

Researcher studies high-value vegetable crop production under high tunnels

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Dr. Charlie Rush and Jimmy Gray, both with Texas A&M AgriLife Research in Amarillo, discuss building beds for tomatoes under high tunnels. Credit: Kay Ledbetter

When planting season comes around this summer, Dr. Charlie Rush, Texas A&M AgriLife Research plant pathologist in Amarillo, won't be planting traditional crops or in traditional fields.

Rush is beginning a new project looking at high-value vegetable crop production under high tunnels, particularly tomatoes this year. High tunnels are Quonset hut-type structures similar to greenhouses in appearance but lacking artificial heat.

As [water](#) concerns continue to rise, the potential for making more money with the available water is really good, he said, so that's one of the reasons to look at this new production system with high tunnels and high-value vegetable crops.

"One of the reasons we're doing this research is because the Ogallala Aquifer is certainly limited and in most cases the water level is dropping," Rush said. "In areas south of Amarillo particularly, the water availability is becoming scarcer every year."

It's more difficult for farmers to pump due to the depth of water and the cost involved, he said.

"So obviously it's really important that everybody make the most out of every inch of water they apply that they can," Rush said. "We strongly believe that in some of the areas where they are running out of water, they're no longer going to be able to grow high-value crops like peanuts or potatoes and even corn, because these all require a lot of water."

"Whereas, if you had a high tunnel, you could grow tomatoes and the amount of money you could make for every inch of water vastly outpaces what you could make on any other crop we're currently growing in the Panhandle."

Rush said he has multiple research projects to conduct under the high tunnels with a growing interest being expressed by retailers. H-E-B is currently supporting one project with the Texas Department of Agriculture and United Supermarkets also expressed interest in

collaborating.

"The potential for retail grocers to increase availability of high quality vegetables by purchasing from local growers is quite high," he said.

So far, the frames of four individual high tunnels have been erected with a target date for having tomato seedlings planted by the first week of May, Rush said.

Rush said the tomato cultivars have already been selected and are growing in a greenhouse setting. The seed came from Dr. Kevin Crosby, AgriLife Research vegetable breeder in College Station, and also from some commercial tomato breeders in California.



High tunnels, Quonset hut-type structures similar to greenhouses, are large enough to allow some traditional farm equipment to be used in preparing the beds. Credit: Kay Ledbetter

"The little seedlings are growing and looking great," Rush said. "They'll be ready to go by the middle of April, and then it just depends on when we are able to get everything we want done out at the high tunnels as to when we plant the tomatoes there."

Each high tunnel is 96 feet long, 30 feet wide and 12 feet tall, said Jimmy Gray, AgriLife Research technician in Amarillo. Each will have six, 60-inch beds that will be plowed and shaped up prior to completion of the tunnel building in preparation for planting.

The high tunnel metal frames will be covered with a fiberglass impregnated tarp to allow sunshine in and keep most of the weather out, Gray said. The sides will roll up about 5 feet. The end walls have a 20-foot by 10-foot door that will roll all the way up to allow a breezeway through the high tunnel.

"We are also installing drip tape – both subsurface drip irrigation and root-demand irrigation – along the length of each 5-foot bed," he said. "We will have three beds per zone and four zones per tunnel, so about 40 foot lengthwise by three 5-foot beds will be one irrigation management zone. And those will be controlled individually with RDI on two of the zones and SDI on two of the zones."

A similar irrigation setup will be developed in the open field, Rush said. This way researchers and engineers involved in the project can compare vegetable production and water use inside the tunnels and in the open fields.

Rush said this will allow them to conduct precision irrigation and fertilizer practices as they grow tomato plants, and develop best management practices to pass on to producers who adopt high tunnels in

the future.

"Eventually, we will look at more than just tomatoes; we will look at all sorts of other specialty crops including vegetables to be grown under [high tunnels](#)," he said. "We're going to have to work out a cropping system because you can't grow one vegetable every year inside the entire tunnel, so you need to do just like you would in a field and have rotation schedules."

Rush said some of the management techniques they will study concern irrigation frequency and method.

"We are excited to look at the new root-demand irrigation," he said. "Instead of having our traditional subsurface drip or drip tape on top of the bed, root-demand irrigation tape is buried in the bed around the root zone, and as the root grows into contact with that, the roots are actually able to extract water directly from the tape when they need it."

Once it is installed, Rush said, theoretically producers should not have to worry about irrigation scheduling and the plant should never be exposed to stress because water is always available.

Provided by Texas A&M University

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