Improving Pressure Management of Drip Systems

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Why is pressure management important for drip?

Applying water uniformly

Fertigating uniformly

Scheduling

Drip germinating vegetable crops

Successful germination of lettuce by drip requires applying water uniformly throughout the field

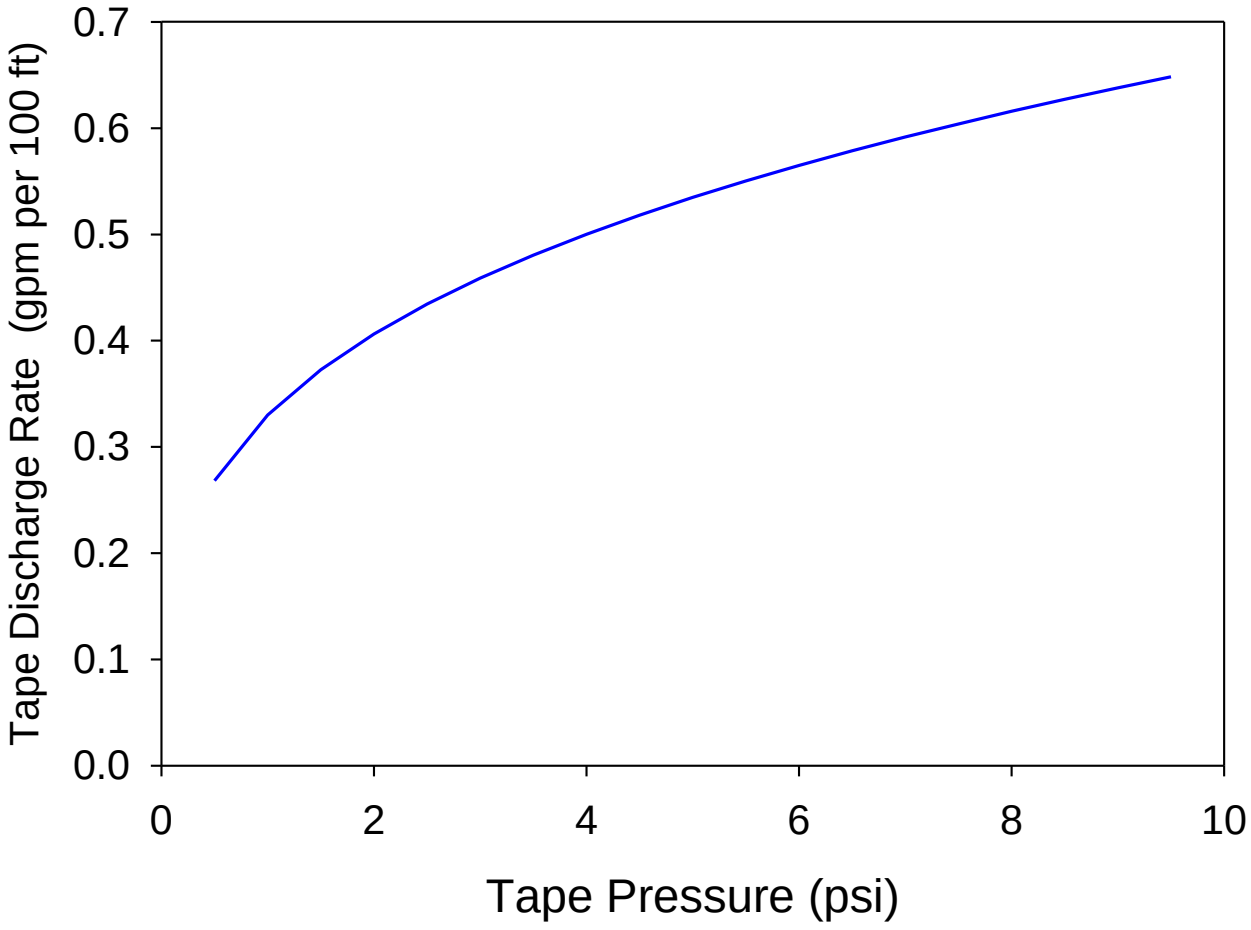
The uniformity of fertigation applications depends on the how evenly the drip system distributes water

