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Effect of nutrient on growth characters of wheat under gharuan condition of punjab

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Abstract
The present investigation entitled, "Studies on the influence of nutrient and performance of wheat under Gharuan condition of Punjab, was conducted in the field of Agronomy at Chandigarh University, Gharuan Distt. Mohali for carrying out the study. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. There were seven treatments viz. F_0 = Control, F_1 = Fertilizer dose (RFD)(N,P,K)60:40:20 kgha^{-1} F2=RFD +5 tones FYM ha-^{1}, F_3 = RFD+2.5 Tones vermicompost ha^{-1}, F_4 = 75percent RFD+5 tones FYM ha^{-1}, F_5 = 75 percent RFD + 2.5 tones vermicompost, F_6= RFD + 5 tones FYM +2 tones of vermicompost ha-1 and F_7= 75percent RFD+5 tonesfym+2.5 tones of vermicompost ha-1. in main plots and 2 varieties (UNNAT PBW 343, HD 2851) in sub plots. A significant improvement in growth and yield attributing characters were recorded with the application of recommended chemical fertilizers and FYM, vermicom post over the rest of the treatments.The results of experiment shows that the F6 treatment and UNNAT PBW343 shows best proformane in relation to plant height, number of tillers, grain yield, straw yield, biological yield and harvest index after that F_7, F_3, F_2,F_1 and control. and Among varieties, highest grain yield was recorded with the variety UNNAT PBW 343 variety and lower grain yield was recorded with the variety HD2851.

Keywords: nutrients management, growth and yield on wheat crop

Introduction

Wheat (*Triticum aestivum* L.) is one of the main cereal crops in world. It is widely cultivated and produced throughout the world. Of all the grain crops, wheat is the most popular staple food crop for human consumption. Belonging to family poaceae, it is annual crop of self pollination. It is cultivated over an area of about 29.14(2019-20) million per hectares with an annual production of 2646.7 million tonnes (acc. to FAO) throughout the world. In india area under wheat cultivation is 29.58(2019-20) million hectares with an annual production and yield of 99.70 million tonnes and 3371 kg/ha respectively (Directorate of Economics and Statistics). Wheat is a major cereal crop of Punjab. It is grown on an area of 35.20 lakh hectares during (2019-20) with production of 182.62 lakh tonnes and average yield of 51.88 quintals per hectare(acc. to PAU,Ludhiana. Among the various factors, which contributes towards productivity, the sowing condition and selection of suitable genotypes is quite important. Each variety has a specific genotypic ability to maintainits performance over a wide range of environmental conditions which is referred to as sensitivity or adaptability of a variety (Longove *et al*.,2014). The cultivars developed and adapted in a particular agro-ecological zone usually remain suficiently stable for the expression of morpho- physiological characters but occasionaly behave differently when exposed to other zoned with different growing conditions. Changing crop phenology is considered an important bio-indicator of climate change, with the recent awrming trend causing an advancement in crop phenology. The effects of clomate change on crop phenology have interacted with the effects of changesin crop management, such as changing cultivars (Liu *et al*.,2009). Developing varieties in demand with the local and zonal requirements and strategic planning to deploy matching production technology have contributed a lot in this endeavour. To strengthen the role of wheat in food security under changing climatic conditions, it is pertinent to develop wheat varieties and check their adaption in various agro-climatic conditions. Location alter not only the yielding ability of a genotype but also the yielding potential of sites located in the specific region (Mohan,2014). In addition to a number of factors influencing yield attributes, the vital factor for harvesting suitable environment into grain yield is the genetic potential of the crops (Nadeem,2001). Therefore, there is a need to generate valueable information on these aspects.

