



English

NASA RESEARCHES FARMING IN SPACE

THE ORLANDO SENTINEL - Sunday, April 7, 1985

Author: By James Fisher of The Sentinel Staff

The bone dry, cratered surface of the moon is not exactly Iowa farming country, but someday residents on a moon base will have to grow most of their food there in special enclosures.

Moon scientists and miners will sit down each day to meals that could include algae protein, vegetables and vegetable byproducts -- possibly something like the soy "veggie burgers" served today, researchers say.

Care packages with fresh food from Earth will arrive infrequently and grocery shopping will be a thing of the past for moon residents. Those who make a two- to three-year voyage to Mars or other long spaceflights also will be on their own.

"It is hoped that space-grown food could supply up to 97 percent of their diet with some trace minerals being resupplied," said David Smernoff, a research scientist at NASA's Ames Research Center in Mountain View, Calif.

Plants also give off water and oxygen, which could help resupply a closed atmosphere in space, he said.

NASA hasn't committed itself to a moon base or a Mars mission, but research on galactic gardening already is under way at Ames, Kennedy Space Center, several universities and other sites around the country.

Ames scientists are overseeing studies to develop the strains of plants most suitable for growing in space.

Space center technicians are developing a mechanism to grow plants in space. They have to deal with a series of tricky issues. How do you supply water and nutrients without making a weightless mess, and how do you get roots to grow in the right direction when there is no "down"?

"In space, you can't just use a plant and a pot and soil. If you add water, the water crawls out of it or doesn't get into the soil," said Ron Biro, a plant physiologist for the Bionetics Corp., a research contractor for the space center.

In a lab on Cape Canaveral Air Force Station near the space center, Biro is experimenting with a mechanism that nurtures plant roots between two spongy membranes. The membranes are enclosed within two 5-inch square plastic plates.

Water and nutrients are injected into the membranes for the plant roots to absorb. The plant stalk grows out from between the plates while its root system, water and nutrients are contained inside.

"There is no loose moisture anywhere in the system," he said.

Biro also is experimenting with stimulating the roots with electricity to make sure they grow in the proper direction, one of the problems with growth in weightlessness.

Bean plants are being used for tests now, Biro said.

Devising mechanisms to grow plants in space "is something that has really not been done. There hasn't been a reason," said Bill Knott, a biological sciences officer at the space

center.

"We've got one candidate. There probably will be others," Knott said. Several universities are studying mechanisms in which to grow plants, he said.

Eventually, Knott expects this mechanism or others to be approved for testing aboard the space shuttle. Experiments in basic germination and plant growth already have been performed aboard the shuttle and Skylab.

Research on the space center's mechanism is moving away from testing and into production. Plans call for manufacturing two dozen more small plate containers, and designers are working on a prototype for larger plates.

Knott also has resurrected a 27-foot-tall sealed chamber from the 1960s Mercury program to simulate the closed structures where plants will grow in space.

Plants normally use carbon dioxide and give off oxygen. "We don't know what will happen if you put a whole lot of plants in a small space and close the door," Knott said.

Along with shuttle tests, scientists hope to add a plant growth module to the space station after it begins operation around 1994, Smernoff said.

They hope to grow enough food aboard the space station to feed two people continually at first, and possibly all residents later, he said.

But the space station will be geared to frequent resupply by shuttles, and research there likely will be only "a proving ground." The real application would be on a moon base or other manned space station too far from Earth for easy access, he said.

A vegetarian diet may not sound too tasty, but there is considerable research under way to turn plants into "palatable foodstuffs," Smernoff said. Lettuce, wheat, potatoes and soybeans are seen as having the maximum development potential for space cuisine.

"And eventually it might be possible to include animals in space" as food, he said.

For now, Ames scientists are overseeing research to get plants to fit the requirements of space: a lot of growth in a small space with low power needs.

Like the space center research, "We are still in the early stages of learning about plant growth in space," he said.

One area of plant growth research still very dormant is the psychological effect of plants on space dwellers who will be contained in closed, high technology environments that bear little resemblance to home.

Soviet researchers have found that watching plants grow keeps astronauts in a better frame of mind during long flights.

"I think it is fairly obvious there are some psychological advantages to that," but more research is needed, Smernoff said.

Caption: PHOTO: Biro examines roots of plant growing between spongy membranes in plastic plates. ANGELA PETERSON/SENTINEL

Edition: 3 STAR

Section: INSIGHT

Page: G7

Index Terms: SPACE FORECAST FOOD RESEARCH SCIENCE

Dateline: CAPE CANAVERAL

Record Number: 0290060161

Copyright 1985 Sentinel Communications Co.

To bookmark this article, right-click on the link below, and copy the link location:

[NASA RESEARCHES FARMING IN SPACE](#)