Texas AgriLife Research scientists making better melons

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UVALDE — With the extended statewide dry spell, researchers at the Texas AgriLife Research and Extension Center in Uvalde and elsewhere have been focusing their attention on improving varieties of more drought-tolerant crops, particularly melons, said the center's administrator.

"We're looking into improved varieties of melons, such as cantaloupe and honeydew, and are growing and assessing some Spanish and Italian specialty melons that are relatively new to this area," said Dr. Daniel Leskovar, Texas AgriLife Research vegetable physiologist and interim center director.

Leskovar said the goal of the research is to identify and produce melons with consumer-preferred characteristics, such as size, shape, color, texture, firmness and sugar content, as well as identify or develop other traits to improve them.

Texas AgriLife Research scientists at centers in Uvalde and Weslaco, as well as the Vegetable and Fruit Improvement Center in College Station, have been working to develop better melon crops, including assessing European specialty melon varieties to determine their viability and profit potential for Texas producers. (Texas AgriLife Research photo)

"In our melon breeding program, we've been evaluating the more well-known Texas-grown cantaloupe varieties for several years, but we've only been evaluating the possibility of commercially producing Spanish, Italian and other specialty melons for the past few years," he said.

He said in addition to melon look, feel and taste, he and other researchers have been assessing overall food quality, yield, and disease and drought resistance.

"We've been interested in the possibility of specialty melons such as Tuscan-type melons with orange flesh, Galia-type melons with green flesh and canary types with near-white flesh, from the perspective of how they might fare as a high-value, high-income crop for Texas producers," he said. "We've also been examining the effects of factors such as deficit irrigation on their growth and productivity."

Leskovar said in spite of this year's drought, the center's fields dedicated to melon production saw "exceptional growth and yield."

From center production data, Leskovar estimates that early or "right" planted melons, those planted from mid-March to mid-April of this year, would have produced up to 85,000 kilos of total production of melons per hectare. Later-planted melons were estimated to have potentially produced about 50,000 kilos per hectare.

"From these totals, we had up to 75 percent marketable melons," Leskovar said. "We grew these melons using drip irrigation and are assessing the use of varying amounts of irrigation to determine the effects on melon growth. Melon production is similar to that of peppers in that drip irrigation is the key, along with proper bed population and mulching of the beds."

Researchers at the center are using scientific technology to take vegetative growth measurements to determine how the melons cope with varying levels of irrigation, as well as differing soil types and levels. The mini-rhizotron technique is used to image root development, a portable photosynthesis system measures gas exchange over the leaf area, and soil moisture sensors assess water dynamics around the plant root systems.

"These measurements are used to determine whether the roots are developing properly and achieving

adequate soil penetration, as well as the effects of the variables we are using in our investigations on plant physiology," Leskovar said.

Melon varieties were planted at three different locations including a study at the Uvalde center where plants were given 50 percent and 100 percent irrigation to determine effects on yield, quality and root management, said Sat Pal Sharma, graduate research assistant at the Uvalde center.

"We discovered that some melon varieties still provided excellent yields with only 50 percent irrigation when applied after the young transplants are fully established, and that one specialty melon produced as well or better than a traditionally planted variety, Sharma said. "Potentially this could mean that a producer could make a lot more from planting the higher-value specialty melon instead."

A mini-rhizotron was installed in the melon production area of the Texas AgriLife Research and Extension Center in Uvalde so scientists could measure the impact of irrigation and other variables on the root growth and other aspects of plant physiology of different types of melons. (Texas AgriLife Research photo)

"We're investigating the use of synthetic cytokinins on cantaloupe and specialty melons to see if this will enable them to have an easier time when establishing," he said, "And we're also investigating plant growth regulators and the ethylene inhibitor 1-MCP to see if those can assist in fruit set development."

Cytokinins are phytohormones that promote plant growth through stimulation of cell division in roots and shoots of plants, and also impact bud growth and leaf maturity.

Leskovar said this research would help producers be more successful when establishing melons in "more stressful" areas of the state, such as drier areas with less-than-optimal soil.

"Melons prefer a medium textured soil, but the South and South Central Texas area has more of a silty clay soil," he said. "Melons developed or bred for better efficiency using less irrigation will have a lower risk of failure in areas that might once have been considered inhospitable for them."

He said he has contacted growers in these areas about testing melon production on a more commercial basis and that he already has had some positive response to the idea.

Kevin Crosby, AgriLife Research specialist in vegetable breeding and genetics with the Texas A&M Vegetable and Fruit Improvement Center in College Station, part of the College of Agriculture and Life Sciences, has been working in conjunction with Weslaco center scientists to produce more disease-resistant melon varieties.

"What you might see in terms of disease related to melon varieties are viral diseases spread by whiteflies, and fungal pathogens which cause vine-decline diseases, and mildew," Crosby said.

He said he and others at the Weslaco center and Vegetable and Fruit Improvement center are assessing and breeding melon varieties that are more resistant to disease, have a longer shelf live and better transportability and higher phytochemical content.

Among those phytochemicals the melons are being assessed for are vitamin C and beta-carotene, which is a carotenoid found in fruits and vegetables that provides much of the vitamin A recommended for the typical American diet. Beta-carotene is also used in a number of medical applications, including the treatment of exercise-induced asthma symptoms, heart disease and age-related macular degeneration.

"Typically, the only melons on the market in early May have been the ones from the Rio Grande Valley," Crosby said. "But there's a Dutch melon being grown in Central America and shipped to the U.S. that will challenge that early availability. So it's important that Texas growers are aware of what's going on so they can also compete in the global marketplace. We're trying to help Texas producers grow melons that have not only the visual and taste characteristics consumers want, but also have higher yields and are durable enough to ship longer distances."

Crosby said other traits they are trying to identify or develop in melons are a high fruit set and the ability for

multiple plantings so producers can make the best use of their labor force as melons are typically harvested by hand.

“We’re hoping the results of the work we’re doing at the Uvalde and Weslaco centers and elsewhere will enable us to expand and implement melon production of both traditional and the newer specialty melon varieties through South and South Central Texas, as well as West Texas,” Leskovar said. “These efforts should allow us to help the producer eliminate some of the risks that come with other traditional crops being grown in those areas.”

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