



Agrestals phytosociological attributes of groundnut crop weeds in Ieeja mandal, Gadwal district, Telangana

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Abstract

In agro-ecological systems, the plants which are competing with cultivated crops and having short vegetative phase and high reproductive output are termed as weeds. Weeds deplete large quantities of minerals and moisture more efficiently than the crop plants. The inventory of weeds will be of immense help in controlling the weed loss of crop productivity. The phytosociological attributes Importance Value Index (IVI) are calculated. The knowledge and information regarding the ecology of agrestals will be communicated to concerned agencies for effective management strategies.

Keywords: agrestals, crop, phytosociological, attributes, IVI, management, strategies

Introduction

From the point of agro-ecological systems, the plants which are competing with agricultural crops and having short vegetative phase and high reproductive output are termed as weeds. Agrestals are weeds of arable lands compete with crops for space, water, light and mineral nutrients and thereby affecting the crop productivity. Weed-crop competition is critical in obtaining the ability of weeds than the crops. Weeds deplete large quantities of mineral nutrients and moisture more efficiently than the crop plants and thrive better over the crops in drought conditions. An ecological survey of weed flora is a must for a comprehensive idea of weed problem. Understanding the sociological structure of weeds in crop fields is a prerequisite for its effective management. Identification and quantification of weed species present in different crop cultures and cropping systems is possible to provide strategies for weed control methods in important crops that can be adapted by marginal farmers. Since not all the weed species are important to determine the nature of weed communities, it will be desirable to know the quantitative characters like density, frequency and importance value of individual species. Towards this, phytosociological attributes of weeds of an area will be of immense help in controlling the weed loss to crop productivity.

Approximately 6700 species of the flowering plants are recorded as weeds in different agro-ecosystems of the world of which 76 are categorized as the 'world's worst weeds' (Holm *et al.*, 1977) [8]. Maheswari (1962) [11] opined that 40% of the Indian flora is introduced and naturalized and many of the herbaceous plants are weeds in cultivated fields. In India, overall losses in crop yields up to 30% or above have been reported by Mani *et al.* (1968) [12]. Crop-weed competition varies with the nature and type of weed species associated with the crops (Zimdahl, 1999) [29]. Uncontrolled weeds cause grain yield reduction up to 76% under transplanted conditions (Singh *et al.*, 2004) [24]. A comprehensive study on weeds in agricultural fields of India was done by Thakur (1954) [28].

Weed flora have been investigated by different authors in different crop fields from India (Chakravarty, 1957; Paul & Bhattacharya, 1959; Datta & Maiti, 1962) [3, 17, 5]. Kanodia & Gupta (1972) [9] reported 134 species of weeds belonging to 83 genera and 33 families from kharif crops of western Rajasthan. Arun Guptha *et al.* (2005) [1] reported 71 weed species belonging to 23 families in wheat crop fields of Dehradun district. Gupta *et al.*, (2007) [7] explained the weed flora of Sagar in rainy and post rainy season. Sugha and Shukla (1977) [26] surveyed the weed flora of rice fields of Kangra district of Himachal Pradesh and identified 56 species of weeds belonging to 39 genera and 19 families. Diwakar & Ansari (1996) [6] reported 102 species of weeds in Buldana district of Maharashtra. Raju (1998) [20] analysed the prevalent weeds of Peninsular India. Rao and Rao (1993) [22] listed 171 weed species of cultivated fields from Andhra Pradesh. Pullaiah and Rao (1995) [18] recorded over 120 weed species of cultivated fields of Nizamabad District. Rajeswaramma (2001) [19] recorded 306 weed taxa in dry and irrigated fields of Nellore district and found that 54% of the weeds are common to all fields and 187 species of the total are found in Groundnut fields. The flora of weeds has been known to some extent but the phytosociological studies of crop-weed association are limited (Pandya & Sood, 1974; Pandya & Purohit, 1976; Sen, 1979; Sundaramoorthy *et al.*, 1998) [16, 15, 23, 27]. Kim and Moody (1980) [10] and Raju *et al.* (1995) [21] were provided the methodology for quantitative analysis of weeds. Baruah and Sharma (1992) [2] studied the phytosociology of weed flora of paddy fields at Jalukbary of Assam and recorded 26 weed species. Rajeswaramma (2001) [19] studied the phytosociology of weeds of Nellore district of Andhra Pradesh.

