SURVIVABILITY OF *BUCHLOE DACTYLOIDES* 'PRESTIGE' (PRESTIGE BUFFALOGRASS) GREEN ROOFS IN OKLAHOMA SUMMER CLIMATE CONDITIONS

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Increased Environmental Problems

- As the population increases so do environmental problems
  - Increased temperature
  - Air pollution
  - Degraded water quality and availability
  - Decreased biodiversity

The Solutions

- Green roofs alone do not hold the key but they:
  - Decrease temperatures
  - Improve air quality
  - Retain storm water
  - Provide habitat

Hypothesis

- H_0: All Prestige Buffalograss green roof irrigation treatments will result in the same stand presence
- H_a: At least one irrigation treatment differs from the others

Research Questions

- For average rainfall and temperature conditions, is supplemental irrigation required for central Oklahoma green roofs using Prestige Buffalograss?
- Is evapotranspiration a significant indicator of stand presence over the course of the study?
- Is normalized difference vegetative index (NDVI) a significant indicator of stand presence over the course of the study?
- Will the treatments reach permanent wilting point, i.e. dies.

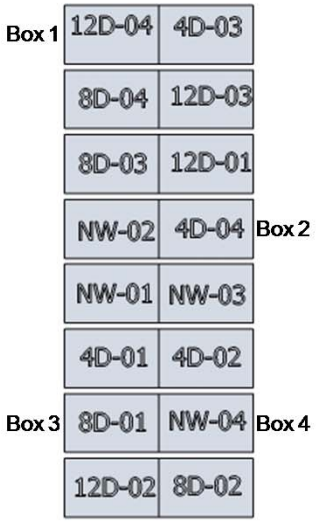
Set Up

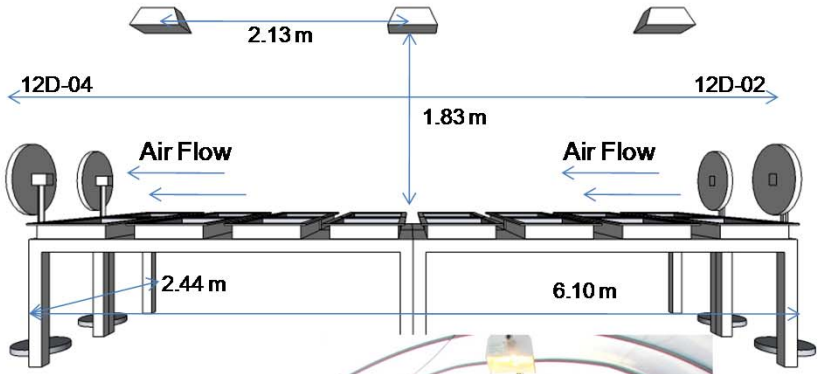
- 16 planting boxes (4 treatments with 4 repetitions)
- Prestige Buffalograss Plugs
- 60/40 soil mix

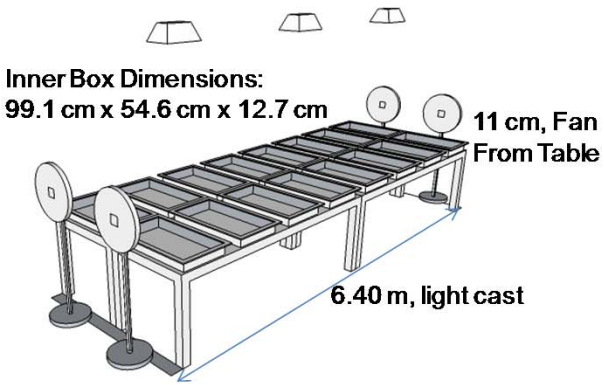
Experimental Design

- 92 day study
  - 60 day test period
  - 32 day recovery period
- Average climate conditions for Stillwater, OK
- 4 treatments
  - 4 days
  - 8 days
  - 12 days
  - No water

