Chemical Weeds Control in Canola

Ijaz Ahmad Khan[1], Gul Hassan[1], Ihsanullah Daur[2] and Baharullah Khattak[3]
(1) Department of Weed Science, NWFP Agricultural University, Pakistan, Email.ijazahmadk@hotmail.com; (2) Department of Agronomy, NWFP Agricultural University, Pakistan; (3) Department of Plant Pathology, NWFP Agricultural University, Pakistan

Abstract

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Experiment was conducted at Agricultural Research Farm Malakandher, NWFP Agricultural University, Peshawar during the 2000/2001 season using Randomized Complete Block (RCB) design with four replications. The Canola Variety Dunkled was planted in plots of 6x3m² during the last week of October, 2000. Data were recorded on weed density m^{-2}, days to 50% flowering, 1000 seed weight (g) and seed yield (kg ha^{-1}). None of the herbicides except Sencor WP70 had a phytotoxic effect on the crop. All the parameters were significantly affected by different herbicidal treatments. Minimum weed density (3.20 m^{-2}) and the highest 1000 seed weight (3.68 g) and seed yield (1568 kg ha^{-1}) were recorded from plots treated with Treflan 4EC applied pre-emergence.

Key words: Canola, weeds and herbicides

Introduction

Rapeseed and mustard are grown in rabi season in irrigated and barani areas of Sindh, Punjab and North West Frontier Province (NWFP) of Pakistan. Rapeseed and mustard have remained one of the major sources of edible oil in the sub-continent and China for centuries. Their cultivation goes back to 2000-1500 B.C in the sub-continent as indicated by sanskrit records.

The canola developed in western Canadian breeding program is low in erucic acid and glucosinolate. Canola oil has the lowest level of saturated and highest level of mono and poly unsaturated fatty acids. Canola originated from *B. napus* L. containing less than 2% erucic acid and less than 851 µmol of glucosinolates/oz oil free meal. Some genotypes of *B. campestris* are free of erucic acid and glucosinolate content. Moreover, some genotypes of Indian mustard (*B juncea*) are extremely low in erucic acid and glucosinolate content (A. Rabbani, NARC, Islamabad, Personal Communication). Canola has been recently introduced to Pakistan to increase domestic edible oil production. It is a rich source of oil and protein (5).

One of the main reasons for low acreage of *Brassica* spp. is that its sowing season overlaps with that of wheat. As wheat is the staple food of the nation, lesser attention is devoted to oilseed crops of rabi season. *Brassica* is mostly grown on barani lands and no improved practices are applied for this crop as most of the farmers are involved in wheat crop.

Canola is a smother crop, because of its larger leaves, rapid growth and early closing canopies, yet the weed competition is critical during early stand establishment. The very small size of canola seeds makes the attempts to eliminate weed seed contamination extremely difficult. Thus, infested crop fetch lower prices in the market apart from quantitative losses. The most common weeds of canola are *Cyperus rotundus, Avena fatua, Vicia* sp., *Phalaris minor, Sorghum helapense, Fumaria indica, Convolvulus arvensis, Anagallis arvensis, Lathyrus aphaca, Medicago denticulate* and *Pova anua.*

Keeping in view the importance of different herbicides for controlling weeds in canola, the present experiment was carried out with the following objectives: (i) to find out the most suitable herbicide for weed control in canola; and (ii) to figure out the effect of different herbicides on yield and yield components of canola.

Materials and Methods

The experiment was conducted at Malakandher Research Farm, NWFP Agricultural University, Peshawar during rabi season 2000/2001. Dunkled variety of canola, as availed from the Directorate of Oilseeds, Agricultural Research Institute, Tarnab, was planted on 28 October 2000. The seed rate used was 5kg ha^{-1}.

The experiment was laid out in a Randomized Complete Block (RCB) design with four replications. There were 10 treatments in each replication. The size of each plot was 6x3 m². Each treatment had 4 rows, 75 cm apart. The details of treatments during the study were the following:

Along weedy check Pre-emergence herbicides namely Treflan 4 EC, Dual Gold 960 EC, Stomp 330 EC and Sencor WP70 were used at the rate of 1.20, 1.44, 0.99 and 0.35 kg ai ha^{-1}, respectively. Post-emergence herbicides namely Ronstar 12 L, Fusilade 13 EC, Topik 15 Wp, Puma super 75 EW and Agil 100 EC were used at the rate of 0.36, 0.26, 0.03, 0.75 and 0.15 kg ai ha^{-1}, respectively.

