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RESEARCH ARTICLE

EFFECT OF WEEDS ON THE YIELD OF MAIZE CROP IN TEHSIL NOWSHERA DISTRICT RAJOURI, J&K

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ABSTRACT

The present communication pertains to the effect of weeds on the yield of maize crop in tehsil Nowshera, district Rajouri (J&K).The study was conducted during June to November, 2010. During this course the authors have selected two plots of 01 hectare each (P1 and P2) in village Jaba (irrigated area) of tehsil Nowhera. The plot P1 was marked as Weed Free plot (WF) and P2 as Weedy Plot (WP). Both the plots were ploughed and the seed beds were prepared by adding equal amount of NPK fertilizer (Urea150 kg, DAP 100 kg and Potash 40 kg/hec.). Same variety of maize seeds was sown in both the plots during second week of June, 2010. Nitrogen fertilizer urea was given in split doses (50kg before sowing, 50 kg, 40 DAS and 50 kg at tassel stage). In plot P1 (WF) 2 days after sowing the herbicide Atrazine was sprayed @ 1.2 kg/ hq.,hoeing and earthingup was done twice (first 20 DAS and second 40DAS) deweeding (hand pulling and eradicating weeds with the help of digger and sickle) was done during the month of Aug.-Sept., 2010. In plot P2 (WP) no herbicide was sprayed, only one hoeing was done (20 DAS) and no deweeding operation was carried, as a result 38 weeds were reported from this plot. After ripening the crop was harvested (during first week of Nov., 2010) from both the plots and threshed separately. The grains collected in different bags were weighed. The weeds compete with maize crop in plot P2 (WP) and reduced the yield by 30.61%.

INTRODUCTION

Weeds are unwanted plants growing along with agricultural crops. The concept of weeds as unwanted plant was developed when man started to grow plants for their own purposes. Holm, et.al 1979 estimated 250 weed species which are important for agricultural crops throughout the world. As cropland is an artificial ecosystem where the plants desired by man (crops) are cultivated but the weeds do come up and competes with crops mainly for space, sunlight, moisture, nutrients and reduces the quantity as well as quality of production. The competition of weeds for nutrients may results in such obvious responses as dwarfing in plant size, nutrient starved conditions, wilting and actual dying out of plants (Anderson 1996). Weed seeds germinate earlier to agricultural crops, their seedlings grows faster and aggressive so that they crowd out all other plants which possesses more valuable properties and establish a kingdom of their own within a short period of time. Weed species mature ahead of crops so that their seeds are collected with the crop harvest and get distributed to other places. Some weed species caused damage to crops by harboring pests and disease agents'.

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Younkin 1942 and Peters 1955 reported that weeds acts as host for bacteria, viruses and nematodes that causes diseases in crop plants. Weeds show allelopathic effects on agricultural crops by secreting allelochemicals that inhibit their growth and germination (Oudhia, P. and Tripathi, R.S. 1998a). The weedy crop may sometime leads to complete failure. The cost of removing weeds adds to the cost of production of crops, thus producers losses part of their investment and the country suffers a reduction in agricultural products.

Maize (*Zea mays* L.) is third most emerging crop after wheat and rice in India, beside its use for human food it is a source for number of industrial products like animal feed, maize corn starch, corn oil, baby corn and pop corn etc. Being staple food it plays an important role in the economy of India, hence occupies a central position in agricultural policy making. The average per hectare yield of maize is less as compared to other advanced countries due to many factors (lack of irrigation, quality of germplasm, availability fertilizers and ecological conditions etc.) out of which the problem of weeds is also prominent. Sharma and Nautiyal (1993) reported that weeds reduced the yield of maize crop in India by 58.80% which is more than the combined losses caused by insects, pests and diseases.