Experimental Design





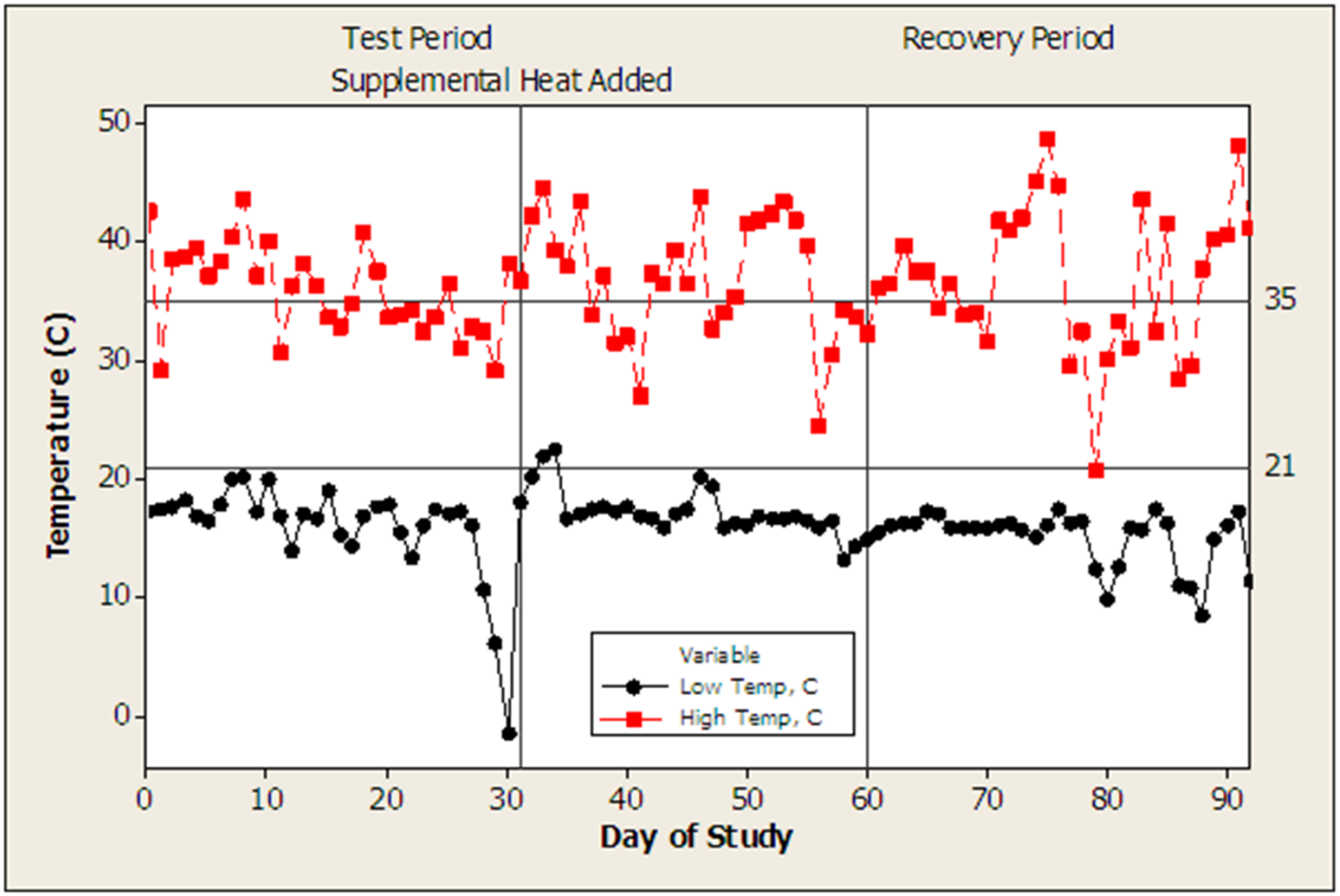


Experimental Design

Programmed Time and Temperature for Greenhouse.

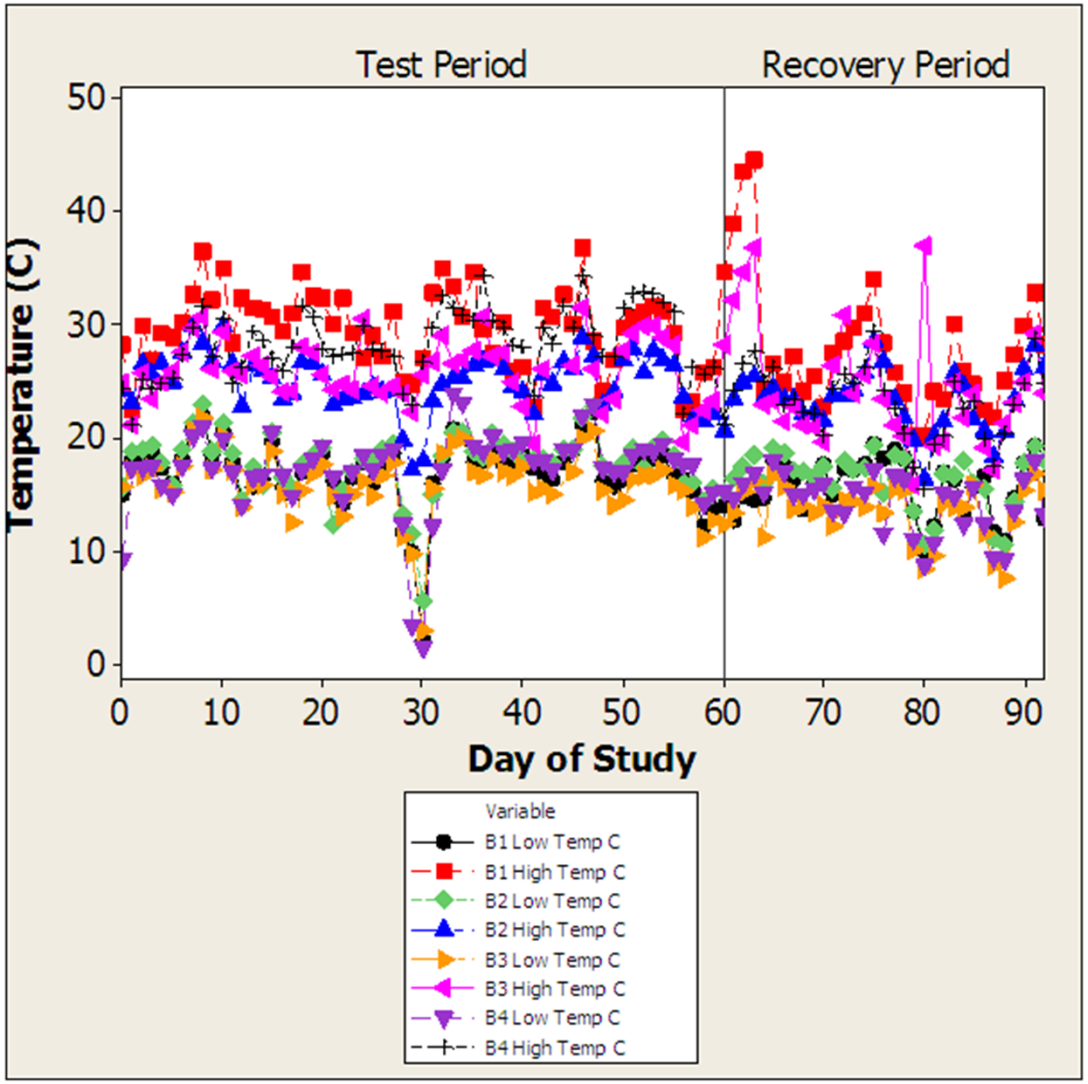
Start Time	End Time	Average Set Temperature, ºC
6 AM	8 AM	28
8 AM	8 PM	35
8 PM	10 PM	28
10 PM	6 AM	21

