

Survey of Weed flora and the Ecological study on Weeds adjacent to Jai Prakash University Campus, Chapra (Saran), Bihar

Ranjana kumari

Department of Botany, J.P.University, Chapra,Pincode- 841301, Bihar, India
Email: rksri97@gmail.com

ABSTRACT

The study was conducted during the period from 2015 to 2016 in and around the campus of Jai Prakash University Chapra , (Saran), Bihar to find out the weed flora and the ecological study on weeds of cropland adjacent to the JPU campus. The study was based on different Plots of croplands during different months of the years.

During the Study period a total number of 64 species belonging to different families and their botanical names were recorded.

The calculation of biomass of the total species and the phytosociological characteristics of weed flora were done.

Keywords: Weeds, Weed flora, Weed ecology, Biomass, Croplands, Phytosociological characteristics

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INTRODUCTION

Weeds are unwanted plants which grow abundantly in wild condition. It is generally associated with mainly important crop plants which affects the growth and yield of crop plants. It reduces the growth and minimizes the crop-production. It affects the economy of cereals, legumes and other crops. Weeds are undesirable plant species growing alongwith domesticated or agricultural crops. They reduce crop yield by competing for water, soil moisture, soil nutrients, sunlight and growing space needed by crop plants. eg; Dub grass, *Prikle bushes*, *Blackberries*, *Prikly accacia*,

Parkinsonia etc. Their presence can reduce crop growth, quantity, quality and yield and they can make harvest difficult. We remove such unwanted plants or weeds from the agricultural fields. *Eg; Cynodon dactylon, Cyprus rotundus, Parthenium, Datura fastuosa, Lantana camara, Eichhornia, Ipomea etc.* Weeds cause economic loss to the producers as they lose part of their investment. Any weed plant requires some forms of action to reduce its effect on the economy, the environment, human health and amenity etc. Weeds possess abundant seed production, rapid population establishment, seed dormancy, long term survival, adaptation of vegetative reproductive structures and, ability to occupy sites disturbed by human activities.

There are approximately 250,000 species of plants worldwide of those about 3% or 8000 species behave as weeds. Weeds are troublesome in many ways. Primarily, they reduce crop yield by competing for water, light, soil nutrients and space. Weeds produce the chemical substances which are toxic to crop-plants (allelopathy), animals and humans. Weeds can also cause human health problems. Many common weeds such as Parthenium weed, Rag weed, Rye Grass and Privet cause asthma and other respiratory problems, especially in children.

Some weeds can also cause skin irritation and some are poisonous such as; *Datura fastuosa, Parthenium hysterophorus, Solenum nigram, Calotropis procera (Aak) etc.*

Despite of negative impacts of weeds, some plants usually thought of as weeds actually provide some benefits.

Some attributes include : Soil stabilization habitat and feed for wildlife, nectar for bees; aesthetic qualities and organic matter; provide genetic reservoir, human consumption and provide employment opportunities. Weeds are also known as invasive plants. It is also called Exotic or Alien plants. Such as; *Parthenium hysterophorus, Lantana camara etc.*

This study was conducted to identify the weed species and the ecological study on weeds of cropland adjacent to the university campus of Jai Prakash University, Chapra (Saran).

Materials and Methods

The present study was conducted to find out the weed flora and the ecological study on Weeds of cropland adjacent to Jai Prakash University campus Chapra (Saran), Bihar in the different months of the year from 2015 to 2016.

The study was based on different Plots of cropland adjacent to university campus Chapra during different months of the year .

The study area is located nearby cropland in and around at Jai Prakash University, Chapra. (Saran), Bihar.

The study was based on the extensive or intensive field survey made in all agricultural plots around the university Campus, Chapra (Saran) Bihar. The study was conducted in Mustard (Brassica

compestris Linn), Wheat (*Triticum aestivum* Linn.) crop fields etc. Various cropland localities around the Univ. campus of Jai Prakash University, Chapra was selected randomly. At each locality all area of the available crops of wheat and mustard was randomly selected.

Weed plants were collected randomly by Quadrate method. Three 1×1m plots 10m apart were sampled in each plot.

Different sites were selected in each plot for survey of weed flora and periodic field trips were made twice or thrice a month randomly by quadrate method in each site for collection of weed species. Frequent field trips were arranged to various parts of the area to collect weed species by square quadrate at different locations in the farmers fields around the Jai Prakash University, Campus, Saran.

