

**Effect of planting methods and nitrogen levels on grain yield of wheat**Amritpal Singh<sup>1</sup>, Manpreet Kaur<sup>2</sup> and Vandna Chhabra\*<sup>1</sup>*Department of Agronomy, City University, Jalandhar (Punjab) India- 144001*<sup>2</sup>*Department of Agronomy, KMV, Jalandhar (Punjab) India- 144001*\**Department of Agronomy, School of Agriculture, Lovely Professional University, Phagwara (Punjab) India- 144411*\**Corresponding author: [vandna.21027@lpu.co.in](mailto:vandna.21027@lpu.co.in)**<Lovely Faculty of Science & Technology>**<School of Agriculture>***ABSTRACT**

*During rabi season of 2017-18, a field experiment was performed at Lovely Professional University research farm on wheat variety HD 2967. The experiment was conducted in Randomized Block Design with nine treatments replicated thrice. It has been observed that at different levels of nitrogen combined with two wheat establishment methods, all the growth and yield attributes showed superiority when crop was planted on raised beds as compared to flat sowing. Even, raised bed planted wheat applied with recommended dose of nitrogen showed grain yield gain over other treatments with higher dose of nitrogen.*

**Keywords:** *Flat sowing; nitrogen; grain yield; wheat*

**INTRODUCTION**

Wheat is known as most important food crop in India and cultivated all over the world. Wheat covers almost 217 million hectares area with an annual production 731 million tonnes<sup>1</sup>. The wheat cultivated on around 30 million hectares produced 99.7 million tonnes having an average productivity of 3371 kg/ha<sup>2</sup>. It is a good source of carbohydrates and proteins for human. To attain higher production of wheat different methods were used viz. flat and raised bed planting system<sup>3</sup>. In bed system use efficiency of water was higher than flat sowing. In bed irrigation system more water saving was observed as compare to flat system. Raised bed greatly influenced the germination rate, tillers count, grains in each spike, test weight and seed yield<sup>4</sup>. Out of different planting methods, raised bed method was proved better than other methods by saving 40% irrigation water and also enhanced the productivity of water and soil properties. Under raised bed, less weed competition was observed<sup>5</sup>. Permanent bed method reduced the yield of crop by 15% as compared to fresh bed. Effect of planting method mostly depends on soil type and bed age<sup>6</sup>. Yield of crop was appreciably influenced by different planting methods and nitrogen sources and raised bed improved all

the parameters of crop which were influenced by nitrogen sources <sup>7</sup>. Maximum plant height was recorded under flat bed followed by raised bed. Maximum yield was registered in bed method <sup>8</sup>. Maximum tillers and grains were observed under raised bed condition. Higher water use efficiency recorded in bed method <sup>9</sup>. The effect of different planting methods and nitrogen dose on yield of wheat was studied and it has been observed that by application of 150% nitrogen on raised bed increased the nitrogen uptake, efficiency of water, and yield than conventional flat method. 20% water saving was observed in bed method <sup>10</sup>. The uptake of nitrogen improved by increased dose of nitrogen. Permanent bed method significantly produced maximum grain yield, nitrogen uptake, nitrogen use efficiency as compared to other planting techniques <sup>11</sup>. Higher nitrogen content in grain and straw was found on bed sowing with at 50% more nitrogen than recommended. Maximum nitrogen uptake was recorded in bed method than flat sowing. Highest grain yield was recorded in bed planting <sup>12</sup>.

