

## WEED FLORA OF WINTER CROPS GROWN IN POONCH DISTRICT OF JAMMU AND KASHMIR

Rani Mughal<sup>1</sup>, Fayaz Qazi<sup>2</sup>

<sup>1</sup> Botany Department Govt. Degree College, Poonch, J &K, India.

<sup>2</sup> Agriculture Department, Govt. of Jammu and Kashmir, India.

Corresponding Email: [fayazqazi@gmail.com](mailto:fayazqazi@gmail.com)

### ABSTRACT

A survey of weed flora was carried out in different crops of winter season grown in Poonch district. During the course of the survey, the weeds noted in great intensities were *Cyperus rotundus*, *Cynodon dactylon*, *Spergula arvensis* and *Anagallis arvensis*. Besides, other weeds such as *Phalaris minor*, *Avena fatua*, *Chenopodium album*, *Gnaphalium luteo-album*, *Polygonum plebejum*, *Euphorbia helioscopia*, *Ranunculus sceleratus*, *Cichorium intybus*, *Vicia hirsuta*, *Mellilotus indica*, *Polypogon spp.* etc. were also noted in different field crops of the winter season with low intensities.

**Key Words:** Survey, Winter, Crops, Weed flora, Frequency, Relative density, Weed intensity.

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### INTRODUCTION

Weeds are defined as plants that have potential to enter markedly into disturbed or cultivated habitats occupied by the man and to inhibit or replace the native plant populations or plants purposely cultivated on account of their commercial, ecological or aesthetic value (Navas 1991). Ross and Lembi (1999) defined weeds as the plants that interfere with the growth of desirable

plants and that are unusually competitive, persistent and pernicious. The presence of each weed population in an arable field is the result of ecological reactions to previous management practices, soil characteristics of the site and the regional climate (Tamado and Milberg 2000).

The weed flora also expresses the ecological significance of each species (Thomas and Abraham 1996). Weed surveys are useful for determining the occurrence and relative importance of weed species in crop production systems (Thomas 1985; Frick and Thomas 1992 and McCully *et al.* 1991). Some studies about weed flora in cereal, oil seed crops and some of the annual crops have been done in many countries e. g., from India (Patil and Jadhav 2013; Nawacho and Buth, 1987; Reshi *et al.* 1987; Sapru and Raina 1983; Singh and Dangwal 2013).

In a country like India where agriculture predominates, weeds play a key role in its economy because these compete with crops for nutrients, moisture, space and light (Rajput *et al.* 2008 and Anderson *et al.* 1996), thus bringing about the significant reduction in yield as well as in quality. Weeds compete with crops for natural and applied resources besides being responsible for reducing quantity and quality of agricultural productivity (Rao and Nagamani, 2010, 2013 and Rao *et al.* 2015), despite continuous research and extension efforts made. Bhan *et al.* (1999) estimated that weeds in India reduce crop yields by 31.5% (22.7% in winter and 36.5% in summer and Kharif seasons).

The presence of noxious weeds cause great loss to all industries like tourism, forestry, agriculture, properties, health, wildlife, navigation, natural resources, water bodies, livestock, fishing etc., (Larry *et al.* 1996; Boucher 1994; Goold 1994; Beck 1993 and Wright 1994). While Holm *et al.* (1977, 1979) estimated that about 8000 weed species growing in the world, only 250 are of particular importance to agricultural crops. Weeds are the major pests of crop husbandry and are managed properly for realizing higher yield (Hassan and Marwat 2001). For successful implementation of any weed control practice, it is essential to have an adequate knowledge of weed flora of a particular area.

Dynamics of weed populations in arable fields are influenced by environmental and soil characteristics and also by cropping system and management practices (Koocheki *et al.* 2009). Major grains cropping system of this area in winter is wheat, mustard, chickpea, peas, lentil, oats, berseem followed in summer by maize, rice, sesame, groundnut, soybeans, moong, sorghum, cotton, jute crops etc. The detailed information about the floristic and ecological

behaviour of weeds in arable area is lacking, hence the present study was undertaken to investigate the eco-sociology of the Rabi crop weeds in parts of Poonch district.

