

Yield and carbon isotope discrimination for wheat, barley and lentil under different crop sequences and water treatments in Northern Syria

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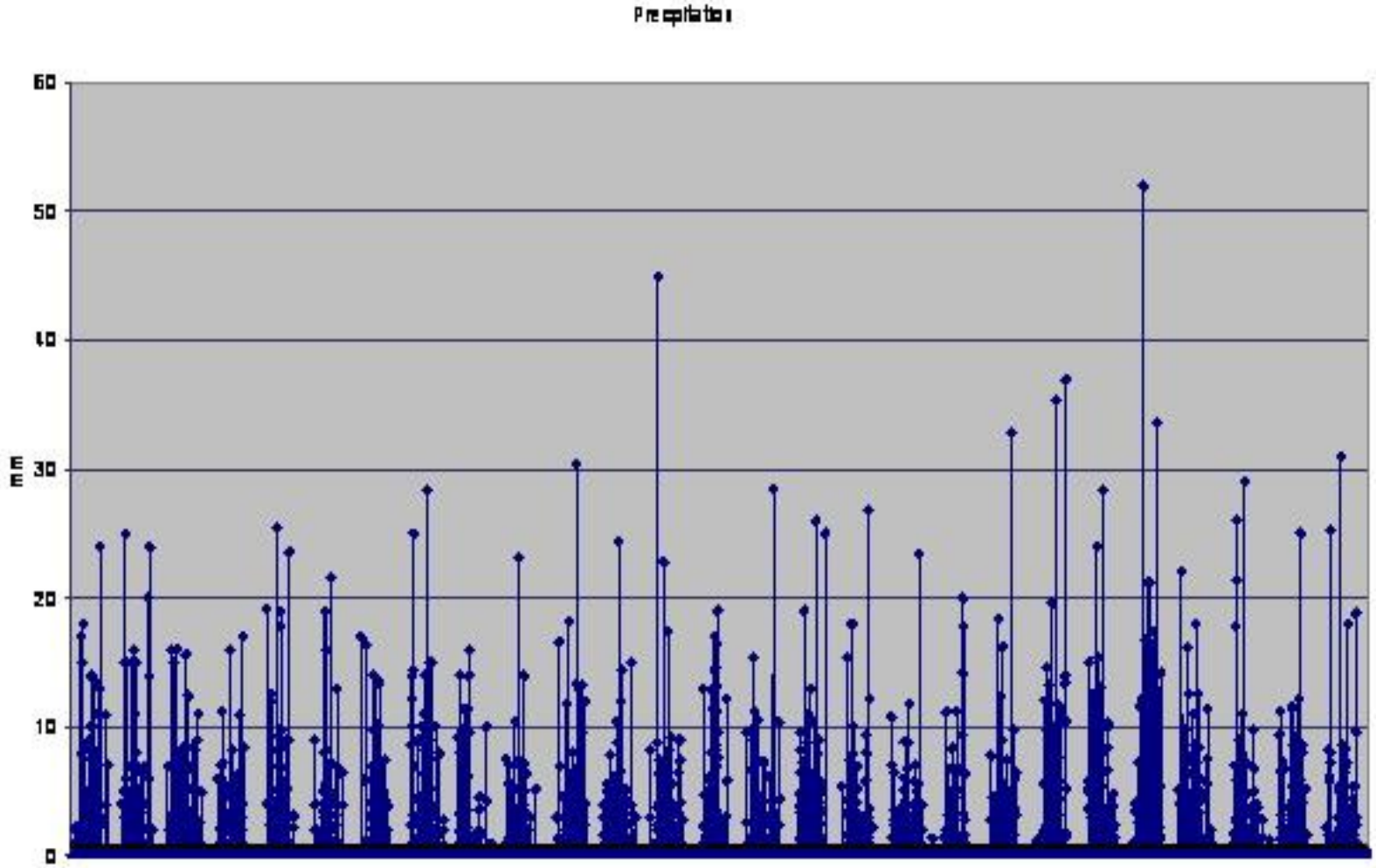
