*Pak. J. Agri. Sci. Vol.* 38(1-2), *2001*

# EFFECT OF DIFFERENT HERBICIDES ON WEED POPULATION AND YIELD OF MAIZE *(Zea' mays* L.)

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Evaluation of different herbicides for the control of weeds in maize was done at the Adaptive Research Model Farm, Quetta during 1998. Seven different herbicides were applied at recommended rates. Weedicides significantly affected the weed population, weed biomass and various yield components. The highest grain yield (5.16 t ha:') was obtained in plots treated with Gesaprim 80 WP closely followed by Gramaxone 20 EC (5.12 t ha") against 3.12 t ha'! in control plots. The increase over control was 54.50 and 53.38 %, respectively.
J(ey words: weedicides, weed population, maize yield

## IN1RODUcnON

Maize *(Zea mays* L.) plays an important role in the economy of Pakistan. In spite of the best efforts and intensive research, maize yield in Pakistan is low (1300 kg ha") which is much below the potential yield. Weeds cause reduction in crop yields by competing for light, nutrients, water and carbon dioxide and interfere in farm operations beside increasing the cost of production. In addition, weeds harbour insects and plant disease organisms and in some cases, they serve as alternate host for insect pests and disease organisms.

Weed can be controlled physically, chemically and biologically. In general, cultural methods are still useful but are getting expensive, laborious and time consuming. Chemical weed control is an important alternative. This method is quite effective and efficient. Weed control in maize with herbicides have been suggested by many researchers (Shakoor *et aI.,* 1986; Corea *et al.,* 1990 and Owen *et al.,* 1993). Herbicides application is not only more effective and cheap but also efficient method to check weeds. The study was therefore, planned to evaluate the effect of different pre- and post-emergence herbicides application on weed population and yield of maize.

## MATERIALS AND METHODS

The investigations pertaining to the effect of different herbicides on weed population and yield of maize were carried out on sandy clay loam soil at Adaptive Research Model Farm, Quetta during 1998. The experiment was laid out in a Randomized Complete Block Design (RCBD) with four replications. The net plot size was 3.6 m X 8 m. Maize variety "Sunehri" was grown as a test crop. The crop was sown in the month of June using a seed rate of 35 kg ha:' in 75 cm apart rows with plant to plant distance of 25 cm. The experimental treatments comprised 1) Gesaprim 80 WP (Altrazine @ 2.5 L ha:' applied post-emergence), 2) Gramaxone 20 EC (paraquat) @ 2.5 L he'ı (post-emergence), 3) Basta 20 SL (glufosinate ammonium) @ 2.5 L ha:' (post-emergence), 4) Bladex plus (Aatrex 80 X + Bladex 75 WP)@3.5Lha·1. (post-emergence), 5) Primextra 50 WP (Altrazine + Metolochlor) @ 3 L ha" (pre-emergence), 6) Banvel-P, a-I (Dicamba 21 g/lit + Mecoprop32nit) @ 4 L ha·1 (post-emergence), 7) Stomp 330 E (Pendimethaline) @ 3.5 L ha? (pre-emergence) and 8) control (weedy check).

The herbicides were sprayed with the help of knap sack sprayer cp-3 fitted with four flat fan 8003 number nozzles on a specially made boom, directed post-emergence sprays using polijet tips with a shield employed for knap sack spraying. Drift was minimized by using these nozzles with shield.

An area of one meter square from two different places was ear marked at random in each plot for recording maize germination count and weed population. Initial weed population was recorded just before spraying. The second weed population was recorded twenty days after weedicides spray to calculate mortality percentage. The data on various parameters were recorded during the course of studies following standard procedures. The data collected were analyzed statistically by using appropriate statistical methods (Steel and Torrie, 1980).

