

Low Energy Sprinkler Application (LESA) Center Pivots

Treasure Valley Irrigation Conference

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LEPA vs. LESA

- LEPA (Low Elevation Precision Application)
 - Water applied at ground level by hose with drag sock
 - Water applied just above ground level with Quad Spray (bubbler, Horizontal Spray, Chemigation,...)
- LESA (Low Elevation Sprinkler Application)
 - Water applied about 1 ft above ground with Quad Spray horizontal spray, or spray head

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What is LEPA?



LEPA Management Considerations

- **Level Fields** –Maximum recommended slope is 1%
- **Surface Water** – Not recommended without extremely effective and maintained filtration
- **Circle Planting** – Not necessary but keeps applicator centered in furrow
- **Furrow Diking** – Small basins hold water until it can infiltrate the soil
- **Deep Chiseling or Ripping** – Loosens soil to improve infiltration
- **Soil Moisture Monitoring** – To schedule irrigation to help reduce deep percolation losses
- **Soft Middles** – Leave furrows be as un-compacted as possible.
- **Crop Residue** – To increase surface storage capacity and help prevent soil redistribution

LEPA Modes



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LEPA Benefits

- Watering every other crop row leaving the other row dry, this application wets less than 50% of soil surface and saves water
- Plant canopy stays dry, helping to prevent foliage damage due to water quality
- Discharging water very near to, or on the soil surface eliminates wind-drift and minimizes evaporation
- Low pressure operation 6-10 psi saves energy, reduces fuel consumption and operating costs

Concerns:

- What spacing is required for germination?
- Excessive runoff?



2013 LESA Experience

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Assembling the pivot manifolds to double the number of drops



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Attaching manifold to existing gooseneck



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Attaching manifolds to the pivot pipe



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Attaching drop hoses



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Access tubes for soil moisture measurement with depth (to 5 ft)



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Wells, NV FFA students measuring soil moisture



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First irrigation: LESA vs. MESA (original arrangement)



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Conclusions

- It appears there is little difference between LESA and MESA early in season before full crop canopy and at night.
- During the daytime of mid-summer with full crop canopy, it appears there may be up to a 30% savings with LESA.
- Uniformity improves with narrower spacing under LESA. This may or may not affect yield.
- 4-5 ft spacing appears OK on most applications.
- 30" spacing on sandy or gravel soils with bubble application or uneven topography

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LESA (Low Energy Sprinkler Irrigation)

- Spray heads with about 15 ft wetted diameter
- 6psi regulators
- Heads dropped to about 1 ft above the ground
- In canopy in grain, alfalfa, corn, potatoes (?)
- In-canopy reduces wind drift and evap. losses by 15-20% (or more)
- Drop spacing about 4-5 feet
- Applies to moderate or high intake soils where runoff is not an issue

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Screening tool to assess runoff potential



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2014 Work

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Double goose-necks and truss-rod hose slings.

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2014 Arco, ID

- Water-short area – much grower interest
- High elevation and windy
- Adjacent to desert (upwind of field)
- Spring wheat
- No yield comparison – hailed out before harvest