Environmental Parameters



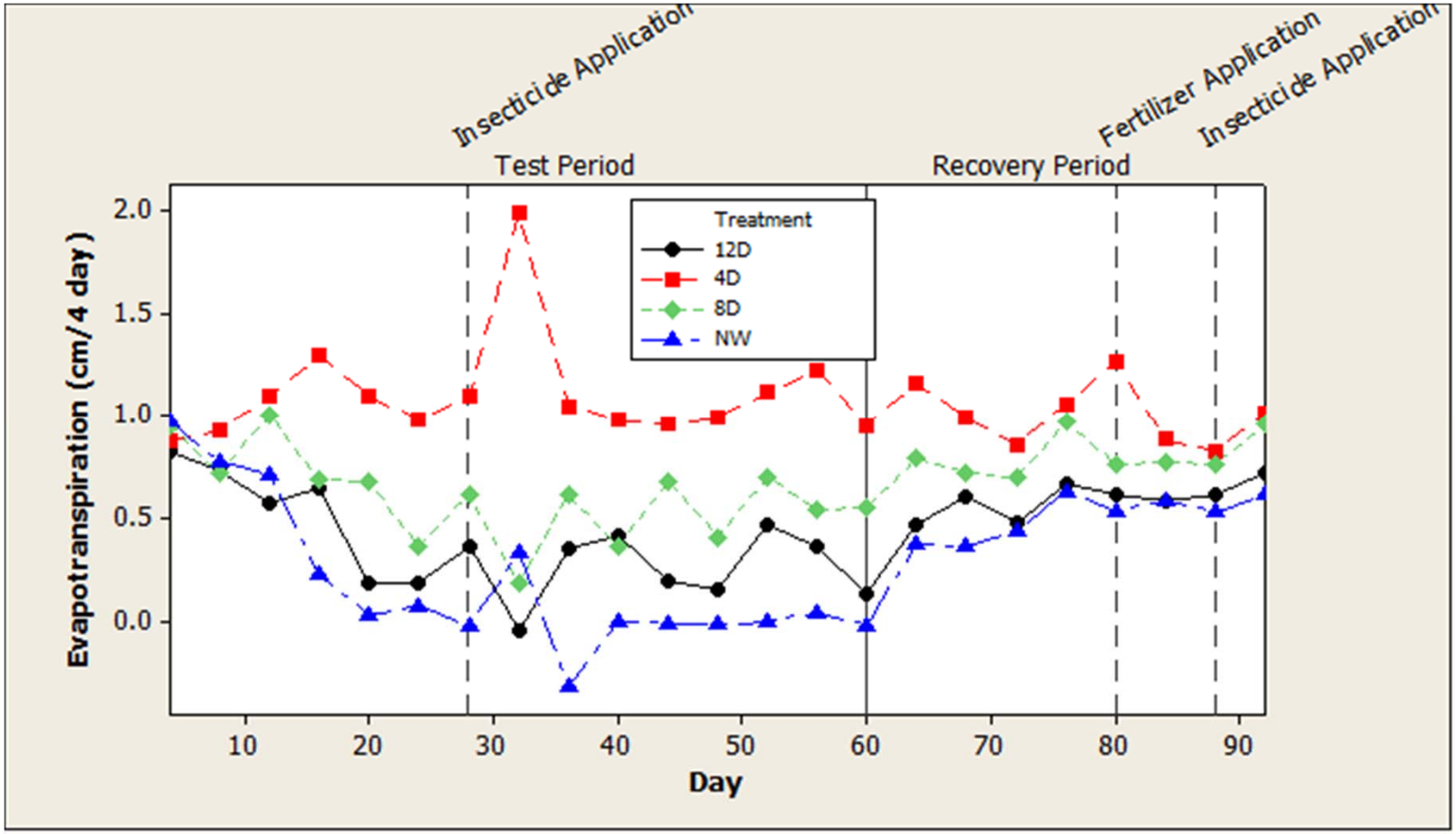
High and Low Daily Temperature (0-60 days test period, 60-92 days recovery period)