During the period of study farmers and agriculturists of each site were interviewed about seasonal weeds and their flowering fruiting season and for the most effective weed management strategy.

All weed species were collected from the study area of Rabi crops ie. Mustard, wheat etc. were then taxonomically identified the name of weed species and their families with the help of available literature and by comparing with the already identified plant specimens of the herbarium was deposited in the Department of the Jai Prakash University, Chapra.

I separated all the weed species and counted them. Then the fresh weight was estimated of weed species family wise and were placed in oven for dry at 80°C for 48hrs. After 48hrs dry weight was estimated. Biomass, frequency, density, abundance, relative frequency, relative density, relative abundance and finally IVI of all species by formula were calculated using the given formula by Mishra (1968).

Results

The study was conducted during 2015 to 2016 in and around the campus of Jai Prakash University, Chapra , (Saran), Bihar. During the Study period 18 species belonging to 14 families were recorded.

	Scientific Name	Family
1)	<i>Anagalis arvensis</i> L.	<i>Primulaceae</i> .
2)	<i>Cajanus cajan</i>	<i>Papilionaceae</i>
3)	<i>Calotropis procera</i>	<i>Asclepidaceae</i>
4)	<i>Chenopodium album</i>	<i>Chenopodiaceae</i>
5)	<i>Cynodon dactylon</i>	<i>Compositae</i>

6)	<i>Cyperus rotundus</i>	<i>Compositae</i>
7)	<i>Fumaria parbiflora</i>	<i>Fumeraceae</i>
8)	<i>Gomphrina</i>	<i>Amaranthaceae</i>
9)	<i>Ipomoea</i>	<i>Convolvulaceae</i>
10)	<i>Lantana camara</i>	<i>Verbinaceae</i>
11)	<i>Lathyrus odoratus</i>	<i>Paplionaceae</i>
12)	<i>Oxalis corniculata</i>	<i>Oxilidacea</i>
13)	<i>Parthenium hystophorus</i>	<i>Asteraceae</i>
14)	<i>Phalaris minor</i>	<i>Poaceae</i>
15)	<i>Pisum sativum</i>	<i>Paplionaceae</i>
16)	<i>Solanum nigrum L.</i>	<i>Solanaceae</i>
17)	<i>Viccia fava</i>	<i>Paplionaceae</i>
18)	<i>Viccia Sativa</i>	<i>Fabaceae</i>

During the study period a total number of 23 weed species belonging to 03 monocot and 20 dicot families were recorded out of 23 families of weeds reported from the selected sites the predominance was shown by monocot family *Poaceae* having 13 weed species followed by dicot families. *Asteraceae* and *Verbinaceae* each having 10 and 6 weeds. The family *Papaveraceae* was represented by 6 weeds. The family *Paplionaceae* was represented by 5 weeds species. while each of the family *Solanaceae*, *Fabaceae*, *Portulacaceae*, *Primulaceae* contained 4 weeds. The family *Oxiliadaceae* and *Chenopodaceae* were represented by 03 weed species each while *Fumeraceae*, *Compositae* contained 02 weed species each. The remaining families like *Amaranthaceae*, *Cucurbitaceae*, *Convolvulaceae* were represented by 01 weed species.

The other reported weeds were occurred in wheat, mustard, potato crops. The detail list of 44 weed species belonging to 30 families identified in crops in the study area along with their Botanical names, families are given in table.

TABLE 1: Botanical names and family of weed species

Botanical Names	Family
<i>Achyranthus aspera L.</i>	<i>Amaranthaceae</i>
<i>Amaranthus viridis L.</i>	<i>Amaranthaceae</i>
<i>Anagalis arvensis L</i>	<i>Primulaceae</i>
<i>Argemonne Mexicana</i>	<i>Papaverceae</i>

