

Food that's out of this world

Canada world leader in race to grow crops in space

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MONTREAL - It takes three days to travel to the moon and six months to get to Mars. But the real challenge is not getting there, it's what to eat.

"Space agriculture is what's required for long-term space exploration," Mike Dixon, director of the controlled environment systems research facility at the University of Guelph, said Tuesday during a space conference in Montreal. "We can't afford to keep shipping water, oxygen and Kraft dinner to the moon indefinitely."

Research being conducted at a state-of-the-art facility in Guelph, Ont., has Canada leading the world in space agriculture.

It's far easier to plant a flag than a crop on the moon.

"We want to grow the first plant on the moon. That's a Canadian space first that we can actually aspire to," Dixon said in an interview. "Let's face it, the next worse place after a snowbank in Canada to do controlled-environment plant production has got to be the moon."

Growing food in space would allow crews to embark on longer expeditions to the moon or even the Red Planet. The plants would be grown in a greenhouse that would provide food, potable water and oxygen as well as recycle carbon dioxide and waste.



The model is a five-foot-square sealed chamber made of stainless steel, Teflon and glass. A set of gloves built into the greenhouse would allow the crew to plant seeds and harvest plants without risking contamination.

The size of the prototype is relatively small - it would take over 10 of them just to feed one astronaut for a day.

To produce a higher yield and grow plants with less water, light, oxygen and atmospheric pressure, researchers are breeding and genetically modifying plants.

"The reality is that we are taking these plants to such a strange ecosystem, where we require them to be the life support engines of our exploration activities," Dixon said. "So

it behooves us to equip those plants with the best genetic tools that they can have to be sustainable and reliable."

There are about 40 crops on the menu for space, but the focus is on food staples like soybeans, wheat and rice.

"Oh yeah, if you're going to Mars, you're a vegetarian," Dixon said. "After the bacon that you carry in your back pocket is gone, it's all over. And you can't carry enough bacon to last 18 months."

About 65 faculty, staff and students work at the research facility at the University of Guelph, which cost \$8.75 million to build in 2001 and another \$4 million to run annually.

Funding for the public-private project comes from several sources, including the Canada Foundation for Innovation and the Centre for Research in Earth and Space Technology.

In response to criticism that the money could be better spent, Dixon said: "The socio-economic spinoffs are enormous. **This is the next Canadarm,**" he said, referring to the Canadian-made mechanical arm used at the space station.

The technology could also be applied to improve agriculture and environmental management here on Earth, Dixon said.

"When you go to the moon or Mars, you can't throw anything away - there is no such thing as garbage. The words garbage and waste will not be in the dictionary when we're off this planet.

"All of the recycling technologies that we must have on the moon are so eminently useful here on Earth to help us sustain our own ecosystem and survival."

The space conference, the 37th Scientific Assembly of the Committee on Space Research, has nearly 2,000 participants from 61 countries and runs until Sunday.