Distribution Uniformity of Water and Injected Fertilizer

Field #	Lettuce Type	Bed width	Irrigation DU[1]	Fertilizer Uniformity	Plugged emitters	Average pressure
		inches	--------- %	-------	%	psi
1	Romaine	40	58	54	5	7.2
2	Romaine	80	75	82	4	4.3
3	Romaine	80	81	73	1	8.3
4	Iceberg	40	80	75	2	13.8
5	Romaine	40	83	74	3	10.8
6	Romaine	80	46	66	16	4.6
7	Romaine	80	86	78	2	7.0
8	Iceberg	40	88	46	0	9.0
9	Romaine	80	38	32	2	3.5
10	Iceberg	80	81	80	3	7.2
11	Romaine	40	87	74	0	12.4
Average			73	67	3	8.0

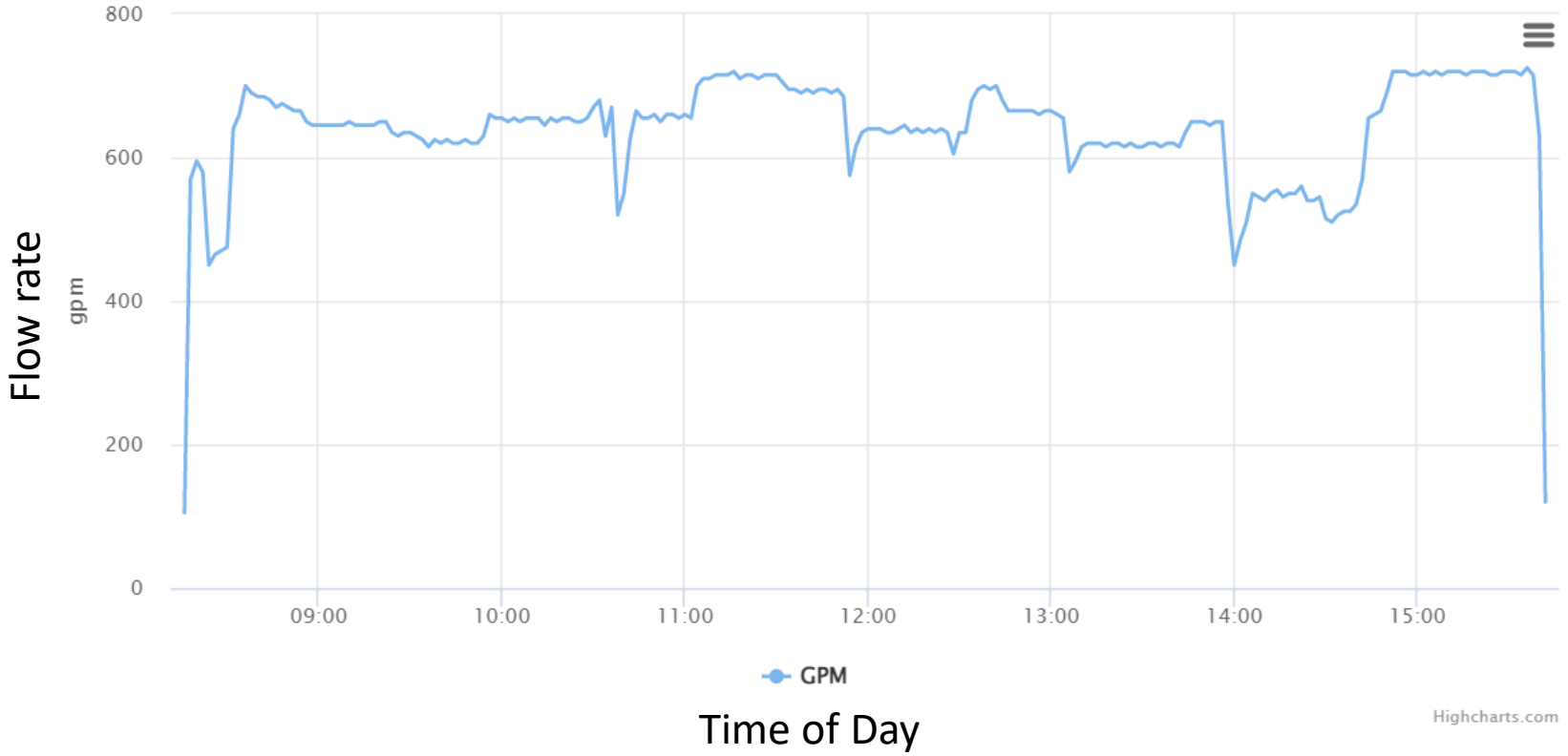
1. Distribution Uniformity of the lowest quarter

