learn the mutation effects of space-flight on plant seeds.

METHODS In March 2008, seeds of Asagao (Japanese morning glory), Miyako-gusa (Japanese bird's foot trefoil) and Sunflower were launched to the International Space Station (ISS) aboard Endeavour Shuttle Mission STS-123. The specimens were then remained on the ISS for near 9 months, when Endeavour Shuttle Mission STS-126 retrieved these educational biosamples, the seeds were returned to Earth. In case plant seeds were exposed to radiation as mutagen, the resulting mutations would be recessive in almost all examples. In breeding science, the above views are commonly well known. So, one could not identify mutants in the first generation cultivated from space-flight seeds judged by the observation of their phenotypes such as the figures, colors and so on. However, in the second generation, we can easily find the recessive homozygote as a mutant from their looks, if the plant has the characteristics of not only diploid but also self-pollination. Although there are also many types of plants characteristic of polyploidy, or cross pollination, the criteria described above could not be applied to them at all. It is summarized as follows: we have chosen seeds of Asagao and Miyako-gusa featuring with diploid and self-pollination as biospecimens for this education experiment, which could be used to identify the mutants from their phenotypes on the M2 generation. The space-flight seeds of Asagao and Miyako-gusa were then distributed to

some hundred of schools in Japan, on May 2010 with another sets of ground (negative)-control (i.e., seeds that never left Earth) and positive control (seeds irradiated with carbon ion beams at RIKEN Accelerator Research Facility). Participating students aged 3 to 18 year-old were given every 10 seeds of flight, ground control and positive control as one set for Asagao and, for Miyako-gusa, 20 every seeds were distributed. The students have been still conducting the cultivation of their plants twice for two seasons to find the mutants until fall of 2011.

CONCLUSIONS It is our hope that the students will precisely understand that the mutation rates of seeds in such a space-flight event, are extremely low compared to their expectations, and also they will actually learn what scientific experiments are.