



Mulching Perennial Cut Flowers

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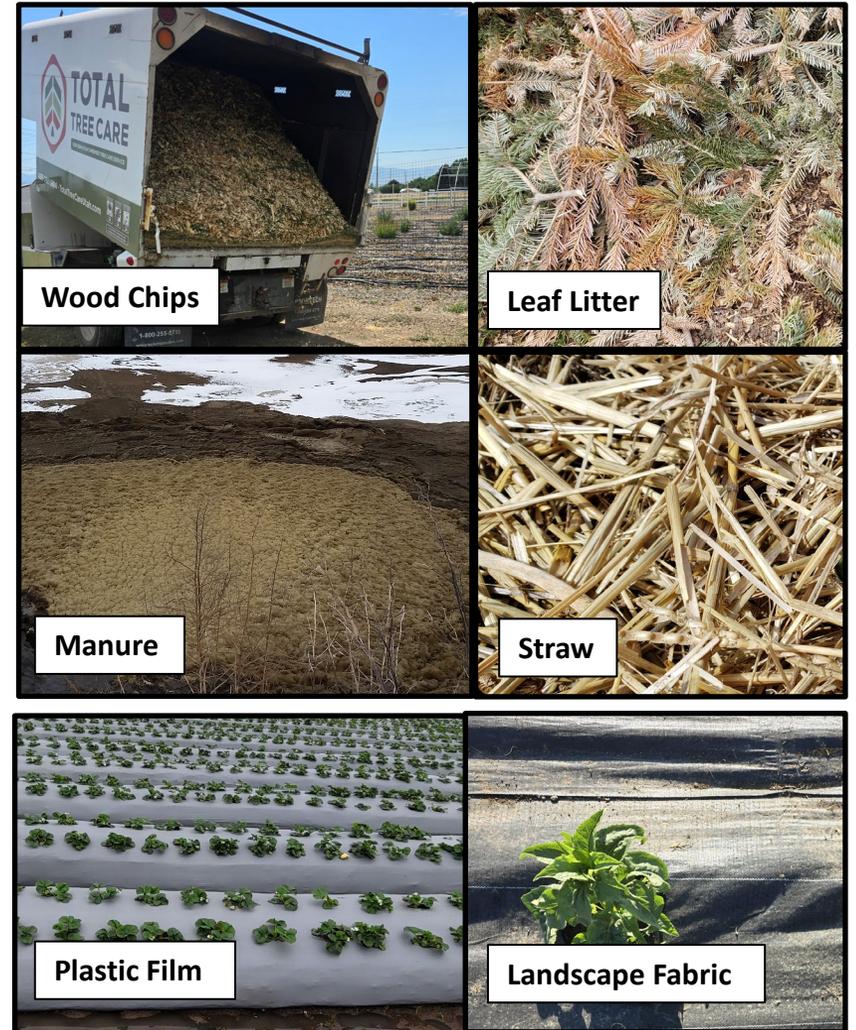
Mulching Options

Natural ^[1]: Wood chips, leaf litter, grass clippings, straw, compost, or animal products

- Reduce weed pressure, regulate soil temperature, improve soil structure, moisture retention, organic matter, and nutrient content, and are easier for small-scale
- Limited by bulk, transport, and availability

Synthetic ^[1]: Woven landscape fabric, plastic film, or mats

- Reduce weed pressure, regulate soil temperature, improve soil moisture retention, and regulate soil temperature
- Produce plastic waste, and do not contribute to soil organic matter or nutrients



Unwashed wool may be an alternative

Wool Availability in Utah^[1]

- 280,000 head of sheep
- 2.13 million pounds of wool produced annually

Ungraded Wool (Grease Prices) \$0.55 per lb. ^[4]

- Romney White \$0.50 & Black Face \$0.25

Compared to Fabric

- Cost per 16 ft² (4×4 area): Fabric = \$1.76; wool applied (7.5 lb ≈ 3-inch depth)



