International Journal of Scientific Research in Biological Sciences
Vol.7, Issue.6, pp.147-150, December (2020)
Research Paper
E-ISSN: 2347-7520

Investigation of Weeds in Wheat Crops of Tehsil Kotli, Kotli Azad Jammu and Kashmir, Pakistan

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Available online at: www.isroset.org

Received: 01/Dec/2020, Accepted: 10/Dec/2020, Online: 31/Dec/2020

Abstract—Weed infestation is one of the most drastic factors which adversely affects the grain quantity as well as quality in cereal crops like wheat, which is a worldwide cultivated staple food crop. The aim of this research was to survey the weed species found in wheat growing in tehsil Kotli. The survey was performed from seeding to harvest during the wheat campaign 2019-2020. Thirty one weed species belonging to twenty six genera and sixteen families were reported. Most weed species (26%) belonged to the Asteraceae family followed by Poaceae (13%), Brassicaceae (10%), Polygonaceae (10%) and Papaveraceae (6%). Other minor families found belonged to Amaranthaceae, Apiaceae, Caryophyllaceae, Cyperaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Oxalidaceae, Primulaceae, Ranunculaceae and Saxifragaceae. Rumex genus was the most represented by four species followed by Cirsium, Fumaria and Lepidium. Controls of these weeds require awareness of farmers about the use of ecofriendly methods (i.e. physical, biological and crop rotation) in a weed integrated management.

Keywords— Weed's diversity, Kotli AJK, Wheat, Economy, Invasive Species, Parthenium

I. INTRODUCTION

Wheat occupies the central position among the cereal crops round the globe. It's the most important cereal crop of Pakistan. According to the Pakistan bureau of statistics (PBS), in 2018-19, it was cultivated on about 8.75 million Hector area of Pakistan [1]. Pakistan occupies 8th position among the most wheat producing countries, about 3.35% of the world's wheat production. Various biotic and abiotic factors reduce its production rate. Among biotic factors, weeds are considered as most infesting agents which adversely lower the quantity as well as quality of crops [2]. Weeds are the unwanted plant species present in crops which invade and reduces yield, as they compete with the main crop for space, light, nutrients and water etc. [3]. Weeds not only directly participate in lowering the production, but also attract insects which attack on crops and further reduce yield [4].

Weeds adversely affect the economic status of a country which ultimately leads to poverty and hunger in undeveloped and developing like African and Asian countries. In Pakistan, they cause about 28 billion PKR annual losses to wheat crop alone and overall about 130 billion PKR annual losses [5]. In Australia and USA, an annual loss of about 3.3 and 138 billion dollars respectively, were reported due to weed infestation in crops [6], [7]. Different researchers and investigators had reported various weed species from different regions of the country. Among all weeds *Parthenium hysterophorus* is adversely affecting the flora and fauna of the country, due to occurrence of allelo chemicals in it [8].Weeds may be of grassy or sedge type belongs to monocot and dicot families [9].

Weeds are ubiquitous, due to a lot of flexibility in their genome, they have potential to grow and dominate in veriety of habitats in a very short period. Various methods like physical, chemical, biological and crop rotation methods are used round the globe for the management of weeds [10]. All methods are effective to a limited range and are applied according to the invasiveness of weeds. As, due to occurrence of variety of allelo chemicals they not only adversely affect the production quantity and quality, but also adversely affects the climate and flora and fauna of the locality [8]. Mostly weeds have common allergic effects on humans. They should manage in eco-friendly way. So, we and our biodiversity remain safe.

II. METHODOLOGY

The present study was designed from sowing to harvesting period (November 2019 to April 2020) of Wheat, *Triticum aestivum*, for the documentation of weeds, by survey, of selected areas of tehsil Kotli of district Kotli which is renowned district of AJK [11].

II.I. STUDY AREA

Soil of tehsil Kotli is very fertile from the agriculture point of view. The focus was on major cultivated areas of Kotli which were selected for research after a general survey of various cultivated sites of tehsil Kotli (as shown in Fig. 1).

In this regard, twelve villages viz. Sarhota No. 2, Samror, Choki-Moong, Roli, Dhamool, Dana, Maneel, Fagoosh, Baralli, Sarda, Kurti and Kohmar were selected and visited for the observation and collection of samples.

Figure 1, Map of study area.

II.II. Sample Collection

Weed samples were collected, by proper scientific way, from the fields of wheat, *Triticum aestivum*, of selected areas, during the course of study. Specimens were also captured on camera.

II.III. Plant Identifecation

Identification of specimens was done on the morphological basis. Specimens were confirmed by matching with the available taxonomic literature [12], [13] and also by the help of online various weed science and other plant science websites **[14], [15], [16], [17]**.

II.IV. Statistical Analysis

The data was statistically analysed, summarized and graphically presented by using Microsoft Excel 2017.

