



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; SP4: 88-90

Tavinder Singh
Department of Agriculture,
D.A.V. College, Abohar, India

Karampal Singh Brar
Department of Agriculture,
D.A.V. College, Abohar, India

Navdeep Gandhi
Department of Agriculture,
D.A.V. College, Abohar, India

(Special Issue- 4)

National Seminar

“Role of Biological Sciences in Organic Farming”

(March 20, 2019)

Effect of application of herbicides on weeds in the wheat (*Triticum aestivum* L.) crop and yield attribute

Tavinder Singh, Karampal Singh Brar and Navdeep Gandhi

Abstract

The experiment was carried out at the farm of S. Dalip Singh at Abohar, Teh-Abohar, Dist-Fazilka, Punjab. The crop was grown in Rabi season of 2017-18 to study the effect of application of herbicides on weeds in the wheat crop and yield attribute. The crop was sown on November 28, 2017. The following treatments are T₁- (Pendimethlin 30 EC @ 1L/ acre), T₂- (Isoproturon 75% WP @ 500g/ acre), T₃- (Metsulfuron methyl 20% WP @ 8g/ acre), T₄-(Hand weeding), T₅ -(Control) treatments. The experimental conducted that among the treatments T₁ has performed better in parameter like plant height (103.08 cm), effective tillers (267), yield per acre (25.44q) and harvest index(44.66%). It is concluded from the experiment that higher yield can be obtained by pre-emergence application of Pendimethlin 30 EC (Stomp).

Keywords: herbicides on weeds, crop and yield attribute, wheat

Introduction

Wheat (*Triticum species*) is a crop of global significance. It is grown in diversified environment. It is a staple food of millions of people. Approximately one-sixth of the total arable land in the world is cultivated with wheat. Among food grains wheat is the richest source of protein and its stands at second place after pulses. In general wheat contains carbohydrates (70%), protein (12%), lipid (2%cent), vitamins & minerals (2%) and crude fibre (2%). (www.agropedia.iitk.ac.in.com) ^[1] The herbicide 2,4-D had been used in crop fields quite for long time. Depending on the type of cereal crop, the weed spectrum, cultural practices and climatic factors, 2,4-D might be applied as salt, esters, amines or free acid formulation at rates ranging from 250 g to 2 Kg/ha (rarely up to 4 Kg/ha). The herbicide application is usually made when weeds and cereal plants are small. (Kumar and Singh) ^[2] Pendimethlin [N-(1-ethylpropyl)-2, 6-dinitro-3,4-xylylidine] is a herbicide of the dinitro-aniline group used as pre-emergence application to control annual grasses and certain small seeded broadleaf weeds. It inhibits cell division and cell elongation. Dinitroaniline herbicides kill susceptible plants by inhibiting cell division in roots cells which arrests normal root growth. (Kaur *et al.*) ^[3]

Materials and Methods

The experiment was carried out at the farm of S. Dalip Singh at Abohar, Teh-Abohar, Dist-Fazilka, Punjab. The crop was grown in Rabi season of 2017-18. The experiment was conducted in five plots with each plot having dimensions of 10 m x 2.5m, length and breadth respectively. The crop was sown on November 28, 2017. Wheat variety HD 3086 was sown at the seed rate of 40KG for one acre. Sowing was done using seed drill on November 28, 2017. Plant heights was measured with the help of measuring tape from the soil surface to the highest leaf of the plant. One plant was selected from each plot randomly and then plants were kept in oven for oven drying for 72 hours at temperature of 60⁰ C at an interval of 15 days. As for the calculation of 1000 grain weight, 1000 grains were counted from each treatment after harvesting and were weighed with the help of weighing machine. After harvesting, grains were separated from spikes by threshing. The weight of grains was recorded. The grains yield was computed and expressed as quintals per acre. Harvesting index was calculated by using

Correspondence
Manmeet Kaur
Department of Agriculture,
D.A.V. College, Abohar, India

formula- Economic yield (seeds) / Biological yield (seeds + plant straw) x 100.