Discharge rate of drip tape varies with pressure

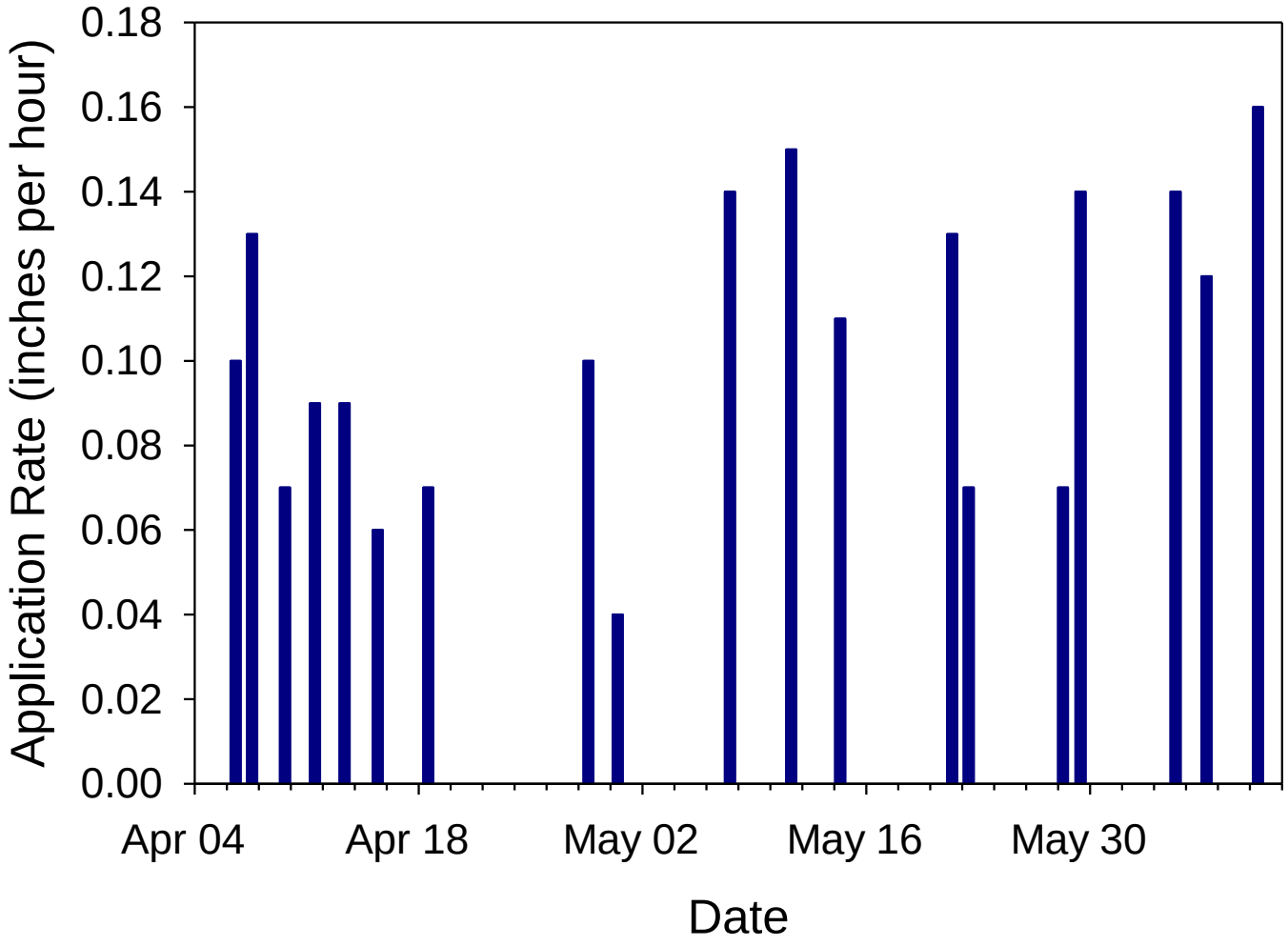


Many irrigators regulate pressure of drip systems using a valve

If pressure varies then the flow rate of the drip system will vary



The application rate of this drip system varied 33% during the season



Main Strategies for maintaining optimal pressure in drip systems

- Improve the system design
- Accurately monitor pressure
- Use pressure reducing valves