The green revolution has made our country self-sufficient in food production. As a result of green revolution, the total food production has increased more than three times, while the productivity in the same period has increased more than twice. This successful story has been possible due to use of agricultural inputs such as use of chemical fertilizers, higher use of agrochemicals and improvement in farm mechanization. This production technology has helped the country develop a food surplus as well as contributing to concerns of soil health, environmental pollution, pesticide toxicity, and sustainability of agricultural production. The continous use of chemical fertilizers and pesticides has resulted in increased nitrate levels in the ground waters and contaminated food products with pesticides. Organic farming is one of the widely used methods, which is thought of. as the best alternative to avoid ill effects of chemical farming. Addition of organic matter in the soil is a well-known practice to increase crop yields. Organic matter like farmyard manure (FYM) supplies available nutrients to the plants and also provide favourable soil environment and increase water holding capacity of soil for longer period of

time. Farmyard manure is applied to soils mainly as a source to plant nutrient. Animal manure supplies all the macronutients as well as micronutrients necessary for plant growth, hence it acts as diverse fertilizer. An integrated use of manure with chemical fertilizer results in build up of available nutrients in soils much more effectively than that of chemical fertilizer alone. (Bhatt, 2017). Accoding to (Joy *et al*.,2018) soils which receive plant nutrients only through chemical fertilizers shows declining productivity despite being supplied with sufficient nutrients. Application of FYM also enhances the effectiveness of commercial fertilizers through favourable soil microbial activity and augmentation of organic soil collides (humus) that possess large nutrient retaining surface area. FYM is the major source of nutrient supply and it is considered as the desirable soil amendment and reports of it's effects on soil properties are numerous.

Materials and Methods

A field experiment entitled "Assessing the Studies on influence of nutrient and performance of wheat under Gharuan condition of Punjab Wheat (*Triticum aestivum* L) was conducted at the experimental farm of the Division of Agronomy, Chandigarh University of Agricultural Science and Technology of Punjab. Sowing two wheat late variety UNNAT"PBW-343" and HD 2851 was used in the experiment. The Experimental site is investigation was conducted at the experimental farm of Chandigarh University Gharuan Mohali and Punjab that lies between 30.7691oN latitude and 76.5759oE longitude at an altitude of 296.86 meters above the mean sea level. The climate is sub-tropical type characterized by very hot summers and severe winters. The average annual precipitation over past twenty five years in 792 mm and more than 80 percent of precipitation is received during south west monsoon. During crop growth period (6th Dec 28thApril) wettest month was December. The mean maximum and minimum temperature for entire crop growth period of wheat crop was 38.83oC and 3.59oC, respectively.

Plant height ranges between 105-10 cm with conical cylindrical ears. Grains are flint type with green to yellow colour, resistant to turciccum leaf blight, common rust and moderately resistant to stem borer and aphids, also resistant to lodging. It matures in about 110-120 days in the Punjab valley. The present experiment was laid out in randomized complete block design with three replications to examine the effect of different levels of nutrients effect on productivity of wheat (*Triticum aestivum* L). The treatment details are as follows: F_0 (Control), F_1 (Recommend. Fertilizer dose (RFD)(N,P,K),60:40:20 F_2 (RFD +5 tones FYM ha-1), F_3 (RFD+2.5 Tones vermicompost ha^{-1}), F_4 (75 percent RFD+5 tones FYM ha^{-1}), F_5 (75percent RFD +2.5tones vermicompost), F6 (RFD + 5 tones FYM +2 tones of vermicompost ha-1) and F7 (75 percent RFD+5tones FYM+2.5 tones of vermicompost ha-1). In observations Growth studies (Plant height, Dry matter accumulation and Number of tillers) Development studies (Days to 50 per cent tillering, Days to 50 per cent earring. Days to maturity (Yield attributes, Number of effective tillers per meter square Length of spike, Number of grains per spike, 1000-grain weight, Grain yield, Straw yield, Harvest index. In order to work out the economic profitability of treatments in a system, the economic yield of both crops were subjected to economic analysis by calculating the cost of cultivation, gross returns, net returns and benefit: cost ratio were recorded. The data recorded on various aspects in the present study was subjected to the statistical analysis using analysis of variance as per procedure suggested by

Results and Discussions

Yield attributing

Grain yield is influenced by various factors, either directly or indirectly. The number of effective tillers has a direct effect on the grain yield because it contributes to more numbers of grains to increase the yield. The data regarding the effective tillers m-2 are presented in table. The number of effective tillers decreased as compared to the total number of tillers m-2. The competition among the total number of tillers (of the same plant or of different plant) for nutrients and other resources might be the reason for reduced number of effective tillers at maturity. The highest number of effective tillers m-2 (468.6) was recorded with the recommended doses of fertilizers (RDF) which was significantly higher than all other treatments. The reason behind this may be the supply of proper amount of nutrients through recommended doses of chemical fertilizers. These results are suppoted by Dhar *et al.,* (2010). The higher level of FYM gave significantly higher effective tillers m-2 than the lower levels of FYM and unfertilized control. The results are supported by the findings of Jan and Noor (2007). Among varieties, variety UNNAT PBW 343 gave highest number of effective tillers m-2 (382.7) than other Variety HD 2851 gave (324.9) effective tillers m-2 par with variety