## MATERIAL AND METHOD

The survey of weed flora was conducted in Rabi season 2013- 2014 in different crops grown in Poonch district. The pH of most of the fields varied from 7.33 to 7.46. The collected weed plants were dried, pressed, preserved and properly identified with available literature by Stewart 1972; Sharma and Kachroo 1983; Swami and Gupta 1998; Kaul 1986 ; Nawacho and Buth 1987; Reshi *et al.* 1987 and Sapru and Raina 1983 . Weed survey methods have been introduced by many scientists (McCully *et al.*1991; Thomas 1991; Thomas and Dale 1991 and Schroeder *et al.* 1993). Weeds were counted at random at four places in a field by using quadrat method for the present study (Clements 1905).

By taking each quadrat of 50 cm x 50 cm was used for recording weed population after Oosting (1956); Ambasht and Ambasht (1969) and Braun Blanquet (1932) for calculating frequency percentage, relative density (%) and weed intensity  $m^{-2}$  , respectively with the formulae given below.

$$\text{Frequency \%} = \frac{\text{Total Number of quadrats of occurrence}}{\text{Total Number of quadrats studied}} \times 100$$

$$\text{Relative density \%} = \frac{\text{Total Number of particular weed spp.}}{\text{Total Number of all weed spp.}} \times 100$$

$$\text{Weed intensity} = \frac{\text{Total Number of individuals}}{\text{Area of occurrence}}$$

## RESULTS AND DISCUSSION

The survey of weed flora of 7 crops grown during winter season was carried out. The weeds noted during the course of the survey are shown in labelled plates, presented in figures 1-7, listed in Table 1(A-G), and discussed crop wise here as under:

**Weed Flora of Wheat Crop:** The weeds occurring in wheat fields represent a major production loss (Mehdi *et al.* 2008) and 18.60% reduction in yield was also assessed by Gharde *et al.* 2018. The data pertaining to the weed flora of wheat crop indicated (Fig-1) that *Cyperus rotundus* and *Avena fatua* were the most predominant weeds which constituted 20.34 and 16.690 % of total weed density, respectively. *Phalaris minor*, *Anagallis arvensis*, *Cynodon dactylon*, *Polygonum plebejum*, *Chenopodium album*, *Euphorbia helioscopia* and *Polypogon spp.* were also noted with 16.17, 9.39, 8.69, 6.43, 6.26, 3.40 and 2.60 % relative density, respectively (Table 1A).

**Weed Flora of Oats (Fodder) Crop:** The results presented in Table 1B and Fig-2 make it clear that the oats crop grown was severely infested with 12 weed species. *Cyperus rotundus* occurred in the field with the highest (19.64%) relative density in all the quadrats studied followed by *Cynodon dactylon* and *Avena fatua* with 16.18 and 14.66 % relative density, respectively.

**Weed Flora of chickpea:** Chickpea crop was infested with a number of weed species (10) and the predominant among them were *Cyperus spp.* and *Anagallis arvensis* with 66.10 and 16.61 % relative density, respectively (Fig-3). These two weeds existed in all quadrats studied. Other weeds observed in the field were *Cynodon dactylon*, *Phyllanthus niruri*, *Chenopodium album*, *Phalaris minor*, *Polygonum plebejum*, *Mellilotus indica*, *Vicia hirsuta* and *Euphorbia helioscopia* with 12.54, 7.11, 5.76, 5.08, 4.06, 2.37, 2.37 and 1.69 % relative density, respectively (Table 1C).

