EFFECT OF WATER AND HEAT STRESS ON GROWTH AND YIELD PERFORMANCE OF SOME WHEAT (*Triticum aestivum* L) VARIETIES/CULTIVARS

Kamal Uddin Ahamed

Extended summary

Water and heat stress both are evident in Bangladesh. These stresses occur due to scanty rainfall, lack of irrigation facilities, soil type, and fluctuation of temperature to the extreme and late sowing of wheat in Bangladesh. The yield of wheat is seriously affected due to these stresses. Wheat is the second staple food in Bangladesh. Along with human consumption wheat is widely used as animal feed. Yield of wheat in Bangladesh is 2.20 t/ha (BBS, 2001), where as the world wheat production is 2.71 t/ha (FAO, 1999). This lower amount of yield of wheat in Bangladesh is not only due to poor cultural practices but for water and heat stresses as well. Due to this low yield the government of Bangladesh has to import large amount of wheat each year. So it is important to study the effect of water and heat stresses on the growth and yield of wheat cultivars in Bangladesh.

An experiment was conducted at the experimental field of Agricultural Botany Department, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh from the period of November, 2008 to April 2009. The experimental area was situated at 23^{0} 774′ N latitude and 90^{0}335′ E longitude at an altitude of 8.6 meter above sea level. The soil of the experimental field belongs to the General soil type, Deep Red Brown Terrace Soils under Tejgaon Series. Five wheat varieties namely Bijoy (BARI gam – 19), Prodip (BARI gam – 24) were used in the experiment to observe their morphophysiological performances sowing them in the terminal time (30 November) of recommendation. The highest leaf number with highest flag leaf area was observed in case of the variety Shatabdi followed by Bijoy. The lowest flag leaf area was observed in case of variety Sourav and others were in between them. The highest plant height was seen in Shatabdi and the lowest in Sufi. The highest number of total and fertile tiller was found in Sourav followed by Shatabdi, which were almost equal. The seeds were germinated more or less in similar time. The highest dry weight of stem and leaf were observed in Sourav followed by Shatabdi and Bijoy. Early booting stage was observed in Sufi and Bijoy, which was the latest in Sourav. Similar trend was observed in case of ear emergence, anthesis and maturity. The highest number of fertile floret was observed in the variety Shatabdi followed by Sourav and it was the lowest in Sufi followed by Prodip. The highest seed weight per mainstem was observed in the variety Prodip followed by Sourav, Shatabdi, Bijoy and Sufi. However, the highest seed weight per plant was observed in Sourav followed by Bijoy, Shatabdi and Prodip and the lowest in Sufi. The highest yield (kg/ha) was observed in

Principal Investigator and Professor, Dept. of Agricultural Botany, Sher-e-Bangla Agricultural University, Dhaka -1207

Bijoy followed by Shatabdi. But it was observed in all the cases that yield of wheat reduced from the normal time sowing (15 November sowing) wheat. So, it is better to sow wheat within 15 November. From the experiment it is evident that the rise in temperature during flowering period is not favorable for wheat.

Objective of this project is to find out highly sensitive stage of wheat (growth, development and maturity stages) to water and heat stresses as well as to find out the appropriate or optimum time of sowing of wheat varieties at the present prevailing climatic situation. After observing various morpho-physiological and yield responses suitable information and varieties could be found out for further recommendation.

Nineteen wheat varieties were collected to observe their responses. Seven experiments were set maintaining sowing date of 30-11-2008, 16-12-2008 and 31-12-2008. Different irrigation frequencies were maintained. Experiments will be conducted for two years in the experimental field of Sher-e-Bangla agricultural University. In the first year the seven experiments were conducted successfully. Randomized Complete Block Design (RCBD) was used in setting the experiments and number of replication was three.

Crop was cultivated following standard methods. Different characters on which data were collected are – No. of total tiller/plant, No. of fertile tiller/plant, No. of sterile tiller/plant, No. of leaf per main stem, Leaf length (cm), Leaf breadth (cm), Leaf area (cm^2), Plant height at different DAS, No. of tillers at different DAS, Days to germination, Days to booting, Days to ear emergence, Days to anthesis, Days to maturity, Ear length /main tiller (cm), No. of spikelet/main stem, No. of fertile floret/main stem (per spikelet), No. of sterile floret/main stem (per spikelet), Weight of ear, Weight of seed, Weight of husk (per main stem and per plant), 1000 seed weight (g) and Yield per hectare.

Data of one experiment was analyzed and data of other six experiments were recorded but not analyzed. After completion of analysis final report will be submitted.