The study area is located at an elevation range of 470-1200 m. asl and situated at latitude of 33^{O} -10' and longitude of 74^{0}-41'. The boundaries of tehsil Nowshera, is bounded on the eastern side with Kalakote and Sunderbani blocks, on the northern side with Rajouri, its southern and western boundaries are bounded with Pakistan.

MATERIAL AND METHODS

The present study was undertaken to find out the effects of weeds on the yield of maize crop. The study was conducted in village Jaba (irrigated area) of tehsil Nowshera during the months June to November 2010. During the course of study the authors have selected two plots (P1 and P2) of 01 hectare each. Both the plots were ploughed with the help of tractor, the exposed weed roots, rhizomes and other germplasm were collected and burned. The seed beds were prepared by adding equal amount of NPK fertilizer (Urea 150 kg, DAP 100 kg, Potash 40 kg/hq.). In both the plots the rows were prepared with equal space of 60× 25cm (space of 60cms between two adjacent rows and 25 cm between two plants). The plot (P1) was marked as weed free plot (WF) and plot (P2) as weedy plot (WP). In both the plots (P1 and P2) the maize seeds of Dekalab (double hybrid) variety were sown during second week of June, 2010. The nitrogen fertilizer (Urea) was given in split doses (50 kg before sowing, 50 kg 40 DAS when the crop reached at knee stage and 50 kg at tassel stage). In plot P1 (WF) 2 days after sowing (before emergence) the herbicide Atrazine was sprayed @ 1.2 kg/hq for eradication of weeds and two hoeing were done (with the help of digger) at an interval of 20 days (first20 DAS and second 40 DAS when the crop reached at knee stage) The de-weeding (hand pulling and eradicating weeds with the help of digger and sickle) was done during the month of Aug.-Sept., 2010. In plot P2 (WP) no herbicide was sprayed, only one hoeing was done (20DAS) and no de-weeding (hand pulling and eradication of weeds with the help of digger and sickle) was done during the month of Aug.-Sept., 2010. After ripening the crop was harvested from both the plots (P1 and P2) during first week of November and cobs were kept separately. The cobs of two plots were threshed and the grains were collected in different bags. The grains from two plots (P1 and P2) collected in different bags were weighed separately to determine the effect of weeds on the yield of maize crop.

RESULT AND DISCUSSIONS

A good yield of maize crop was obtained from Weed Free plot (WF) as compared to Weedy Plot (WP). A total of 50.4 quintal of maize grains was obtained from Weed Free Plot (WF) and 34.9 quintal from Weedy Plot (WP). This clearly indicated that weeds compete with maize crop in plot (P2) for space, sunlight, moisture, nutrients and hence reduced the yield of maize crop. Moreover, the grains of plot (P2) were contaminated with weed seeds and were of low quality. The percentage (%) of yield loss can be calculated by using the following formula: - {Total amount of Maize grains obtained from Weed Free plot (WF) – Total amount of Maize grains obtained from Weedy Plot (WP) ÷Total amount of Maize grains obtained from Weed Free plot (WF)} ×100 (Dangwal et.al. 2010).

$$= \{50.3\text{-}34.9 \div 50.3\} \times 100$$

$$=15.4 \div 50.3 \times 100$$

$$=30.61\%$$

Thus the weeds reduced the yield of maize crop by 30.61% in village Jaba of tehsil Nowshera. The yield of Maize crop in plot P1 (WF) and P2 (WP) is indicated in Fig. A and the reduction of crop yield in plot P2 (WP) is shown in Fig. B

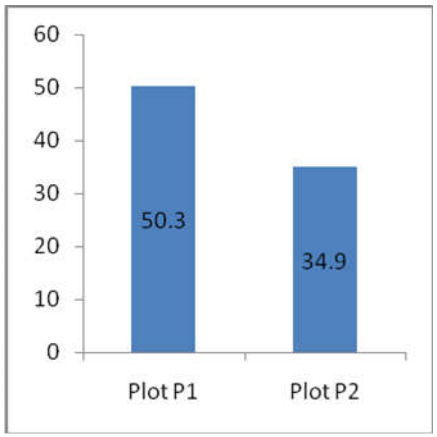

Fig. 1. The yield of maize crop in terms of quintal in plot P1 and P2.