Materials & Methods

Ieeja mandal is one of the major mandal in Gadwal District. This mandal is bounded by Vaddepally & Itikyala mandals in the East; Gattu mandal and Karnataka state in the West;

Maldakal mandal in the North; Thungabhadra river in the South. The mandal lies between 77° 33' 38" Longitudes and 16° 1' 15" Latitude. There is no forest in this mandal. The main crops being cultivated in this area are Paddy, Jawar, Bajra, Red gram, Ground nut and Cotton.

Phytosociological Studies

Ground nut crop is a significant crop in Ieeja. The phytosociological studies were conducted during 2015-2016. The studies were conducted during Kharif season three field sites within a radius of 5km were identified. All the weeds encountered in the sample control plots of Uppal, Uttanur and Ieeja crop fields were carefully collected and identified. Random quadrat method was adopted for studying phytosociological attributes of weeds. In each field site, five quadrates of 50cm were laid down and hence a sum of 15 quadrates. All the weeds from each quadrates were collected separately in polythene bags. The quadrates were laid down four times based on their phenology and crop duration. The four phases of study are pre-plough, 15 days, 45 days and before harvest (60 days). The phytosociological attributes: abundance, density and frequency and their relative values and Importance Value Index (IVI) are calculated following the principles of Curtis and McIntosh (1950) [4], Misra (1968) [13] and Mueller-Dombois and Ellenberg (1974) [14].

Results and Discussion

Analysis of Quantitative Characters of Weed Species in Ground nut crop a total of 46 weed species (38 dicots, 8

monocots) were recorded in all 15 quadrates combining all phases of crop cycle. A total of 35 species were present during pre-plough period of the crop, 27 species are recorded during the second phase (15days) and after 45 days 31 species, whereas it is 33 species after 60 days. *Cyperus rotundus* is the most abundance species during the pre-plough phase. After 15 days *Martynia annua* is found to be the abundant species. *Physalis minima* is considered most abundant after 45 days and *Celosia argentia* after 60 days. Abundance, Density, Frequency and their relative values, and Importance Value Index (IVI) of the weeds encountered in groundnut crop fields are provided in Table 1. Importance Value Index of individual species encountered in the crop fields identified *Cyperus rotundus* as the most important species during the pre-plough phase followed by *Croton bonplandianum*. After 15 days, *Martynia annua* has become the most important weed followed by *Celosia argentia*. After 45 days again *Physalis minima* appeared as most important species followed by *Cyperus rotundus*. After 60 days *Physalis minima* appeared once as important species followed by *Celosia argentia*. From the above results, it is clear that *Physalis minima* and *Celosia argentia* are the most important weeds in the groundnut fields. The documentation of agrestals encountered in Ieeja mandal, Gadwal district, Telangana region in the present study has brought out the valuable information to light. Since, the information on the inventory, distribution and quantitative characters of weed species in different cropping systems of the district is a pre-requisite for effective weed management, the present paper holds immense significance.

