

Shallow drip considerations



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Subsurface drip irrigation

- SDI has been used throughout the Midwest for decades
 - Kansas State University has an excellent resource for SDI <https://www.ksre.k-state.edu/sdi/>
- Usually these are permanent installations
 - 12-24-inches deep
 - Thick walled drip tubing (15 mil)
 - On heavier soils that allow capillary movement of water



Photo – Kansas state univ. <https://www.ksre.k-state.edu/sdi/images/photos/swine/submain.jpg>

Traditional SDI continued.

- Typically are using 1 dripline between 2 rows of agronomic crops
- Used widely in California – in long term rotations including processing tomatoes
- Generally agreed to limit weed growth and utilize water more efficiently

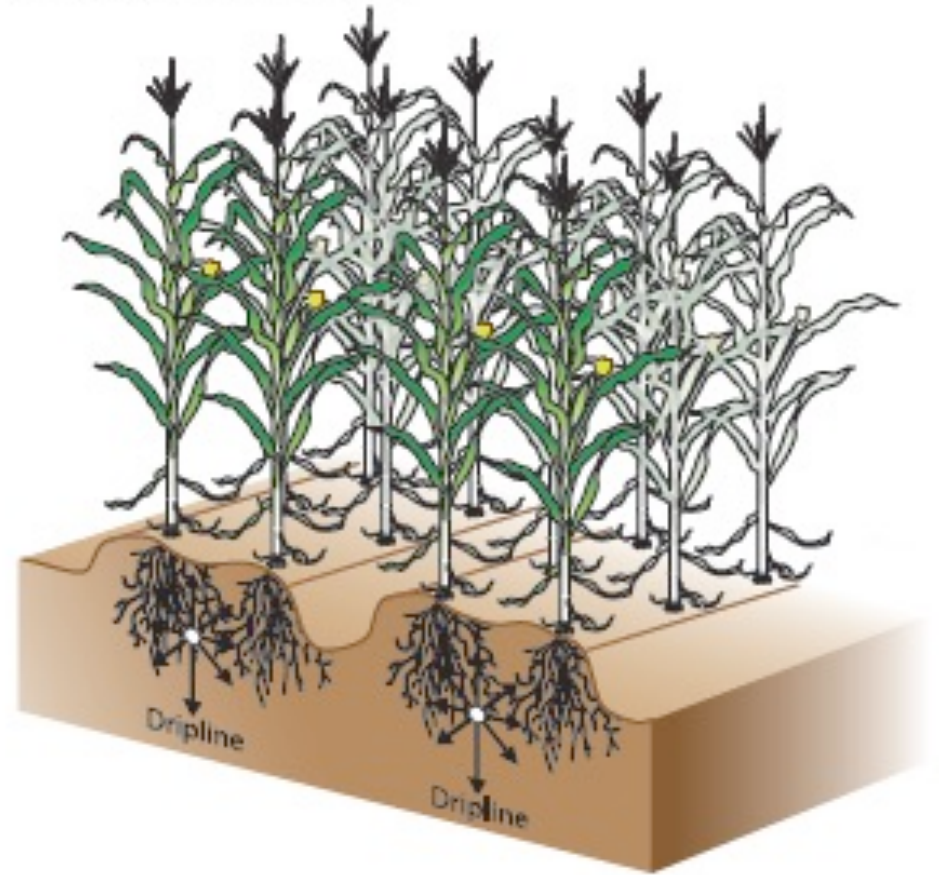


Image: *Subsurface drip irrigation in Kansas: An overview*

Shallow subsurface drip irrigation (SSDI)

- Only mean for a one year or one season use
- Utilize a thinner wall drip tubing
- Buried shallow for vegetables – typically with 1 line per row of vegetables



Installation



SDI trials fall squash



Reduced surface wetting



Results

- The SSDI used less water than surface drip to maintain the same soil moisture levels (6-inches deep) in 1 year, in year 2 no difference.
- In year 1 the SSDI had superior yields, in year 2 was no different
 - Year 2 was much hotter and drier during plant establishment*
- After one season flow rates did not differ per plot
 - No root intrusion was observed – either year