Environmental Parameters



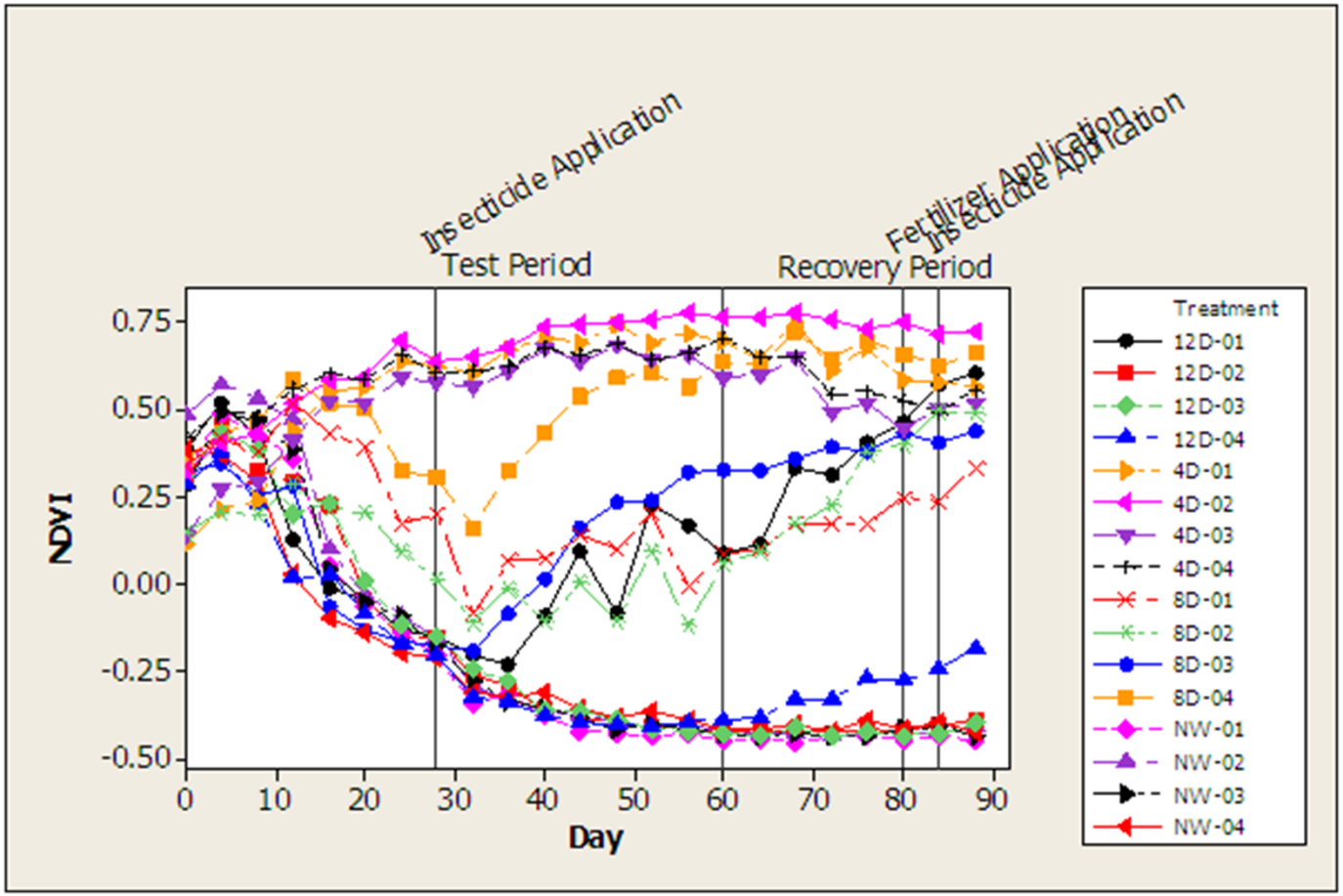
High and Low Daily Box Temperatures for Each Treatment (0-60 days test period, 60-92 days recovery period)

