

Table of Contents

	Page
Acknowledgement	i
Abstract	ii
Table of Contents	vi
List of Tables	vii
List of Figures	ix
Chapter 1 Introduction	1
Chapter 2 Literature Review	2
2.1 Effects of Temperature	2
2.1.1 Shoot Temperature	2
2.1.2 Root Temperature	4
2.2 Effects of Water Stress	5
2.3 Effects of Mulching	7
Chapter 3 Materials and Methods	8
3.1 Experimental Site and Soil	8
3.2 Experimental Design and Procedure	8
3.3 Data Collection	10
3.3.1 Soil Temperature	10
3.3.2 Soil Moisture	10
3.3.3 Seedling Emergence, Tiller Number and Plant Height	11
3.3.4 Shoot Dry Matter and Nutrient Uptake	11
3.3.5 Anthesis, Maturity and Grain Filling Period	11
3.3.6 Yield and Yield Components	12
Chapter 4 Results	12
4.1 Soil Temperature	12
4.1.1 Daytime Changes	12
4.1.2 Seasonal Changes	16
4.1.3 Average Soil Temperature	21
4.2 Soil Moisture	23
4.3 Seedling Emergence, Tiller Number and Plant Height	28
4.4 Shoot Dry Matter	30
4.5 Nutrient Uptake	33
4.6 Anthesis, Maturity and Grain Filling Period	37
4.7 Yield and Yield Components	37
Chapter 5 Discussion	40
5.1 Effects of Rice Straw Mulching on Soil Temperature and Moisture	40
5.2 Effects of Rice Straw Mulching on Growth of Wheat	41
5.3 Effects of Rice Straw Mulching on Wheat Grain Yield	42
Chapter 6 Conclusion	43
Chapter 7 References	44
Appendix	48
Curriculum Vitae	62

List of Tables

Table	Page
1. Schedule for each irrigation treatment	10
2. Average soil temperature at 5 cm. depth during the wheat growth period	22
3. Effects of irrigation and mulching on tiller number of wheat (tillers/m ²) at 35 days after sowing	29
4. Effects of irrigation and mulching on plant height of wheat(cm.)	29
5. Effects of irrigation and mulching on nitrogen uptake (kg./ha) by wheat at 35 days after sowing	34
6. Effects of irrigation and mulching on nitrogen uptake (kg./ha) by wheat at 56 days after sowing	34
7. Effects of irrigation and mulching on phosphorus uptake (kg./ha) by wheat at 35 days after sowing	35
8. Effects of irrigation and mulching on phosphorus uptake (kg./ha) by wheat at 56 days after sowing	35
9. Effects of irrigation and mulching on potassium uptake (kg./ha) by wheat at 35 days after sowing	36
10. Effects of irrigation and mulching on potassium uptake (kg./ha) by wheat at 56 days after sowing	36
11. Effects of irrigation and mulching on grain yield (kg./ha) of wheat at maturity	38
12. Effects of irrigation and mulching on spike number/m ² in wheat	38
13. Effects of irrigation and mulching on grain number/spike in wheat	39
Appendix Table	
1. ANOVA of seedling number/m ² , tiller number/m ² and plant height of wheat as affected by irrigation and mulching treatments	49
2. ANOVA of yield and yield components of wheat as affected by irrigation and mulching treatments	49
3. ANOVA of shoot dry matter of wheat (gm./m ²) at different growth stages as affected by irrigation and mulching treatments	50

4. Shoot dry matter of wheat (gm./m ²) at different growth stages as affected by irrigation and mulching treatments	51
5. ANOVA of nitrogen, phosphorus and potassium uptake by wheat (kg./ha) at 35 days after sowing	52
6. ANOVA of nitrogen, phosphorus and potassium uptake by wheat (kg./ha) at 56 days after sowing	52
7. Nitrogen, phosphorus and potassium uptake by wheat (kg./ha) at 35 and 56 days after sowing	53
8. Days to anthesis, days to maturity and grain filling period of wheat as affected by irrigation and mulching treatments	54
9. Soil temperature (°C) at 03:00 pm. during the wheat growth period as affected by irrigation and mulching treatments	55
10. Soil temperature (°C) at 07:00 am. during the wheat growth period as affected by irrigation and mulching treatments	56
11. Changes of soil temperature (°C) during the daytime period (07:00 am. to 05:00 pm.) at booting stage of wheat as affected by irrigation and mulching treatments	57
12. Soil chemical properties and soil texture of the experimental plots (at 0-25 cm. depth)	57
13. Climatic data during the growing season at the research station of Multiple Cropping Center	58
14. Soil moisture content (% by weight) before irrigation in different soil layers	59
15. Effects of irrigation and mulching on seedling number of wheat (plants/m ²)	60
16. Effects of irrigation and mulching on 1,000-grain weight (gm.) in wheat	60
17. Effects of irrigation and mulching on number of grain-bearing spikelets/spike in wheat	61

List of Figures

Figure	Page
1a. Daytime changes of soil temperature during booting stage in different mulching treatments under early irrigated (a) and late irrigated conditions (b).	14
1b. Daytime changes of soil temperature during booting stage in different mulching treatments under full irrigated (a) and non-irrigated conditions (b).	15
2a. Seasonal changes of 03:00 pm. soil temperature in different mulching treatments under early irrigated (a) and late irrigated conditions (b)	17
2b. Seasonal changes of 03:00 pm. soil temperature in different mulching treatments under full irrigated (a) and non-irrigated conditions (b)	18
2c. Seasonal changes of 07:00 am. soil temperature in different mulching treatments under early irrigated (a) and late irrigated conditions (b)	19
2d. Seasonal changes of 07:00 am. soil temperature in different mulching treatments under full irrigated (a) and non-irrigated conditions (b)	20
3a. Changes of soil moisture content at 0-25 cm.depth (a) and 25-50 cm.depth (b) in different mulching treatments under early irrigated condition	24
3b. Changes of soil moisture content at 0-25 cm.depth (a) and 25-50 cm.depth (b) in different mulching treatments under late irrigated condition	25
3c. Changes of soil moisture content at 0-25 cm.depth (a) and 25-50 cm.depth (b) in different mulching treatments under full irrigated condition	26
3d. Changes of soil moisture content at 0-25 cm.depth (a) and 25-50 cm.depth (b) in different mulching treatments under non-irrigated condition	27
4a. Changes in shoot dry matter of wheat at successive harvests in different mulching treatments under early irrigated (a) and late irrigated conditions (b)	31
4b. Changes in shoot dry matter of wheat at successive harvests in different mulching treatments under full irrigated (a) and non-irrigated conditions (b)	32