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Effect of Weed Control Methods with Different Varieties in Wheat (*Triticum aestivum* L.) under Semi-Arid Conditions

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Abstract **– The trial was conducted to evaluation the effect of mode of weed control methods with different varieties in wheat under semi-arid conditions, field experiments was carried out in 2018-19 growing seasons. Experimental units were arranged in *Factorial Randomized Block Design* (RBD) with three replications. The highest growth parameters were observed with the application of pendimethalin application 3.3 litre per hectare with HUW 234. Significantly highest plant height at 90 DAS 97.13 cm was measured with the application of pendimethalin followed by hand weeding and application of 2, 4-D. The weed control measures i.e. hand weeding, application of 2, 4-D were calculated non-significantly higher among each other. The control measure was recorded significantly lesser than the all other treatments of weed control. The value for number of functional leaves per plant, fresh weight (g) and dry weight (g) per plant at 30, 60 and 90 DAS were also found highest in similar way.**

Keywords **– Weed Control, Herbicide, Hand Weeding, Varieties.**

I. INTRODUCTION

In India, the whole meal called "Atta" is chiefly used for making chapaties, paranthas and poories. In the industries the wheat grain is used for the manufacturing of paste, alcohol, oil and gluten. The wheat straw forms an important ingredient of dry fodder for cattle in India. It furnished the "bread of life" for most of the people in the country wheat grain have important place in India economy as well as daily human diet. wheat grain contain 9 -18 per-cent moisture, 10-12 per-cent protein, 2.0 – 2.5 per-cent cellulose, 1.5 – 2.0 per-cent fat, 1.5-2.0 per-cent minerals and 62-71 percent carbohydrate. All wheat whether wild or cultivated belong to the genus *Triticum* of the family Gramineae (poaceae). The cultivated wheat (*Triticum aestivum L.*) is an allohexaploid.

Wheat is one of the most important and widely cultivated staple food crops among the cereals and is contributing about 30% to the food basket of the country. It is agronomically and nutritionally most important cereal essential for the food security. Poverty alleviation and improved livelihoods. The world acreage under wheat crop accounts 223.11 million hectare with production of 737.83 million tons with an average productivity of 3.39 tons/ha. After china, India is leading producer of wheat in the world. In India, wheat stands second after rice among cereals and cultivated in an area 30 million hectare with the production of 104.32 million metric tons recorded in 2016-17. In Uttar Pradesh, wheat is grown on an area of 9.65 million hectare with a production of 26.87 million metric tons and productivity of 3093 kg/ha "2017-18 has been quite a promising year for the state's farmers as production of wheat is concerned," principal secretary, agriculture, at government said adding "Not only has production increased, productivity has also increased compared to previous years." The productivity has gone up from 30.93 quintal per hectare last year to 27.50 quintal per hectare during preceding time. Both, production and productivity are higher but the sowing area has decreased this year. Wheat was sown on a total area of 97.86 lakh hectares of land against 98.85 lakh hectares during 2016-17.

The existing low production of wheat grains really a matter of great concern to the state as well as country be-

-cause there is no possibility of putting more Increase under this crop. The long term strategies on the other hand, may acreage the anticipated threats like climate change, water scarcity, soil health, need for tillage specific varieties, improving yield potential of future genotypes and production pressure on agriculture land due to increasing population. It is imperative that the average production and productivity of wheat crop can be increased by adopting improved agro-techniques use of weed control techniques and Suitable high yielding varieties optimum amount of manures and fertilizers and their applications, irrigation, timely sowing, and plant protection measures.

Among many factors responsible for low production weeds occupy dominant position hence weed control measures reduced plant nutrients and ultimately more plant nutrients available to the crop (Pandey et al. 2000).

II. Materials and Method

The experiment was conducted at the Brahmanand Mahavidyalaya, Agricultural Research Farm, Post-Rath, District Hamirpur, State-Uttar Pradesh (India) during the winter (rabi) season of 2018-19. The soil of experimental field was 'parwa' (A category of red soil) with slightly alkaline in reaction (pH 7.6) which was low in available nitrogen (200.83 N_2O kg ha^{-1}), medium in available phosphorus (29.28 P_2O_5 kg ha^{-1}) and high in available potassium (474.16 K_2O kg ha^{-1}) and ranging 0.56% organic carbon content (Jackson, 1973). The trial was laid out in factorial randomized block design with three replications having 16 treatment combinations of four weed control methods i.e. control, hand weeding, application of pendamethilin @ 3.3 litre per hectare at 30 DAS at pre-emergence application, 2, 4-D @ 1.251 litre per hectare at 35 DAS after first irrigation.

