

Space greens beat the blues

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NASA astronaut and Expedition 23 flight engineer, T.J. Creamer harvests a tissue sample from white spruce seedlings grown in the 2010 Canadian Space Agency 2 (APEX-CSA2) Advanced Plant Experiment in the Destiny laboratory of the International Space Station. Credit: NASA

Where people will go in the cosmos, plants will go. That's the message of



a paper titled "Gardening for Therapeutic People-Plant Interactions during Long-Duration Space Missions" written by Raymond Odeh, and Charles L. Guy of the University of Florida (Gainesville) and published in the De Gruyter journal *Open Agriculture*.

In the beginning of the <u>space</u> age, researchers sought to see if <u>plants</u> could survive in a zero-gravity atmosphere and scientific curiosity was the main driver of this research. However, the realization that it would be more cost effective and healthier to grow fresh fruits and vegetables on demand during a long space mission, rather than to rely on processed foods, also played a role. Once it was established that plants could survive, more experiments were conducted to see if they could be used in other ways, such as for purifying the air inside a spacecraft since plants consume carbon dioxide and produce oxygen and clean the air of pollutants.

The paper reveals even more surprising results. Plants may also play a key role in maintaining the psychological well-being of space crews. The next frontier of space plant experimentation is to examine the psychological impact of plant life on astronauts.

Space travel can cause sleep disorders, a reduction in energy, inattentiveness and difficulty in problem-solving, and even memory loss. It can cause people to be more hostile, act more impulsively and, despite the danger and excitement, is sometimes boring. Any of these conditions and problems can lead to dangerous, if not tragic outcomes.

Odeh and Guy have written a review of the existing literature on plantpeople interactions. On Earth, there are about 600 species of economically useful plants, and 7000 edible species in total. That number is dwarfed by the number of species that are used for gardening and landscaping - 28,000. These species have been taken all over the world and adapted to different climates. So clearly we get something



from plants other than food and medicine, the question the paper seeks to answer is: what do we get, and how we can apply it to space travel?

Numerous studies show that gardening or even just the presence of plants has a positive psychological effect on people, making them happier and more social. Gardening helps people spend time with nature, relax and learn new skills. The research the authors have uncovered also shows that humans have a tendency to look for natural life, referred to as the Biophilia Hypothesis, which might help to explain why space travel can be so dangerous for the human psyche.

The authors conclude that what applies to humans on Earth also applies to astronauts in space. Plants can help reduce both social and cognitive problems associated with space travel, and suggest that plants should be part of the design of <u>future space missions</u> for both nutritional – and psychological – reasons. Peggy Whitson, an astronaut aboard the ISS, confirms this: "It was surprising to me how great 6 soybean plants looked... I guess seeing something green for the first time in a month and a half had a real effect. From a psychological perspective, I think it's interesting that the reaction was as dramatic as it was... guess if we go to Mars, we need a garden."

Dr. Raymond Wheeler, a senior scientist for NASA at the Kennedy Space Centre has this to say about the paper: "A review of this topic for space research is long overdue, and should provide a strong argument to systems analysts and biomedical researchers to look more closely at the "other" contributions of plants to exploration of space. I highly recommend this paper for anyone who has an interest in human <u>space</u> <u>travel</u>, and the notion of using plants for bioregenerative life support."

More information: Raymond Odeh et al. Gardening for Therapeutic People-Plant Interactions during Long-Duration Space Missions, *Open Agriculture* (2017). DOI: 10.1515/opag-2017-0001



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