Plant Nutrients in Wool: Reported Ranges (ppm) ^{[2],[3]}													
NO ₃ ⁻	P	K	Ca	Mg	Na	S	B	Cu	Fe	Mn	Mo	Zn	Se
38 to 64	148 to 1,764	476 to 755	1,353 to 10,270	112 to 2,200	228 to 2,165	21,700 to 23,500	3.95 to 7.62	0.73 to 10.5	22 to 627	3.37 to 33.4	0.37 to 1.02	2.24 to 116	0.015

Sources: USDA NASS Sheep & Goats Report (2024–2025) ^[1], Patkowska-Sokoła et al., (2009) ^[2], Patkowska-Sokoła et al., (2020) ^[3], American Sheep Association ^[4]

Our goals

- Evaluate the performance of unwashed wool as a surface mulch by tracking soil moisture and irrigation water
- Compare unwashed wool mulch with conventional landscape fabric and bare soil to determine impacts on crop growth and performance
- Monitor root-zone soil temperature across mulch treatments to assess the effects on plant development and stress
- Evaluate the field longevity of unwashed wool mulch and its contributions to soil nutrients and salinity



2025-2026 Greenville Farm, Logan, Utah

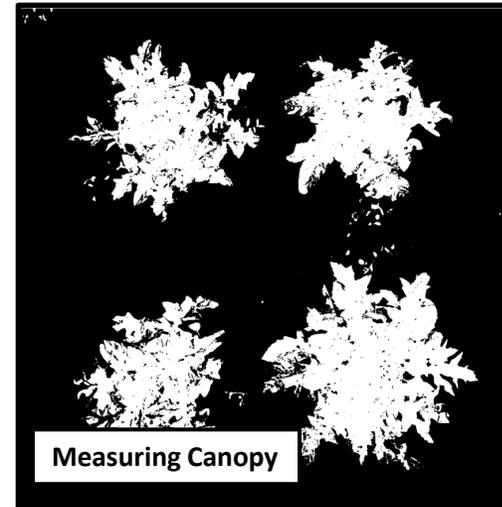
Size: $\frac{1}{4}$ acre site with 1,296 plants

Mulches

- Wool – No Replacement (3-inch depth)
- Wool – Annual Replacement (3-inch depth)
- Woven Landscape Fabric
- Bare Soil

Environmental and Plant Monitoring

- Water usage + savings: 5 flow meters
- **Sensors:** 48 soil moisture, 12 air temperature, 12 soil heat, and 12 solar radiation
- Root-zone temperature
- Plant establishment, canopy, height, and yield
- Soil nutrients and salinity: measured before and after each growing season



Measuring Canopy



July 2025



Measuring Plant Height



October 2025

2025-2026 Drought Tolerant Perennial Cut Flowers

Coneflower

(Echinacea purpurea)

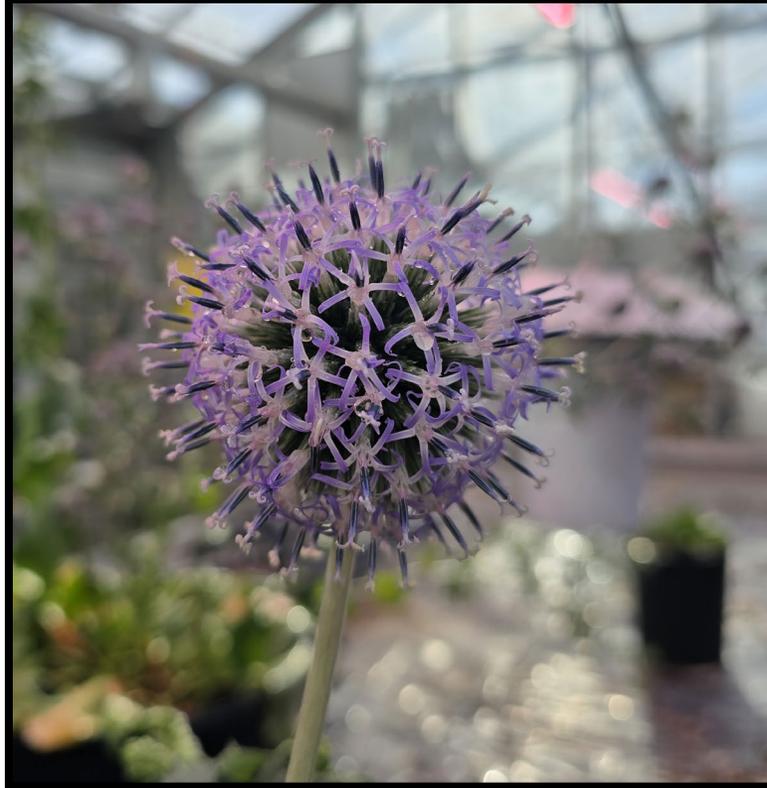
- 'Magnus Superior'
- Primadonna® 'Deep Rose'
- Primadonna® 'White'