Treatments

- T₁- Pendimethlin 30 EC @ 1L/ acre
 T₂- Isoproturon 75% WP @ 500g/ acre
 T₃- Metsulfuron methyl 20% WP @ 8g/ acre
 T₄- Hand weeding
 T₅- Control

Result and Discussions

Number of weeds

It is was observed that density of weeds in wheat in treatments, T₁, T₂, T₃, T₄ and T₅ were 5 m⁻², 7 m⁻², 8 m⁻², 4 m⁻² and 12 m⁻², respectively. So, Bibi *et al.* [4] observed that the minimum weeds density (157.8 m⁻²) was recorded in Topik treated plots. While maximum (352.0) weeds density was recorded in weeds check followed by Agritop and 2,4-D at 25 days after herbicidal application. Similarly, Hassan *et al.* [5] observed that the maximum weeds density m⁻² (98.75) was recorded in weedy check followed by 45.00 in Puma Super 75 EW. The lowest weeds density (16.00) was recorded in Puma super + Sencor, followed by 21.25 in Pujing + Sencor, and 21.75 m⁻² in Affinty 50 WP. The weeds density of Sencor, Pujing and WH-01 are statistically comparable to one another.

Plant height (cm)

As from the experiment, at maturity plant height of wheat in T₁, T₂, T₃, T₄ and T₅ were 103.08 cm, 95.8 cm, 100.1 cm, 102.8 cm and 97.2 cm respectively. So maximum plant height was obtained in the treatment T₁ i.e. 103.08 cm and minimum in T₂ i.e. 95.8 cm. So Abbas *et al.* [6] observed that the maximum plant height (92.53 cm) was achieved in T₂ where Buctril Super 60% EC @ 825 ml/ha was applied, followed by T₅ (Starane—M @ 875ml/ha) with 90.10 cm height, as compared to T₁ (control) where the least plant height (84.70 cm) was recorded. Similarly, Nadeem *et al.* [7] observed that the maximum plant height (216.70 cm) was recorded in plots of manual hoeing and it was statistically at par with foramsulfuron + isoxadifen-ethyl at 1125 g a.i./ha + 3% urea (213.70) and foramsulfuron + isoxadifen-ethyl at 1125 g a.i./ha alone (212.70). The minimum plant height (195.70) was recorded in weedy check plots.

Dry matter accumulation per plant (g)

Dry matter accumulation in wheat T₁, T₂, T₃, T₄ and T₅ were 12.5 gm, 17.4 gm, 20.6gm, 18.5 gm and 19.2 gm, respectively. So, Asad *et al.* [8] concluded that the highest dry wheat biomass (0.24 Kg m⁻²) was recorded in Buctril super 60 % EC @ 988 ml/ha in the line of (0.23 Kg m⁻²) in Wheat Star @ 370.5 g/ha and (0.20 kg m⁻²) in Wheat Star @ 247 g/ha. The minimum value of dry biomass (0.08 Kg m⁻²) was recorded in weedy check control treatment. Similarly, Kishore *et al.* [9] observed that the maximum dry matter accumulation (697.40 and 705.30 gm⁻²) was recorded with 50 hills m⁻² fb two hand weedings, which was at par with 40 hills m⁻² fb Butachlor @ 1.0 kg ha⁻¹ fb one hand weeding. The minimum dry matter accumulation was recorded (366.20 and 372.00 gm⁻²) with 20 hills m⁻² and weedy check during 2009 and 2010, respectively.

1000-grain weight

Among the different herbicides T₄ has maximum grain weight (40.7 gm) and minimum grain weight (37.7 gm) were found

in T₁. So, Arif *et al.* [10] concluded that the maximum 1000 grain weight (268.8 g) was produced by Equip 2.25 % OD @ 2000 ml/ha while minimum 1000 grain weight (186.7 g) was obtained in the weedy check. Similarly, Khan *et al.* [11] observed that the highest (3.68 g) 1000 seed weight was obtained from Treflan 4 EC and Fusilade 13 EC (3.40 g) plots. It was further observed that the lowest 1000 seed weight (2.72 g) was obtained from Sencor WP 70 treated plots, which was statistically equal (2.78 g) to the weedy check plots which in turn was statistically similar with the remaining herbicidal treatments except the top scoring treatments and the Ronstar 12 L (3.20 g).

