Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06761, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06761
EGU General Assembly 2008

A precursory technology of growing first plants in a lunar base

N. Kozyrovska (1), I. Zaetz (1), T. Voznyuk (1), I. Rogutskyy (2), O. Mytrokhyn (3), D. Lukashov (3), S. Mashkovska (4), B. Foing (5)

(1) Institute of Molecular Biology&Genetics of National Academy of Sciences, Kyiv, Ukraine, kozyr@imbg.org.ua / Phone: +38-044-5265596, (2) Institute of Physics of National Academy of Sciences, Kyiv, Ukraine, (3) T. G. Shevchenko Kyiv National University, Kyiv, Ukraine, (4) Botanical Garden of National Academy of Sciences, Kyiv, Ukraine, (5) ESA Research and Scientific Support Department, ESTEC/SCI-SR, Noordwijk, The Netherlands.

With the possibility of human return to the Moon around 2020, we have to think about growing plants for permanently manned lunar base. A conception of a precursory technology of growing first multipurpose plants in a lunar greenhouse anticipates to use 1) a local material such as a lunar regolith, possessing plant-essential elements to reduce a cost of early missions to the Moon; 2) microorganisms (both pro- and eukaryotic) for decomposition of both silicate rocks and plant straw needed for a protosoil formation and growing plants of next generations (Kozyrovska et al., 2004; 2006; Zaetz et al., 2006). A scenario of growing pioneer plants for lunar base includes using incrusted seeds of undemanding plants for germinating in a mineral substrate made from grinded local lunar material. It's simple to manage the technology of growing plants, just using to water seeds and seedlings periodically, without application nutritional compounds: microorganisms will provide the plant with leached from the silicate substrate essential minerals, with biostimulators and also protect the plant from environmental stressors.

In model experiments a consortium of well-defined plant-associated microorganisms were used for growing French marigold (*Tagetes patula* L.) in anorthosite, a substrate of low bioavailability, analogous to a lunar rock. It was clearly exhibited, on one hand, that a rationally assembled consortium of microorganisms promoted germination of

marigold seeds and supported the plant development and flowering (control plants did not blossom) under growth limiting conditions, providing the essential for growth elements, and, on the other hand, protecting the plant against stressors as seen on activity of plant enzymes and other biomolecules which indicated an adaptive reaction of plants grown under any stress.