## RESULTS AND DISCUSSION

The data regarding the weed population and mortality of weeds (Table 1) indicated that weed population was significantly decreased by the application of different herbicides. All the herbicides reduced weed population considerably over the check. Gesaprim 80 WP and Gramaxone 20 EC were more effective in suppressing weed density compared to rest of the treatments. These two treatments, however, did not differ significantly from each other. Amongst the post-emergence herbicides treatments, Gesaprim 80 WP and Gramaxone 20 EC were found quite effective in suppressing almost all types of weeds while Primextra 50 WP and Stomp 330 E were efficient against broad leaved weeds. These results are in consonance with the findings of Hill *et al. (1974).*

The height of maize plants was not affected significantly by different herbicide treatments. However, the plant height on the average varied from 208.10 to 220.28 cm. These results are contradictory to the findings of Silva *et al.* (1982) who reported that with the application ofweedicides, plant height was reduced.

None of the herbicide treatments showed significant effect on number of cobs per plant.. This might be due to the fact that this character is genetically controlled and is little influenced by the environmental conditions. These results are contradictory to the findings of Singh *et al.* (1986) who reported higher number of cobs per plant in plots treated with herbicides. The number of grains per cob plays an important role in determining the final yield of maize. The data revealed that number of grains per cob varied significantly (Table 1). Maximum grains per cob were recorded in plots treated with Gramaxone or Basta 20 producing 16.30 and 15.55 grains per cob, respectively against the minimum of 13.70 in weedy check. The data on l000-grain weight indicated significant differences among all the herbicide treatments over weedy check but the differences among the herbicide treatments were non-significant.

The grain yield was significantly affected by different herbicides. Weedicide by reducing weed density, increased the grain yield. The highest grain yield (5.16 t ha-I) was obtained from the plots treated with Gramaxone 20 EC and was at par with Gesaprim 80 WP (4.16 t ha"), Basta 20 (4.75 t ha") and Bladex plus (4.44 t ha:·) against the minimum (3.44 t ha") from control plots. The increase over control was found from 14 and 50 %. These results are in consonance with the findings of Tomordi *et al.* (1987) who reported significant increase in grain yield of maize with the application of herbicides.

Conclusion: The effects of herbicides on weed mortali1y, number of grains per cob, lOOO-grain weight and grain yield were favourable to the agricultural productivity of maize. The increase in grain yield was about 14 - 50 % compared to that from the control.

Table 1. Effect of different herbicides on weed population, yield and yield components of maize

| Treatments | Weed mortality (%) | Plant height at harvest (cm) | Cobs/plant (No) | Grain/cob (No) | l000-grain weight (g) | Grain yield (t ha:·) |
|---|---|---|---|---|---|---|
| Gesaprim 80 WP @2.5Lha-:. (post-emergence) | 86.05 a | 220.28b | 1.50NS | 665.10 a | 256.07 a | 4.16a |
| Gramaxone @2.5Lha'· (post-emergence) | 81,87 a | 218.58b | 1.02 | 646.35 a | 254.40 a | 5.16a |
| Basta20 L @2.5Lha'· (post-emergence) | 75,40 a | 215.00b | 1.02 | 632.30 a | 247.63 a | 4.75 a |
| BladexPlus @3.5Lha'· (post-emergence) | 79.75 a | 215.15b | 1.00 | 628.10bc | 249.29 a | 4.44 a |
| Primextra 50 WP @3.00Lha'l (Pre-emergence) | O.OOb | 214.99b | 1.00 | 623.55b | 243.80 a | 4.0000 |
| Banvel-P @4.0Lha'l (post-emergence) | 72,34 a | 212.lOb | 1.00 | 618,45b | 242.79 a | 3.99bc |
| Stomp 330 E @3.5Lha'l (Pre-emergence) | O.OOb | 212.88b | 1.00 | 611,45bc | 240.99 a | 3.94c |
| Control (weedy check) | O.OOb | 208.10b | 1.00 | 662.90c | 227.28b | 3.44c |

Means in a column not sharing a letter in common differ significantly at pSO.05. NS = non significant

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