

200+ BUSHEL CORN WITH LIMITED WATER

CASE STUDIES

Growers are discovering they can boost corn yield using Subsurface Drip Irrigation (SDI) and attribute it to more efficient water use, lower plant stress because the root zone is watered daily and more efficient fertilizer use. Whatever the cause, a number of growers who use SDI to irrigate corn under deficit conditions have experienced a yield bump from adopting the technology. When growers first adopted center pivots, they were able to harvest the same volume of grain from 125 acres of sprinkler irrigated corn as 160 acres of furrow irrigated corn. The sprinkler allowed them to impart a higher amount of management at a reasonable cost in terms of both money and labor. There is evidence to suggest that under deficit irrigation, SDI can stabilize crop yields at an even greater level than center pivot sprinklers were able to achieve.

Three western Corn Belt producers who grow irrigated corn and use flood, pivot and drip systems can regularly produce 200+ bushel corn. The adoption of SDI has not only increased yield but increased consistency across the field.

Larry and Glenn Palmer farm south of Fort Morgan in eastern Colorado in an area that was once dotted with pivots but is now primarily dry land winter wheat. "Water was once easy to get here and everyone grew corn," said Larry Palmer. "But wells are drying up and municipalities are buying the water rights." They were irrigating 110 acres with flood using water provided by two wells and only producing 200 bushel corn.

The Palmer family installed an SDI system and are in their fourth season growing corn. "With drip we have been able to irrigate more acres and we have gotten our best yields. While the corn may wilt a bit, it won't blue or become stressed like corn under the pivot does," said Palmer. The Palmers not only gained 40 acres, they also gained 40 more bushels per acre from this investment without significantly changing other production practices. With their SDI system they are irrigating 150 acres, using one 300 GPM well, harvesting 230 to 250 bushels and believe the top end could be 270 bushels.

Mark Eitel who farms near Dighton, Kansas grows both dry land and irrigated corn. Under SDI, Eitel expects his corn to yield as much as 250 bushels. With SDI Eitel can water daily or every other day and get the greatest yield per inch of water applied. With a pivot, full irrigation is 0.30 inches per day. With drip, Eitel can get by with applying 0.20 inches per day and still get the same or better yield.

The Wisemans in Friona, Texas said irrigated corn under a pivot with full water with 20 inches applied can yield between 220 to 250 bushels. However, under limited water of 12 - 15 inches, a full pivot will only yield 160 or 170 bushels for not much less investment, so growers split pivots. They installed SDI on a 60 acre site that shares the corners between four pivots. "Before drip, our 60 acre site with a 300 GPM well was insufficient to grow corn or cotton," said Landon Wiseman, "and we didn't really manage the field but spent a lot of time irrigating it."

With drip they have increased productivity while eliminating almost all the labor. Initially they were only getting 175 to 180 bushels for this site when flood irrigated but have seen the yield go to 225 bushels in 2008, to 240 bushels in 2009 and in 2010 they expect it to go even higher as they upped the plant population and applied more nitrogen.

With SDI delivering up to 18 bushels per inch of water applied and with growers having access to at least 12 inches of irrigation water, corn should easily produce 200+ bushels out of the gate and with more water and better management, as much as 250 or 300 bushels.



PUSHING THE YIELD BARRIER

Growers across the Corn Belt who aren't content with their corn yields are networking and testing new ideas to surpass their own yield barriers. SDI adopters aren't content either - even with the yield windfall that accompanies adopting SDI's more efficient delivery. These same growers want to know what their new yield barrier is and are incorporating practices to push yield.

Palmer's average corn yield in eastern Colorado, under pivot is only about 200 bushels and they only have enough water to irrigate half a pivot of corn at a time. However with SDI, yield approaches 240 bushels and they are also irrigating full fields. They believe that with better management, the top end is closer to 270 bushels and they are testing some practices to get there.

NITROGEN REDUCTIONS ARE THE FIRST STEP

Glenn Palmer explained that besides a popup at planting, nitrogen and phosphorus are applied through the drip tape. They have been able to drop their nitrogen rate from 220 units applied through pivots to only 160 units applied through drip tape; a savings of 27 percent.

Eitel agrees and his reduction goes even further. He explained that when he flood irrigates corn he has to apply one pound of nitrogen for each bushel of yield expected. However, since he adopted SDI he has reduced that to 0.5 pounds per bushel, a savings of 50 percent.

However, the Wisemans have increased their nitrogen rate an additional 50 pounds to support thicker plant stands and a greater yield expectation. They apply 300 units of nitrogen preplant, split a third dry and two thirds through the drip tape.

INCREASING PLANT POPULATION COMES NEXT

The first step progressive corn growers take to drive yield improvement is to increase plant population or narrow up the rows. This practice works as new varieties come to market with the ability to tolerate higher plant populations and increased competition. With corn, the number of ears makes the yield.

Palmer's have decided to increase population from 32,800 a few thousand more seeds and perhaps test a twin row planter. Eitel has moved his plant population range up from 24,000 to 28,000 under pivot to 28,000 to 32,000 with SDI. Landon Wiseman took the big step in 2010 jumping from 34,000 to 40,000 seeds per acre. Doug Nort at Diamond Ag Research in Larned, Kansas said with SDI, "We can support more ears and bigger ears than with a pivot."

SOIL MANAGEMENT IS STILL CRITICAL

Eitel is an avid no-tiller and always rotates his corn with soybeans under irrigation or with wheat under dryland. "During a dry year no-till is a big advantage. Plant roots can grow down and access more water and there is no evaporation. And we use rotation to minimize pests and save on corn production costs in the following corn year. With corn after corn we have to fight Mother Nature and invest more to get the same yield as after soybeans."

The Palmers and Wisemans are both testing strip till as a way to preserve the soil, reduce soil drying and minimize costs. These two operations are content growing corn after corn because they feel it gives the best return per acre under SDI.

FOLIAR FEEDING AND FUNGICIDES MAY COME NEXT

Many growers are testing foliar applications of fungicides to protect yield and improve plant health and foliar nutrients to stimulate growth. How promising these technologies are is still unclear and results are still inconsistent. However national corn contest winners regularly use foliar applications to stimulate growth and boost yield.

Eitel applies one quart per acre of Helena's Ele-Max 5-4-2 with 2 percent manganese as a routine practice. He doesn't yet routinely use a fungicide because responses aren't consistent, exactly the sentiments of many growers who contemplate applying a foliar fungicide or nutrient.

DROUGHT TOLERANT HYBRIDS

Three hundred bushel corn isn't around the corner but we may see average field yields that size in our lifetime. And the biggest contributor to this increase will be genetics that are more nitrogen and water use efficient and can better withstand the myriad of stress that nibble away at crop yield.



TO PUSH CORN YIELDS TO NEW LEVELS - CONSIDER THE FOLLOWING TECHNOLOGIES

- Select a race horse hybrid with resistance to Goss' Wilt.
- Push plant population and narrow row spacing.
- Apply lime to keep pH at 6.0 to in 6.5.
- Apply a starter at planting to stimulate early growth.
- Use fertigation to apply 200 pounds per acre nitrogen as UAN. Start application no later than when the corn is knee high and continue through tasseling.
- Spray with a systemic fungicide to control foliar diseases like gray leaf spot and common or southern rust and improve plant health.



NETAFIM USA
5470 E. HOME AVE.
FRESNO, CA 93727
CS 888 638 2346
F 800 695 4753
www.netafimusa.com