Irrigation Design Attributes for SDI Alfalfa Production

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The Starting Point for Success

Sub-surface Drip Irrigation is a management tool that allows for control over the irrigation system and, ultimately, control over the crop life in the root zone.

It is essential to understand soil types and sub-surface water movement through the soils to begin to design the proper components for a system for alfalfa production.

The system design criteria should include features to allow for the plants to receive the same amount of water in sufficient quantity at the proper time for every irrigation cycle.
The Drip Irrigation Difference for Alfalfa Growers

- INCREASED YIELDS
- Increased stand life
- Higher quality hay
- Lower fertilizer and chemical inputs
- Fuel, labor costs and energy savings
- Salinity management
- Better weed management; no standing water
- No evaporation losses
- Increased Water Use Efficiency
Key Drip System Components

- Emission Device (Dripperline)
- Filtration
- Air Vents
- Water Meters
- Control Valves
Emission Device Selection: Dripper Flow Rate and Spacing

The wetting patterns in a given field will be different when irrigating at low and/or high frequencies.

- **Low Frequency irrigation:**
  - Allows water delivered to the root zone too much time to move down and out of the root zone. Then, it must be re-established.

- **High frequency irrigation:**
  - Allows water delivered to the root zone to maintain the proper sub-saturation levels.

- **Low flow drippers of .18 GPH and 12”-16” dripper spacings give optimum results with higher frequency irrigations.**
Tubing Specifications

Typical Product
7/8” ID (Quarter mile runs)
10-15 mil wall thickness
Thicker walls on heavy/rocky soils
Low flow dripper of .18 GPH per emitter
12” to 16” emitter spacing
Non Compensating Drippers vs. Pressure Compensating Drippers
Filtration

- Knowing your water source and water quality
- Selecting and Properly Designing the correct filtration approach for your site is KEY

- Types:
  - Disk
  - Media
  - Screen
Other System Components

Field Control Valves:
- Control of flow and pressure to the field blocks where proper flow and pressure are critical to crop uniformity.

Air Vents:
- Remove air in the system which could cause issues like water hammer which could result in damage to pipelines and other components.

Water Meters:
- Give you visibility of how much water is going through the system at any one time. This allows field flow verification and system balancing.
SDI Alfalfa Arizona Desert (year 1)
A design feature to add a take-off for sprinkler connections can be done at the field valve tree manifold. It is best to consider sprinkling up a new stand of alfalfa for full germination of the small alfalfa seed.

The Sprinkler Supply Valve is used to connect the mainline water supply to a solid set sprinkler system used for crop germination. The mainline supplies a total of 2500 gpm at 30 psi, which is connected to a mobile booster pump that pressurizes the water to 80 psi for the sprinkler system.

4a – Pressure Relief. Two of the four Sprinkler Supply Valve's will be equipped with a Pressure Relief Valve to protect the Mainline.
Dripperline Depth

- Depth placement in sandier soils should be in the 8” to 12” range.
- For heavier soils, it is recommended to shallow up to about 7” to 10”.
- Since equipment and tractors will be moving through the field on a regular basis throughout the year, shallow depths of less than 6” of the dripperline are not recommended.
Drip Lateral Spacing

- Goal – to create a blanket of water across the field using Capillary Action to move the water.
- This is greatly influenced by Drip Lateral Spacing
- Spacings of 30” – 40” are common
- Factors that Influence Spacing
  - Soil type
  - Soil Structure
  - Crop Rotation
Some Final Thoughts on SDI Alfalfa Production

It is important to remember that going from a traditional furrow/flood irrigation system to a sub-surface drip irrigation regime requires a management level of the system that is critical to achieving the best practice results of high quality hay production at a potential increased yield of 25% to 50%.

Seek out qualified distributors who have the capability of designing the proper system for a given application. Use experienced designers who are certified to design the system that will work best for you in your soils and water and for the expected results in efficiency, uniformity and increased yields.
Making the Investment in Drip Pay

Todd Rinkenberger
Drip Irrigation Value

- INCREASED YIELDS
  - Increased stand life
  - Higher quality hay

- Lower fertilizer and chemical inputs

- Fuel, labor costs and energy savings
  - Salinity management
  - Better weed management; no standing water
  - No evaporation losses
  - Increased Water Use Efficiency
The Processing Tomato Experience

Timelines
2004 Beginning of Adoption
2007 Massive Expansion – up to 40%
By 2013 – 95% Penetration
From 2007 to 2013 Yields INCREASED on a Statewide level (all acres) by 20%+

Source: National Ag Statistics Service
What can be accomplished in Alfalfa

- Traditional expectation is 20% increase with improved Irrigation Application
  - Uniformity
  - Responsiveness to Crop
- Range we have seen in Alfalfa at this point – 25% - 40%
- A Couple Examples to Consider
Economic Example

Parameters:
- 25% Yield Increase
- Water Cost - $100/ac ft
- Price per Ton of Alfalfa - $250
- Drip Irrigation System Cost - $1,800 / acre
Increasing Yield by 35% Reduces Payback to 2 years

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<th>CURRENT SYSTEM</th>
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THANK YOU for your input.
The estimated payback period for investing in a DRIP-MICRO IRRIGATION SYSTEM per the information you entered will be approximately: 2.01 years

By converting to DRIP-MICRO the water saved could allow you to irrigate an additional 31.34 acres.
Thank You