**Weed flora of Peas:** It is apparent from (Fig-4) the weed data embodied in Table 1D that the major weeds existed in the field of Pea crop were *Spergula arvensis*, *Cyperus spp.*, *Chenopodium album*, *Phalaris minor*, *Gnaphalium luteo-album*, *Mellilotus indica* and *Vicia hirsuta* which constituted 37.87, 33.51, 12.26, 6.18, 4.63, 2.72 and 2.17 % relative density, respectively.

**Weed Flora of Lentil:** Lentil crop grown was seen to be infested with 9 weed species (Fig-5). But of these *Cyperus rotundus* ranked first in respect of relatively weed density followed by *Cynodon dactylon* which occupied the second position in the list of weed species. Other weeds were found with low intensities (Table 1E).

**Weed Flora of Mustard:** Mustard crop was severely infested with *Cyperus rotundus*, *Cynodon dactylon*, *Vicia hirsuta*, *Anagallis arvensis*, *Ranunculus sceleratus*, *Phalaris minor*, *Mellilotus alba*, *Chenopodium album*, *Amaranthus viridis* and *Chenopodium murale* with 39.67, 22.24, 8.94, 6.88, 5.96, 5.04, 3.66, 2.98, 2.52 and 2.06 % relative density, respectively (Table 1F and Fig-

6). The weeds cause an alarming decline in yield ranging from 15-30% to a total failure in rapeseed-mustard yield (Shekhawat *et al.*, 2012).

**Weed Flora of Berseem Crop:** *Cyperus spp.*, *Cichorium intybus*, *Portulaca oleracea* and *Cynodon dactylon* were major weeds occurred in the fields of the berseem crop with 100% frequency and constituted 38.13, 17.12, 10.89 and 8.56 % of the total weed population, respectively (Table 1G and Fig-7). Thakur *et al.* (1990) found *Cichorium intybus* associated with berseem give more competition stress by robbing the crop of essential nutrients, light, moisture and space and substantially reduces the green forage yield and consequently, it causes reduction up to 30 - 40 percent besides deteriorating quality of green forage (Pathan *et al.*, 2013).

**Table 1A: Weed Flora of Wheat Crop**

S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Cyperus rotundus</i>	117	20.34	100
2	<i>Avena fatua</i>	96	16.69	100
3	<i>Phalaris minor</i>	93	16.17	100
4	<i>Anagallis arvensis</i>	54	9.39	100
5	<i>Cynodon dactylon</i>	50	8.69	100
6	<i>Polygonum plebejum</i>	37	6.43	100
7	<i>Chenopodium album</i>	36	6.26	100
8	<i>Euphorbia helioscopia</i>	20	3.47	100
9	<i>Polypogon spp.</i>	15	2.60	100
10	<i>Fumaria indica</i>	15	2.60	75
11	<i>Asphodalus tenuipholius</i>	12	2.08	75
12	<i>Melilotus indica</i>	9	1.56	75
13	<i>Euphorbia hirta</i>	9	1.56	75
14	<i>Euphorbia microphyla</i>	5	0.86	75
15	<i>Cirsium arvense</i>	4	0.69	50
16	<i>Ranunculus sceleratus</i>	3	0.52	25

**Table 1B: Weed Flora Oats (Fodder) Crop**

S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Cyperus rotundus</i>	142	19.64	100
2	<i>Cynodon dactylon</i>	117	16.18	100
3	<i>Phalaris minor</i>	106	14.66	100
4	<i>Avena fatua</i>	106	14.66	100
5	<i>Polypogon spp.</i>	81	11.20	100

6	<i>Anagallis arvensis</i>	63	8.71	100
7	<i>Euphorbia helioscopia</i>	34	4.70	75
8	<i>Polygonum plebejum</i>	25	3.45	50
9	<i>Chenopodium album</i>	19	2.62	50
10	<i>Melilotus indica</i>	15	2.07	50
11	<i>Ranunculus sceleratus</i>	8	1.10	50
12	<i>Vicia hirsuta</i>	7	0.96	50

