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Space Agriculture

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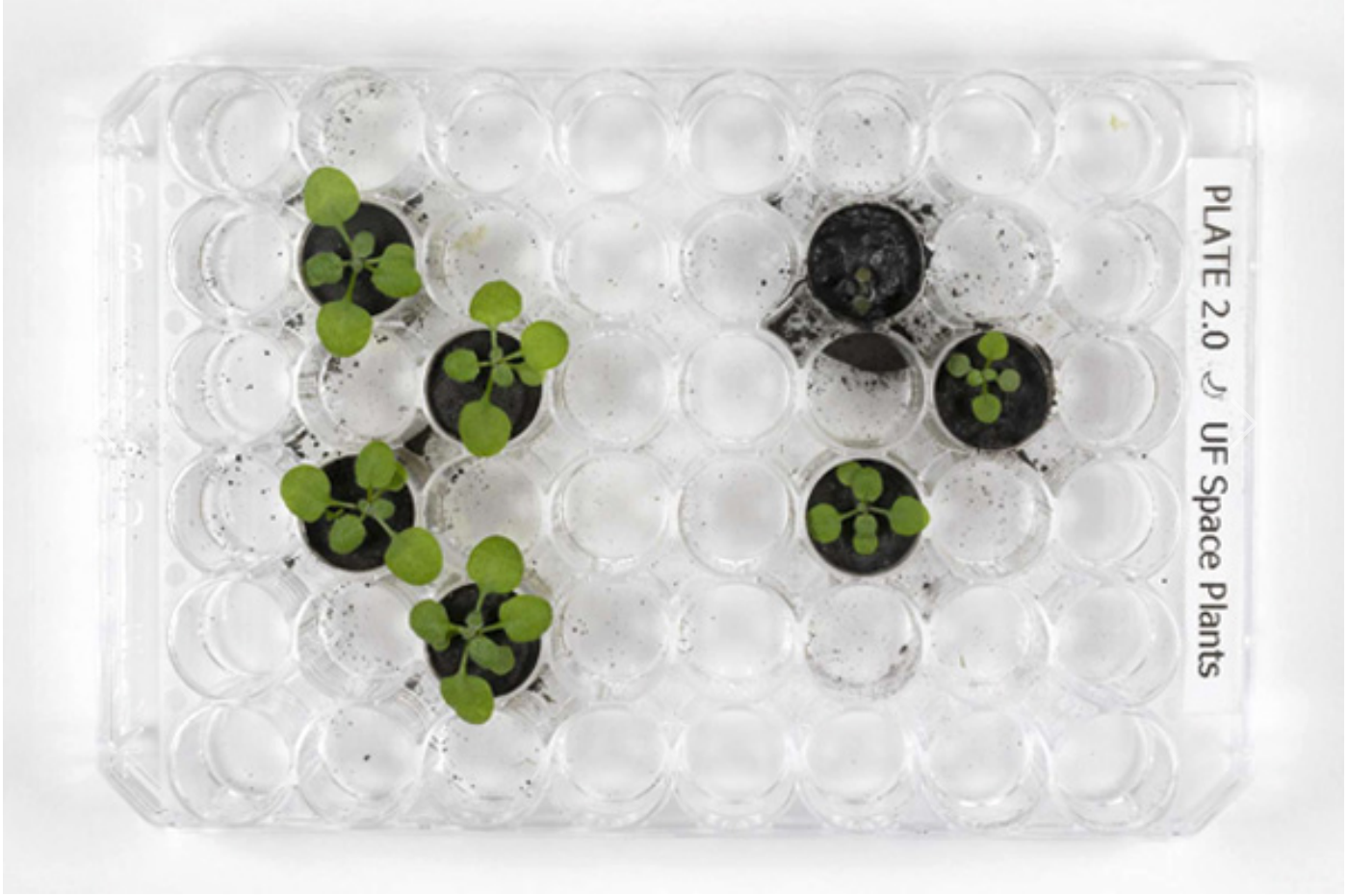

For the first time, scientists have grown plants in soil brought from the Moon by astronauts Neil Armstrong and Buzz Aldrin from the Apollo 11 mission.

For the experiment, described in the journal Communications Biology last week, a team led by Anna-Lisa Paul from the Institute of Food and Agricultural Sciences at the University of Florida used twelve grams of lunar soil collected during the Apollo missions in the 1970s. In small flowerpots they sowed plant seeds in lunar soil and added a nutrient solution daily.

Slower growth

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In parallel control experiments, the scientists also planted the plants in normal soil and in soil samples that imitate the composition of the soil on the Moon and Mars. The seeds germinated within two days both in the lunar soil and in the other pots.

All the plants looked the same during the first six days, explains Anna-Lisa Paul. After that, the differences became evident: in the lunar soil the plants grew distinctly more slowly and had less developed roots.

After 20 days, the experts collected all the plants and carefully analyzed their DNA. The results indicate that the specimens grown in soil from the Moon exhibit reactions similar to those of plants grown in a stressful environment such as saline soil or soil contaminated with heavy metals.

The model plant thale cress (Arabidopsis thaliana)

The plant thale cress was not used by chance for the experiment conducted with soil from the Moon. As early as 2015, Professor Teresa Fitzpatrick from the University of Geneva discovered the biosynthetic pathway of vitamin B6 in the model plant thale cress. Two enzymes, PDX1 and PDX2, are involved in the synthesis of the vitamin, which were used for the creation of a new cassava genome with increased levels of vitamin B6. For years, the development of new plant varieties with increased levels of vitamins and the ability to be cultivated in areas with extreme climatic conditions has been considered a means that will help in the fight against food shortages in places such as Africa.

The future of space agriculture

The study is of crucial importance for NASA’s long-term space exploration programs, according to the director of the U.S. space agency, Bill Nelson. For future projects for permanent stations on the Moon or Mars, it is important to use the resources there so that astronauts on site can have constant access to fresh food products.

Photo: UF/IFAS, Tyler Jones