Table 1: Phytosociological Attributes Of Groundnut Crop Weeds

S. No.	Name of the Species	Pre-plough				15 days				45 days				60 days			
		RD	RF	RDom	IVI	RD	RF	RDom	IVI	RD	RF	RDom	IVI	RD	RF	RDom	IVI
1	<i>Cleome gynandra</i>	2.74	3.57	1.98	8.30	-	-	-	-	-	-	-	-	3.00	3.61	2.40	9.01
2	<i>Cleome monophylla</i>	-	-	-	-	-	-	-	-	-	-	-	-	2.00	2.41	2.40	6.81
3	<i>Cleome viscosa</i>	1.37	0.89	3.97	6.23	-	-	-	-	0.92	1.15	2.37	4.44	2.00	1.20	4.80	8.00
4	<i>Sida acuta</i>	1.37	0.89	3.97	6.23	-	-	-	-	0.92	1.15	2.37	4.44	2.00	1.20	4.80	8.00
5	<i>Triumfetta rhomboidea</i>	1.37	1.79	1.98	5.14	0.80	1.11	3.06	4.98	0.92	1.15	2.37	4.44	-	-	-	-
6	<i>Tribulus terrestris</i>	3.43	3.57	2.48	9.48	-	-	-	-	1.83	1.15	4.74	7.73	1.00	1.20	2.40	4.60
7	<i>Cardiospermum helicacabum</i>	0.69	0.89	1.98	3.56	0.80	1.11	3.06	4.98	1.83	1.15	4.74	7.73	-	-	-	-
8	<i>Alysicarpus monilifer</i>	0.69	0.89	1.98	3.56	2.40	2.22	4.60	9.22	-	-	-	-	1.00	1.20	2.40	4.60
9	<i>Clitoria ternatea</i>	0.69	0.89	1.98	3.56	0.80	1.11	3.06	4.98	0.92	1.15	2.37	4.44	-	-	-	-
10	<i>Tephrosia purpurea</i>	1.37	1.79	1.98	5.14	-	-	-	-	-	-	-	-	2.00	1.20	4.80	8.00
11	<i>Trianthema portulacastrum</i>	-	-	-	-	0.80	1.11	3.06	4.98	1.83	1.15	4.74	7.73	-	-	-	-
12	<i>Gisekia pharnaceoides</i>	-	-	-	-	1.60	2.22	3.06	6.89	0.92	1.15	2.37	4.44	2.00	2.41	2.40	6.81
13	<i>Parthenium hysterophorus</i>	1.37	0.89	3.97	6.23	3.20	4.44	3.06	10.71	3.67	3.45	3.16	10.28	4.00	3.61	3.20	10.81
14	<i>Tridax procumbens</i>	2.06	0.89	5.95	8.90	4.80	3.33	6.13	14.26	1.83	2.30	2.37	6.50	2.00	2.41	2.40	6.81
15	<i>Enicostemma axillare</i>	3.43	3.57	2.48	9.48	0.80	1.11	3.06	4.98	1.83	1.15	4.74	7.73	-	-	-	-
16	<i>Trichodesma indicum</i>	0.69	0.89	1.98	3.56	-	-	-	-	-	-	-	-	-	-	-	-
17	<i>Evolvulus alsinoides</i>	2.06	1.79	2.98	6.82	-	-	-	-	0.92	1.15	2.37	4.44	1.00	1.20	2.40	4.60
18	<i>Physalis minima</i>	1.37	1.79	1.98	5.14	4.30	4.41	4.92	13.63	10.09	8.05	3.73	21.86	8.00	7.23	3.20	18.42
19	<i>Solanum surratens</i>	2.74	1.79	3.97	8.50	-	-	-	-	-	-	-	-	-	-	-	-
20	<i>Striga asiatica</i>	0.69	0.89	1.98	3.56	-	-	-	-	1.83	2.30	2.37	6.50	1.00	1.20	2.40	4.60
21	<i>Martynia annua</i>	1.37	1.79	1.98	5.14	14.41	13.33	4.60	32.34*	-	-	-	-	-	-	-	-
22	<i>Pedaliem murex</i>	0.69	0.89	1.98	3.56	-	-	-	-	1.83	2.30	2.37	6.50	2.00	2.41	2.40	6.81
23	<i>Sesamum alatum</i>	-	-	-	-	2.40	2.22	4.60	9.22	4.59	4.60	2.96	12.15	4.00	3.61	3.20	10.81
24	<i>Indoneesiella echioides</i>	4.11	3.57	2.98	10.66	-	-	-	-	-	-	-	-	-	-	-	-
25	<i>Lepidagathis cristata</i>	1.37	0.89	3.97	6.23	0.80	1.11	3.06	4.98	-	-	-	-	2.00	2.41	2.40	6.81
26	<i>Leucas aspera</i>	4.48	5.36	3.64	13.48	4.00	3.33	5.11	12.44	2.75	2.30	3.56	8.61	-	-	-	-
27	<i>Achyranthus aspera</i>	-	-	-	-	-	-	-	-	2.75	2.30	3.56	8.61	2.00	2.41	2.40	6.81
28	<i>Amaranthus spinosus</i>	1.37	1.79	1.98	5.14	-	-	-	-	-	-	-	-	2.00	2.41	2.40	6.81