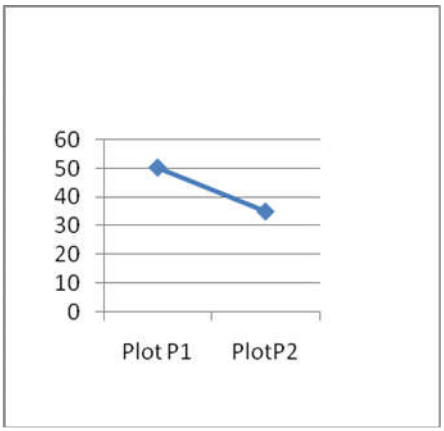

Fig. 2. Decrease in yield of maize crop in Plot P2 (WP)

Maize is the major kharif crop of tehsil Nowshera, but along with maize paddy is also grown on small scale. The economy of this tehsil revolves around production of its cash crops but the per hectare yield is less as compared to other parts of India due to many factors out of which the factor of weeds is of great concern. In the study area it has been observed that weeds reduces the yield of maize crop by 30.61% and caused enormous loss to the producers. In plot P1 (WF) the yield of maize crop was 50.3 quintal because 2 days after sowing (before emergence of seedlings) the herbicide Atrazine was sprayed @ 1.2 kg/hq. Which eradicates the weeds at early stages of competition and two hoeings and earthingups were done (first 20 DAS and second 40 DAS when the crop reached at knee stage). The de-weeding operation (hand pulling and eradicating weeds with the help of digger and sickle) done during the month of Aug.-Sept., 2010 also help in eradicating the remaining weeds. But in plot P2 (WP) where equal amount of NPK fertilizer was added and same variety of maize seeds were sown the yield of crop was 34.9 quintals because no

herbicide was sprayed only one hoeing was done (20 DAS) and no de-weeding was done due to which 38 weed species grow and competes with crop plants for space, sunlight, moisture, nutrients and thus reduced the yield by 30.61% besides reducing the yield they also reduces the quality of germplasm because the grains of plot P2 (WP) were contaminated with weed seeds. The 38 weed species reported from plot P2 *are Achyranthes aspera, Amaranthus tricolor, Aubtilon indicum, Bidens bipinnata, Boerhaavia diffusa, Crotalaria medicaginea, Cassia occidentalis, Cassia tora, Celosia argentea, Cleome viscosa, Commelina benghalensis, Cyanotis vaga, Cynodon dactylon, Digitaria ciliaris, Digera muricata, Elusine indica, Echinochloa colona, Euphorbia indica, Euphorbia geniculata Gomphorena celosioides*, *Ipomoea pes-tigridis, Ipomoea nil, Ipomoea purpurea, Leucas cephalotes, Malvestrum coromandelianum, Oxalis corniculata, Oldenlandia corymbosa, Portulaca oleracea, Physalis minima, Solanum nigrum, Solanum xanthocarpum, Phyllanthus urinaria, Sida cordata, Sida cordifolia, Tribulus terrestris, Trianthema portulacastrun*, *Triumfetta rhomboidea Xanthium stramorium.* Although some weed species reported from plot P2 *i.e. Achyranthes aspera, Cassia occidentalis, Cassia tora*, *Commelina benghalensis*, *Cynodon dactylon*, *Phyllanthus urinaria* are of medicinal importance used in pharmaceutical industries. The present investigations may be helpful for farmers and agriculturists to find out the effects of weeds on the yield of maize crop and also helps in finding the role of herbicides in controlling the weeds. It also helps the scientists involved in the management of weeds. Further research work is needed in the fields of weed control, weed biology and weed utilization as the component of integrated weed management.

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