Evapotranspiration



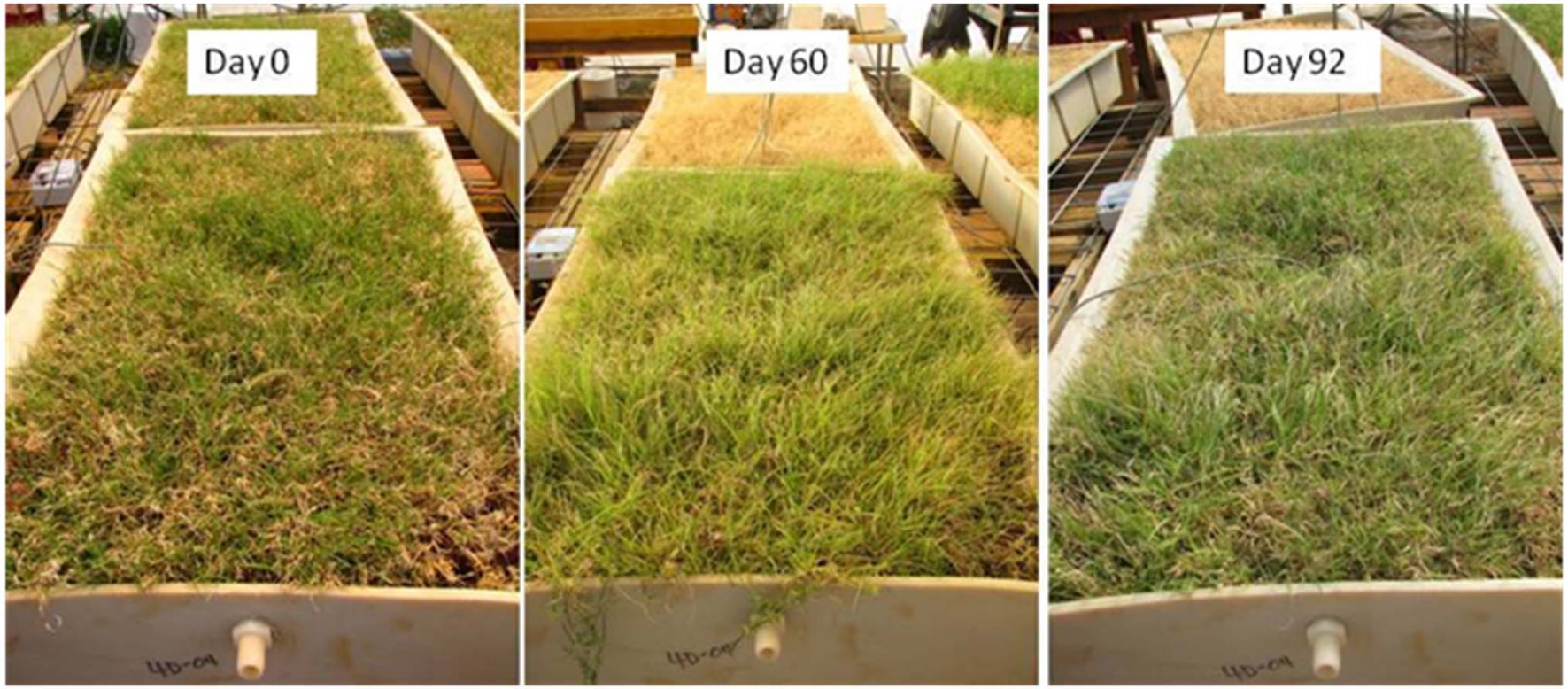
Average Four Day Evapotranspiration per Box (0-60 days test period, 60-92 days recovery period)(4D = Irrigate every 4 Days, 8D = Irrigate Every 8 Days, 12D = Irrigate every 12 Days, NW = No Days Irrigated)

