Research Paper

A Survey of Weed Flora in Maize fields of district Rajouri (J&K), India
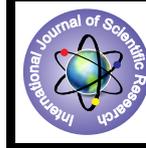
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ABSTRACT *The present study was conducted to explore the weed flora in maize fields of district Rajouri (J&K) .The study was based on extensive and intensive field surveys made in different months of Kharif seasons from 2009-2011. During the course of field study the authors have selected 6 important agricarian blocks in district Rajouri i.e. Budhal, Rajouri, Thanamandi, Manjakote, Nowshera and Sunderbani. Three sites were selected in each block for survey of weed flora.During the study period the authors have reported a total of 104 weed species belonging to 03 monocot and 30 dicot families. Out of 33 families of weeds reported from the selected sites the predominance was shown by monocot family Poaceae having 16 weed species followed by dicot families Amaranthaceae and Asteraceae each having 12 and 10 weeds respectively.*

Introduction

Weeds are undesirable plants growing along with domesticated crops. They are non -indigenous plants that can invade or negatively alter native plant communities (Muhammad et al., 2009). They reduce available moisture,nutrients,sunlight and growing space needed by crop plants. Their presence can reduce crop growth, quality and yield in addition they can make harvest difficult. Weeds are hard to control, because they grow rapidly produce vast numbers of seeds and spread aggressively by vegetative structures and seeds, which enables them to establish a kingdom of their own within a short period of time (Dangwal et al. 2010).Weed cause economic loss to the producers as they lose part of their investment. They show allelopathic effects on agricultural crops by secreting allelochemicals that inhibit the growth and germination of agricultural crops (Oudhia and Tripathi, 1998, a, b).

Maize (Zea mays L.) is the 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 (Dangwal et al. 2011). The average per hectare yield of maize in India is less as compared to other advanced countries due to many factors like lack of irrigation, quality of germplasm, availability of fertilizers and ecological factors etc. Out of which the problem of weeds is the major barrier in the loss of production.). Earlier it was reported from the study area that weeds reduce the yield of maize crop by 30.61% (Dangwal et al. 2011).

Study area

The study area is located at western part of Jammu division in the foot hill of Pir panjal range. It lies in between 320-58' & 330-35' latitude and 740-81' longitude at an elevation range of 470 – 6000m asl. covering an area of 2630 sq. kilometers.

Fig. 1. Map showing the Study Area

Material and methods

The present study was conducted to find out the weed flora in maize fields of district Rajouri (J&K) .The study was based on extensive and intensive field surveys made in 6 agricarian blocks of district Rajouri (i.e. Budhal, Rajouri, Thanamandi, Manjakote, Nowshera and Sunderbani) during different months of Kharif seasons of 2009-11.Three sites were selected in each block for survey of weed flora and Periodic field trips were made twice a month in each site for collection of weed species. During the period of study the farmers and agriculturists of each site were interviewed about seasonal weeds and their flowering and fruiting season. The collected weed plants were pressed, dried, preserved and properly identified with the help of available literature, monographs by Sharma and Kachroo (1983), Swami and Gupta (1998), Kaul (1986) and confirmed from the authentic regional herbaria i.e. Botanical Survey of India, Northern Circle (BSD), Dehradun and Forest Research Institute Herbarium (DD), Dehradun and deposited them in the H.N.B. Garhwal Central University Herbarium, Department of Botany, S.R.T. Campus, Badshahithaul, Tehri Garhwal, Uttrakhand, India.

Result and discussion: - During the study period the authors have reported a total of 104 weed species belonging to 03 monocot and 30 dicot families. Out of 33 families of weeds reported from the selected sites the predominance was shown by monocot family Poaceae having 16 weed species followed by dicot families Amaranthaceae and Asteraceae each having 12 and 10 weeds respectively, while the family Euphorbiaceae contained 6 weeds. The family Convolvulaceae, was represented by 05 weed species while each of the family Fabaceae, Malvaceae, Solanaceae and Scrophulariaceae contained 04 weeds. The families Commelinaceae, Cucurbitaceae were represented by 03 weed species each while the families Apiaceae, Caesalpiniaceae ,Cyperaceae, Lamiaceae, Lythraceae, Nyctaginaceae Oxalidaceae, Polygalaceae, Rubiaceae and Tiliaceae contained 2 weed species each. The remaining families like Aizoaceae, Cleomaceae, Cuscutaceae, Menispermaceae, Mollugoginaceae, Polygonaceae, Portulacaceae, Ranunculaceae, Sapindaceae, Urticaceae, Zingiberaceae and Zygophyllaceae were represented by 01 weed species (Table-1).