Yield per acre

As from the experiment, among the different herbicides T₁ has maximum yield per acre (25.44q) and minimum yield per acre (21.24q) were observed in T₅. So, Chaudhry *et al.* [12] concluded that maximum seed yield (2315 kg/ha) was obtained in case of Stomp application at SBP which was 69.10 percent higher than weedy check (1369 kg/ha). However, it was statistically at par with Dual Gold (2230 kg/ha) and partner (2183 kg/ha) at SBP which produced 62.89 and 59.46 percent higher than weedy plot, respectively. Minimum seed yield was obtained in case of Sencor at SBP (84 kg/ha) and JAS (123 kg/ha) due to severe mortality of crop plants. Similarly Chhokar *et al.* [13] found that the lowest wheat grain yield of 2.78 and 2.03 t/ha was recorded under weedy check, during first and second year, respectively, due to severe weed competition. All the herbicide treatments except Metsulfuron 4g/ha provided significantly higher grain yield compared to weed check. Wheat grain yield improvement of > 56.8% was recorded with the use of sulfosulfuron, sulfosulfuron + metsulfuron and clodinafop.

Observations and Tables

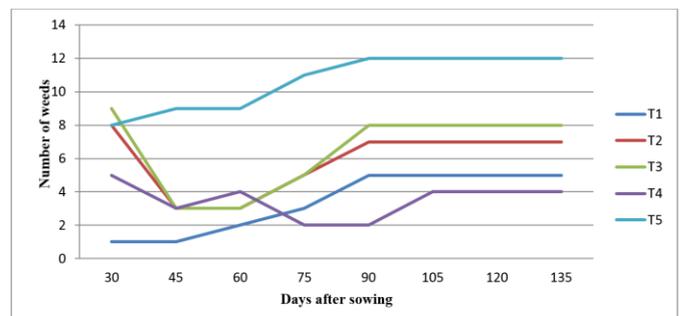


Fig 1: Effect of different herbicides on number of weeds

Table 1: Effect of different herbicides on 1000-grain weight (gm)

	T ₁	T ₂	T ₃	T ₄	T ₅
At harvest time	37.7	38.4	40.1	40.7	39.0

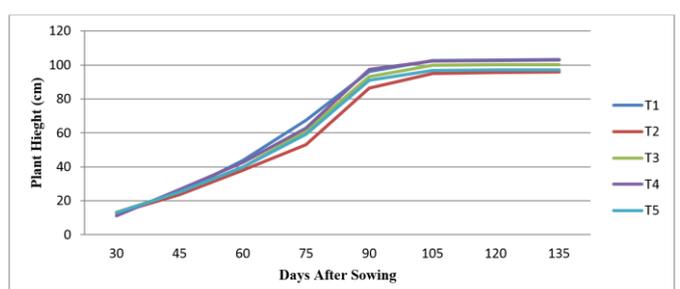


Fig 2: Effect of different herbicide on plant height (cm)

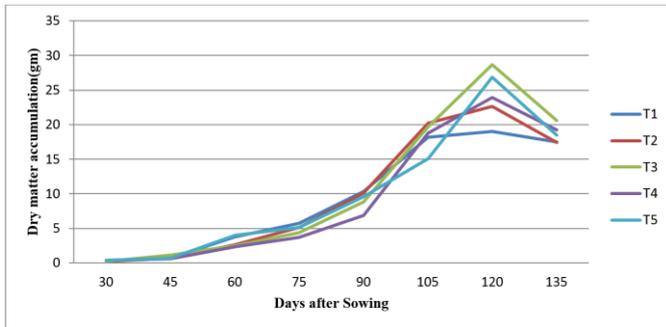


Fig 3: Effect of different herbicides on dry matter accumulation (gm)