NDVI



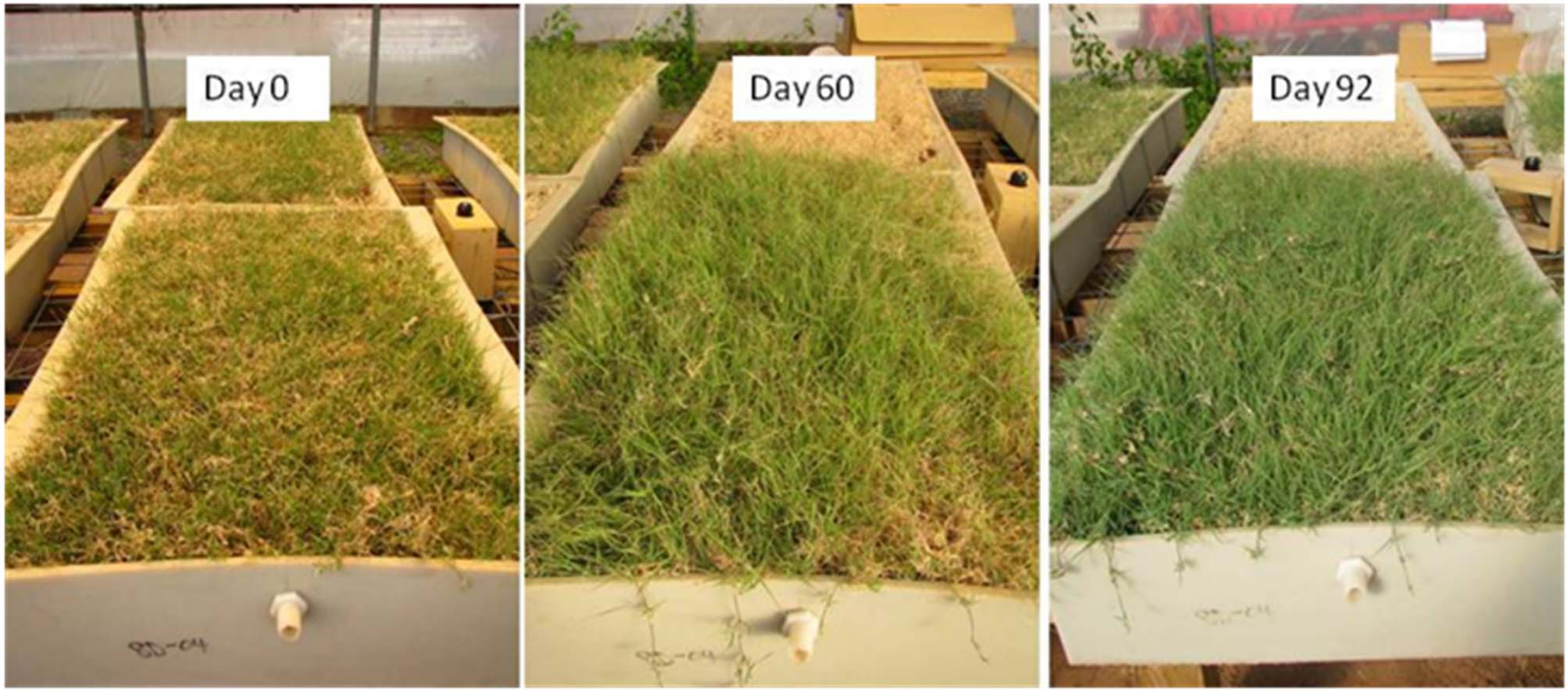
Every Four Day NDVI per Box (0-60 days test period, 60-92 days recovery period)(4D = Water every 4 Days, 8D = Water Every 8 Days, 12D = Water every 12 Days, NW = No Days Irrigated)

Discussion



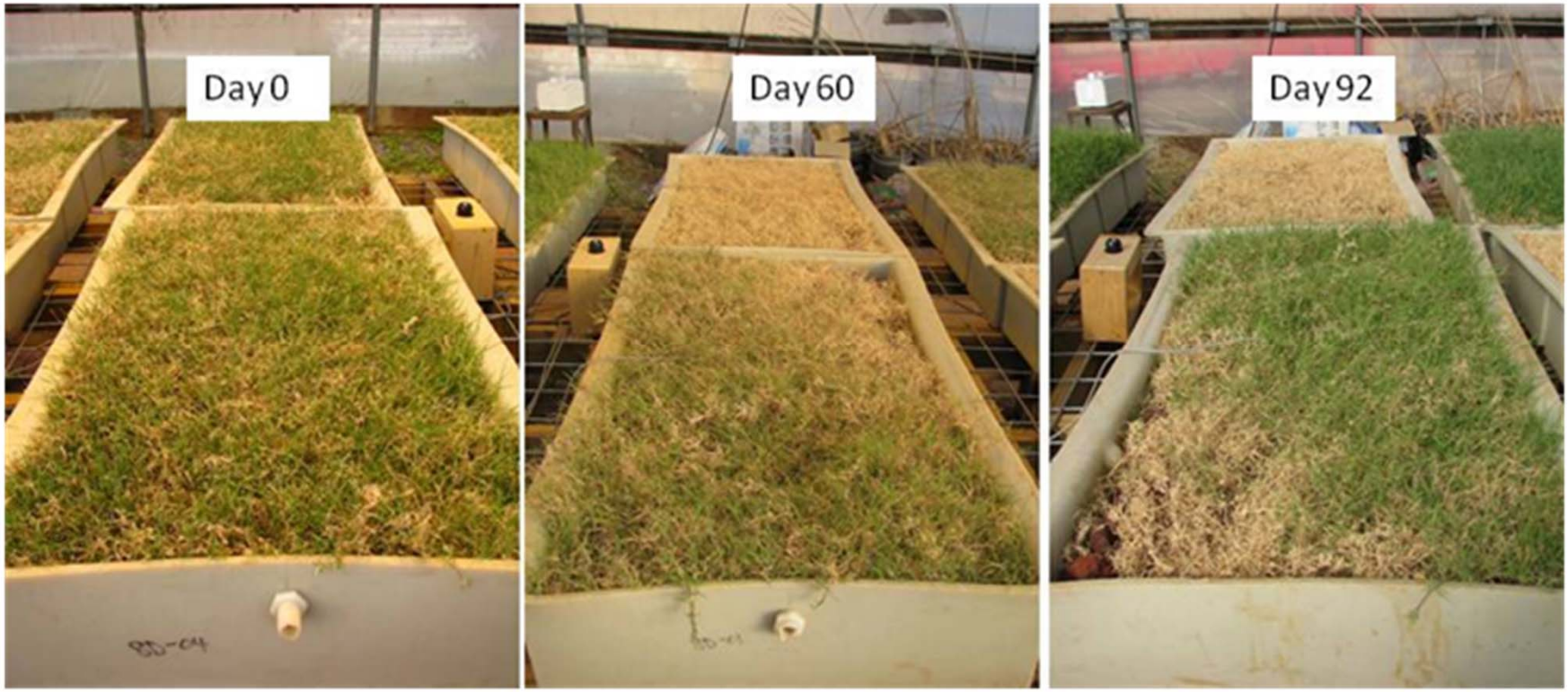
Box 4D-04, Irrigated every Four Days, on Day 0, Day 60, and Day 92 (Typical results for the boxes irrigated every four days)

