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Out of this world: Logan High students test space seeds

By Sean Dolan staff writer Jan 11, 2017



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A team of Logan High students had the rare opportunity to experiment with radish seeds that were launched into space on a Russian satellite.

The three 10th-grade students, Gareema Dhiman, Michelle Jung and Andre Nguyen, have begun prodding at the viability of prolonged space travel to Mars by comparing the germination rates of the space seeds, seeds shaken in a paint mixer and a control group of regular radish seeds. The experiment showed that the seeds sent into space germinated faster than the other two groups.

“Space travel is a hot, new thing; we all want to go to Mars now by 2030,” said Logan High School biology teacher Shaunda Wenger.



It all started when Gayle Bowen, who works at the Space Dynamics Laboratory and helps coordinate the GEAR UP program that helps middle and high school students prepare for college, acquired seeds that were sent into space as part of the Russian BION-M1 mission in 2013 that studied the effects of a 30-day low and polar orbit on living organisms.

Bowen contacted Wenger, who studied seeds for her master’s research, to try to figure how the seeds could be used. Wenger then visited with USU professors to come up with a research idea. When she met with JR Dennison at the Material Physics Group, “a light bulb clicked on,” Wenger said.

Dennison studies the effects of space travel on satellites, cameras and other equipment. He said most people think of space as empty and peaceful, but it is actually a pretty harsh environment. Dennison worked with students visiting from the University of Tsukuba in Japan

to design a container to hold the seeds in space and radiation chambers that simulate space radiation. Their research will continue throughout the year.

He said the coordinated research effort turned out to be a “perfect storm.”

On Tuesday, Logan City School District board members and the superintendent visited Wenger’s classroom to hear a report from the three young scientists.

In the presentation, Nguyen explained their findings. The seeds sent into space germinated the fastest. The seeds shaken in a paint mixer — to simulate the launch and re-entry of a spacecraft — germinated at a significantly slower rate than the space seeds. The control group of radish seeds took the longest to germinate.

Dhiman said their analysis using both a light and scanning electron microscope showed there were abrasions in the seed coats of both the space and shaken seeds. When the seed coats become disrupted, anti-fungal proteins come out and water seeps in, causing a faster germination rate.

Jung said the three groups of seeds looked the same to the naked eye, but under the electron microscope, the space seeds were rougher. Dhiman said that the cell walls were thinner in the space seeds.

While their experiment showed that disruption from space travel and a paint shaker increased the germination rate, they will be continuing their research on irradiated seeds using the capsule and radiation chamber designed by Dennison and the University of Tsukuba students.

Jung said the idea of the experiment is to see if seeds can travel into space and without getting damaged. They were inspired, in part, by the movie “The Martian,” where a stranded astronaut has to survive on Mars.

School Board Member Ann Geary told the students she has been excited to meet with them since she heard about their experiment.

“This is cutting-edge,” Geary said. “I love that you are working with the university and others on this.”

Dennison said he has been astonished at how the students were able to think outside the box with this experiment.

“Trying to do stuff that nobody else has ever done before is really, really hard,” Dennison said.

Dhiman, Jung and Nguyen will be taking their research project on the road later this month as the only high school students at the University of Utah Research on Capitol Hill event Jan. 25 in Salt Lake City. In March, they will compete at the regional high school science fair at Weber State University.

The collaborative research team will continue to explore how space travel affects seeds. Dennison said it is unclear at this point whether faster germination would create a better radish. Wenger added that there is a possibility that the seeds may die on the nine-month trip to Mars, which would encounter about 50,000 times as much radiation as the low-orbit of the Russian satellite.

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