<i>Azorum conyzoidis</i>	<i>compositae</i>
<i>Brassica compestris L.</i>	<i>Brassicaceae</i>
<i>Cajanus cajan</i>	<i>Paplionaceae</i>
<i>Canabis sativa L.</i>	<i>Cannabinaceae</i>
<i>Cephalandrus indica</i>	<i>Cucurbitaceae</i>
<i>Calotropis procera Ait</i>	<i>Asclepiadaceae</i>
<i>Cassia tora</i>	<i>Leguminaceae</i>
<i>Chenopodium album L.</i>	<i>Chenopodiaceae</i>
<i>Crotonus sparsiflora</i>	<i>Euphorbiaceae</i>
<i>Cuscuta reflexa Roxb</i>	<i>Cuscutaceae</i>
<i>Cynodon dactylon L.</i>	<i>Poaceae</i>
<i>Cyperus rotundus</i>	<i>Cyperaceae</i>
<i>Echhornia</i>	<i>Ponttederiacceae</i>
<i>Eclipta alba L.</i>	<i>Asteraceae</i>
<i>Euphorbia helioscopia L.</i>	<i>Euphorbiaceae</i>
<i>Fumaria parbiflora</i>	<i>Fumeraceae</i>
<i>Gomphorina silosoides</i>	<i>Amaranthaceae</i>
<i>Hemidesmus indicus</i>	<i>Helcaricaceae</i>
<i>Ipomoea nil L.</i>	<i>Convolvulaceae</i>
<i>Lantana camara</i>	<i>Verbinnnaceae</i>
<i>Lathyrus odoratus</i>	<i>Paplionaceae</i>
<i>Lathyrus sativus</i>	<i>Fabaceae</i>
<i>Lepidium sativum L.</i>	<i>Brassicaceae</i>
<i>Mollugo pentaphylla L.</i>	<i>Mollugoginaceae</i>
<i>Nicotiana tobaccum L.</i>	<i>Solanaceae</i>
<i>Oxalis corniculata L.</i>	<i>Oxalidaceae</i>
<i>Parthenum hysterophorus L.</i>	<i>Asteraceae</i>
<i>Phalaris minor</i>	<i>Poaceae</i>
<i>Phylla nodiflora</i>	<i>Verbinaceae</i>
<i>Phyllanthus urinaria L.</i>	<i>Euphorbiaceae</i>
<i>Pisum sativum</i>	<i>Paplionaceae</i>
<i>Porttulaca olaracee</i>	<i>Portulacaceae</i>
<i>Ranunculus arvensis L.</i>	<i>Ranunculaceae</i>
<i>Solanum melongana L.</i>	<i>Solanaceae</i>
<i>Solanum nigrum L.</i>	<i>Solanaceae</i>
<i>Solanum tuberosum L.</i>	<i>Solanaceae</i>
<i>Spergula arvensis</i>	<i>Spergulaceae</i>

<i>Vicia fava</i>	<i>Papilionaceae</i>
<i>Vicia sativa L.</i>	<i>Fabaceae</i>

Despite of negative impacts of weeds, some plants usually thought of as weeds any actually provide some benefits.

Some attributes include : Soil stabilization habitat and feed for wildlife, nectar for bees; aesthetic qualities and organic matter; provide genetic reservoir, human consumption and provide employment opportunities.

Some weeds are used in medicine and some used as cooking recepies and some are used as fodder in the study area.

The calculated Biomass, Frequency, Density, Abundance, Relative Frequency, Relative Density, Relative Abundance and IVI of all species are given in table.

TABLE 2 : BIOMASS OF THE TOTAL SPECIES

Name of Species	Number of Species	Dry Weight
A. <i>Chenopodium album</i>	11	20.16
B. <i>Lethirus odratus</i>	6	92
C. <i>Oxalis corniculata</i>	8	36
D. <i>Fumaria parbiflora</i>	3	2
E. <i>Cajanus cajan</i>	4	68
F. <i>Parthenium hysterophorus L.</i>	4	23.4
G. <i>Angella arvensis</i>	5	5.04
H. <i>Pisum sativum</i>	5	4.72
I. <i>Cyperus rotundus</i>	4	8.64
J. <i>Gompherina</i>	3	9.92
K. <i>Vicia faba</i>	2	18.16
L. <i>Solenum melongama</i>	3	275
M. <i>Cynedonn dactylon</i>	3	7.92
N. <i>Hemisdiscus indiscus</i>	3	2.72
	Total=64	

TABLE 3: Phytosociological characteristics of weed flora

Total no.of Individuals.	Total no. Of Quadrate of Occurrence	Total no.of Quadrate Study.	Frequency (Freq.)	Density (Dens.)	Abundance (Abdn.)
A-164	10	10	100%	16.4	16.4
B-224	10	10	100%	22.4	22.4
C-72	8	10	80%	7.2	9.0
D-268	10	10	100%	26.8	26.8
E-228	10	10	100%	22.8	22.8
F-40	4	10	40%	4.0	10.0
G-324	10	10	100%	32.4	32.4
H-36	7	10	70%	3.6	5.142
I-68	7	10	70%	6.8	9.714
J-144	10	10	100%	14.4	14.4
K-388	10	10	100%	38.8	38.8
L-64	5	10	50%	6.4	12.8
Total=2020	Total=101	Total=120	Total=1010	Total=202.0	Total=220.656

The calculated Biomass, Frequency, Density, Abundance, Relative Frequency, Relative Density, Relative Abundance and IVI of all species are given in table.