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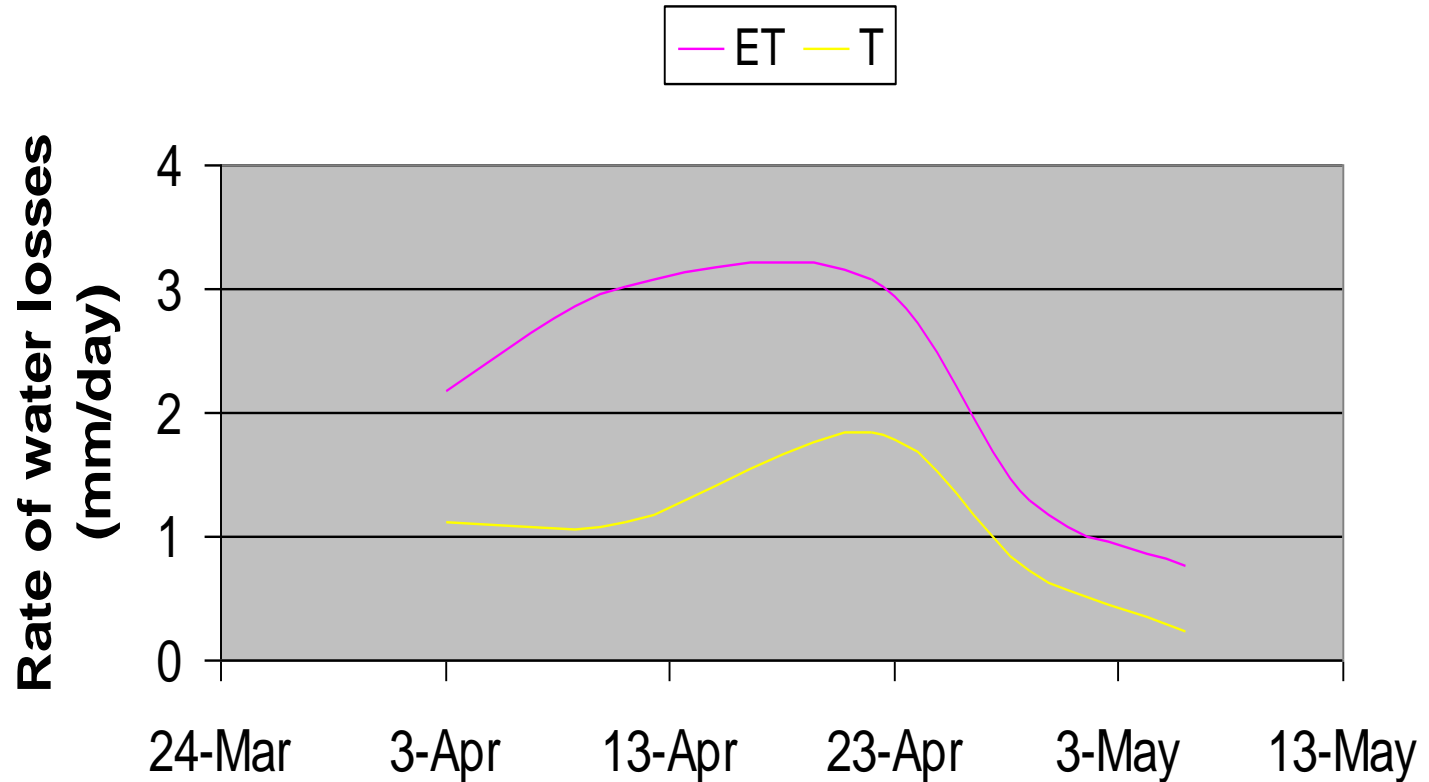
- Important of water and therefore should target for high WUE
- Climatic changes, and example in Syria for

