



Extrait du Observatoire de Paris

<http://www.obspm.fr/on-the-outside-of-the-international-space-station.html>

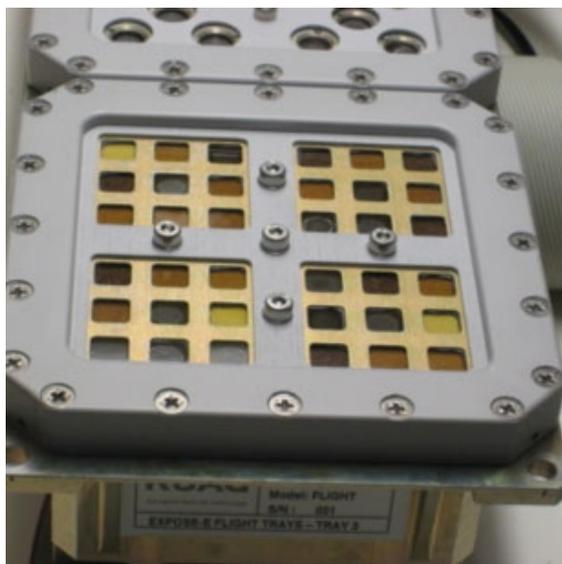
On the outside of the International Space Station, vegetable seeds survive



Date de mise en ligne : vendredi 6 juillet 2012

Observatoire de Paris

Seeds can survive being in space, especially if they are protected from UV light. That is the conclusion of three French scientists from the INRA and from the Observatoire de Paris, from an eighteen month long experiment carried out on the international space station, on the external part of the European Columbus module.



Plaques contenant les graines, fixées à l'extérieur de la Station spatiale internationale (Inra / Andreja Zalar)

The plausibility of the theory of panspermia (the hypothesis that life is not of terrestrial origin, but could have come from elsewhere) has been tested by exposing two varieties of plant seed to the conditions of space on the outside of the international space station, including solar UV light, galactic cosmic rays, the vacuum of space and extreme temperatures (from -21 to +61 °C). After their return to Earth, 23 % of the 2 100 seeds of Arabidopsis (of the mustard family) and of wild tobacco, germinated and produced fertile plants. The survival rate was smaller in the case of mutant plants without substances such as the flavonoïdes which serve as UV screens, but survival was not decreased in the case of seeds protected from solar light, suggesting that longer exposures might be possible in the case of seeds within an opaque matrix.

Seeds can thus survive trips in space, especially if they are protected from UV light. Even without protection, they could resist solar UV in the case of a hypothetical trip from Mars to the Earth. It is conceivable that a desiccated organism, protected by UV screens, such as those found in the husks of seeds, or surrounded by an opaque material, could have brought life to Earth about 4 billion years ago. Seeds of existing plants, possibly including bacteria, could play the part of vectors to send life to distant habitats.

This experiment opens the door to a better understanding, not only of plant resistance, but also of the origin of life ; it confirms the possibility that Man is exploring life beyond the Earth, by sending interplanetary probes for the conquest of space.

Collaboration

This work involves : the research unit Physicochimie et écotoxicologie des sols d'agrosystèmes contaminés - PESSAC of the Institut national de la recherche agronomique - INRA and the Laboratoire d'étude du rayonnement de

On the outside of the International Space Station, vegetable seeds survive

la matière en astrophysique - LERMA of the Observatoire de Paris (Observatoire de Paris / CNRS /Université de Cergy-Pontoise / Université Pierre et Marie Curie / ENS).

The French space agency CNES has financed the development and implementation of many experiment in the EXPOSE project, including the SEEDS experiment.

Team

The scientists are : David Tepfer and Andreja Zalar of the research unit PESSAC, INRA and Sydney Leach of the scientific department LERMA (Observatoire de Paris / CNRS /Université de Cergy-Pontoise / Université Pierre et Marie Curie / ENS).

Reference

Survival of Plant Seeds, Their UV Screens, and nptII DNA for 18 Months Outside the International Space Station. David Tepfer, Andreja Zalar, and Sydney Leach, *Astrobiology*, May 2012, 12(5) : 517-52