District Rajouri is one of the important hilly district of J&K state whose economy is based on production of agricultural crops. Majority of people of this district rely on agriculture as a source of livelihood. Maize is the major Kharif crop grown in this district but the per hectare yield of maize is less as compared to other parts of India due to heavy weed infestation. During the study period it was reported that the weeds like Ammania baccifera, Commelina benghalensis, Cyanotis vaga, Celosia argentea,, Digera muricata, Echinochloa colona, Eleusine indica, Setaria glauca, Physalis minima and Trianthema portulacastrum etc. were the most frequent weeds found in all the selected sites. The most common and densely populated weed species was Echinochloa colona. Majority of the weeds

reported from the maize fields were herbs. The climbing weeds like Ipomoea nil, Ipomoea purpurea and Ipomoea pes –tigridis etc.crawl around the maize plants and cover their canopy from all the sides. Their vegetative growth is so vigorous that whenever their weight exceeds they break the crop plants and cause heavy loss to crop. Earlier Sharma and Nautiyal (1993) studied the weed management in maize and black gram intercropping in midhills of Himachal Pradesh and reported that weeds reduced the yield of maize crop by 58.80% which is more than the combined losses caused by insects, pests and diseases. Shailey and Gaur (1993) studied the phyto-sociological association of crops and weeds of Pauri district of Utatrakhand, they reported 180 weed species belonging to 50 angiospermic families, the maximum dominance was shown by families Commelinaceae and Poaceae among maize crop. Sandhu et al. (1999) studied the weed composition in maize fields of Punjab and reported 75 weed species; the predominant weeds associated with the crop were Eleusine aegyptiacum, Eragrostis tenella, Trianthema portulacastrum, Digera arvensis and Cyperus rotundus etc. Our findings are in a greater analogy with the previous work of Kaul (1986) who studied the weed flora of Kashmir valley and reported 401 weed species. The present investigation is localized in a limited area of the district Rajouri, hence the flora is less diverse. Although some of the weeds reported from the study area i.e. Achyranthes aspera, Boerhavia diffusa, Cassia occidentalis, Cassia tora, Cleome viscosa, Commelina benghalensis, Cynodon dactylon and Eclipta alba etc. are of medicinal importance used in pharmaceutical industries. The weeds like Commelina benghalensis, Cyanotis vaga, Eleusine indica, Setaria glauca, Setaria verticillata, Heteropogon contortus, Digitaria ciliaris and Paspalum distichum etc. are used as fodder in the study area. The weeds like Crotalaria medicaginea, Portulaca oleracea and Solanum nigrum etc. are used for certain cooking recipes in the study area.

Table 1. Showing 104 weed species along with their Families, Botanical names Flowering and Fruiting seasons.

S. no	Family	Botanical Name	Flowering and Fruiting Season
1	Aizoaceae	Trianthema portulacastrum L.	Jun.-Dec.
2	Amaranthaceae	Achyranthes aspera L.	Mar.-Dec.
		Alternanthera sessilis L.	Feb.-Oct.
		Alternanthera pungens Humb.	July-Nov.
		Amaranthus anardana Buch.	Aug.-Oct.
		Amaranthus spinosus L.	Jul.-Dec.
		Amaranthus caudatus L.	Aug.-Nov
		Amaranthus paniculatus L.	July-Nov.
		Amaranthus tricolor. L.	Aug.-Nov.
		Celosia argentea L.	Aug.-Dec.
		Cyathula tomentosa Roth.	July-Nov.
		Digera muricata L.	Aug.-Oct.
		Gomphorena celosioides Martius.	Mar.-Dec.
3	Asteraceae	Acanthospermum hispidum DC.	Jan.-Jul.
		Ageratum conyzoides L.	Mar.-Dec.
		Bidens bipinnata L.	Mar.-Dec.
		Bidens tripartita L.	Feb.-July.
		Eclipta alba L.	Jan.-Dec.
		Gnaphalium affine D.Don	Throughout the year.
		Gnaphalium luteo-album L.	Apr.-Dec.
		Parthenium hysterophorus L.	Throughout the year.