III. Results and Discussion

Reference to table 1 indicate that growth characters viz. plant height, number of functional leaves per plant, fresh and dry weight per plant, number of tiller per plant were found maximum with application of pendimethalin application for weed control. The maximum plant height 26.28, 69.69 and 97.13 cm was recorded at 30, 60 and 90 DAS which was found significantly more over hand weeding, 2, 4-D application and the control, respectively at all the stages of growth observation. The hand weeding and application of 2, 4-D application were differed non-significantly among each other at 30 DAS, while, both of these mode of application differed significantly at 90 DAS of crop stage. The control measure of weed control was significantly decreased plant at all the stages of plant observation at 30, 60 and 90 DAS. Number of functional leaves per plant were observed at 90 DAS and found significantly maximum (4.64) with the application of pendamethalin for weed control over hand weeding (4.15), 2, 4-D application (4.15) and control (3.75), the hand weeding and application of 2, 4-D were differed non-significantly among each other in this regards, while the control significantly decreased number of leaves per plant at this stage. Fresh weight per plant (g) was recorded highest (19.32) with application of pendamethilin followed by hand weeding (17.98), 2, 4-D (17.24) and the control (15.08). The hand weeding and application of 2, 4-D were differed non-significantly among each other while both of these mode of weed control were recorded significantly more value over control. In the similar way of fresh weight the dry weight was also calculated more value (10.02) with application of pendamethilin followed by hand weeding, application of 2, 4-D and the control i.e. 9.50, 9.33 and 8.20, respectively. The control was significantly produce less dry weight over 2, 4-D, hand weeding and pendamethilin measures of weed control. Number of tillers per plant is an crucial parameter of wheat plant directly related to the economic

production of wheat, significantly highest tillers were counted with the application of pendamethilin which was 11.54 percent more over hand weeding, 11.52 percent over 2, 4-D and 39.30 percent more over the control, the hand weeding and 2, 4-D application of weed control were significantly more over control. The increase in above parameters may be due to proper space without weed competition. The availability of light moisture and nutrients for crop plant increased. The results are in agreement with those of Singh et al. (2013) and Mustafee (1989).

It is clear from table 1 that the growth parameters like height of plant (cm), number of functional leaves per plant, fresh weight, dry weight and number of tillers were found to increase in a linear manner. The highest plant height (cm) was recorded with HUW-234 variety (94.08) at 90 DAS which was found significantly more over WH-147 (89.04), PBW-154 (88.25) and JW-3211 (85.99), respectively. The varieties WH- 147 and PBW-154 were differed non-significantly among each other in this regards, while, the WH-147 significantly reduced the plant height then the others at 30, 60 and 90 DAS. Number of functional leaves per plant was counted at 90 DAS and found significantly more (4.66) with HUW- 234 over WH-147 (4.35), PBW-154 (4.22) and JW-3211 (4.11). The varieties PBW- 154 and JW- 3211 were differed non-significantly among each others in this regards. Significantly fresh weight per plant (G) was recorded highest with HUW-234 (19.87) which was found in increasing manner of 2.78, 2.32 and 2.79 with WH- 147, PBW- 154 and JW- 3211, respectively, all these three varieties were differed non-significantly among each other. Dry weight per plant (g) produced highest with HUW- 234 with a value of 6.82 which was increase significantly over all others varieties. The HUW- 234 value was calculated more 18.60 percent, 21.78 percent and 28.67 with WH- 147, PBW- 154 and JW- 3211, respectively. The variety HUW- 234 produced significantly more dry matter than WH- 147, PBW- 154 and JW-3211, while the varieties PBW- 154 and JW- 3211 were differed non-significantly among each others. Number of tillers per plant directly related to the higher yield attributes of any crop, the significantly highest number of tillers per plant were counted with HUW- 234 (6.82) which was significantly more over WH- 147, PBW- 154 and JW- 3211. The increase in above growth parameters were due to rapid multiplication of meristernatic tissues which were favored by essential and major nutrients, water and variety itself. The similar results have also been reported by Mishra. P.H. and Pepo, P (1988).

IV. Conclusion

It is clear from the investigation that the application of pendamethilin @ 3.30 litre/hectare as pre-emergence stage of the crop with variety HUW- 234 produced more growth parameters and the increased growth characters will ultimately increased the yield of crop.

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