Table 2: Effect of different herbicides on yield per acre (Quintal)

	T ₁	T ₂	T ₃	T ₄	T ₅
At harvest time	25.44	24.16	23.52	23.20	21.24

Conclusion

The present experiment was carried out to study the effect of different application of herbicides on weeds in the wheat (*Triticum aestivum* L.) crop and yield attribute. The following treatments are T₁ – Pendimethlin 30 EC @ 1L/ acre, T₂ – Isoproturon 75% WP @ 500g/ acre, T₃- Metsulfuron methyl 20% WP @ 8g/ acre, T₄ – Hand weeding, T₅ – Control. The experiment concluded that among the treatments T₁ has performed better in parameter like plant height (103.08 cm), effective tillers (267), yield per acre (25.44q) and harvest index (44.66%). T₃ has performed better in parameter like dry matter accumulation (20.6gm), tillers per plant (5.8) and spikes per plant (5.6). T₄ has performed better in parameter like number of weeds (4m²) and 1000-grain weight (40.7gm). T₂ has performed better in parameter like grains per spike (60.4). It is concluded from the experiment that higher yield can be obtained by pre-emergence application of Pendimethlin 30 EC (Stomp).

References

1. <https://www.agropedia.iitk.ac.in.com>
2. Kumar S, Singh AK. A review on herbicide 2,4-D damage reports in wheat (*Triticum aestivum* L.), J Chem Pharm Res. 2010; 2(6):118-24.
3. Kaur S, Kaur T, Bhullar MS. Bio-efficacy of brand formulations of pendimethalin-penda 30 EC and Markpendi 30 EC for control of *Phalaris minor* in Wheat, J Krishi Vigyan. 2014; 3(1):10-12.
4. Bibi S, Marwat KB, Hassan G, Khan NM. Effect of herbicides and wheat population on control of weeds in wheat, Pak J Weed Sci. 2008; 14(3-4):111-19.
5. Hassan G, Khan I, Khan H, Munil M. Effect of different herbicides on weed density and some agronomic traits of wheat, Pak J Weed Sci Res. 2005; 11(1-2):17-22.
6. Abbas G, Ali MA, Abbas Z, Aslam M, Akram M. Impact of different herbicides on broadleaf weeds and yield of Wheat, Pak J Weed Sci Res. 2009; 15(1):1-10.
7. Nadeem MA, Ahmad R, Khalid M, Naveed M, Tanveer A, Ahmad JN. Growth and yield response of autumn planted maize (*Zea mays* L.) and its weeds to reduced doses of herbicide application in combination with urea, Pak J Bot. 2008; 40(2):667-76.
8. Asad M, Ali S, Ansar MR, Ahmad I, Suhaib M, Abuzar MK. Weed and wheat dynamics preceding different herbicides, Pak J Agric Res. 2017; 30(4):346-55.
9. Kishor R, Dwivedi A, Singh R, Naresh RK, Kumar V, Bankoti P *et al.* Integrated effect of population and weed

management regimes on weed dynamics, performance, and productivity of basmati rice (*Oryza sativa* L.) Paddy Water Environ, 2016.

10. Arif M, Mukhtar T, Rahman SU, Hussain K, Razar A, Iqbal RA. Efficacy of different herbicides against weeds in maize (*Zea mays* L.), Pak J Weed Sci Res. 2011; 17(2):125-33.
11. Khan IA, Hassan G, Marwat KB, Daur I. Efficacy of some pre and post-emergence herbicides on yield and yield components of canola, Pak J Bot. 2008; 40(5):1943-47.
12. Chaudary SU, Hussain M, Iqbal J. Effect of different herbicides on weeds control and yield of canola (*Brassica napus*), J Agric Res. 2011; 49(4):483-89
13. Chhokar RS, Sharma RK, Jat GR, Pundir AK, Gathala MK. Effect of tillage and herbicides on weeds and productivity of wheat under rice-wheat growing system, Crop Prot. 2007; 26:1689-96.