Globe Thistle

(Echinops ritro & Echinops bannaticus)

- Ritro
- 'Blue Glow'
- 'Star Frost'



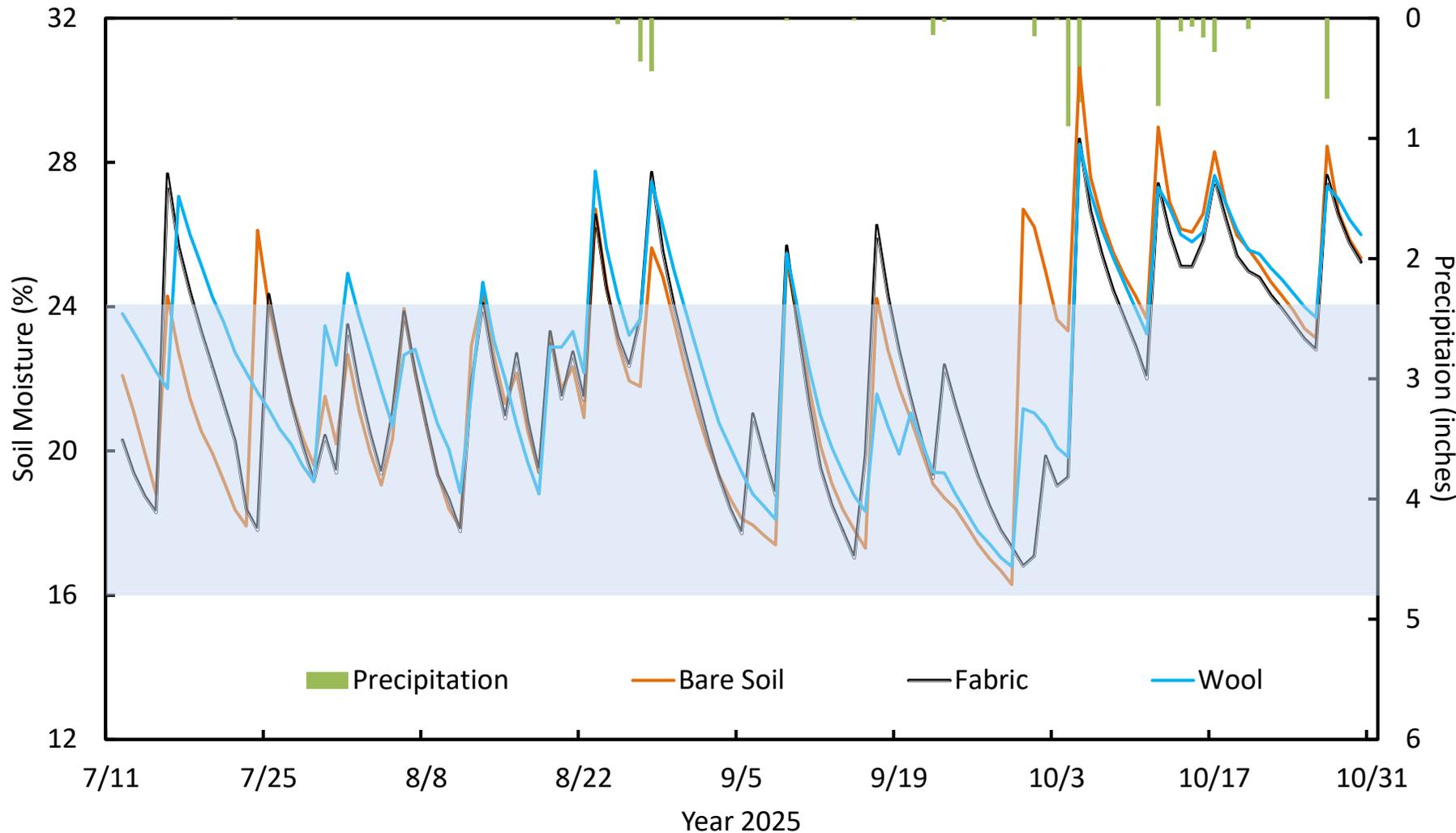
Sea Holly

(Eryngium planum)

- 'Sea Holly'
- 'Blue Glitter'
- 'White Glitter'



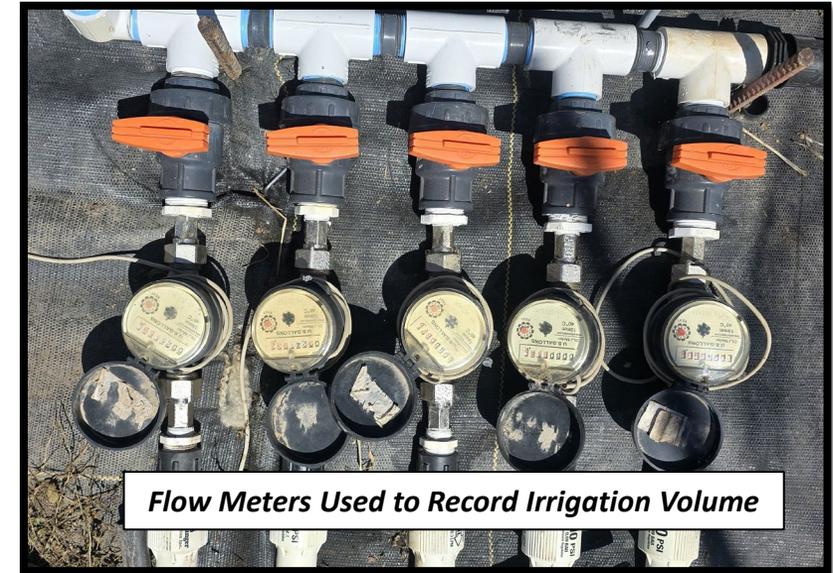
Water Usage Results



- The optimal soil moisture (16 to 24%) is shaded blue
- **Wool beds had an average of 8** irrigation events for the season, whereas **bare soil had 13**, and **fabric had 11**
- Peaks above range are attributed to **rainfall or fertilizer application**