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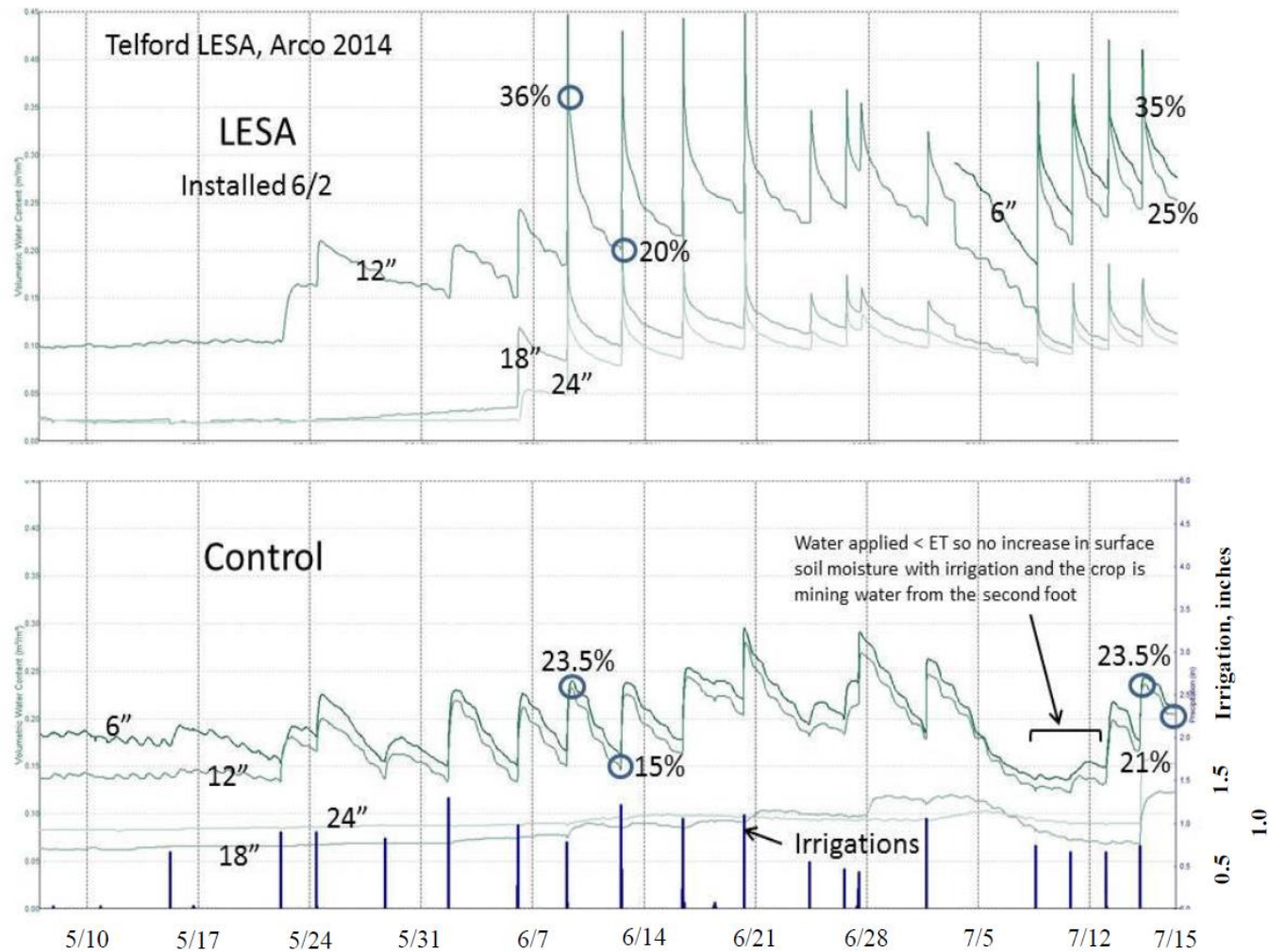
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Water Savings

- Ruby Valley, NV 2013:
 - about 30% when in-canopy,
 - 10-15% for season
- Arco, ID 2014:
 - About 50% in-canopy
 - About 20% for season
- Eureka, NV (3 full pivots)
 - Installed for only part season, rain eliminated yield comparisons
 - Some water savings information will be available

Final Thoughts:

- LEPA technology will save water, power and has other benefits- if soils will accept water without runoff
- LESA technology will also save water, power, etc. (savings will be a little less), but can be used with wider drop spacings and germination on a wider variety of soils
 - 15-20% seasonal, 20-50% in-canopy
 - 30-50% savings for dry, windy conditions near desert
- Crops tested so far: alfalfa, oats, spring grain, corn, mint, (potatoes in 2015)

Final Thoughts, cont.

- Additional benefits to grain production:
 - Less lodging
 - Lower head disease pressure (?)
- LEPA and LESA should be used only on appropriate soil and topographic conditions
 - Runoff has been a problem in silt loam and similar soils

The End -- Questions?