For very long beds (>1000 ft): Placing the submain a third of the way down the field minimized pressure differences and improved distribution uniformity

Undersized connections between the main and submain can cause excessive pressure loss

Monitoring pressure is more complicated than it seems

- Mechanical pressure gauges on an irrigation system are often inaccurate, in the wrong location, or broken.
- New mechanical pressure gauges may be inaccurate by as much as 1 to 2 psi (10% to 20% error for tape at 10 psi).

Best practices for monitoring pressure of drip systems

- Install Schrader valves where you want to check the pressure of the drip system (submain, ends of drip tape, middle of field, etc.
- Add a Schrader adapter to an accurate mechanical gauge
- Use the same gauge to check pressures
- Periodically check the calibration of the pressure gauges and note if they are above or below the calibrated gauge
- Use a gauge with 0 to 30 psi range for the drip system and a gauge with 0 to 100 psi range for pressures greater than 30 psi
- Take care of your pressure gauges. They are more fragile than you might think.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GONZALES
Irrigation Systems

Periodically check the calibration of all pressure gauges

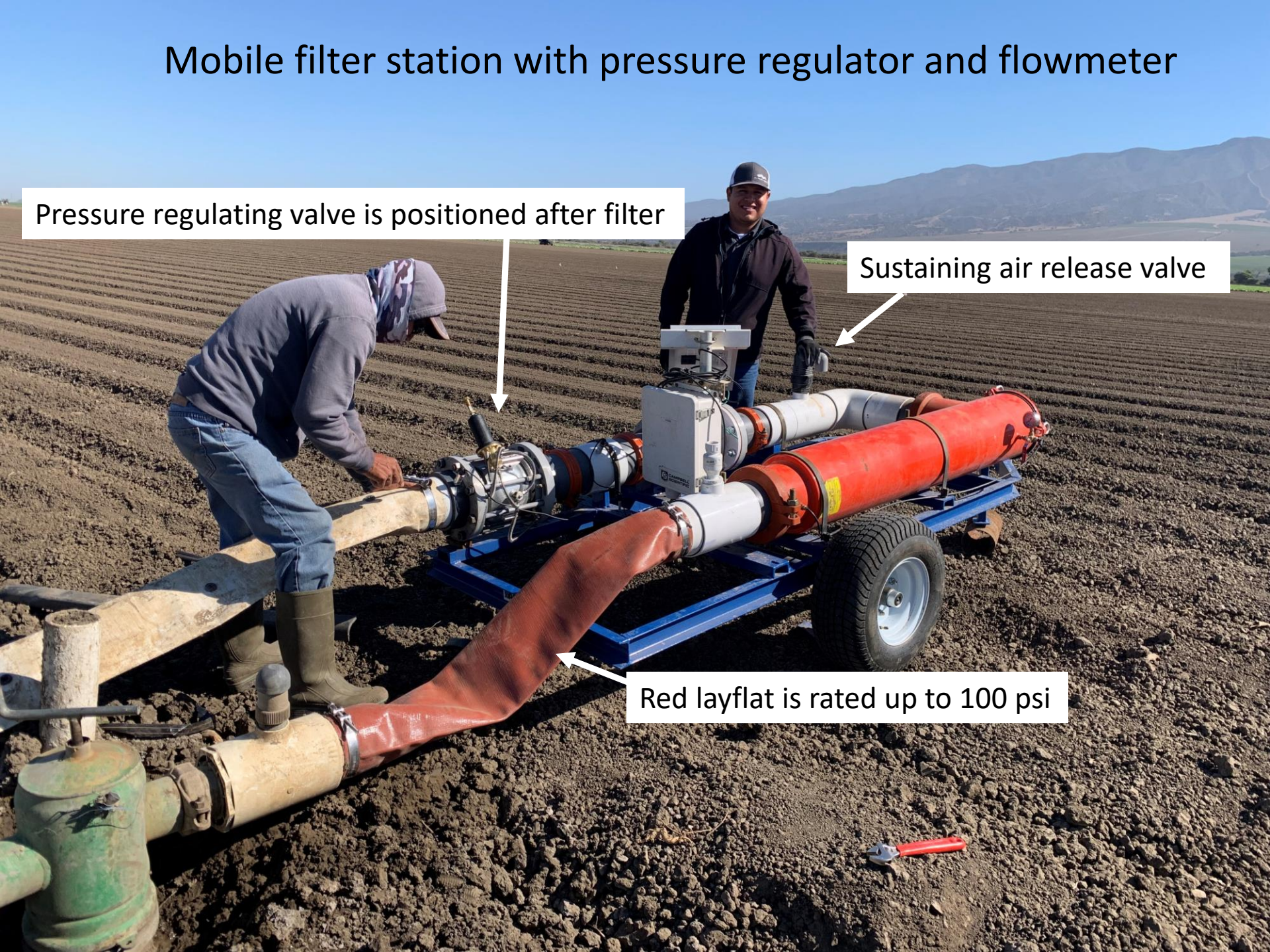

PLANET


BERMAD

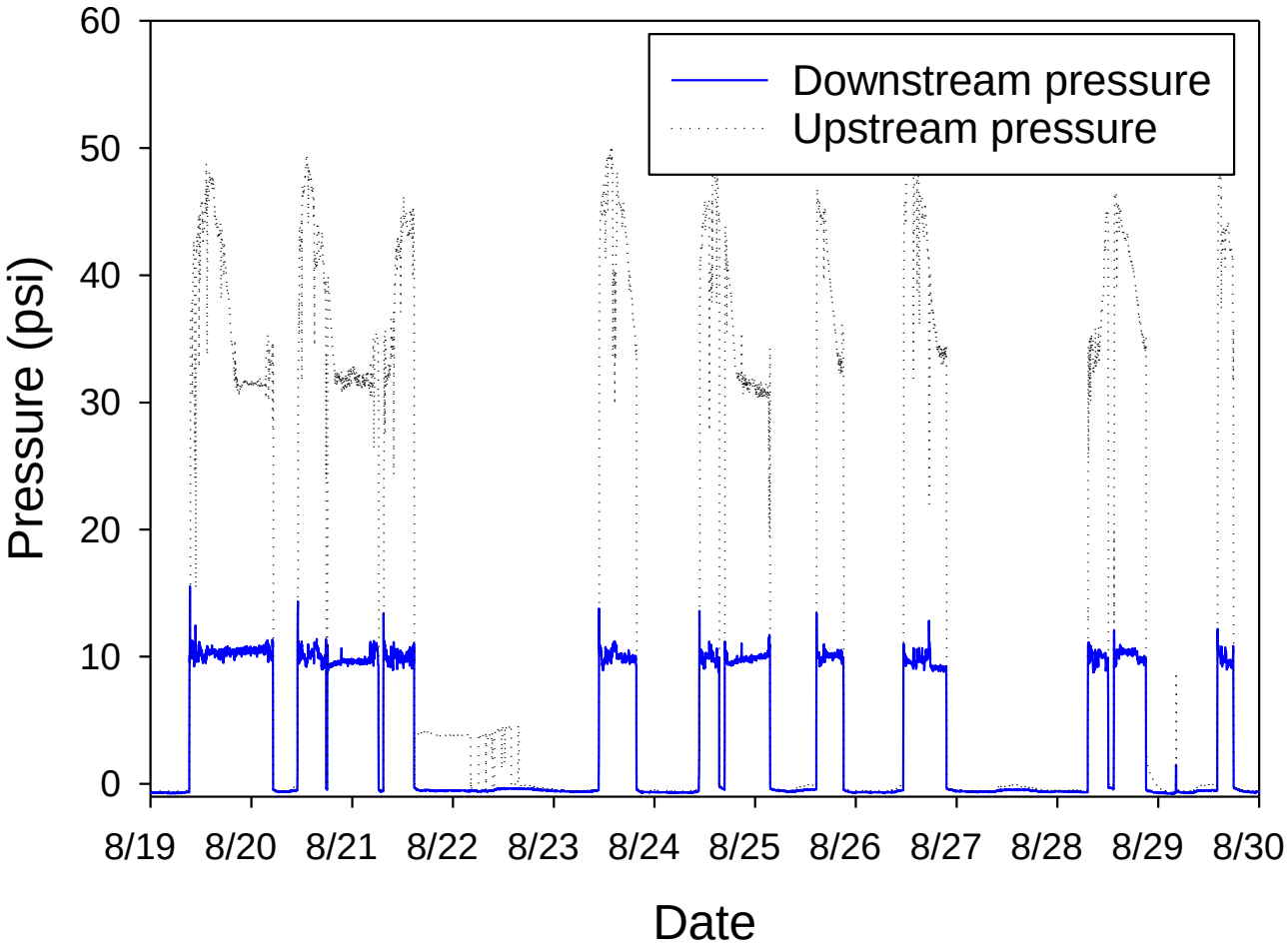
Evaluating pressure regulating valves vegetables