These herbicides were applied with the help of Knapsack sprayer. The pre-emergence herbicides were applied before the emergence of crop, while the post-emergence herbicides were applied after the emergence of canola crop i.e. after 35 days

The following parameters were recorded during the course of experiment: 1) Weeds' density m^{-2} (before and after application of post-emergence herbicides), 2) Days to 50% flowering, 3) 1000 seed weight (g), and 4) Seed yield (kg ha^{-1}). The data recorded for each trait was individually

subjected to the ANOVA Technique by using MSTATC computer software and means were separated by using Fisher's Protected LSD test (4).

Results and Discussion

Weeds density m^{-2}

The data regarding weeds density m^{-2} is presented in Table 1. The maximum weeds m^{-2} (18.83) were recorded in the weedy check. Minimum weed densities were recorded in Treflan 4 EC (3.20 m^{-2}) and Fusilade 13 EC (4.77 m^{-2}) treated plots. The variability in weeds population in different treatments can be attributed to the fact that some herbicides are more effective for weed control than the others. The results are in conformity with those reported by Khan *et al*. (1) who stated that Treflan 4 EC at the rate of 1-2 liters ha^{-1} in rapeseed and at the rate of 1-1.5 liters ha^{-1} in mustard was the best treatment, significantly reducing the weed density and dry weight.

Table 1. Weeds density m^{-2}, days to 50% flowering, thousand grain weight (g) and grain yield (kg ha-1) as affected by different herbicide treatments in canola

Treatments	Weeds density m^{-2}	Days to 50% flowering	Thousand grain weight (g)	Grain yield (kg ha^{-1})
Treflan 4EC	3.20 d*	121.0 bc	3.68 a*	1568 a
Dual Gold 960EC	6.10 bc	120.0 c	2.93 cd	1321 c
Stomp 330EC	6.27 bc	121.3 bc	2.91 cd	1331 c
Sencor WP70	6.70 bc	129.8 a	2.72 d	1077 d
Ronstar 12L	7.37 b	119.8 c	3.20 bc	1346 bc
Fusilade 13EC	4.77 cd	120.8 bc	3.40 ab	1458 ab
Topik 15WP	7.70 b	121.0 bc	2.92 cd	1365 bc
Puma Super 75EW	7.07 bc	120.0 c	2.93 cd	1376 bc
Agil 100EC	8.07 b	122.5 b	2.92 cd	1341 bc
Weedy Check	18.83 a	120.8 bc	2.78 d	1155 d
LSD at 5%	2.493	2.239	0.371	122.87

* Means followed by different letters in the respective column are significantly different at 5% probability level according to LSD test.

Days to 50% flowering

Data on the effect of different herbicides on days to 50% flowering are also presented in Table 1. The comparison of the mean values indicated that maximum days (129.8) to 50% flowering were recorded in the plots receiving Sencor WP70 treatment while minimum (119.8) days to 50% flowering were recorded in plots treated with h Ronstar 12 L herbicide. This rapid flowering in Ronstart-treated plots was, however, statistically not different from many other treatments., as well as, the weedy check (120.5 days). The possible reason for delay in flowering in Sencor WP70 may be due to its phytotoxic effect which was observed during the experiment. The phytotoxic effect of different herbicides has also been observed by Yadav and Shrivastava (6). Whereas the shortest duration availed by the Ronstar 12 L plots can be attributed to the effective weed management which encouraged the crop growth and consequently attain maturity in a shorter duration.

Thousand seed weight (g)

Statistical analysis of the data revealed that herbicides had significant effect on 1000 seed weight. Data for the effect of different herbicides on 1000 seed weight are given in Table 1. The highest (3.68 g) 1000 seed weight was obtained from Treflan 4 EC and Fusilade 13 EC (3.40 g) plots. The perusal of data in Table-5 further revealed 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 at par with the remaining herbicidal treatments except the top scoring treatments and the Ronstar 12 L (3.20 g). The reason for lower seed weight in the Sencor WP70 treated plots might be the injury caused by Sencor WP70 during the experiment while 1000 seed weight increased with application of some herbicides which effectively controlled weeds. These results are in conformity with those reported by Raghavan and Hariharan (2) and Yadav *et al*. (7) who stated that seed weight increases with the application of some herbicides.