		Tridax procumbens L.	Jan.-Dec.
		Xanthium strumarium L.	July-Dec.
4.	Apiaceae	Bupleurum falcatum L.	Jul.-Sept.
		Pimpinella diversifolia Dc.	Jul.-Oct.
5.	Caesalpiniaceae	Cassia occidentalis L.	May-Nov.
		Cassia tora L.	Apr.-Dec.
6.	Cleomaceae	Cleome viscosa L.	July-Oct.
7.	Commelinaceae	Commelina benghalensis L.	July-Nov.
		Murdannia nudiflora L.	Aug.-Nov.
		Cyanotis vaga Lour	July- Oct.
8.	Convolvulaceae	Ipomoea eriocarpa R.Br.	July- Oct.
		Ipomoea nil (L.) Roth.	Mar.-Dec.
		Ipomoea pis -tigridis L.	July-Dec.
		Ipomoea purpurea L.	Feb.-Oct.
		Ipomoea triloba L.	July-Dec.
9.	Cuscutaceae	Cuscuta reflexa Roxb.	Jan.-Dec.
10.	Cucurbitaceae	Diplocyclos palmatus L.	Aug.-Nov.
		Momordica dioica Roxb.	Aug.-Dec.
		Trichosanthes cucumerina L.	July- Oct.
11.	Cyperaceae	Cyperus esculentus L.	July-Dec.

		Cyperus rotundus L.	July-Dec.
12.	Euphorbiaceae	Acalypha ciliata Forsk.	Aug.-Dec.
		Euphorbia geniculata Ortega.	Feb.-Aug.
		Euphorbia hirta L.	Jan.-Dec.
		Euphorbia indica Lam.	Mar.-Dec.
		Euphorbia prostrata Aiton.	Jan.-Dec.
		Phyllanthus urinaria L.	Apr.- Dec.
13.	Fabaceae	Alysicarpus bupleurifolius(L.)DC.	Aug.-Dec.
		Alysicarpus vaginalis (L.)DC.	Sept.-Oct.
		Crotalaria medicaginea Lam.	Apr.-Aug.
		Uraria picta Jacquin.	Aug.-Oct.
14.	Lamiaceae	Leucas cephalotes Roth.	July-Nov.
		Leucas lanata Benth.	Throughout the year.
15.	Lythraceae	Ammania baccifera L.	Aug.-Dec.
		Ammania multiflora Roxb.	Aug.- Nov.
16.	Malvaceae	Abutilon indicum L.	Apr.-Aug.
		Malvastrum coromandelianum L.	Throughout the year.
		Sida cordifolia L	Rainy season.
		Sida acuta Burm.F.	Aug.-Nov.
17.	Menispermaceae	Tinospora cordifolia (Willd.) Hook	Feb.-July

18.	Mollugogiaceae	Mollugo pentaphylla L.	Aug.-Nov.
19.	Nyctaginaceae	Boerhavia diffusa L.	Aug.-Dec.
		Boerhavia verticillata Poir.	Aug.-Nov.

20.	Oxalidaceae	Oxalis corniculata L.	Throughout theyear.
		Oxalis latifolia Kunth	Rainy season.
21.	Poaceae	Arthraxon lancifolius Trinius	Sept.-Nov.
		Cynodon dactylon L.	Jan.-Dec.
		Dactyloctenium aegypticum (Linn.) P. Beauv.	May.-Nov.
		Digitaria ciliaris Retz.	Aug.-Nov.
		Echinochloa colona L.	July-Oct.
		Eleusine indica L.	July-Nov.
		Eragrostis japonica (Thumb) Trinius	July-Oct.
		Heteropogon contortus L.	Aug.-Nov.
		Panicum ramosum L.	Aug.-Sept.
		Paspalum distichum Acut.	Mar.-Dec.
		Saccharum rufipilum Steud.	Aug.-Nov.
		Setaria geniculata Lam.	Sept.-Nov.
		Setaria glauca L.	Aug.-Nov.
		Setaria verticillata L.	Aug.-Oct.
		Sorghum halepense (L.) Pers.	Sept.-Nov.