- Easy to adjust
- Suitable for a large range of flow rates
- Fast reacting to changes in upstream pressure
- Maintains a consistent pressure downstream without adjustment
- Rugged

Mobile filter station with pressure regulator and flowmeter

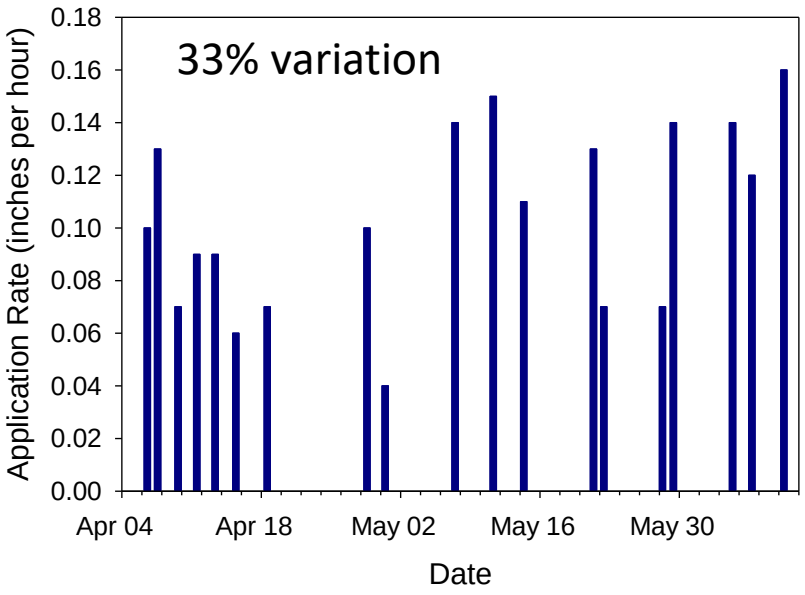


The regulating valve maintained pressure of the submain at 10 psi

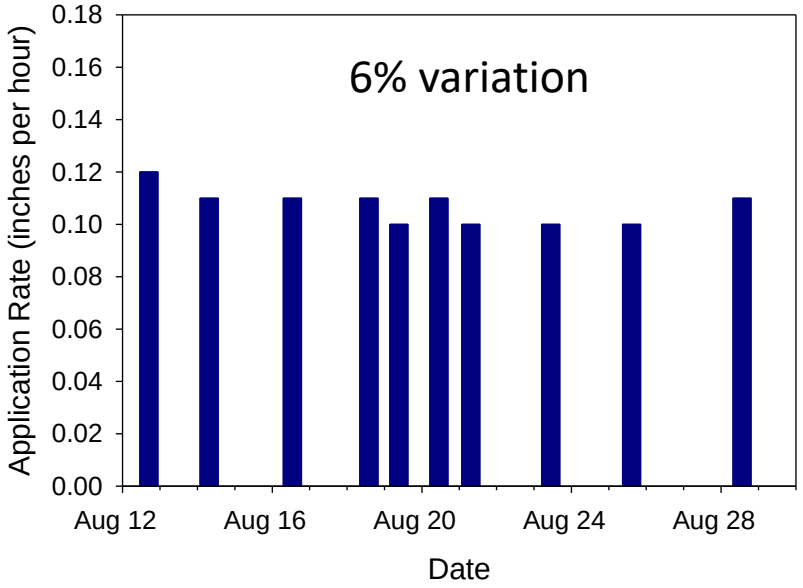


Pressure regulating valve minimized variability in the application rate of the drip system