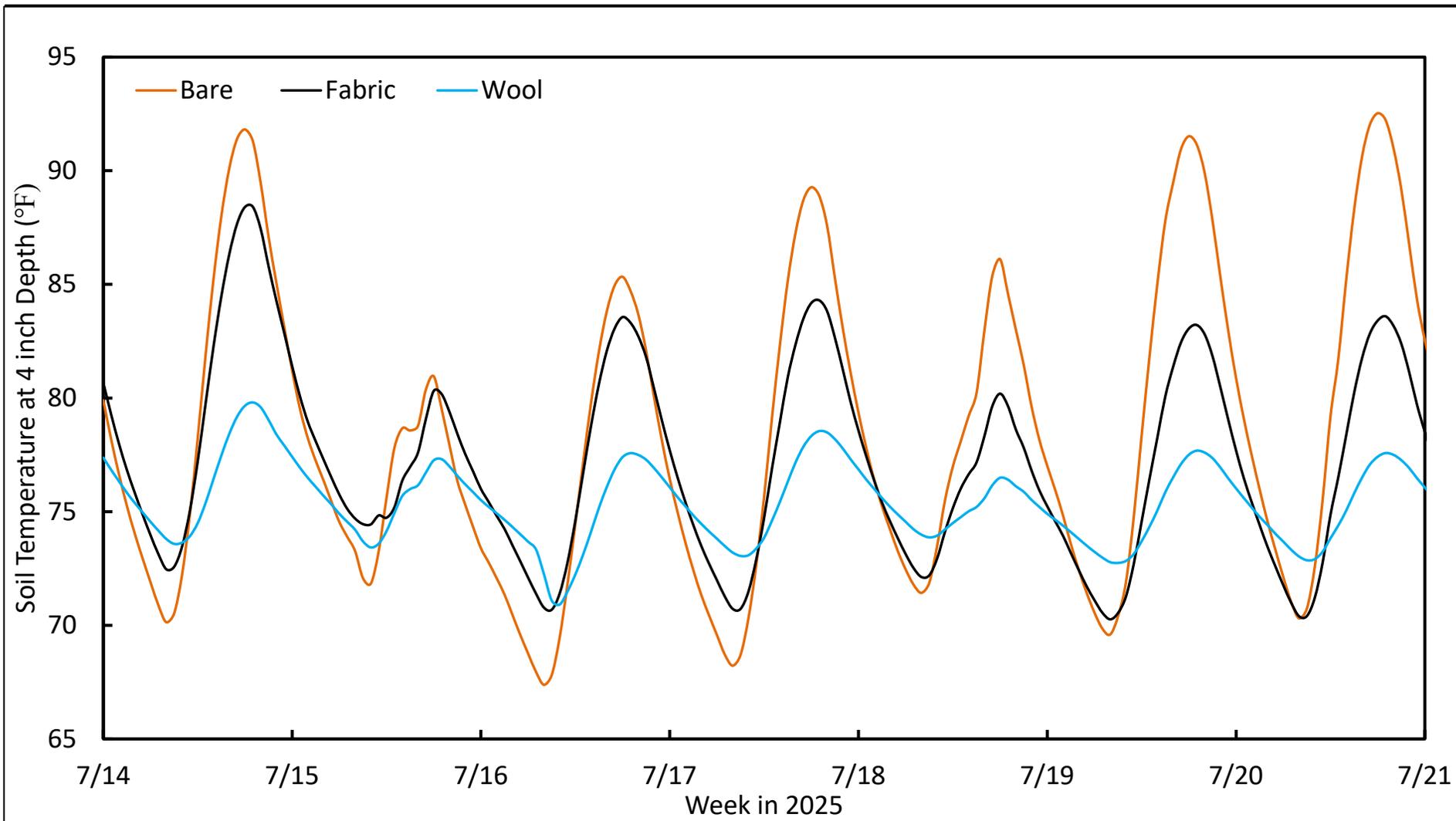
We saved 30% water

Month	Bare	Fabric	Wool	% Water Savings Compared to Bare
Gallons of Water Used*				
July	1863	1623	1121	40
August	2092	2228	1745	17
September	1749	1565	1148	34
October	0	312	0	--
Jul-Oct Total:	5704	5728	4014	30
Inches of Water Used*				
July	10	9	6	39
August	11	12	9	18
September	9	8	6	35
October	0	2	0	--
Jul-Oct Total:	30	31	21	30
Hours of Irrigation*				
July	22	22	14	35
August	29	29	23	22
September	24	21	15	38
October	0	4	0	--
Jul-Oct Total:	75	75	52	31
Average Per 4 ft x 74 ft (296 sq ft)*				