Daily precipitation over 30 years data at Breda, Syria



- Water consumption (in Syria) is 90% for irrigation, and 10% for industrial and human. Soil Evaporation account for about 60-70% of total ET.
- Shortage of Water + Increased demand for foods and human consumption causes a significant need for higher WUE.

With good management we have this results of barley (Wahbi, 1986)



Materials and methods

Field experiment was conducted for four seasons (2005-2009) at the research station (Makasem 5) in Al Hassakeh providence northern Syria.

RCB experiment with three replicates. Six crop sequences; barley/ barley, barley/ lentil, wheat/ wheat, wheat/ lentil, lentil/ barley, and lentil/ wheat, and three water treatments; 75% and 55% of 90% of field capacity and rainfed (control).

Materials and methods

Soil water content was monitored using neutron probe, and ET was calculated.

Grain samples (for the season 2007-2008 and for the two water treatments only) were dried at 70 °C and finely ground for grain Carbon Isotope Discrimination (ΔG) analysis at the International Atomic Energy Agency (IAEA) Laboratories, Seibersdorf, was perform.

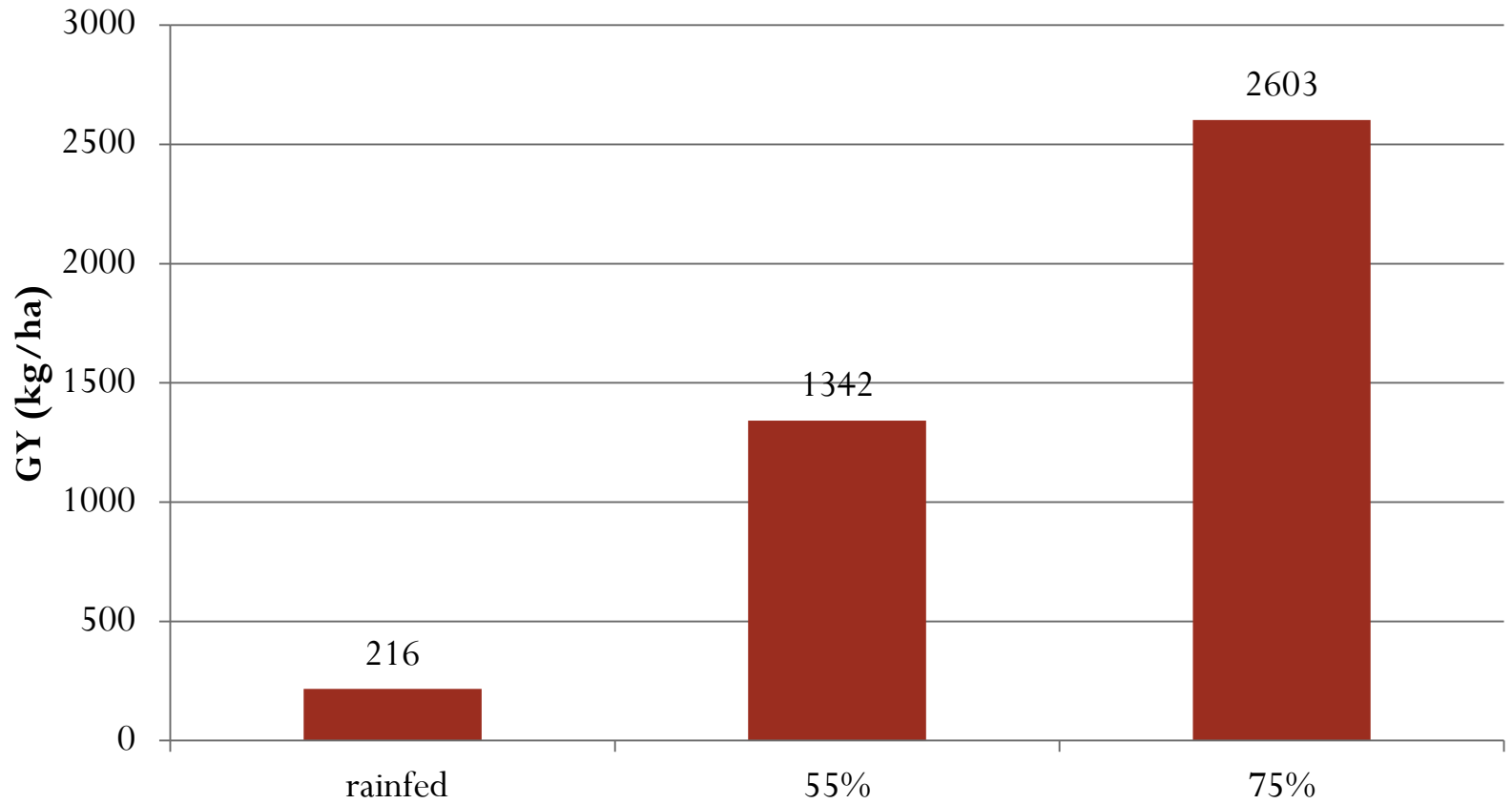
Simulation model was used (Wahbi and Sinclair, 2005), after calibration and showing a close agreements between measured and predicated. Nineteen years weather data was used to simulate wheat and barley performance as well as soil water status.