Table 1C: Weed Flora of Chickpea Crop

S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Cyperus spp.</i>	125	66.10	100
2	<i>Anagallis arvensis</i>	49	16.61	100
3	<i>Cynodon dactylon</i>	37	12.54	100
4	<i>Phyllanthus niruri</i>	21	7.11	75
5	<i>Chenopodium album</i>	17	5.76	75
6	<i>Phalaris minor</i>	15	5.08	75
7	<i>Polygonum plebejum</i>	12	4.06	75
8	<i>Mellilotus indica</i>	7	2.37	50
9	<i>Vicia hirsuta</i>	7	2.37	50
10	<i>Euphorbia helioscopia</i>	5	1.69	25

Table 1D: Weed Flora of Peas Crop

S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Spergula arvensis</i>	139	37.87	100
2	<i>Cyperus spp.</i>	123	33.51	100
3	<i>Chenopodium album</i>	45	12.26	100
4	<i>Phalaris minor</i>	25	6.18	75
5	<i>Gnaphalium luteo-album</i>	17	4.63	75
6	<i>Melilotus indica</i>	10	2.72	50
7	<i>Vicia hirsuta</i>	8	2.17	8

Table 1E: Weed Flora of Lentil Crop

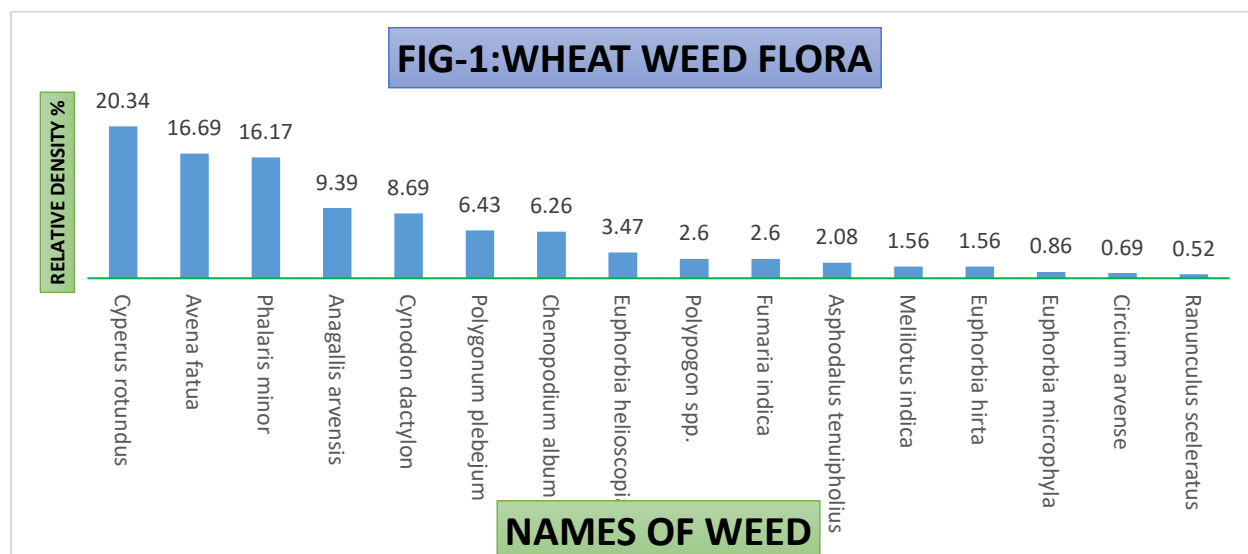
S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Cyperus rotundus</i>	224	36.30	100
2	<i>Cynodon dactylon</i>	133	21.55	100
3	<i>Chenopodium album</i>	83	13.45	100
4	<i>Vicia hirsuta</i>	73	11.83	100
5	<i>Polygonum plebejum</i>	34	5.51	100
6	<i>Melilotus indica</i>	29	4.70	75
7	<i>Spergula arvensis</i>	21	3.40	100
8	<i>Anagallis arvensis</i>	17	2.75	75
9	<i>Phalaris minor</i>	3	0.48	50