29	<i>Amaranthus viridis</i>	-	-	-	-	-	-	-	-	3.67	3.45	3.16	10.28	1.00	1.20	2.40	4.60
30	<i>Celosia argentea</i>	5.48	4.46	3.18	13.12	9.60	7.78	5.25	22.64	5.50	5.75	2.85	14.09	6.00	6.02	2.88	14.90
31	<i>Digera muricata</i>	6.17	5.36	2.98	14.50	8.00	6.67	5.11	19.78	3.67	4.60	2.37	10.64	4.00	4.82	2.40	11.22
32	<i>Gomphrena serrata</i>	1.37	0.89	3.97	6.23	-	-	-	-	-	-	-	-	-	-	-	-
33	<i>Acalypha indica</i>	-	-	-	-	-	-	-	-	1.83	1.15	4.74	7.73	2.00	2.41	2.40	6.81
34	<i>Croton bonplandianum</i>	7.66	8.04	1.98	17.68	4.80	4.44	4.60	13.84	6.42	5.75	3.32	15.49	6.00	4.82	3.60	14.41
35	<i>Euphorbia hirta</i>	-	-	-	-	7.20	8.89	3.45	19.54	4.59	5.75	2.37	12.70	4.00	3.61	3.20	10.81
36	<i>Phyllanthus amarus</i>	4.11	3.57	2.98	10.66	7.20	8.89	3.45	19.54	3.67	3.45	3.16	10.28	5.00	3.61	4.00	12.61
37	<i>Phyllanthus maderaspatensis</i>	3.43	3.57	2.48	9.48	3.20	2.22	6.13	11.55	-	-	-	-	3.00	2.41	3.60	9.01
38	<i>Commelina benghalensis</i>	3.43	2.68	3.29	9.40	4.80	4.44	4.60	13.84	5.50	4.60	3.56	13.66	4.80	4.44	4.60	13.84
39	<i>Cyperus rotundus</i>	12.33	13.40	2.38	28.11	7.20	8.89	3.45	19.54	9.17	9.20	2.96	21.33	5.00	4.82	3.00	12.81
40	<i>Brachiaria distachya</i>	-	-	-	-	0.80	1.11	3.06	4.98	-	-	-	-	-	-	-	-
41	<i>Brachiaria eruciformis</i>	1.37	1.79	1.98	5.14	-	-	-	-	1.83	2.30	2.37	6.50	-	-	-	-
42	<i>Brachiaria reptans</i>	4.11	3.57	2.98	10.66	-	-	-	-	-	-	-	-	1.00	1.20	2.40	4.60
43	<i>Chloris barbata</i>	-	-	-	-	5.00	4.88	12.22	22.10	-	-	-	-	2.00	2.41	2.40	6.81
44	<i>Dactyloctenium aegyptium</i>	-	-	-	-	-	-	-	-	1.83	2.30	2.37	6.50	3.00	2.41	3.60	9.01
45	<i>Digitaria bicornis</i>	0.69	1.79	1.98	4.46	0.80	1.11	3.06	4.98	2.75	3.45	2.37	8.57	4.00	4.82	2.40	11.22
46	<i>Eragrostis viscosa</i>	0.69	1.79	2.98	5.45	2.40	3.33	3.06	8.80	3.67	4.60	2.37	10.64	3.00	3.61	2.40	9.01

Conclusion

The results obtained regarding the taxonomy of agrestals, Ieeja mandal has clearly established the fact that the weed diversity is high and significant. A thorough perusal of literature pertaining to other weed floras of different regions of India has also revealed the high concentration of weeds in the study area compared to the other areas. The knowledge and information regarding the ecology of agrestals of the Ieeja mandal will be communicated to the governmental and non-governmental agencies concerned for effective weed management strategies.

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