Results

The four seasons were very dry (rainfall < 200 mm), and 2 seasons out of 4 produced no grain yield for the rainfed treatment for all the three crops. Wheat used the highest soil water (in all the water treatments) compared with barley and lentil.

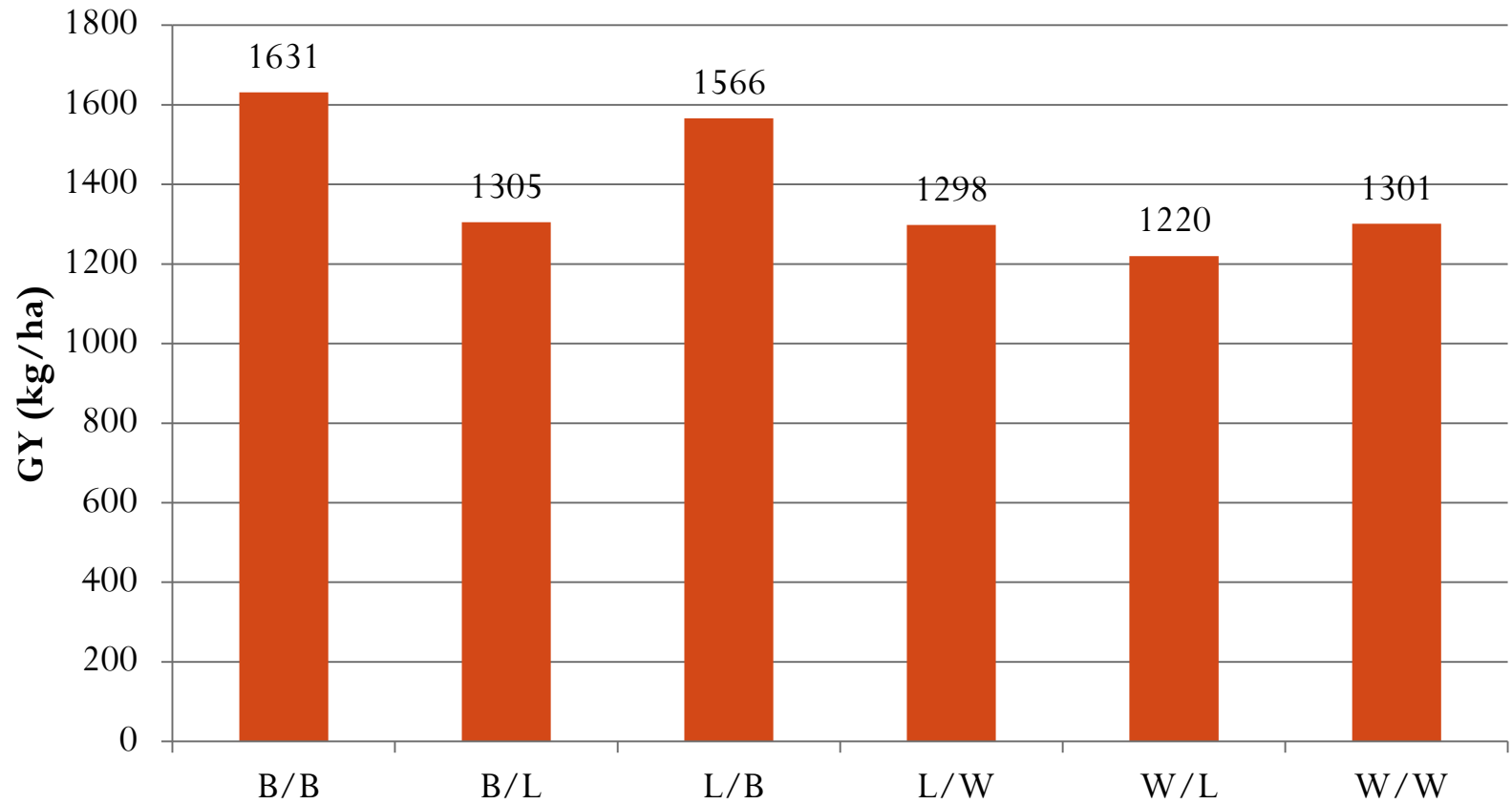
GY

Water Regimes



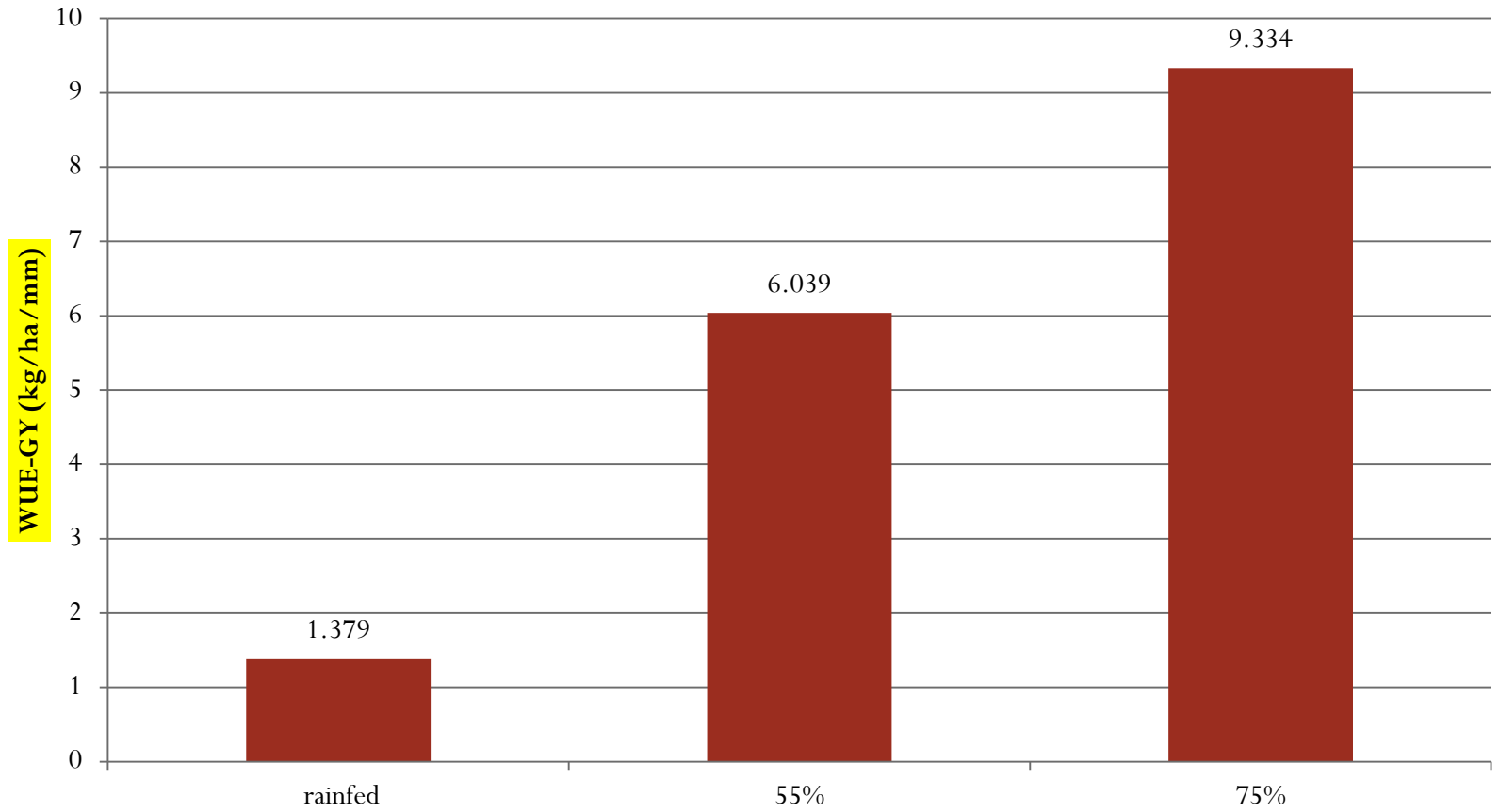
Crop Sequences

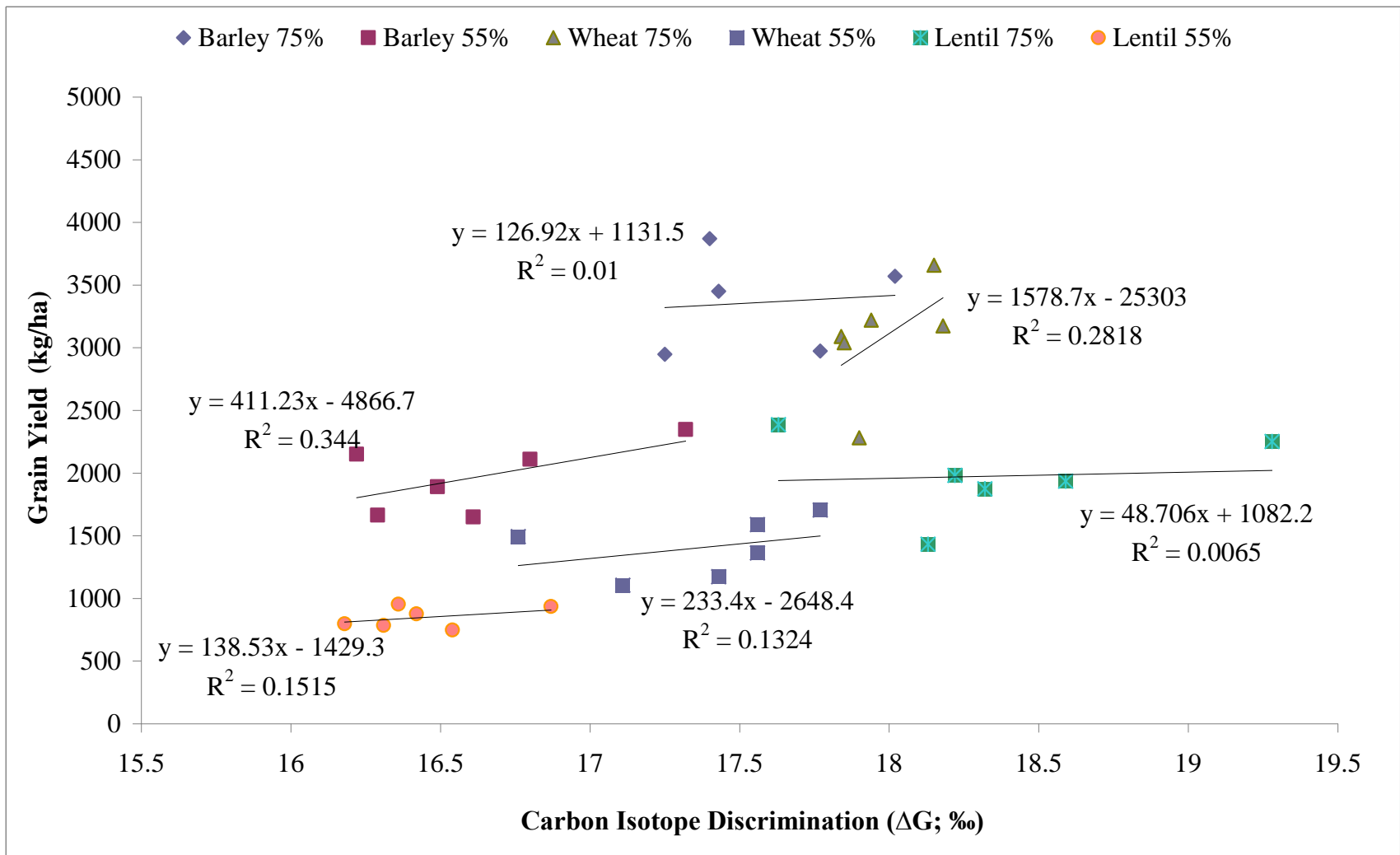