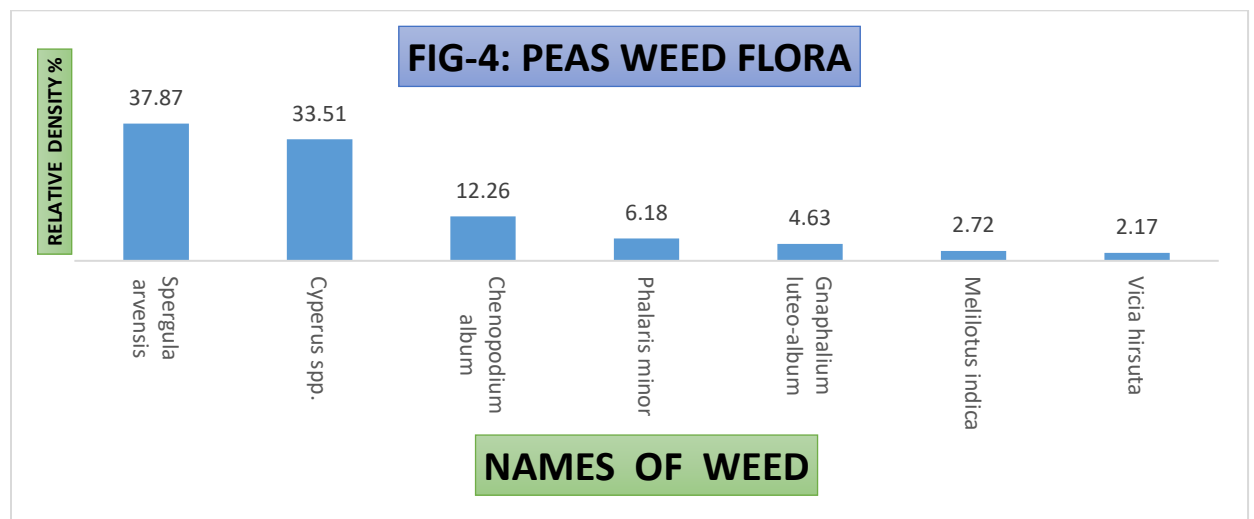
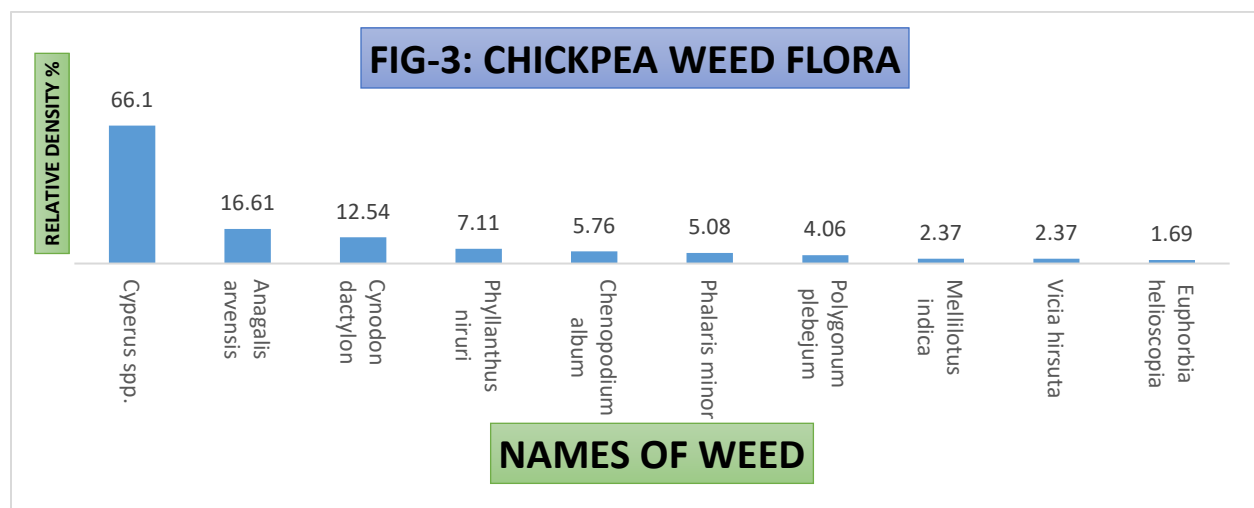
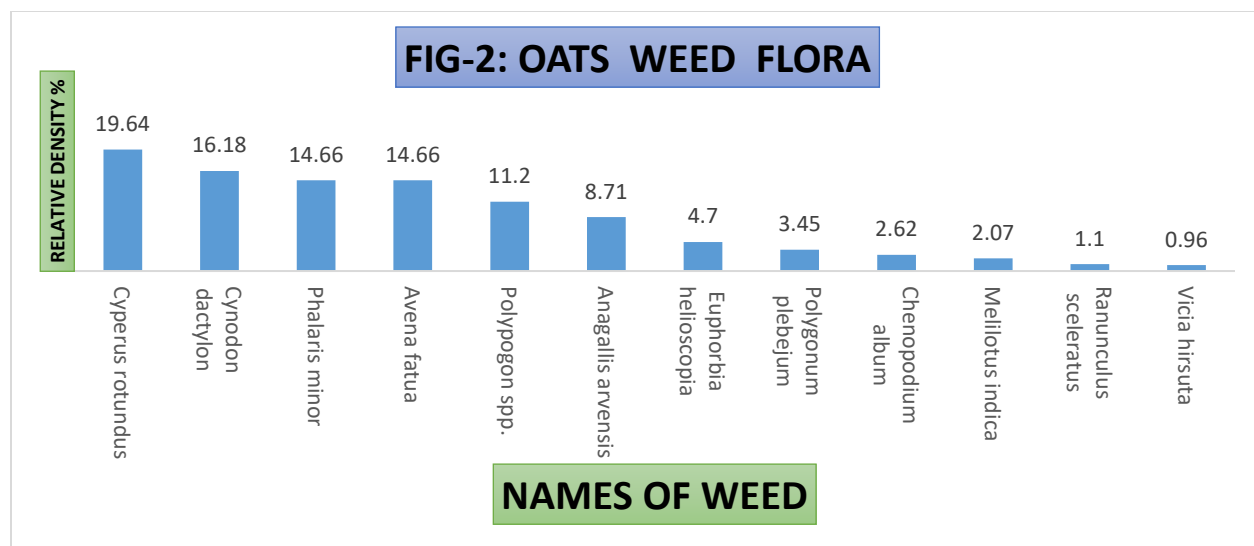
**Table 1F: Weed Flora Mustard Crop**