Grain yield, straw yield and harvest index

The data regarding the number of grains yield as influenced by different organic and inorganic treatments in Table 4.5. The resulted showed that number of grains was influenced under various treatments of organic and inorganic sources. There was significant difference between the treatments F6 recorded higher number of grain yield (45.59).

These results are line with the findings of Kiliç and Gürsoy (2010) and Naveed *et al*. (2014) who found variation in yield attributes for different cultivars explaining their genetic behaviour. Similarly, Ayaz (2016). The data on straw yield presented in Table 4.7 and depicted in figure 4.2 revealed that RDF, FYM and vermicompost treatments significantly ($p>0.05$) increased the straw yield F6 (63.45) over rest of all other treatment groups. Khosravani *et al*., (1998) reported that straw weight and harvest index while these advantages were significantly discernablen some areas.

The data regarding the harvest index as influenced by different organic and Table 4.5-Yield attributes of Wheat as affected by nutrition and varietiesinorganic treatments in Table 4.5. The resulted showed that number of grains was influenced under various treatments of organic and inorganic sources. There was significant difference between the treatments F6 recorded higher number of harvest index (43.57). And lowest value of harvest index was recorded with treatment unfertilized control (40.49%) Among varieties highest harvest index was recorded with the variety UNNAT PBW 343 (43.78%) followed by variety HD 2851(41.81 %). And lowest value of harvest index was recorded with the variety HD2851.

Table 1: Yield attributes of Wheat as affected by nutrition and varieties

Treatment	Effective Tillers m^{-2}	No of grains Ear^{-2}	Grain yield (g ha^{-2})	Straw yield (g ha^{-2})	Harvest Index
F0	198.5	39.38	38.48	45.78	40.49
F1	274.3	43.32	41.12	54.30	41.34
F2	268.3	42.61	40.37	53.78	42.23
F3	375.8	45.04	41.67	55.56	42.99
F4	254.6	42.94	40.47	53.78	46.39
F5	270.3	44.22	41.47	52.89	41.92
F6	419.6	46.41	45.59	63.45	43.57
F7	376.8	45.21	43.58	59.89	43.17
CD (p=0.05	11.02	15.7	15.4	31.8	10.20
Varieties					
UNNAT PBW 343	374.7	45.06	44.76	60.33	43.78
HD2851	253.5	42.91	41.89	56.67	41.81
CD (p=0.05	87.1	9.82	17.6	13.07	9.56