Crop Sequences



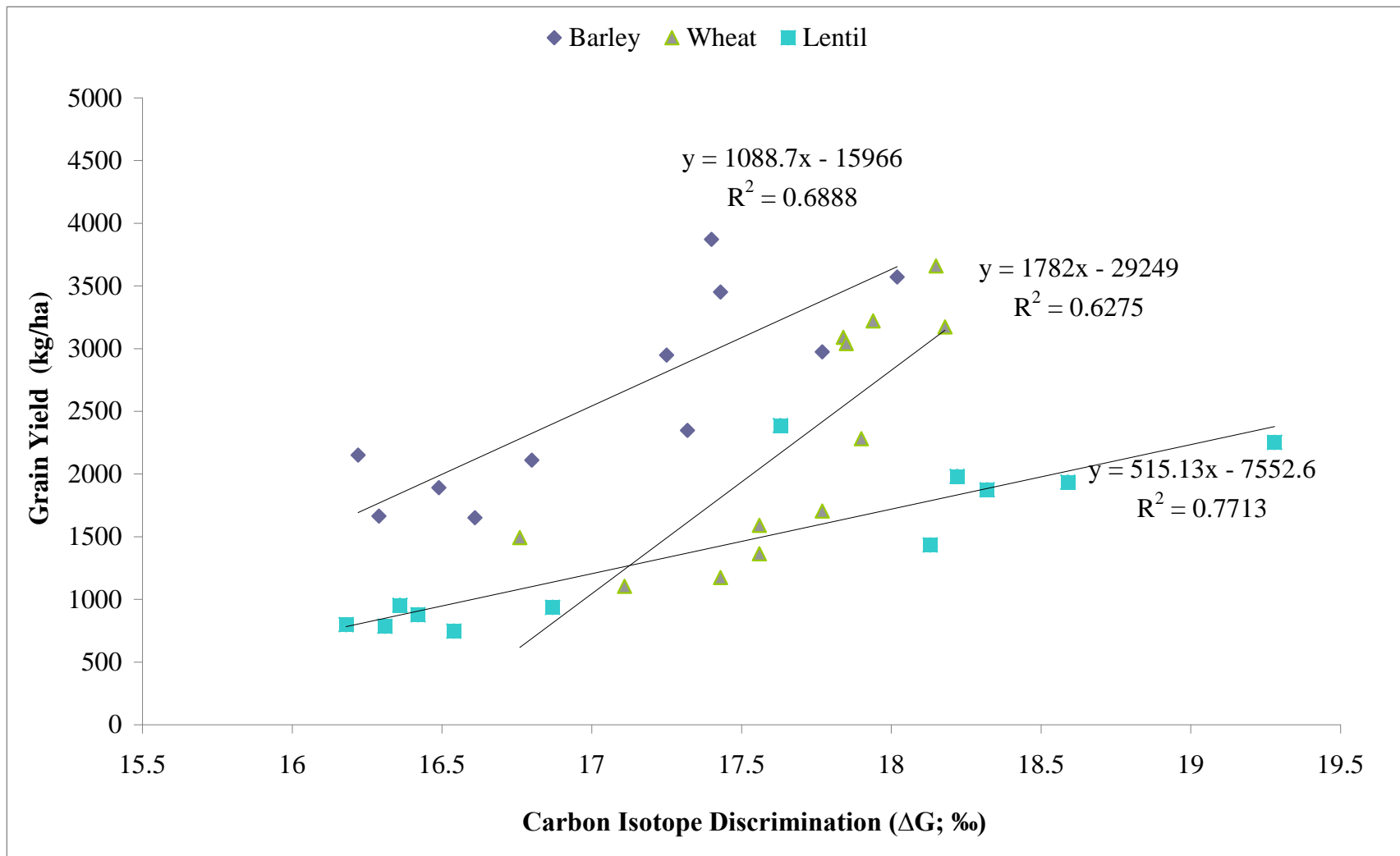
WUE

Water Regimes

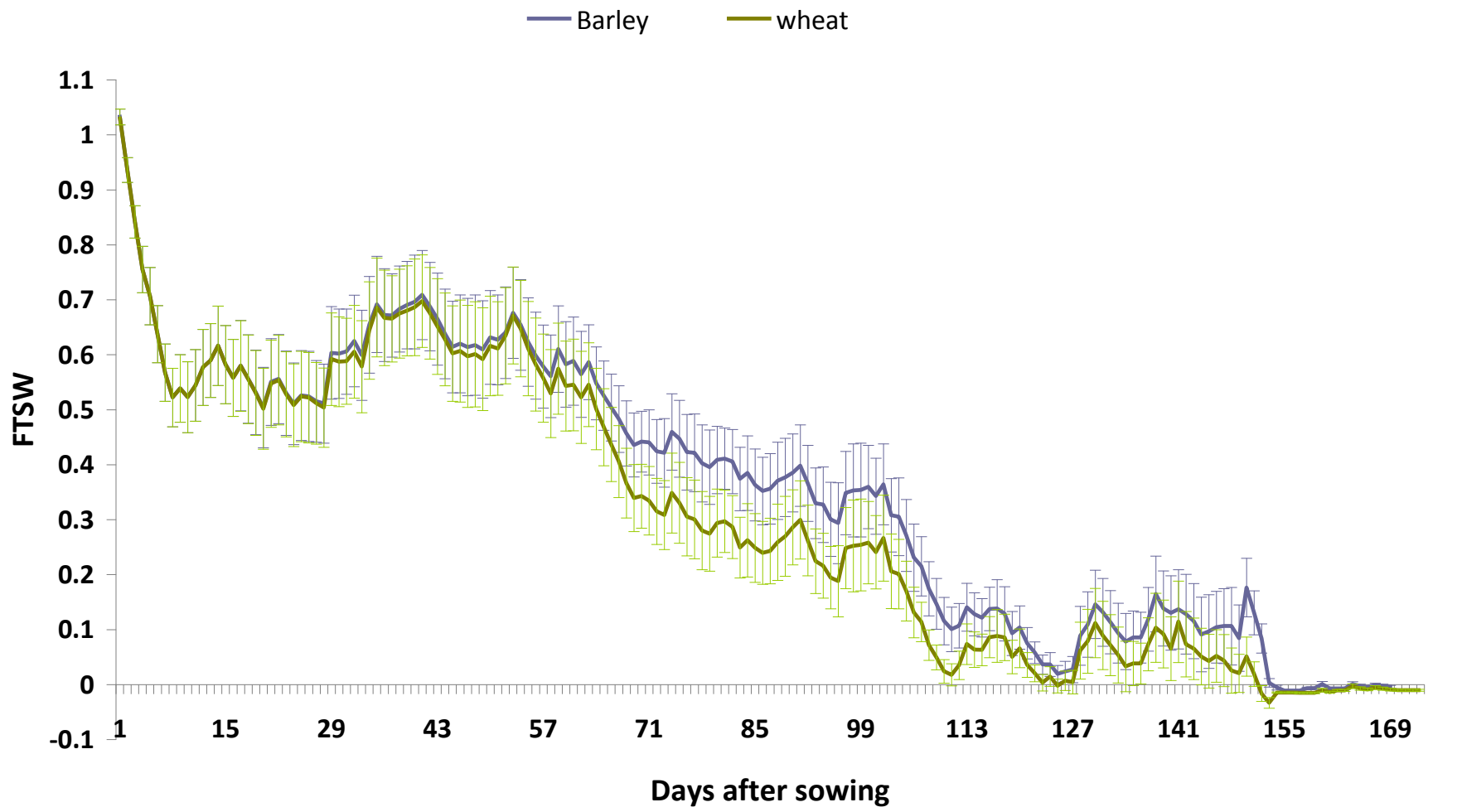




Relationships between grain yield (kg ha⁻¹) and ΔG (‰) for three crops and two water treatments at Makasim 5 station in 2007–08.



Relationships between grain yield (kg ha⁻¹) and ΔG (‰) for three crops at Makasim 5 station in 2007–08.



Relationships between average simulation of, 19 years data, (1990-2009) fraction of extractable soil water (FTSW) for barley and wheat and days after planting at Makasim 5 station .(Bars indicate the standard error).