S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Cyperus rotundus</i>	173	39.67	100
2	<i>Cynodon dactylon</i>	97	22.24	100
3	<i>Vicia hirsuta</i>	39	8.94	100
4	<i>Anagallis arvensis</i>	30	6.88	75
5	<i>Ranunculus sceleratus</i>	26	5.96	100
6	<i>Phalaris minor</i>	22	5.04	75
7	<i>Melilotus alba</i>	16	3.66	50
8	<i>Chenopodium album</i>	13	2.98	75
9	<i>Amaranthus viridis</i>	11	2.52	50
10	<i>Chenopodium murale</i>	9	2.06	50

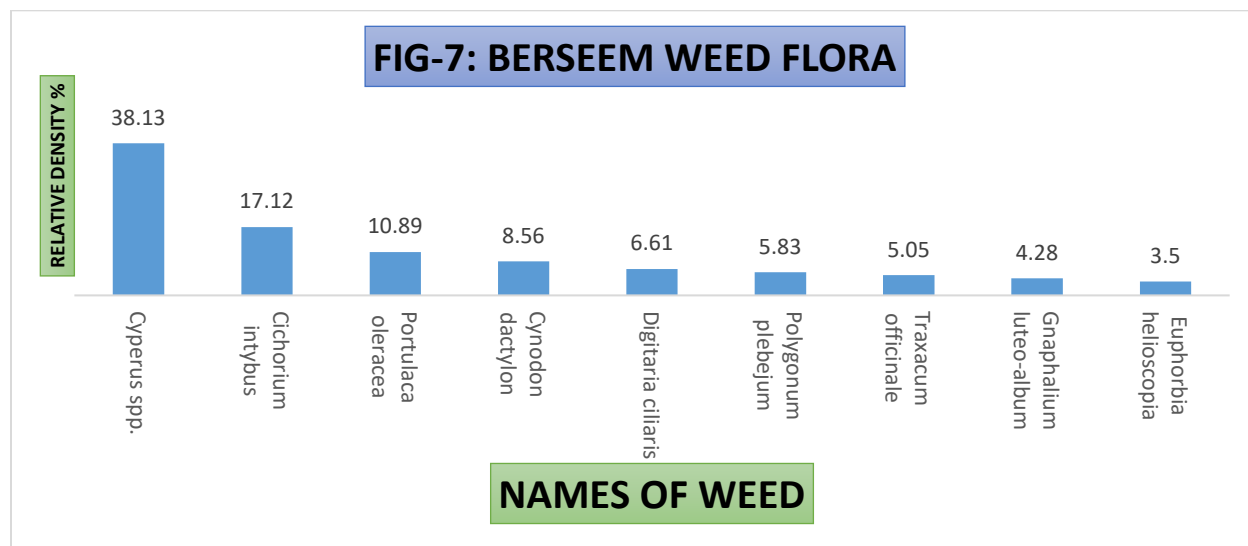
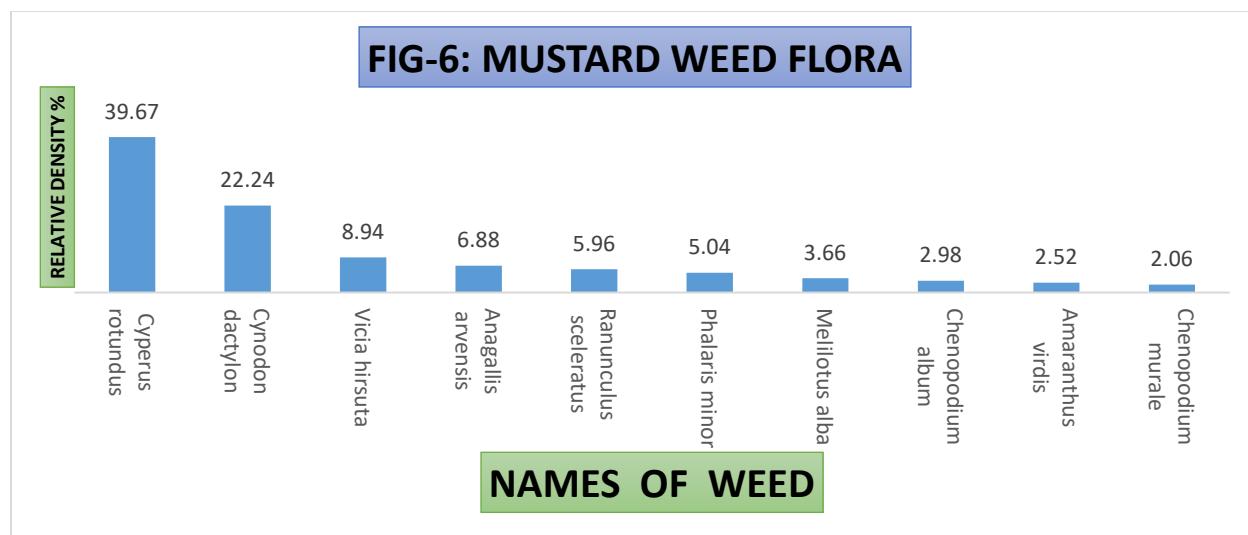
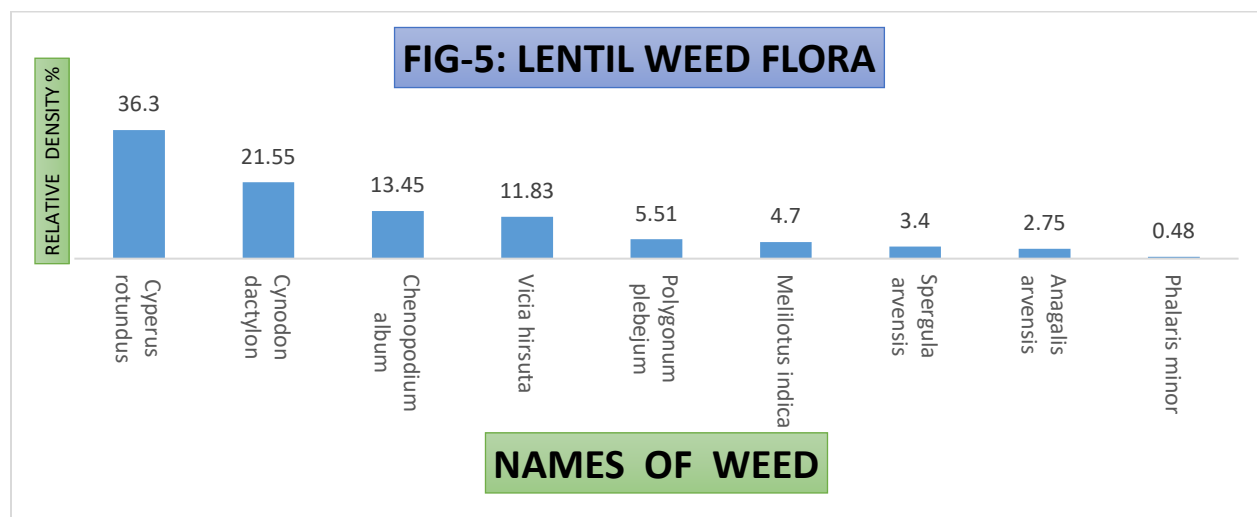
**Table 1G: Weed Flora Berseem Crop**