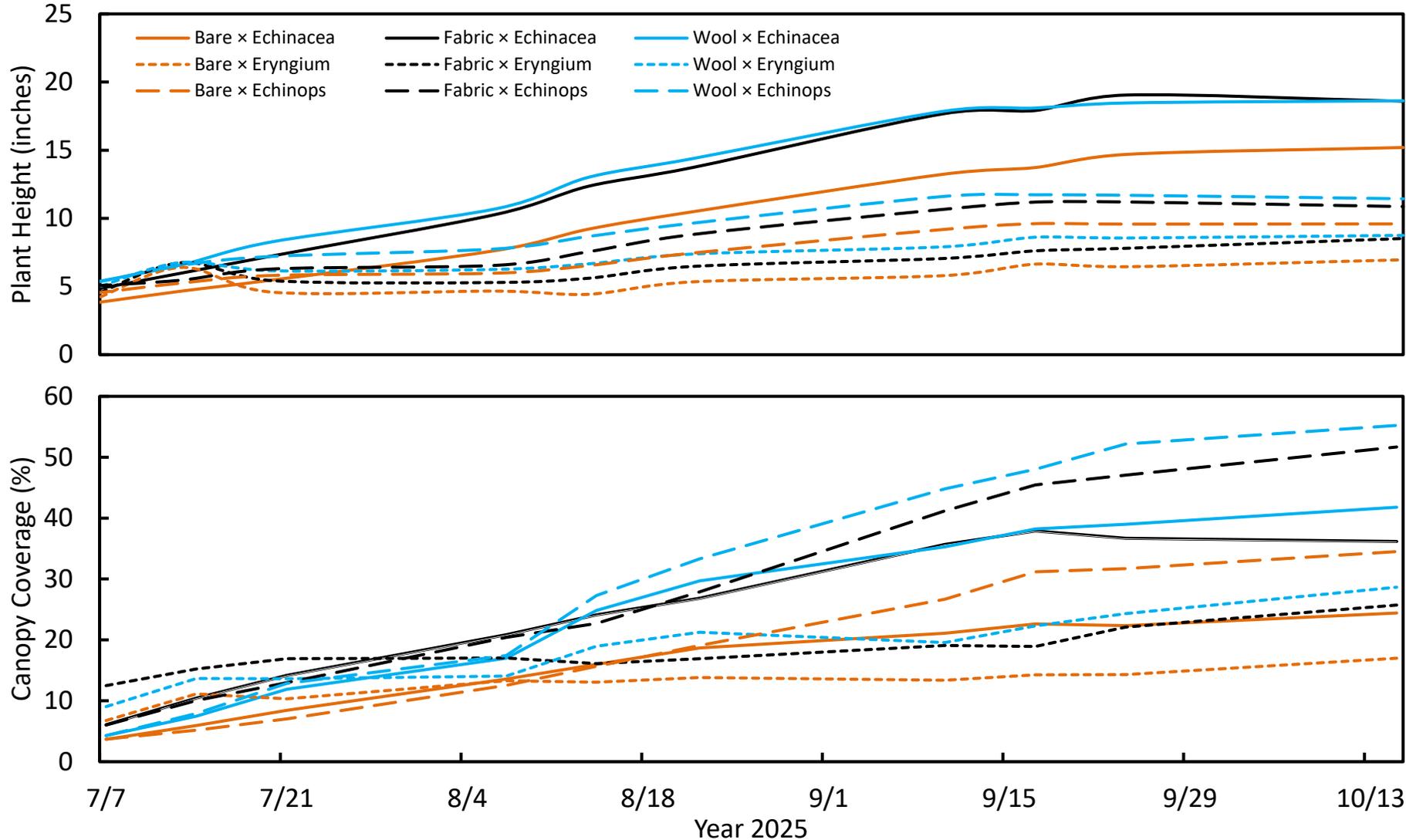
- Wool mulch **saved 1,690 gallons of water** compared with bare soil during the growing season
- Irrigation time was **reduced by 23 hours** under wool mulch

Wool moderated soil temperature



- Wool kept the **soil 10 °F cooler** during the day and **4 °F warmer** at night compared to bare soil
- Wool kept the soil **6 °F cooler** during the day and **3 °F warmer** at night compared to fabric
- Fabric kept soil **4 °F cooler** during the day and **1 °F warmer** at night

2025 Establishment Year



- Plant height was **2.5 inches greater** under wool mulch compared to bare soil, but similar to fabric
- Plant canopy coverage was between **5 to 20% greater** with wool mulch compared to fabric and bare soil

Findings

- We saved water used by 30% with wool mulch compared to bare soil and fabric
- Wool kept summer soil temperature cooler by 10°F
- Plant height and canopy coverage were 2.5 inches and 5 to 20% greater under wool mulch at establishment
- Wool did not eliminate heavy weed pressure, especially field bindweed. Clearing weeds may be time-consuming if weeds are left to grow longer
- 2026 – measure yield response + water for summer + wood chips + soil nutrients
 - Come visit our Field Day!



Thank you to those who have helped!

- James Frisby
- Claudia Nischwitz
- Eric Westra
- Eric Galloway

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