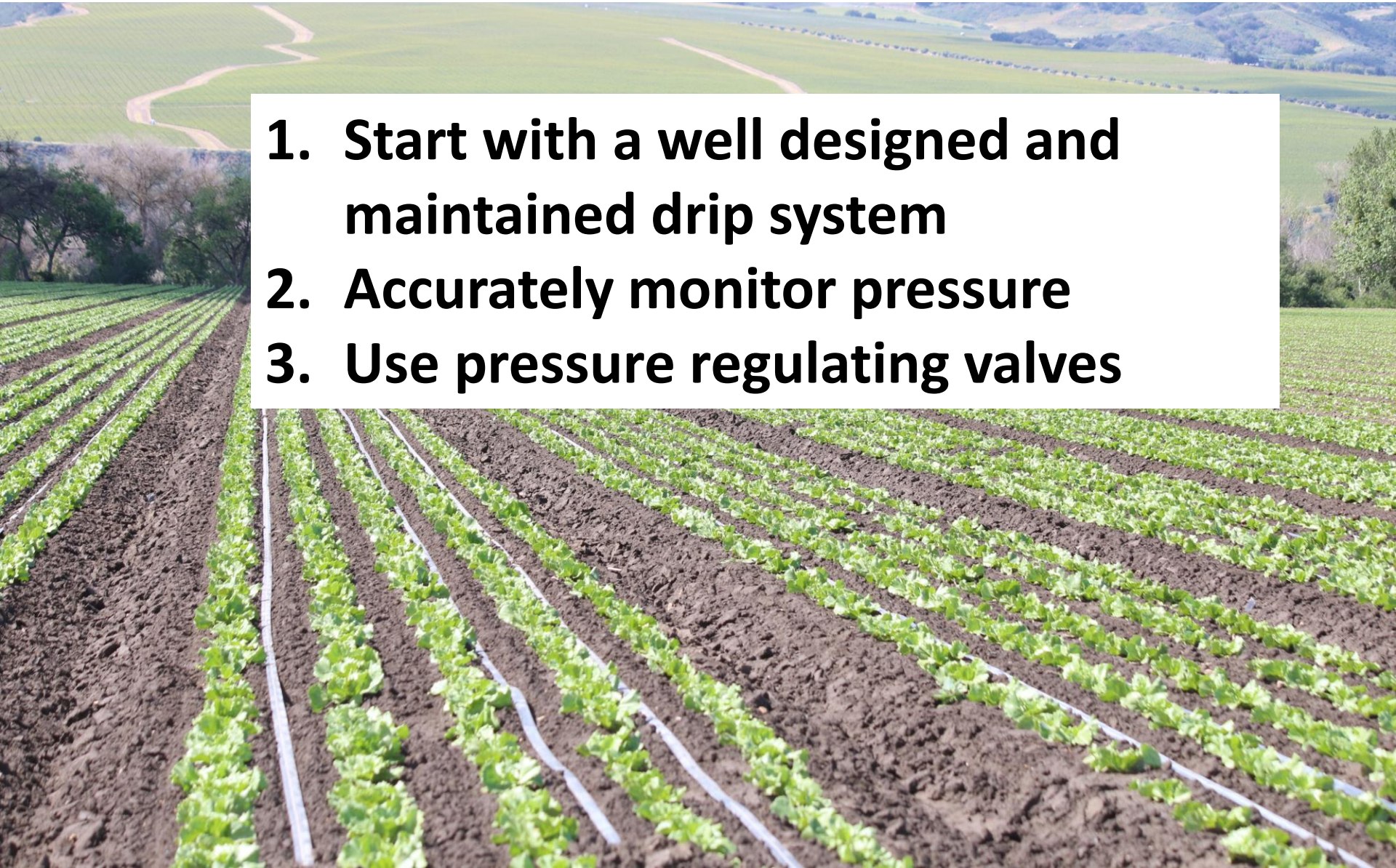
No regulating valve



Regulating valve



Main steps to improving pressure management of drip systems



1. Start with a well designed and maintained drip system
2. Accurately monitor pressure
3. Use pressure regulating valves


Questions?