S.No	Name of the weed	Intensity m <sup>-2</sup>	Relative Density %	Frequency%
1	<i>Cyperus spp.</i>	98	38.13	100
2	<i>Cichorium intybus</i>	44	17.12	100
3	<i>Portulaca oleracea</i>	28	10.89	100
4	<i>Cynodon dactylon</i>	22	8.56	100
5	<i>Digitaria ciliaris</i>	17	6.61	75
6	<i>Polygonum plebejum</i>	15	5.83	50
7	<i>Traxacum officinale</i>	13	5.05	50
8	<i>Gnaphalium luteo-album</i>	11	4.28	50
9	<i>Euphorbia helioscopia</i>	9	3.50	25









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*Amaranthus viridis*



*Anagalis arvensis*



*Fumaria indica*



*Avena fatua*



*Chenopodium album*



*Chenopodium murale*



*Cichorium intybus*



*Circium arvense*



*Cynodon dactylon*



*Cyperus rotundus*



*Cyperus spp.*



*Digitaria ciliaris*



*Euphorbia helioscopia*



*Euphorbia hirta*



*Euphorbia microphyla*



*Gnaphalium luteo-album*



*Melilotus alba*



*Melilotus indica*





*Phalaris minor*



*Phyllanthus niruri*



*Polygonum plebejum*



*Polygonum spp.*



*Portulaca oleracea*



*Ranunculus sceleratus*



*Spargula arvensis*



*Traxacum officinale*



*Vicia hirsuta*



*Asphodalus tenuipholius*