Recent research in Georgia



Evaluating SSDI in conjunction with cultivation regime in organic crops

- Looking at sweet corn and broccoli
- Overhead vs. SSDI – 4.5 inches deep on average
 - SSDI is about 3-4 inches offset from each row
- 4 methods of weed control
 - Hand weed
 - No weed
 - Low input cultivation (using a tine weeder only)
 - High input cultivation (using tine and finger weeders)

Sweet corn



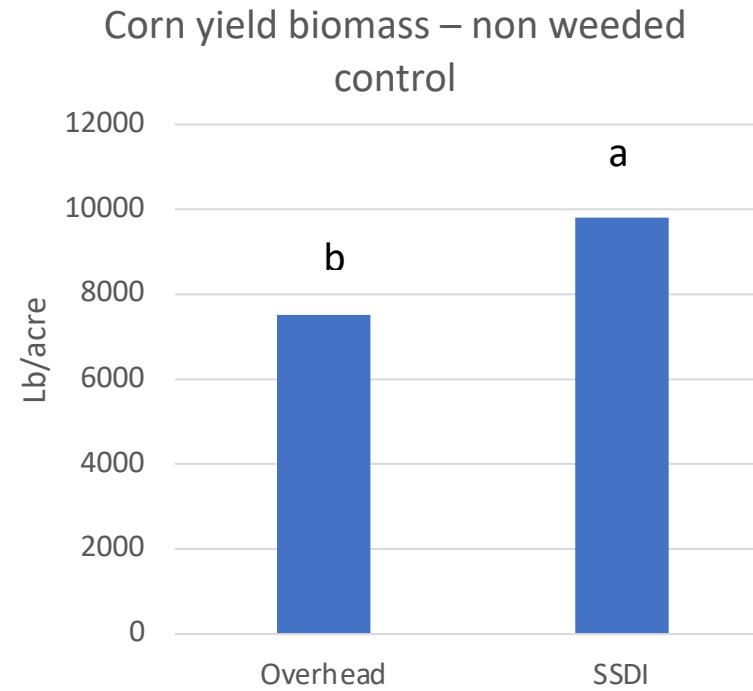
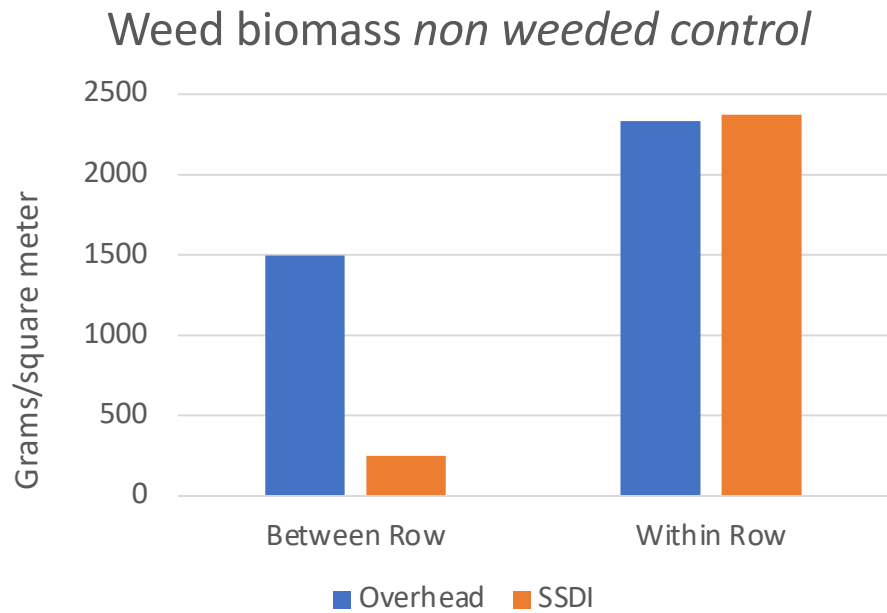
What are we seeing?

