IMPACT OF TEMPERATURE REGIMES ON IRRIGATION USE EFFICIENCY AND GRAIN YIELD OF WHEAT

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2006-ag-1422
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INTRODUCTION

- Affect of temperature and different irrigation levels on grain yield of wheat is studied.
- Environmental constraints are major factors, limiting crop productivity of the world.
- Abiotic stresses such as high temperature and drought limit the growth and productivity of major crops including wheat.
- Temperature has been increasing continuously due to climate change since the end of previous century.
- Irrigation influence the growth and yield of wheat.

CONTI

- Time and amount of Irrigation affect the growth and yield of wheat.
- Even water stress at any growth stage reduces the grain yield.
- Irrigation levels considerably effect on wheat transpiration, total evapotranspiration and canopy temperature.

CONTI

- Irrigated stress crop reduce photosynthesis rate and accelerate leaf senescence.
- Crop developed under water deficit condition have low LA than under well water condition.
- Increased in irrigation times and amount of irrigation water decreased wheat WUE and grain yield while reduction in irrigation time and amount increased WUE and grain yield.
- Usually crops have more WUE under drought condition than under normal condition.
- Agricultural water managements improved WUE to certain extent, most effective to regulate WUE is irrigation regimes.

CONTI

- Increase in 1.2 ^{0}C temperature, decreased water use efficiency by 7.3%.
- To cope with future climate, it is need of the hour to understand the behaviour and response of crop in incresed temperature and under different irrigation levels.
- So the study will evaluate the effects of temperature on irrigation use efficiency and grain yield of wheat.

REVIEW OF LITERATURE

- Wheat (Triticum aestivum L.) is a sensitive crop in elevated temperature (Slafer and Satorre, 1999).
- Reproductive stage is more vulnerable to high temperature (Wollenweber et al., 2003).
- At anthesis high temperature or heat stress enhances abortion of florets (Wardlaw and Wrigley, 1994)
- Absolute production of sterile flower at 30°C temperature (Saini and Aspinal, 1982).
- When the temperature increases, the grain number and size decreases directly (Ferris et al., 1998).

CONTI

- The productivity of wheat is enhanced by increasing irrigation practices (Li, 1993; Lan and Zhou, 1995).
- Grain yield is reduced by water stress at all stages of growth and greatest reduction was at anthesis (Jamal et al., 1996).
- Grain yield of wheat is strongly influenced by the pattern of water use during the season. Adequate water supply at anthesis increase photosynthesis and provide extra time for translocation of carbohydrate reserve (zhang et al., 1998).

RESEARCH PLAN

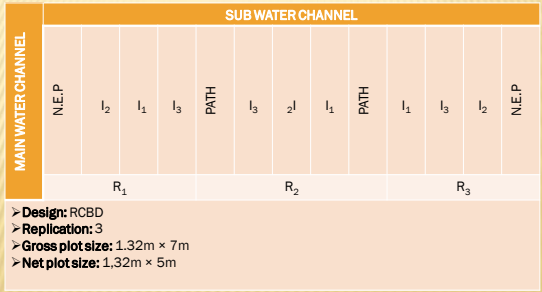
variety: Sehar-2006
Design: CRD (in green house)
RCBD (in field)
Replication: 3
Factor A: Temperature regimes

- T_1: 4 °C more than field temperature (in green house)
- T_2: Field temperature (in field)

Factor B: Irrigation levels

- I_1: 4 irrigations (Tillering + Stem elongation + Dough + Grain development)
- I_2: 3 irrigations (Tillering + Stem elongation + Grain development)
- I_3: 2 irrigations (Tillering + Grain development)

LAY OUT PLAN FOR FIELD EXPERIMENT



- **Design:** RCBD
- **Replication:** 3
- **Gross plot size:** 1.32m × 7m
- **Net plot size:** 1,32m × 5m

TEMPERATURE DATA

Following data of temperature were recorded daily

- Daily maximum minimum temperature
- Temperature before the sun rise
- Temperature at noon
- Temperature before the sun set

PHENOLOGICAL PARAMETERS

Following parameters were recorded

1. Days to germination
2. Days to tillering
3. Days to booting
4. Days to anthesis
5. Days to maturity

GROWTH PARAMETERS

1. Leaf area index (LAI)
2. Total dry matter accumulation (TDM)
3. Leaf area duration (LAD)
4. Crop growth rate (CGR)

YIELD AND YIELD COMPONENT DATA

Recorded parameters regarding yield are

1. Number of tillers (m^{-2})
2. Number of productive tillers (m^{-2})
3. Spike length (cm)
4. Number of spikelets per spike
5. Number of grains per spike
6. 1000-grains weight (g)
7. Biological yield (g/plot)
8. Grain yield (g/plot)
9. Harvest index (%)

Thanks