Discussion



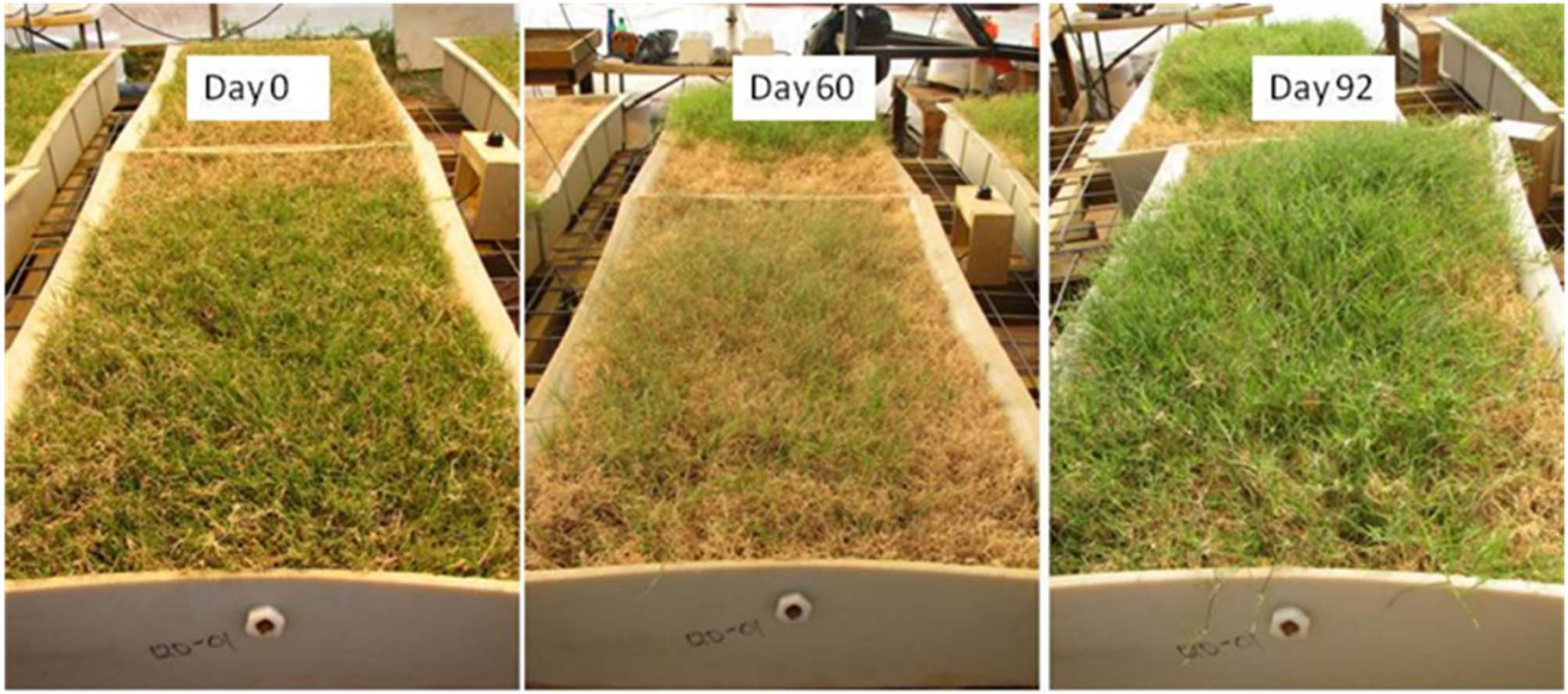
Box 8D-04, Irrigated every Eight Days, on Day 0, Day 60, and Day 92 (Atypical results for the boxes irrigated every eight days)

