Strawberries in winter

Research explores whether strawberries could be cost-effective alternative crop for Nebraskans

After the corn and soybeans are harvested, Nebraska farmers could start growing a new winter crop — strawberries.

Strawberries? Really?

It's not as implausible as it might seem, particularly if they're grown in a low-cost greenhouse, said Ellen Paparozzi, Institute of Agriculture and Natural Resources horticultural scientist.

Paparozzi and her research team are exploring whether strawberries can be a cost-effective, alternative winter crop for Nebraska farmers and, perhaps, urban dwellers with sufficient space for a small greenhouse.

Why strawberries? "Strawberries are the most popular fruit in the US. They are versatile and quick to grow," and, she said, "It's a fun fruit."

The project has several components: low-cost construction of a greenhouse with minimal setup for growing; a crop that is price-competitive, popular and nutritious; an emphasis on environmental sustainability and the ability to capture costs upfront so farmers will know how much income could be earned.

"Nothing about this greenhouse is high-tech even though our monitoring systems are computer controlled," Paparozzi said. The greenhouse is a simple Quonset-style structure, 25 feet by 75 feet, made of aluminum pipe, double plastic poly sheeting and two 6-foot by 60-foot lumber and cinder block growing benches. Recycled or organically certified lumber can be used. The greenhouse can be constructed by anyone with construction skills. The UNL greenhouse is heated with forced air gas, and the double poly is inflated using a squirrel cage fan, but Paparozzi is trying to obtain additional funding to explore alternative energy sources.

The primary growing time is November through March. A capillary mat system is used to water and fertilize the plants to promote water conservation. With a computer and a webcam, a farmer also could monitor humidity and temperature and even water status of the strawberries electronically from the house. This could be particularly advantageous during a snowstorm. Although this is not a labor-intensive crop, the plants must be monitored for insects and disease, and, of course, the strawberries must be harvested.

Horticultural scientist Ellen Paparozzi and undergraduate student Han Do observe strawberry plants being grown in a UNL greenhouse this winter.

Brett Hampton

The greenhouse is designed to be green, although it is not completely so — the UNL greenhouse was constructed with pressure-treated lumber, and synthetic fertilizer is used, but only organically certified pesticides and biocontrols are applied when necessary. Bumble bees provide pollination.

Although winter may seem gray, "there is a lot of light in Nebraska," Paparozzi said. "We have bright winters compared to many other states."

Last spring, in an initial trial with 13 cultivars, 1,800 strawberries were harvested from 300 plants, and only 38 gallons of water were applied, she said. The various cultivars and the number and size of the berries were evaluated before planting this winter's crop. In addition, the differences in flavonoids (antioxidant compounds), glucose, fructose and sucrose are being evaluated.

These greenhouse-grown strawberries are much less expensive to produce than ones grown hydroponically and won't compete with the "you pick" berry farms.

Growers would get the most money for their berries selling them fresh but they have to be perfect, and less than perfect berries can be used in jellies, jams and other food products.

"This could be the perfect thing for someone who wants to work and earn extra income but wants to stay on the farm," she said.

"When we finish this season, we plan to have calculated start-up costs for a greenhouse, direct costs for growing the plants and labor hours as well as how much natural gas and water were utilized. We also plan to select the best cultivars — quantity and quality — for a final trial year of production," Paparozzi said. "Our goal is continual production from December through March when fresh strawberry prices are highest."

In addition to Paparozzi, the research team includes George Meyer, biological systems engineering; Vicki Schlegel, food science and technology; David Lambe, Paul Read, Stacy Adams and M. Elizabeth Conley, agronomy and horticulture.

The research is funded by grants from the state Department of Agriculture Horticulture Specialty Crops Research Initiative program, a Multi-State Regional Project on Controlled Environment Agriculture (NE1035), the IANR Agricultural Research Division and a UCARE Pepsi Foundation Grant so that undergraduate horticulture student Han Do can participate in this research.

Fumiomi Takeda, researcher at the USDA-ARS Appalachian Fruit Research Station in West Virginia; Barclay Poling, strawberry researcher at North Carolina State University; and Nourse Farms in Deerfield, Maine, provided the plants.

– Linda Ulrich