- Using SSDI gives us equivalent yields when using a low input cultivation system as the high input system with overhead irrigation
 - We are effectively reducing between row weeds with the SSDI system
- We are maintaining soil moisture levels as good or better than overhead irrigation putting out equivalent amounts of water (1-inch per week)
- We are maintaining or improving yields





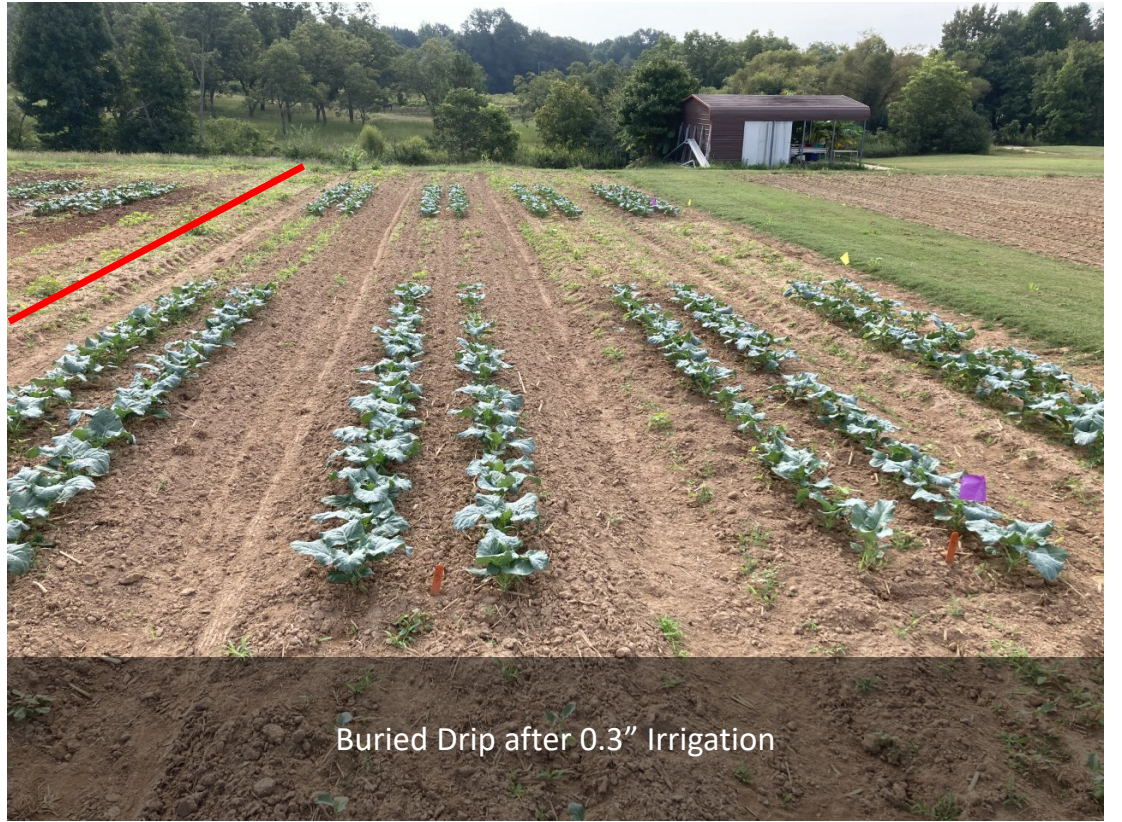
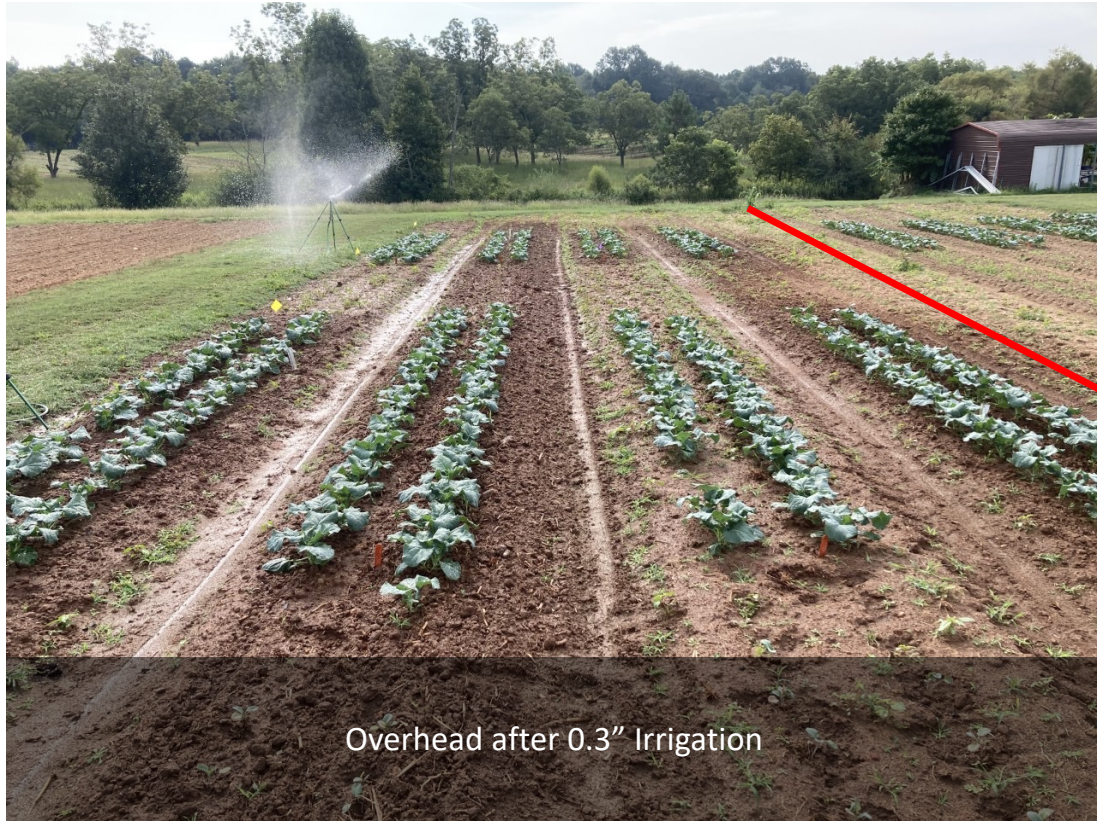
SSDI and weed growth