## **MATERIALS AND METHODS**

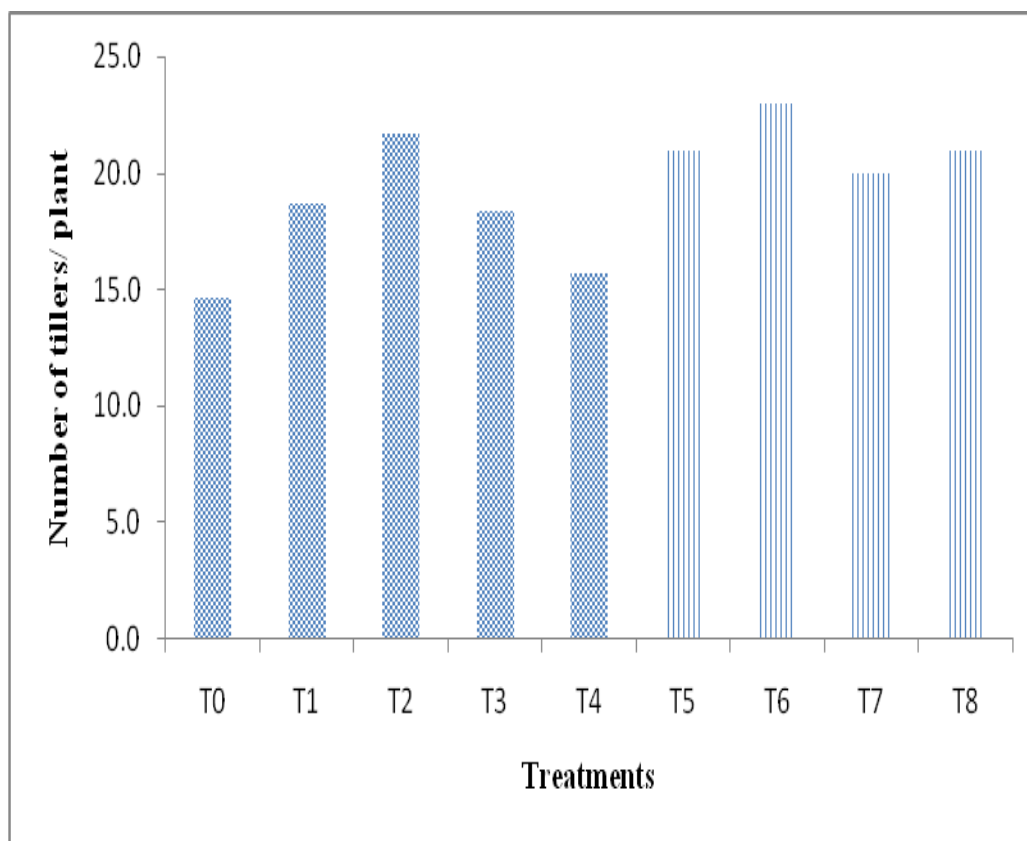
The field experiment was conducted in the research Farm during *rabi* season with 9 treatments and three replications. The treatments were Control (T0); Rec.PK+75%N (T1); Rec.NPK (T2); Rec.PK+110%N (T3); Rec.PK+130%N (T4); Rec.PK+75%N (T5); Rec.NPK (T6); Rec.PK+110%N (T7); Rec.PK+130%N (T8) with two crop establishment methods viz. flat sowing and raised bed sowing. Treatments starting from T0 to T4 were applied on flat beds and rest are on raised beds. Crop was sown on 2<sup>nd</sup> December during the year 2017 and variety HD 2967 was taken.

## **RESULTS AND DISCUSSION**

### **Growth and yield attributes**

Plant height was recorded highest in treatment T4 (Rec.PK+130%N) followed by the treatment applied with Rec.NPK on raised bed (T6). Leaf area index was observed as highest under Rec.PK with 130% N followed by Rec.PK and 110% N. Maximum numbers of tillers were recorded in raised bed treatment (T6) viz. Rec.NPK on raised bed followed by (T2) viz. Rec.NPK on flat bed. There was a 56% increase in tillers in raised bed method of sowing followed by 47% increase in tillers in flat bed method of sowing over the control (T0). The

result showed that at same nitrogen level i.e. recommended dose of nitrogen on raised bed produced more tillers as compared to flat bed method. These results are similar to Waraich *et al.*, 2010 observed for tillers count and spikelet number under raised bed. Numbers of grains in each spike found least in Control (T0) and maximum in T6 viz. (Rec.NPK) on raised bed followed by T2 viz. (Rec.NPK) on flat bed which is shown in fig 2. There was a 24% and 21% increase in number of grains per spike under T6 and T7 treatments respectively from control. Utmost grain yield (6.8 Mg/ha) was observed under T6 viz. (Rec.NPK) on raised bed followed by T7 (Rec.PK+110%N) and T5 (Rec.PK+75%N) shown in fig 3.and resulted the difference of 65% from T2 viz. (Rec.NPK) on flat bed.



