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Research Paper

PHYTOSOCIOLOGICAL STUDIES ON *CELOSIA ARGENTEA* L. IN GROUNDNUT FIELDS OF CHITTOOR DISTRICT

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Standard ecological quantitative methods as described by Ambasht was Followed for quantification studies of *Celosia argentea* L. A survey of weed flora of ground nut field was conducted during kharif 2006, 2007 and 2008 respectively at Cultivated fields of the Rompicherla area of Chittoor district. The weed survey was made by list count quadrat method (Misra, 1968) using 3 x 3c quadrat. Random Quadrats were taken and species wise weed population was recorded in groundnut crop. In order to express dominance of individual species the parameters viz frequency, dominance and abundance. On the groundnut fields of Chittoor district about 21 weeds were observed to be common. *Celosia argentea* L. was found to have highest density, frequency and abundance values. *Eleiotis soreria* has the least density, frequency and abundance values. The analysis showed that *Celosia argentea* L is the predominant weed in the groundnut fields which is responsible for decrease in yield of groundnut.

Keywords: Quantification, Quadrat, Frequency, Dominance, Abundance

INTRODUCTION

Groundnut fields at Chittoor district were found with many weeds. There are few reports on occurrence of weeds in crop fields from Ludhiana (Adlakha *et al.*, 1971), Bhubaneswar (Patro, 1971), Punjab (Sharma, 1981), Bijapur (Murthy, 1995) and Anantapur (Prakasa Rao, 1996). But the knowledge of the occurrence of weeds in groundnut fields in Chittoor district is not available. In order to control and eradicate the weeds, the profound knowledge of the frequency, dominance and abundance is essential need. Therefore, an

attempt has been made by selecting three fields of this area for the study of weed flora in groundnut fields.

MATERIALS AND METHODS

A survey of weed flora of groundnut fields was conducted during kharif 2006, 2007 and 2008, respectively at cultivated fields of the Rompicherla area of Chittoor district. It lies between 12° 37' and 14° 8' of north latitude and between 78° 30' and 79° 55' east longitude. The experiments were laid out is randomized block design with three replications at Rompicherla area.

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The soil was red loamy and Chittoor district soils are more fertile among the other districts soils of Andhra Pradesh. The weed survey was made by list count quadrat method (Misra, 1968) using 3×3c quadrat. Random quadrats were taken from 1 × 1 to 10 × 10 and species wise weed population was recorded in groundnut crop. In order to express dominance of individual species the parameters, viz., frequency, dominance and abundance.

Density, frequency, abundance, relative frequency and Relative density was calculated by using the following formulas.

- 1. Density:** Density is the number of individuals of a species in an unit area or volume.

$$\text{Density} = \frac{\text{Total number of plants in the quadrat}}{\text{Number of quadrats examined}} \times 100$$

The density is determined by actual count for each species in the community.

- 2. Frequency:** The frequency was expressed as the percentage occurrence of individuals of a species in a number of observations.

$$\% \text{ Frequency} = \frac{\text{Number of quadrats in which the species occurs}}{\text{Total number of quadrats examined}} \times 100$$

- 3. Abundance:** It was related to density but is a qualitative estimate.

$$\text{Abundance} = \frac{\text{Total number of plants species in all the quadrats}}{\text{Number of quadrats in which the species occurred}}$$

- 4. Relative Frequency (RF) :**

$$\text{Relative frequency} = \frac{\text{Frequency of one species}}{\text{Total frequency of all species}} \times 100$$

- 5. Relative Density (RD):**

$$\text{Relative density} = \frac{\text{Total number of plants of a species}}{\text{Total number of plants of all the species}} \times 100$$