Fall broccoli

- Planted on 22-inch double rows
- Late August planting
- Emerald Crown
- Harvested in late Oct.

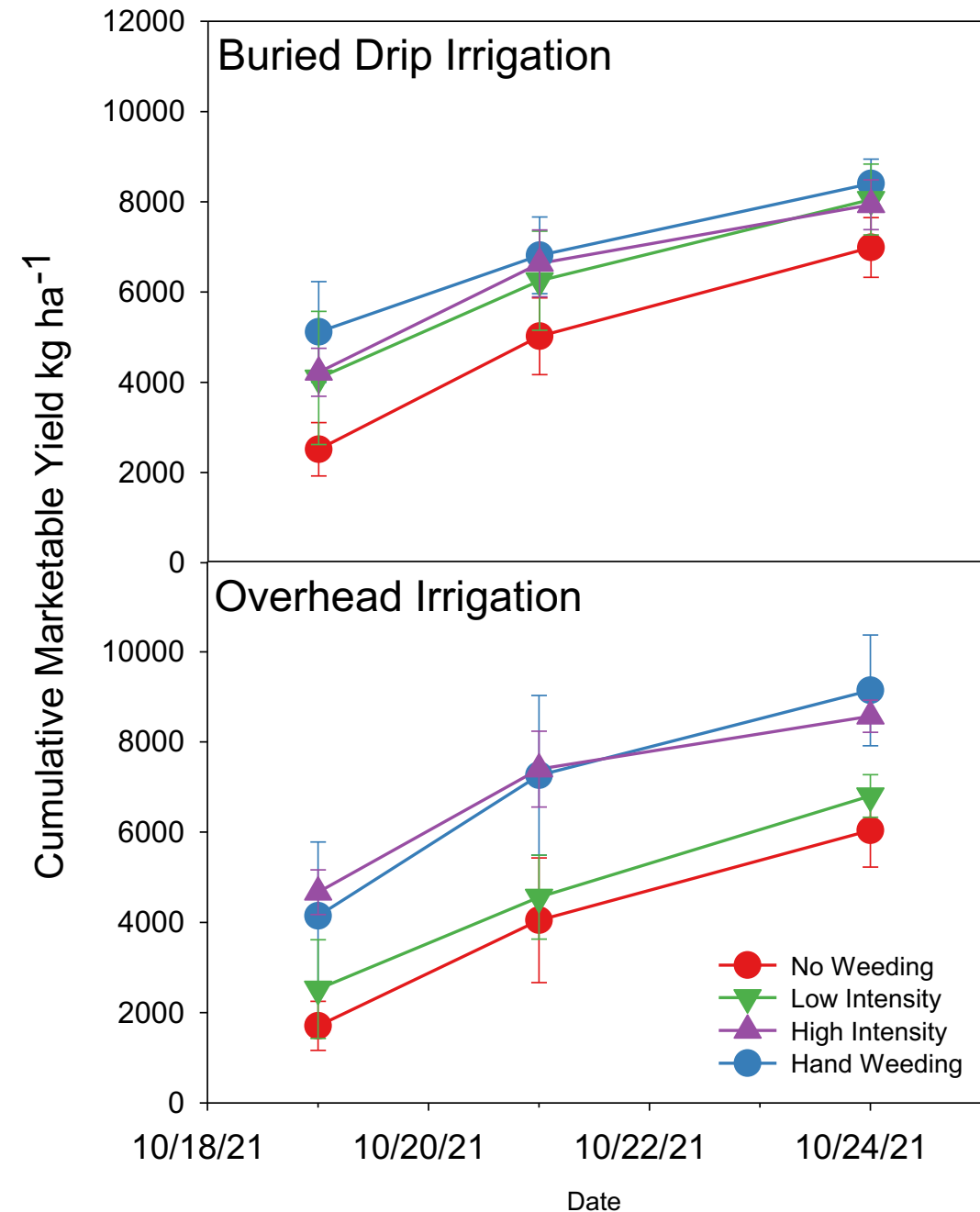




Fall broccoli – Planted

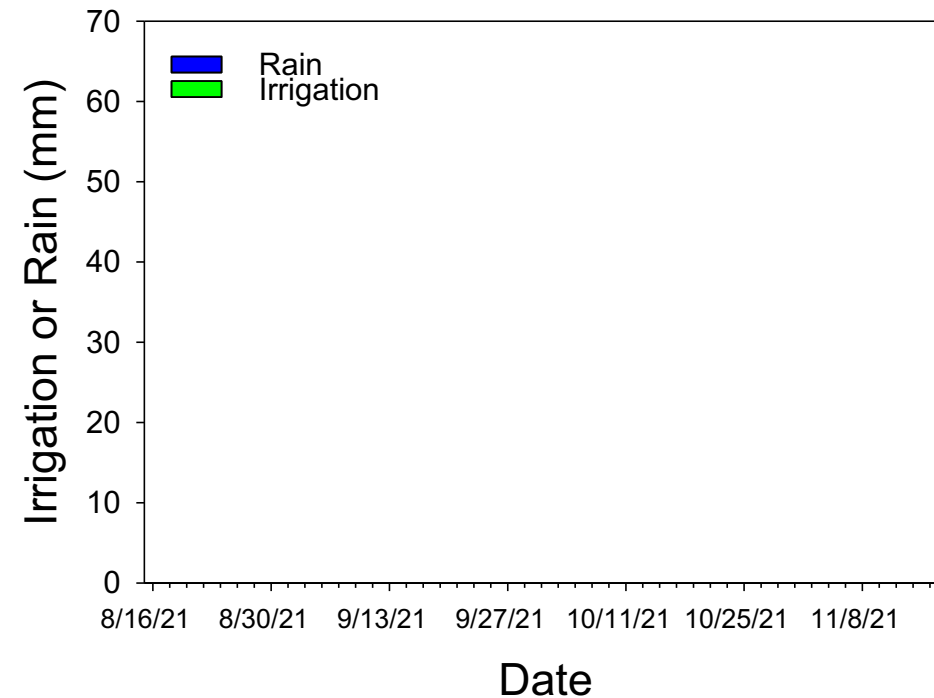
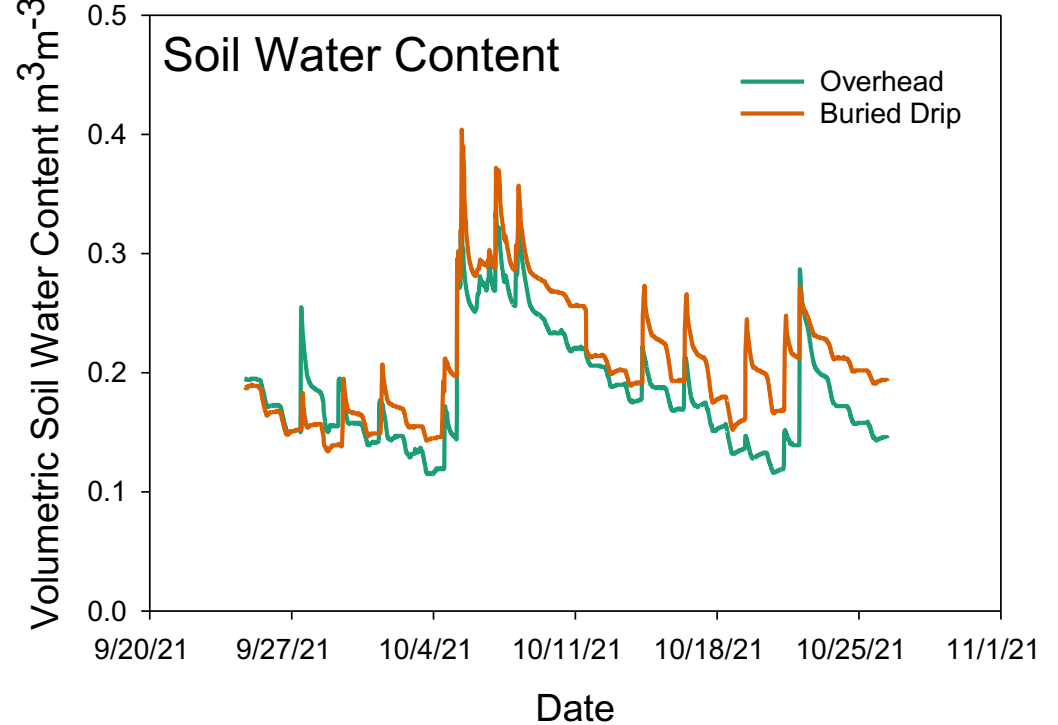
Yield

- Significant interaction between cultivation and irrigation
- Essentially the SSDI system allowed you to “get away” with a lower input cultivation system



Soil water content

- Avg of 10 HS Soil Moisture (inserted vertically to measure top 10 cm in the middle of the row)
- Placed in no weed control and hand weed control and averaged
- Overhead Avg: 18% VWC
- Drip Avg: 21% VWC



SSDI

- Pros:

- On *heavier* soil (piedmont) it has worked to germinate large seeded crops (4 inch depth 3-5 inch offset from row).
- Has worked well with transplants in fall in the piedmont.
- Can reduce weed pressure in both conventional and organic settings.
- Easily allows for cultivation.
- Other research has shown it can use nutrients more effectively.

- Cons:

- Questions remain on SSDI performance in sandier soils.
- Not adequate for germination of small seeded crops.