III. RESULTS AND DISCUSSION

Table 1, List of weeds, reported from the investigated areas of tehsil Kotli, AJ&K

Botanical Name	Family	Local/ vernacular name	English name
Anagallis arvensis L.	Primulaceae	Phool booti	Pimpernel,
Avena fatua L.	Poaceae	Jangli joo	Wild oat
Calendula arvensis (Vaill.) L.	Asteraceae	Gul-e-sharfi	Field marigold
Capsella bursapastoris (L.) Medik	Brassicaceae	Booti	Shep-herd's purse
Centaurea iberica Trevir. & Spreng.	Asteraceae	Kandarii	Iberian knapweed
Chenopodium album L.	Amaranthaceae	Booti	Goose foot
Cirsium arvense (L.) Scop	Asteraceae	Booti	Field thistle
Cirsium vulgare (Savi) Ten.	Asteraceae	Booti	Bull thistle
Cynodon dactylon (L.) Pers.	Poaceae	Khabal	Crab grass
Cyperus rotundus L.	Cyperaceae	Ghass, kaa	Purple nutsedge
Digitaria sanguinalis (L.) Scop	Poaceae	Khabal, ghass	Crab-grass
Euphorbia helioscopia L.	Euphorbiaceae	Dhoodal booti	Sun-spurge
Fumaria indica Pugsley	Papaveraceae	Papara	Indian-fumitory
Fumaria officinalis L.	Papaveraceae	Papara	Indian fumitory
Heuchera richardsonii L.	Saxifragaceae	Booti	Alum root
Lamium amplexicaule L.	Lamiaceae	Phool booti	Henbit
Lepidium apetalum Willd	Brassicaceae	Booti	Pepper weed
Lepidium densiflorum Schrad.	Brassicaceae	Booti	Pepper weed
Malvastrum coromandelianum (L.) Garcke	Malvaceae	Booti	----------
Oxalis corniculata L.	Oxalidaceae	Booti	Yellow sorrel
Parthenium hysterophorus L.	Asteraceae	Gajar booti	Santa maria
Phalaris minor Retz.	Poaceae	Sittaa booti	Canary grass

Rumex crispus L.	Polygonaceae	Halfaree	Curly dock
Rumex cristatus DC.	Polygonaceae	Halfaree	Greek dock
Rumex obtusifolius L.	Polygonaceae	Halfaree	Broad leaved dock
Saussurea heteromalla (Himalaya)	Asteraceae	Kandyari	Sawwort
Scandix pectenveneris L.	Apiaceae	Chawal booti	Stork's needle
Silene conoidea L.	Caryophyllaceae	Khum booti	Weed silene
Silybum marianum (L.) Gaertn.	Asteraceae	Kanda booti, kandyari	Mary thistle, Milk thistle
Taraxacum officinale (L.) Weber ex F.H. Wigg.	Asteraceae	Baloo booti	Blowball
Thalictrum foliolosum DC.	Ranunculaceae	Booti	Leafy meadowrue

In the present study, thirty one weed species were recorded which belongs to twenty six genera and sixteen families. The detailed list of reported weed species along with their botanical name, family name, local/ vernacular name and English name are given in Table-1. Among the reported families Asteraceae was dominating family with eight species followed by Poaceae with four species. Brassicaceae and Polygonaceae had three species each and Papaveraceae family had only two species, while Amaranthaceae, Apiaceae,Caryophyllaceae, Cyperaceae, Euphorbiaceae, Lamiaceae, Malvaceae,Oxalidaceae, Primulaceae, Ranunculaceae and Saxifragaceae had one species each (as shown is Fig. 2). The percentage occurrence of each family is represented in Fig.3, which shows that Asteraceae family with 26% occurrence is the leading family. Poaceae occupies second position with 13% occurrence. Brassicaceae and Polygonaceae with 10% occurrence of each family share third position and Papaveraceae family had 6% occurrence while Amaranthaceae, Apiaceae, Caryophyllaceae, Cyperaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Oxalidaceae, Primulaceae, Ranunculaceae and Saxifragaceae families had 3% occurrence of each (as shown in Fig.3). Rumex genus was leading genera with four species followed by Cirsium, Fumaria and Lepidium having two species from each while all other genera have only one species of each.