Grain yield (kg ha^{-1})

Table 1 shows the effect of different herbicides on the grain yield. The data indicated that maximum grain yield was produced from plots treated to Treflan 4 EC (1568 kg ha^{-1}) and Fusilade 13 EC (1458 kg ha^{-1}). The Fusilade 13 EC was in turn statistically similar to Ronstar 12 L (1346 kg ha^{-1}), Topik 15 WP (1365 kg ha^{-1}), Puma Super 75 EW (1376 kg ha^{-1}) and Agil 100 EC (1341 kg ha^{-1}). Minimum grain yield of 1077 and 1155 kg ha^{-1} was obtained in Sencor WP70 treated and weedy check plots, respectively. Grain yield significantly increased with the application of Treflan 4EC herbicide and these findings are in conformity with those reported by Khan *et al.* (1) who stated that the application of Treflan 4 EC at the rate of 1-2 liters ha^{-1} in rape seed and at the rate of 1-1.5 liters ha^{-1} in mustard significantly increased the grain yield. The minimum grain yield for Sencor WP70 treated plots is due to the inhibitory effect of Sencor WP70. Sharma and Mishra (3) have also reported phytotoxicity on crop due to some herbicides in their studies on rapeseed.

الملخص

خان، أ. أحمد، ج. حسن ، أ. داير و ب. خاتاك. 2008. المكافحة الكيمائية لأعشاب الخردل الزيتي/الكانولا. مجلة وقاية النبات العربية، 26: 72-74.

اجريت تجربة في مزرعة البحوث الزراعية التابعة لمالاكاندهير، جمعة بيشاور خلال الموسم الزراعي 2001/2000 باستخدام تصميم القطاعات العشوائية الكاملة (RCB) وبأربعة مكررات. تم زراعة الخردل الزيتي/كانولا صنف Dunkled في قطع مساحتها 6×3 م^2 خلال الاسبوع الأخير من شهر تشرين الأول/أكتوبر، 2000. سجلت بيانات كثافة الأعشاب في 1 م^2، عدد الأيام للحصول على 50% من الازهار، وزن الألف بذرة (غ) و غلة البذور (كغ/هكتار). لم يلاحظ تأثير لأي مبيد أعشاب في المحصول عدا المبيد Sencor WP 70. تأثرت جميع المعايير تأثراً كبيراً بمبيدات الأعشاب المختلفة. سجلت أقل كثافة للأعشاب (3.20 /م^2) وأعلى وزن للـــ 1000 بذرة (3.68 غ) وانتاج الغلة (1568 كغ/هكتار) في القطع التي عوملت بالمبيد Treflan 4 EC المطبقة قبل ظهور الأعشاب.

كلمات مفتاحية: الخردل الزيتي/الكانولا، أعشاب، مبيدات الأعشاب.

References

1. **Khan, R.U., N.A. Khan, A. Mumtaz and M. Ahmad**. 1995. Performance of treflan: a preplant applied herbicide in rapeseed and mustard. Sarhad Journal Agriculture, 1: 647-655.
2. **Raghavan, K. and N.M. Haribara.** 1991. Effect of 2,4-D pre-sowing seed treatment on growth and yield of *Brassica juncea* (L.). Acta Botanica Indica, 19: 13-17.
3. **Sharma, S.N. and P.J. Mishra**. 1997. Effect of weed control methods on weed, crop growth and yield of Indian mustard *Brassica juncea* (L.) Czernj & Cosson varieties. Environment and Ecology, 153: 511-514.
4. **Steel, R.G.D. and J.H. Torrie**. 1980. Principles and Procedures of Statistics. McGraw Hill Book Co., Inc. New York. 481pp.
5. **Weiss, E.A.** 1983. Rapeseed. Pages 161-215. In: Oil Seed Crops. Longman group, New York. Reported in Crop Production Book under the title Oilseed Crops, 389 pp.
6. **Yadav, R.P. and U.K. Shrivastava**. 1997. Chemical weed control in mustard (*Brassica juncea* L.). Agriculture Science Digest Karnal 171: 47-50.
7. **Yadav, R.P., U.K. Shrivastava and K.S. Yadav**. 1995. Yield and economic analysis of weed-control practices in Indian mustard (*Brassica juncea* L.). Indian Journal of Agronomy, 40: 122-124.

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