

Space rice seeds return from orbit

Crop will help to find sustainable food source for future missions

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Chinese astronauts onboard the Shenzhou XIV spacecraft have returned with the world's first rice seeds produced in orbit, a feat that allows scientists to probe the effects of microgravity on rice growth and find a sustainable food source for long-term space explorations.

On Sunday night, Chinese astronauts Chen Dong, Liu Yang and Cai Xuzhe touched down at the Dongfeng landing site in the Inner Mongolia autonomous region, according to the China Manned Space Agency.

They were in orbit for 183 days, during which they oversaw the completion of China's Tiangong space station and several life sciences experiments.

One such experiment involved reproducing the entire life cycle of rice for the first time in space, which begins with a seed hatching into seedlings and ends with a mature plant producing new seeds. The experiment began on July 29, and after 120 days in orbit they successfully produced new cosmic grains.

The new seeds, along with other bio-samples, have been delivered to the Technology and Engineering Center for Space Utilization of the Chinese Academy of Sciences in Beijing. They will also be transferred to labs in Shanghai for further research.

The returned package also contained seedlings of *Arabidopsis thaliana*, commonly known as thale cress. It is a small flowering plant of the mustard family often used by scientists to study mutations.

The institute said researchers would conduct microbiology, cellular and metabolic analysis to better understand how microgravity affects these plants on a molecular level.



Researcher Zheng Huiqiong handles rice seeds returned from space at the Center for Excellence in Molecular Plant Sciences of the Chinese Academy of Sciences in Shanghai on Monday. XINHUA



Rice seed samples are handed over to the Shanghai research center during a ceremony in Beijing on Monday. XINHUA

This would yield key insights on creating new crops that are more adaptive to the space environment.

Zheng Huiqiong, a researcher at

the Center for Excellence in Molecular Plant Sciences of the Chinese Academy of Sciences, said seeds are crucial for growing new crops and

supporting humanity's long-term survival in space.

Thale cress, rapeseed, peas and wheat were the only plants for which scientists have reproduced their entire life cycle in space, she said, adding scientists can now include rice, which is a staple food for millions of people on Earth, on the list.

While more research is in the pipeline, Zheng said scientists have already noticed several interesting differences between rice grown on Earth and that grown in space.

For instance, the flowering period for the space rice begins slightly earlier than rice planted on Earth. Flowering is a crucial stage for plant reproductive development.

The stems for the space rice are also looser, with the dwarf rice variety becoming shorter while the tall shoot rice variety experiencing no change in height, she added.

Opinion Line

With Shenzhou XIV's safe return, China writes a new chapter in space

The re-entry capsule of the manned Shenzhou XIV spacecraft has successfully returned to the Dongfeng landing site in northwestern China's Gobi Desert.

Getting astronauts back is more difficult than sending them into space, something that stops many economies from joining the manned space mission club. While returning from space, a spaceship must first undock from the space station, slow down as it reenters the atmosphere, and then slow down further as it readies to land at the planned site. During the whole process, a returning capsule brings its speed down from 7.8 kilometers per second to a few hundred meters per second, and then to 7 meters per second, and at last to 1 meter per second. This is done to secure the lives of the astro-

nauts inside the capsule.

Once the capsule lands, the responsibility shifts to the ground staff, who must first locate the capsule on a landing site spread across 13,000 square kilometers. According to reports, a mock drill was carried out on Dec 1, before the actual re-entry, with more than 10 teams involving five helicopters and over 60 automobiles taking part. Since 2003, 14 Chinese astronauts have gone to space and returned to Earth safely.

An equally important feat is that the three astronauts who are crewing the space station, will spend six months in space, beginning the space station's first long-term residents.

At one point in the past week, six astronauts stayed at the station for

five days, showing it is capable of supporting six astronauts rather than three. The three astronauts who will be staying there for longer are an example of a "permanent population" of China 400 kilometers above the ground. In the future, more astronauts could join the three, laying a more solid foundation for China's space experience.

With a space station composed of a core module, two lab modules, a manned spaceship and a cargo spaceship, the Chinese astronauts will continue pioneering space exploration and if some day people are able to reside permanently in space, while visiting Earth now and then, the contribution of Chinese astronauts should not be forgotten.

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