

# Out of this world: 'Moon and Mars veggies' grow in Dutch greenhouse

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Researcher Wieger Wamelink inspects the plants grown in Mars and moon soil simulant in a research facility at the University of Wageningen

Establishing a human colony on the Moon and travelling to Mars has been the stuff of dreams since the dawn of the space age.

But these visions face many hurdles. How can humans survive for months or years in the ultra-hostile environment of [space](#)? What, for instance, will they eat?

Agricultural researchers at a Dutch university say they are taking the first steps towards providing an answer.

They are growing vegetables in soils similar to those found on the Moon and Mars, looking for ways of helping space pioneers grow their own crops.

"When people go to the Moon and Mars they also have to eat, and it's easiest for them to grow their own food," said Wieger Wamelink, surrounded by several dozen [plants](#) in a special greenhouse at Wageningen, an agricultural university in central Netherlands.

"We wanted to use real Martian and [lunar soil](#)," to see if plants would actually grow in it, Wamelink told AFP.

Of course, getting real lunar and Martian potting [soil](#) is an impossible ask. But an Internet search revealed an unlikely supplier: NASA.

The US [space agency](#) makes ground similar to that on the Moon from sand found in an Arizona desert, while Mars' crimson "soil" is scooped from a volcano in Hawaii, Wamelink told AFP.

The first experiments started in 2013 after Wageningen received an order of 100 kilograms (220 pounds) of NASA's imitation "space soil"—at a hefty price of 2,000 euros (\$2,285).

Wamelink stuck tomatoes, peas, cress and other plants in pots containing the simulated soil... and crossed his fingers.

To work in this soil "was very special. Nobody, not even NASA, could tell us what would happen," even just by simply adding water, he said.

The imitation ground at first was a little "reluctant" to absorb water, but soon turned out to be good potting soil.

Like the actor Matt Damon in the science fiction movie "The Martian", Wamelink watched with amazement as his "space veggies" grew bigger day-by-day.

"Especially in the Martian soil, plants were growing very fast and very good. They even started to flower, something that we never anticipated," Wamelink said. The 50-day experiment was written up in the science journal *PLOS One* in August 2014.



NASA plans a human trip to Mars within the next 10 to 15 years

**Safe for humans?**

An essential question however remains whether these unusual vegetables are safe to eat.

Martian and lunar soil, including NASA's own imitation, may contain heavy metals that are harmless to plants but could prove deadly to humans.

Wamelink has come up with a possible solution.

If analyses show that the vegetables contain arsenic, mercury or iron making them unfit for human consumption, the soil can be purified by growing other plant species such as violets which absorb the poisons.

Wamelink concedes that the experiment has a drawback—it is being conducted in non-sterile conditions on Earth where only the nutrient quality of the soil is being assessed.

"There's much more to test," Wamelink admitted.

Extremely cold temperatures—dropping to minus 62 degrees Celsius (minus 79 Fahrenheit) on Mars—as well as a lack of oxygen means that lunar or Martian vegetables and fruit could only be grown in a closed and controlled environment.

The facility would have to be pressurised to normal atmospheric conditions on Earth, heated and lit, and protected from cosmic radiation, which damages plant DNA.

That points to a "space greenhouse"—a type of container, buried underground and kitted out with solar panels and LED lighting. Water should be no problem as it is found as ice on both the Moon and Mars, said Wamelink.

Other questions that need answers include the presence of friendly bacteria to help plant growth and what happens to plants that grow in low gravity.

## **'Long way to go'**

NASA plans a human trip to Mars within the next 10 to 15 years or so but similar plans are also being pursued by billionaire Elon Musk and the Dutch company Mars One, tentatively aiming to set up human colonies on the Red Planet.

Technology and the know-how to keep astronauts alive on Mars still has a long way to go said Christophe Lasseur, a European Space Agency (ESA) "Life Support" expert, who deals with metabolic aspects of space travel.

Lasseur believed Wamelink's research of growing plants in space soils "is not a priority".

He said other requirements for space survival like the proper infrastructure to grow similar vegetables in laboratories was far more essential to provide "maximum reliability" for future teams.

"We must regard a plant as a piece of technology and understand exactly what happens to it first. All chemical, microbiological and physiological aspects (of plants in extraterrestrial conditions) needs to be understood and mapped... We cannot take risks."

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