

Benefits of Drip on Potatoes:

- Increase yields
- Increase percentage of U.S. No. 1's.
- Reduce diseases and fungicide usage
- Improve water use efficiency
- Reduce irrigation water runoff
- Spoon feed water and fertilizers
- Accelerate row closure and harvest
- Reduce fuel usage
- Reduce early vine die-off
- Easily automated



Nolan Masser
Potato Grower
Pitman, Penn.

Reaping benefits from drip irrigation technology

From the arid irrigated west to the largely rain-fed fields in the east, agricultural innovators are discovering significant benefits in adopting a potato production system designed around the use of drip irrigation. Yield increases, quality improvements, ease of field accessibility and a reduction in water, fuel, labor and fungicide use are all cited as reasons to use drip irrigation to grow potatoes.

It's a mainstream technology in dozens of other crop production systems throughout the world because it allows producers to evenly spoon-feed precious water and nutrients directly to every plant's root zone despite variable soil conditions, undulating terrain, odd field dimensions or long lengths of run. But potato producers have been slower to adopt drip since there are significant changes in bed configuration, agronomic decisions, planting and harvesting equipment that go along with this technology.

Ultra-low flow tapes have been an integral part of the success.

Despite the challenges, cutting edge producers, suppliers and researchers are coming up with viable answers in hopes of bolstering the potato industry against the inevitable vagaries of the market, economy, costs and resource availability. Some even believe their future livelihood will depend on mastering this new technology.

Pacific Northwest

Irrigation professionals with an eye toward productivity, quality and efficiency have been working for over a decade to adapt drip irrigation to potatoes in the Pacific Northwest, where hundreds of thousands of acres of potatoes are grown. To date, over 500 acres were under commercial production for processing, fresh pack and specialty potatoes. Jim Klauzer, sales agronomist in Ontario, Ore., reports that there are clear benefits:



A furrow system on the left, drip on the right in the Pacific Northwest. Notice the degree of row closure and size of the drip irrigated plants in comparison to the furrow.

Photo courtesy of Jim Klauzer.

1. Improved water use efficiency. Drip has consistently produced more tonnage per acre inch of water applied, for example, 1.5 tons payable per inch.
2. With drip, row closure occurs faster, thus growth is accelerated and there is a potential for an early dig. When potatoes can be harvested a month early, processors can level-load their plants and start processing in August instead of September. So they can finish up in May instead of June, reaping them a larger processing window.
3. Less disease pressure from alternaria, rhizoctonia, early death, sclerotinia, etc. occurs since the crop is not wetted from above. Less moisture results in less disease and less fungicide use, saving the producer money.
4. More uniformly sized tubers and a higher percentage of U.S. No. 1's. Klauzer explains that processors offer an incentive for that, and it's possible to achieve that with drip.

"There are definitely problems to overcome to reap these benefits. First, tape placement in relation to the seed is very important. Second, equipment must be modified to accommodate the drip tape and a new bed configuration. Third, fertilization needs under drip are



Crop Solutions

Drip Irrigation on Potatoes

different than with sprinklers and must be managed accordingly. And fourth, after tape is lifted to the surface during harvest, it must be removed immediately to avoid subsequent compaction by harvest trucks."

With these challenges in mind, Klauzer has worked out a new patented bed configuration and modified equipment to properly place the drip tape in relation to the seed. The bed consists of a paired row configuration where one line of drip tape is placed between each paired row. Ultra-low flow tapes have been an integral part of the success.

Klauzer notes that they have performed trials against flood irrigation too, with dramatic results. Bob Mittlestadt in Othello, Wash., says, "Our experience with innovative onion growers is that they have used drip to improve their production practices. Clearwater Supply is looking forward to similar opportunities in potato production. This is because water availability is a challenge and the marketplace continues to demand high quality potatoes. Drip is a way to meet that challenge."

"Toro's pressure compensated drip tape really made sense on my hilly terrain and small, odd shaped parcels and corners."

Northeast

Clear across the country, Nolan Masser grows 120 acres of potatoes in the Pitman, Penn., area. After years of dryland farming and irrigating with a pivot and a hard hose traveler, he knew he needed to make a change because of rising fuel costs and the growing scarcity of water. He evaluated pivots, solid set and drip, and settled on trying a one-acre drip test block last year. He was impressed enough with the improved yields and size profile in comparison

with a non-irrigated check that he has installed an additional 20 acres this year on Superiors, Yukon Gold and Reba varieties. He just finished harvesting the Superiors.

"I estimate that with a traveler, it costs about 10 gallons of fuel to apply an inch of water. With drip, it costs about four."

"Irrigating with a hard-hose traveler is like using a club; irrigating with a center pivot is like using a hatchet; but with drip, it's like irrigating with a scalpel," said Masser after realizing a 25 percent yield increase on the drip irrigated Superiors. "The potatoes reach maturity at a faster pace and early dying of the vines is greatly reduced. The drip carries the vines right through to the end. The system can be turned on or off with the flip of a switch."

Masser plants on a de-stoned bed system with two rows of potatoes on each bed, 30 inches apart, and beds spaced on 72-inch centers. One line of Toro AquaTraxx Pressure Compensated drip tape with emitters spaced 16 inches apart is placed in-between the two rows of potatoes in a shallow furrow. With a tape flow rate of .25 gpm per 100 feet, the gross application rate is approximately 0.04 inches per hour. "We felt that by running six to seven hours each day this season we could keep up with evapo-transpiration losses. However, we know that schedule may need to be adjusted for a hotter year, and are mindful that one row of tape per two rows of crop is not wetting the entire root zone and must be watched closely."

"On the upside, with drip, we don't have to second guess our irrigation schedule according to rain predictions. If it doesn't rain, we can irrigate. If it rains, we don't need to."

Masser is quick to point out that Toro's local District Manager Bill Wolfram was a huge asset in the adoption process. "He made sure the system was designed properly, which is extremely important, and introduced me to supportive, knowledgeable dealers such as Nolt's Supply. He also introduced me to Toro's pressure compensated drip tape, which really made sense on my hilly terrain and small, odd shaped parcels and corners."

Masser also credits Dr. Bill Lamont of Penn State University, who has been experimenting with drip on potatoes for over nine years and provided much guidance. In addition to the 20-acre system he purchased, Masser accepted loaner equipment from Penn State to conduct additional trials.

In addition to growing a better crop, Masser notes that runoff was reduced to nothing on the drip fields, and that fuel consumption was about a third of a hardhose traveler.

"I estimate that with a traveler, it costs about 10 gallons of fuel to apply an inch of water. With drip, it costs about four gallons of fuel to apply an inch."

In addition, laborers no longer have to respond to the fixed schedule of a traveler—they can dictate the irrigation schedule with drip, metering small, even doses exactly where and when the plants need it.

Masser is happy with the changes he has made, but acknowledges it wasn't easy and there is more work to be done. "We know we have to improve our installation and removal equipment, and we're still wary of the cost of replacing the drip tape each year. But with the fuel savings and yield increases we have seen so far, it appears to pencil and is worth the effort."

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