**Figure 1.Number of tillers per plant under flat and raised bed treatments**

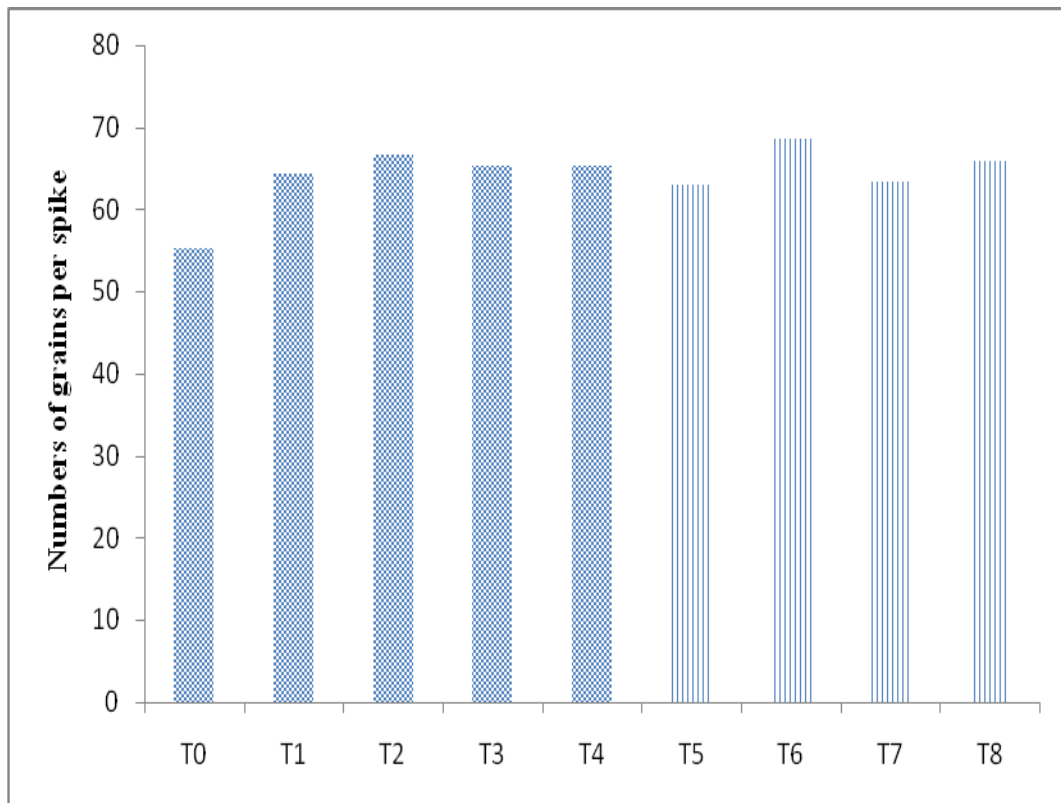


Figure 2. Number of grains per spike under flat and raised bed treatments

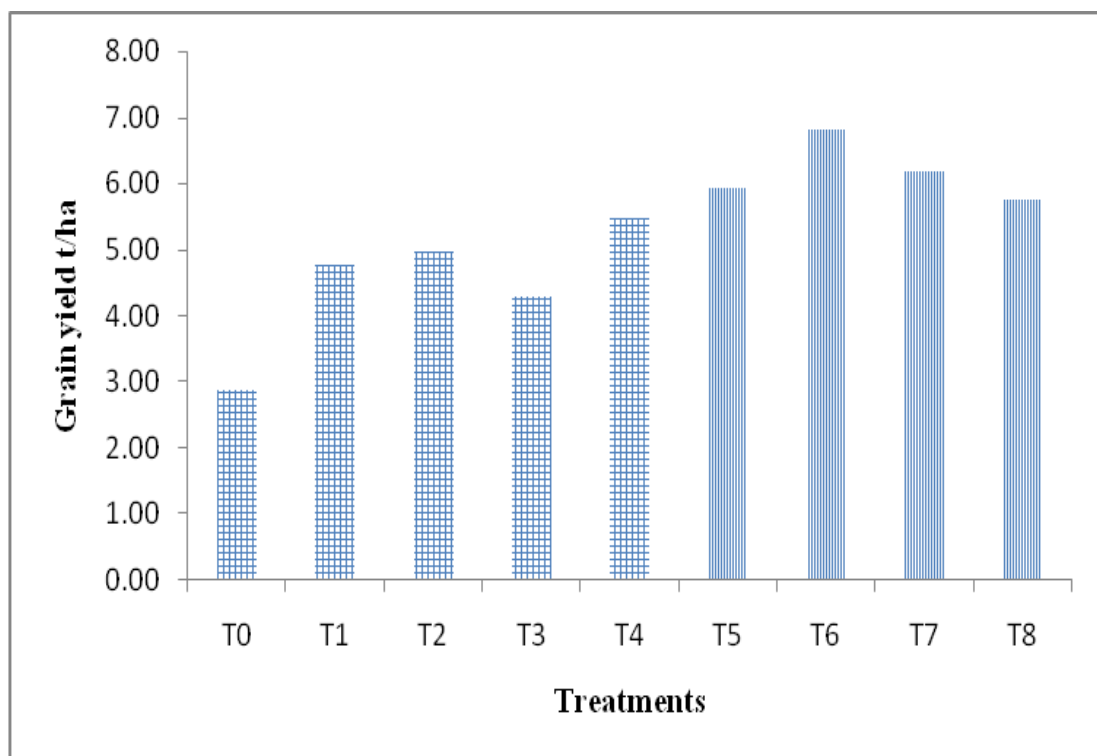


Figure 3. Grain yield of wheat under different treatments

**CONCLUSION**

From the study, it is concluded that planting of wheat on beds took a lead in terms of grain yield along with the different levels of nitrogen. Recommended dose of nitrogen on raised bed produced 65% higher grain yield compared to the flat bed method. There was no yield advantage obtained by increased doses of N on flat bed. From the results it can be suggested that by sowing on raised bed grain yield can be increased along with increasing water and nitrogen use efficiency.

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