TABLE 4: BIOMASS OF THE TOTAL SPECIES

Name of Species	No. of Species	Dry Weight
<i>Chenopodium album</i>	11	20.16
<i>Lathyrus odoratus</i>	6	92

<i>Oxalis corniculata</i>	8	36
<i>Fumaria parbiflora</i>	3	2
<i>Cajanus cajan</i>	4	68
<i>Parthenium hysterophorus</i>	4	23.4
<i>Angella arvensis</i>	5	5.04
<i>Pisum sativus</i>	5	4.72
<i>Cyperus rotundus</i>	4	8.64
<i>Gomphrina</i>	3	9.92
<i>Vicia faba</i>	2	18.16
<i>Solenum melongana</i>	3	275
<i>Cynedonn dactylon</i>	3	7.92
<i>Hemisdesimus indiscus</i>	3	2.72
	Total=64	

TABLE 5: Importance value (IVI) of weed flora

Relative Frequency (RF)	Relative Density (RD)	Relative Abundance (RA)	Importance Value (IVI)
A-9.90099	8.118811	7.43238	25.452181
B-9.90099	11.089108	10.15154	28.422478
C-7.92079	3.564356	4.07874	21.636686
D-9.90099	13.267326	12.14560	35.313916
E-9.90099	11.2871287	10.33282	31.5209387
F.3.960396	1.980198	4.53194	10.472534
G-9.90099	16.396	14.68348	40.98047
H.6.930693	1.782178	2.33032	11.043191
I-6.930693	3.366336	4.402327	14.699356
J-9.90099	7.1287128	6.525995	23.5556978
K-9.90099	19.2079208	17.583931	46.6928418
L-4.950495	3.168316	5.800884	13.919695
Total=99.99997	Total=99.999913	Total=99.999957	Total=299.999867

Discussion and Conclusion

Weeds are undesirable plant species growing alongwith domesticated or agricultural crops. They reduce crop yield by competing for water, soil moisture, soil nutrients, sunlight and growing space needed by crop plants. eg; Dub grass, *Prikle bushes*, *Blackberries*, *Prikly accacia*, *Parkinsonia etc.*

Their presence can reduce crop growth, quantity, quality and yield and they can make harvest difficult. We remove such unwanted plants or weeds from the agriultural fields. Eg; *Cynodon dactylon*, *Cyperus rotundus*, *Parthenium*, *Dhatura fastuosa*, *Lantana camara*, *Echhornia*, *Ipomea etc.* Weeds cause economic loss to the producers as they lose part of their investment. Any weed plant requires some forms of action to reduce its effect on the economy, the environment, human health and amenity etc.

Weeds compete with crop for water, nutrients, and light; has been great concern for the growers (Rajput *et al.*, Sultan & Nasir, 2007).

The losses caused to agricultural crops by *Avena*, *Cyperus rotundus* and *Chenopodium albumaree* significant (Marwat *et al.*, 2006). The weed species with high IVI and frequency might compete better to reduce growyh and yield of associated crop.

Some weeds are important due to their possible allelopathic effects on cultivated crop (Hussain,1983). Weeds have specific characteristics that help their survival. These characteristics may be deep root system. Most of the weeds are annual which propagate by seeds only. Most weeds with small population are unimportant but they share the habitat resources.

Weeds posses abundant seed production, rapid population establishment, seed dormancy, long term survival, adaptation of vegetative reproductive structures and, ability to occupy sites disturbed by human activities.

The present study suggests that a vriety of weeds are infesting the crops quite heavily in and around the campus of Jai Prakash University, District Chapra (Saran), Bihar that may cause losses to yield of different crops. For acquiring the better yield, it is necessary to take appropriate cultural, mechanical, biological and chemical measures for their control. The chemical control is the most effective, time saving and economicl way of weed control.

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