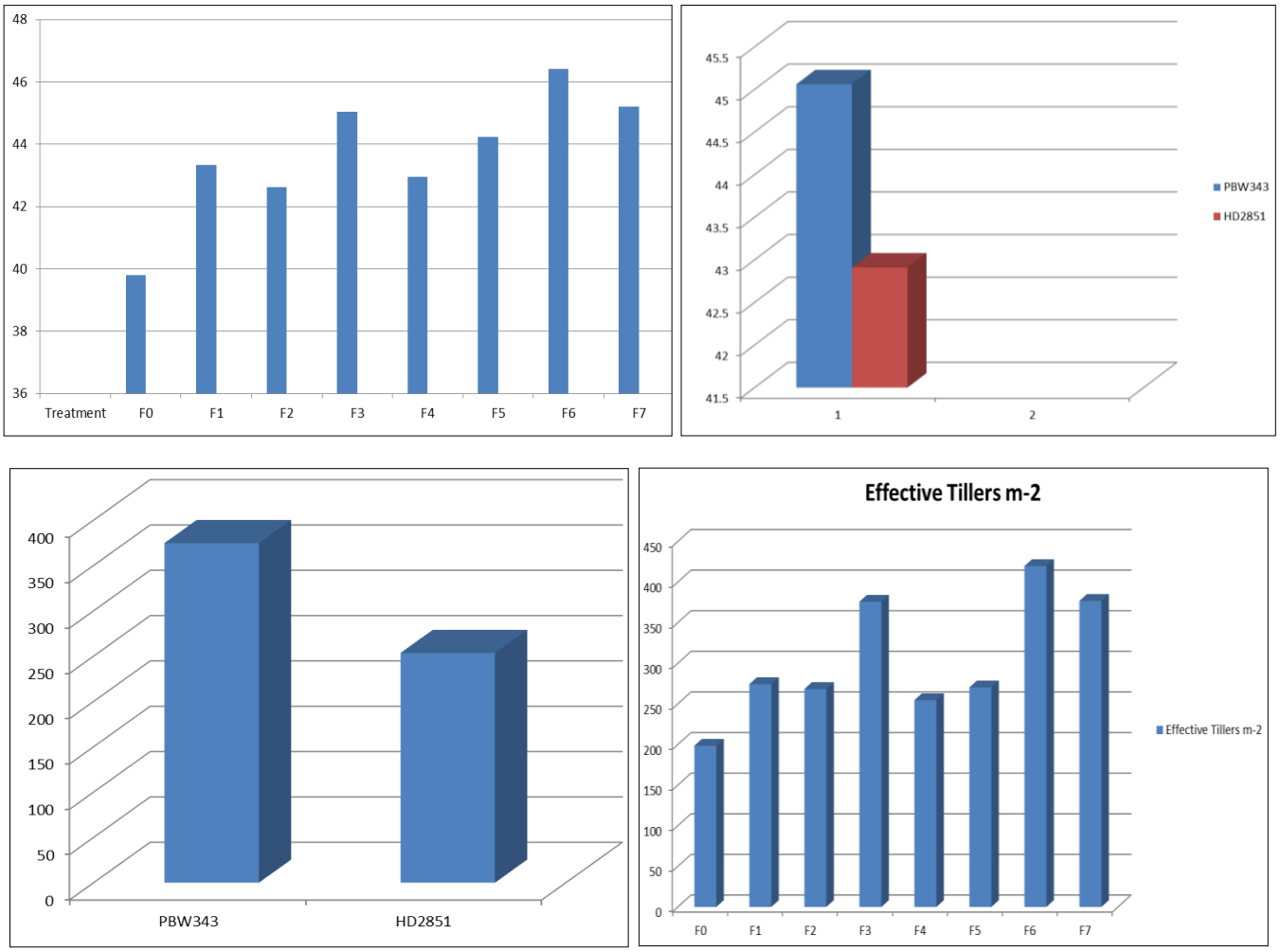

Fig 1: Number of effective tillers m-2 as affected by nutrition and varieties Number of grains ear $^{-1}$ affected by nutrition and varieties

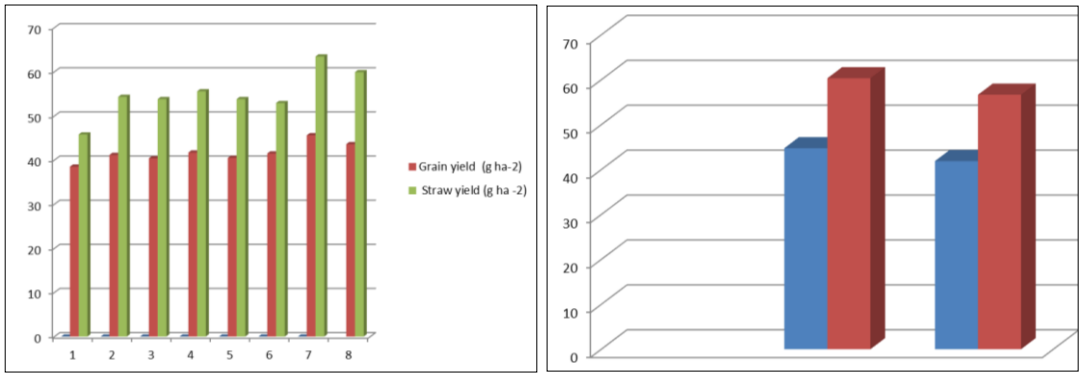

Fig 2: Grain and straw yield (q ha-1) nutrition and varieties

Conclusion

From the present study it may be concluded that treatment recommended dose of chemical fertilizers (RDF) and variety UNNAT PBW 343 could be considered to increase the yield of Wheat.

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