

Subsurface air injection boosts melon yield, quality



By Brenda Carol

While most California growers are busy grappling with water issues, some are turning their focus to air as well. Much attention is given to the importance of water and nutrients in plant root function, but the role of air is often overlooked.

“When you go under water you can’t breathe,” said Chuck Dees, irrigation manager for Stamoules Produce in Mendota. “Plant roots can’t breathe either if they are

drowning in water. They need air in addition to water to function optimally.”

Commercial irrigation practices are probably never excessive enough to actually drown a plant, but the temporary anaerobic state created by the application of water does negatively impact root function to a certain degree. Operating under that theory, some growers have started experimenting with air injection in subsurface drip lines as a means to better optimize the water/air balance in the root zone. The ultimate goal, of course, is to improve yield and/or quality.

Some early adopters have already seen significant improvements. Stamoules Produce is one. The farming operation encompasses more than 16,000 acres and markets its products under the brand name S&S Produce. The company grows broccoli, bell peppers, sweet corn, cantaloupe and honeydew melons.

“Air injection is not a cheap application, but it’s effective,” Dees said. “It’s so effective on cantaloupes that we have to shut it off. You can get about 8 to 15 percent more benefit out of a crop if you use this technology properly.”

One of the benefits is a significant boost in soil microbial activity. Pumping air into water can mitigate the temporary anaerobic effect caused by applied water. The process fosters a healthier root environment that encourages root respiration and beneficial microbial activity.

It’s not a new concept, but the trick has always been figuring out how to effectively deliver air into a drip system. Dees is using a Mazzei AirJection system. Injectors installed on the drip line improve soil aeration by introducing micro-bubbles into irrigation water and forcing them into the root zone.

“We run a pipeline across the head of the field,” said Dees, explaining his setup. “Its only purpose is to access free atmosphere. We run water for the drip tape through



the venturi (injectors) where it accelerates through the narrower opening, creates a vacuum and sucks air into the water.”

The air-injected water then runs through the drip tape, which is 12 inches below the surface.

“Typically when you irrigate, you displace a certain amount of air in the root zone,” he said. “We’re simply trying to supplement the air that is displaced during irrigation.”

Results have been varied, according to Dees, but he is bullish on the concept, especially on certain crops.

“For us, the most effective application for this technology has been on cantaloupes and honeydew melons,” he said. “We’ve also tried it on bell peppers, corn and broccoli.”

The results on melons have been particularly impressive, both in terms of yield and quality.

“It prolongs the period of time you can harvest,” Dees said. “Normally, when you pick cantaloupes, you turn the water off, which channels sugar into the fruit because the plant thinks it is dying. With air injection, we’ve been able to pick, then turn the irrigation back on and rejuvenate the plant. Two or three weeks later we can pick again. That’s something we haven’t been able to do in the past.”

The boost in quality has been one of the unexpected benefits.

“With melons, we’re looking for size, sweetness and density, as well as more pounds,” Dees said. “We sell these melons by the box. The supermarket sells them by the pound. If our melons are denser because we’re using a certain technique, then our melons are more attractive to the buyer because they can sell more pounds for the same cost.”

Air injection appears to have a fit in some operations, but growers are still working out the nuances of the technology and adjusting it to fit their production system.

“We definitely think it has a significant benefit in certain crops,” Dees said. “If you use the product right, it will give you results. We proved that.”

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