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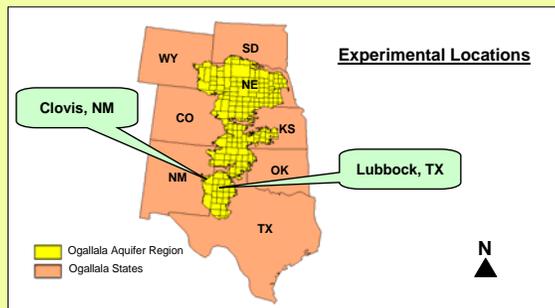
## INTRODUCTION

Water is the most important factor limiting crop productivity in the Southern High Plains. Rainfall in the region is low and the distribution is erratic. Therefore, the majority of agriculture depends on irrigation. Water resources in the region are declining and therefore water use efficiency is of great importance in the region.

The new drive for biofuels has renewed interest in some of the oilseed crops in the region. Sunflower, which is known for water stress and heat tolerance, is one of the better choices for the region. Knowing the relationship between water use and yield can help farmers to decide how much water they should put on sunflower.

### Objectives:

1. To develop sunflower water use and seed yield relationship for the Southern High Plains Region.
2. To assess the effect of concentrating irrigation at vegetative stage vs. reproductive stage on the yield formation.
3. To study the role of irrigation water on sunflower oil content in the Southern High Plains.



## MATERIALS AND METHODS

**Locations:** Clovis, NM and Lubbock, TX

**Sunflower Variety:** Triumph 859HOCL

**Irrigation Treatments:**  
**Amounts:** 0, 3, 6, 9, 12 inch (uniformly distributed)  
**Timing:** All 6 inch at Vegetative vs. at Reproductive stage

**Planting Date:** June 26, 2007 (both Locations)

**Irrigation Management:** Surface Drip system with Water Meters at Clovis and Hand Hose Watering at Lubbock

**Observations:** Plant height, plant population, seed yield, oil content and seasonal soil moisture use

**Harvest:** Hand harvested at maturity

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Figure 1. Installing neutron tubes for soil moisture monitoring. Seasonal pattern of soil moisture use was monitored at Lubbock. At Clovis, end of the season soil moisture content was measured with neutron probe and soil moisture at the beginning of the season was monitored gravimetrically. The project will be continued and seasonal pattern of water use will be monitored at both locations.

Table 1. Sunflower height, seed yield and oil content at Clovis, NM and Lubbock, TX at different irrigation management

Sl #	Clovis, NM				Lubbock, NM		
	Irrigation (inches)	Height (cm)	Yield Kg ha <sup>-1</sup>	Oil %	Height (cm)	Yield Kg ha <sup>-1</sup>	Oil %
1	0	106	1505	40.8	147	1998	39.0
2	3	129	2171	38.7	153	2051	38.6
3	6	128	2803	37.0	156	2439	39.4
4	9	133	2404	39.6	150	2272	39.1
5	12	146	3044	37.5	153	2162	39.2
6	6 <sub>Early</sub>	134	2834	37.2	153	2225	38.5
7	6 <sub>Late</sub>	117	2787	38.3	141	2244	38.3
	<i>Significance</i>	*	*	ns	*	ns	ns
	<i>LSD</i>	21	885		9		



6 Early



6 Inches



6 Late

Figure 2. Effect of irrigation timing on growth of sunflower at Clovis.



Figure 3. Effect of irrigation amounts on the growth of sunflower at Clovis. Treatment receiving 6 inches is shown in fig 2.

## RESULTS

This is first year of the project and results are preliminary.

### Sunflower Growth:

Irrigation management had significant effect on sunflower growth as measured by plant height at both locations. Late irrigation also reduced sunflower growth. This indicates that sunflower adjusts its vegetative growth depending on water availability.

### Seed yield:

The effect of irrigation on sunflower seed yield was significant only at Clovis. The highest seed yield was produced with 12 inches of irrigation. However, it was not significantly different from other irrigation treatments. At Lubbock, irrigation did not increase seed yield. The growing season in 2007 was fairly wet with well distributed rainfall. Both locations received good pre-season rainfall. Lubbock was wetter than Clovis during the season. Soil moisture data, which is being processed, will be useful for the interpretation.

### Oil Content:

The oil content did not respond to irrigation management at both locations. It will be interesting to see the effect under more typical summer season.

## SUMMARY

- Irrigation amount and timing had significant effect on plant height, suggesting vegetative growth may be the first line of response in sunflower.
- The seed yield trends at Clovis suggests that sunflower responds to irrigation management. Under more typical year, we may see greater differences in seed yield.
- Oil content seems to be more stable under lower stress levels.

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