		Tragus racemosus Hook.	July-Dec.
22.	Polygalaceae	Polygala abyssinica R.BR.	Aug.-Oct.
		Polygala arvensis Willd.	Jun.-Oct.
23.	Polygonaceae	Rumex hastatus D.Don.	June-Oct.
24.	Portulacaceae	Potulaca oleracea L.	Apr.-Sept.
25.	Ranuncu-laceae	Thalictrum foliolosum DC.	Jul.-Oct.
26.	Rubiaceae	Oldenlandia corymbosa L.	July-Nov.
		Rubia manjith Roxb.	July-Nov.
27.	Sapindaceae	Cardiospermum halicacabum L.	July-Nov.
28.	Scrophulari-aceae	Lindernia ciliata Colsmann	Jun.-Dec.
		Lindernia crustacea (L.) F.V.Mueller	July-Nov.
		Mazus pumilus (Burm F.) Vam.Steen	Mar.-Nov.
		Torenia cordifolia Roxb.	July-Oct.
29.	Solanaceae	Nicandra physalodes (Linn.) Gaertn.	July-Aug.
		Physalis minima L.	Jun.-Dec.
		Solamun nigrum L.	Throughout the year.
		Solanum surattense Burm.	Mar.-Dec.
30.	Tiliaceae	Corchorus aestuans L.	July-Nov.
		Triumfetta rhomboidea Jacq.	Aug.-Nov.
31.	Urticaceae	Pouzolzia hirta Blume	July-Oct.
32.	Zingiberaceae	Roscoea procera Wallich	Jul.-Sept.

| 33. | Zygophyl-laceae | Tribulus terrestris L. | July-Nov. |

1. Ipomoea purpurea   2. Ipomoea eriocarpa

3. Ipomoea pis -tigridis   4. Digera murica

5. Celosia argentea   6. Leucas cephalotes

7. Crotalaria medicaginea   8. Trianthema portulacastrum

9. Echinochloa colona 10. Lindernia crustacea

11. Tribulus terrestris   12. Setaria verticillata

Plates 1-12. Showing photographs of weeds captured during the Survey.

REFERENCE   Dangwal, L. R., Singh, A., Singh, T., & Sharma, A. (2011). Diversity of weed species in wheat fields of block Nowshera district Rajouri (J&K).Short communication. Indian Journal of Weed Science. 43(1&2):94-96. | Dangwal, L. R., Singh, A., Singh, T., & Sharma, A. (2011). Effect of weeds on the yield of maize crop in tehsil Nowshera district Rajouri J&K. Special Issue International Journal of Current Research 3 (7) 68-70. | Dangwal L. R., Singh, A., Singh, T., & Sharma, C. (2010). Effects of weeds on the yield of wheat crop in tehsil Nowshera. Journal of American science 6(10), 405-407 | Dangwal L. R., Singh, A., Singh, T., Sharma, A., & Sharma, C. (2010). Common Weeds of Rabi (Winter) Crops of Tehsil Nowshera district Rajouri (J&K), India. Pakistan Journal of Weed Science Research 16(1):39-45. | Kaul, M. K. (1986). Weed flora of Kashmir valley. Scientific Publishers: Jodhpur, India. | Muhammad, S. Z., Khan, T., & Cheema A. (2009). Distribution of Weeds in Wheat, Maize and Potato fields of Tehsil Gojra, District Toba Tek Singh, Pakistan. Pakistan Journal of Weed Science Research 15(1): 91-105. | Oudhia, P., & Tripathi, R. S. (1998b). Allelopathic potential of Datura stramonium L. Crop Research. 16(1): 37-40. | Oudhia, P., & Tripathi, R. S. (1998a). Allelopathic effects of Parthenium hysterophorus L. on kodo, Mustard and problematic weeds. First International Conference on Parthenium management. 11. UAS, Dhaward. India. 6-8 Oct. 1997: 136-139. | Sandhu, K., Singh, T., & Singh, S. (1999). Weed Composition of Maize (Zea mays) fields in Punjab. Indian Journal of Weed Science (31) 1-2. | Shailey, D., & Gaur, R. D. (1993). Phyto-sociological studies of crops and weed association of Pauri district. Ph.D. Thesis submitted in Department of Botany. H.N.B. Garhwal, Central University, Srinagr, Garhwal, Uttarakhand, India. | Sharma, B. M., & Kachroo, P. (1983). Flora of Jammu and plants of neighbourhood. Bishen Singh, Mahendrapal Singh, Dehradun, India. | Sharma, J., & Nayital, S. C. (1993). Weed management in maize and black gram intercropping In mid hills of H.P. Indian Journal of Weed Science 25(1&2): 43-46. | Swami, A., & Gupta, B. K. (1998). Flora of Udhampur. Bishan Singh, Mahenderapal Singh, Dehradun, India. |