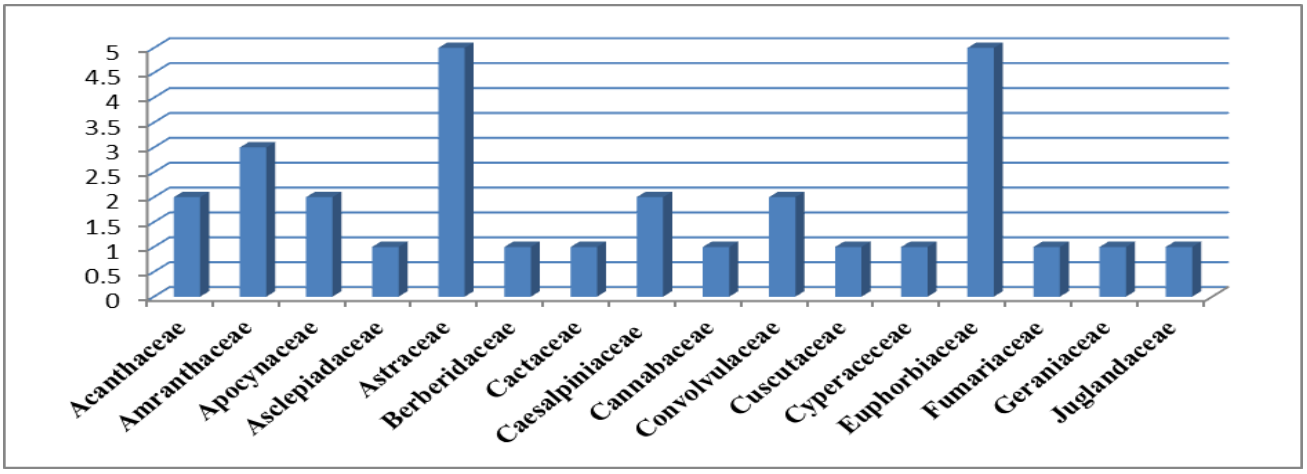

Figure 2, Number of species in different families.

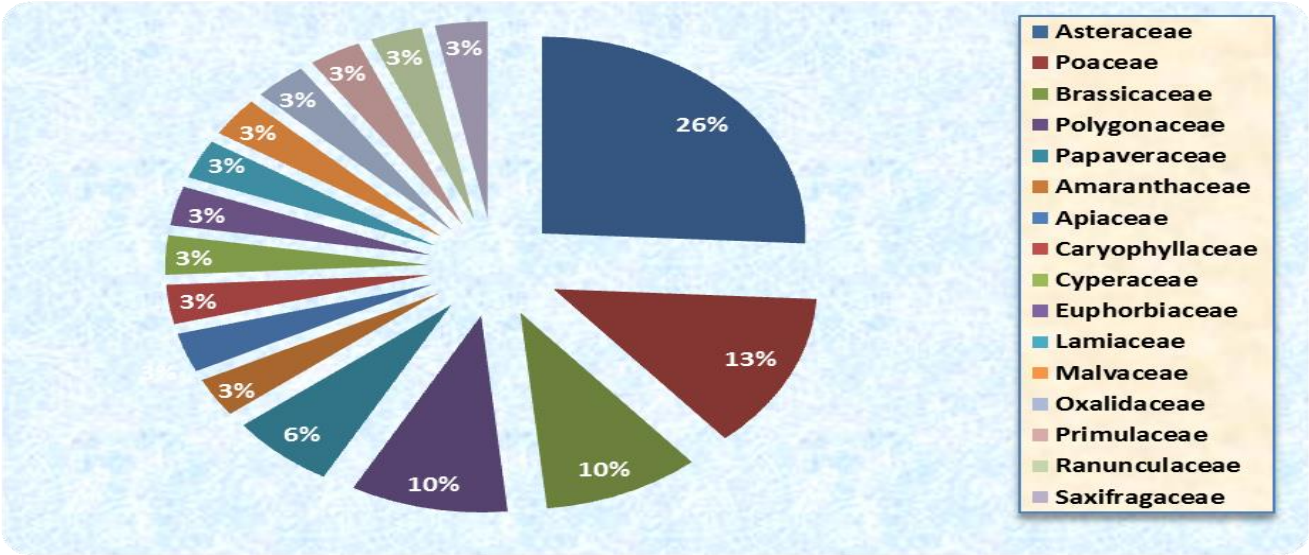

Figure 3, Percentage occurrence of different families.

It was observed that all these weed species had occupied a large cultivated area of wheat crops which affect the development and per acre production of crop. Few farmers try to eradicate them by the hands after rain in their early or before flowering stages, but due to the occurrence of various toxic chemicals in weeds, cause allergic effects. While most farmers use various chemicals besides positive affects it harms the beneficial insects of other crops and fruiting plants. Although chemical method is effective but expensive and local farmers can't afford it. It's necessary that they should be eradicated by eco-friendly way, which should not expensive and be affordable for local farmers. Different weed eater insects can be used against these weeds such as: *Bucculatrix parthenica, Carmenta ithacae, Conotrachelus albocinereus, Epiblema strenuana, Listronotus setosipennis, Platophalonidia mystica, Smicronyx lutulentus* and *Zygogramma bicolorata*, these are being used against Parthenium [8], which had proved very effective. Therefore, weeds need proper identification and agronomic practices to reduce their growth in the fields and to increase the production of crops.

IV. CONCLUSION

From the present study, it is concluded that in order to boost up the productivity and enhance the quality of crops, we should have to control the infestation of weeds and it's necessary that awareness should be created among the farmers and cheapest and eco-friendly methods should be adopted for their eradication. Besides this, genetically modified varieties should be appreciated which not only enhance quantity but, also gives good quality products and we should launch biochemical studies on these weeds so that due to presence of valuable phytochemicals new drugs can be developed against various diseases like CoViD-19, Cancer, HIV, Hepatitis etc.

ACKNOWLEDGEMENT

The author is thankful to the Department of Botany, Mohi-ud-din Islamic University, Nerian Sharif AJK – Pakistan and Department of Botany, University of Kotli, Kotli AJK – Pakistan for their help in this work.

CONFLICT OF INTEREST

Author declared no conflict of interest.

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