Discussion



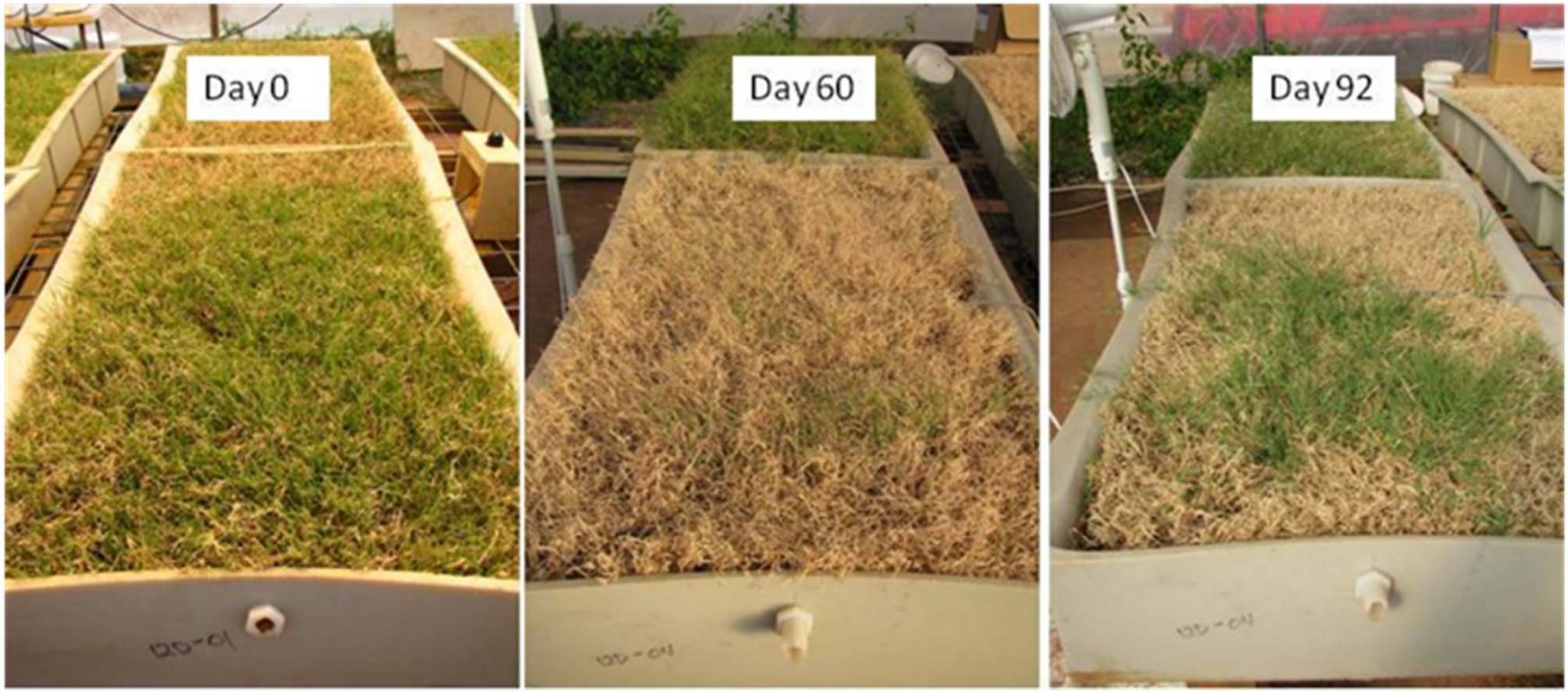
Box 8D-01, Irrigated every Eight Days, on Day 0, Day 60, and Day 92 (Typical results for the boxes irrigated every eight days)

Discussion



Box 12D-01, Irrigated every Twelve Days, on Day 0, Day 60, and Day 92 (Atypical results for the boxes irrigated every 12 days)

Discussion



Box 12D-04, Irrigated every Twelve Days, on Day 0, Day 60, and Day 92 (Typical results for the boxes irrigated every 12 days)

Discussion

Box NW-02, Not Watered Treatment, on Day 0, Day 60, and Day 92 (Typical results for the boxes not irrigated)

Conclusion

- All of the prestige buffalograss irrigation treatments do not result in the same stand presence based on α=0.05
- Using evapotranspiration and NDVI as indicators, there was a significant effect of irrigation frequency on buffalograss in the Oklahoma climate
- Supplemental irrigation is required

Recommendations

- Move the testing outside and perform a year round study
- Test Buffalograss for its winter tolerance
- Begin testing other Oklahoma native grasses and perennials
- Test the effect of different media depths and types on rain retention, filtering, and insulating qualities