RESULTS

In the unmanaged cultivated groundnut fields of Chittoor district about 21 common weeds were identified. The density, frequency, abundance, Relative frequency and Relative density values of weed species present in the groundnut fields were listed out (Table 1). Out of 21 weed species reported four species belonged to monocots and remaining 17 weed species were dicotyledons belonging to 10 Angiospermic families. In the present investigation, it was noted that most of the weeds belong to the family Asteraceae. The frequency of Asteraceae members are as follows. *Acanthospermum hispidum* (80%), *Tridax procumbens* (10%), *Vernonia cinerea* (80%), *Vicoa indica* (20%) and *Xanthium indicum* (20%). The frequency of Poaceae members are *Eragrostis tenella* (80%), *Cynodon dactylon* (90%) *Dactyloctenium aegypticum* (10%). In the present study it was found that *Borreria stricta* (40%), *Euphorbia hirta* (70%), *Euphorbia thymifolia* (30%), *Indigofera trita* (30%), *Leucas aspera* (90%), *Oldenlandia herbaceae* (80%), *Ocimum canum* (20%), *Polycarpaea corymbosa* (70%) and *Sida acuta* (40%) were of common occurrence.

Among all the identified weed species, *Celosia argentea* has highest density, frequency and abundance (38.4, 100, 38.4) and *Eleiotis soreria* has least density, frequency and abundance (0.2, 10, 2) values respectively (Table 1). The present studies revealed that *Celosia argentea* was a predominant weed in the cultivated groundnut fields under unmanaged conditions.

DISCUSSION

According to Braun-Blanquet (1932), "Phyto Sociology" is the study of all phenomena and effects regarding social life of plants. It refers to

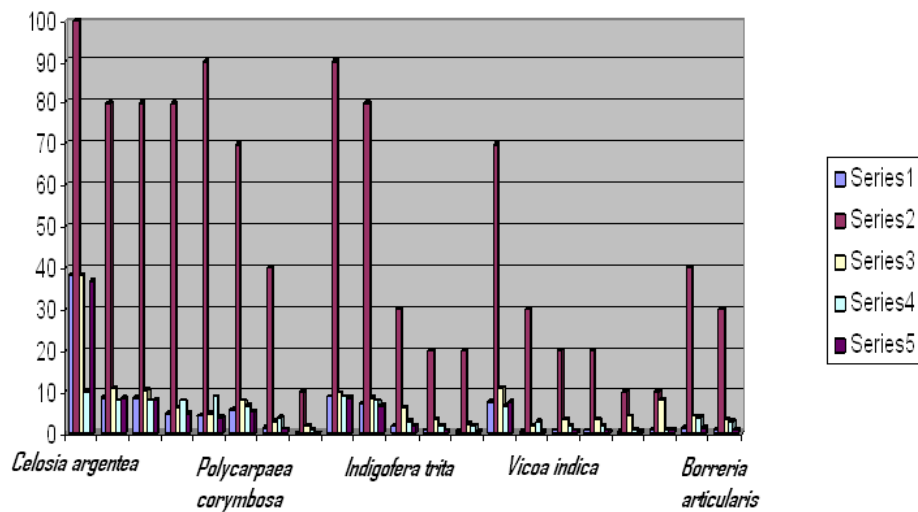
Table 1: Phyto sociology of *Celosia argentea* L.

S. No	Name of the Species	D	F	A	RF	RD
1.	<i>Celosia argentea</i> L.	38.4	100	38.4	9.8	36.99
2.	<i>Vernonia cinerea</i> L.	8.7	80	10.87	7.84	8.38
3.	<i>Oldenlandia herbaceae</i> (L.)Roxb	8.5	80	10.62	7.84	8.18
4.	<i>Acanthospermum hispidum</i> DC	4.8	80	6	7.84	4.62
5.	<i>Leucas aspera</i> Linn	4.1	90	4.55	8.82	3.94
6.	<i>Polycarpha corymbosa</i> (L.)Lam	5.5	70	7.85	6.86	5.29
7.	<i>Borreria stricta</i> (L.F)kshum	1.2	40	3	3.92	1.15
8.	<i>Eleiotis soreria</i> DC.	0.2	10	2	0.98	0.19
9.	<i>Cynodon dactylon</i> (L.)Pers	8.8	90	9.77	8.82	8.47
10.	<i>Eragrostis tenella</i> (Linn)	7	80	8.75	7.84	6.74
11.	<i>Indigofera trita</i> L.F.	1.8	30	6	2.94	1.73
12.	<i>Ocimum canum</i> L.	0.7	20	3.5	1.96	0.67
13.	<i>Xanthium indicum</i> Koen	0.5	20	2.5	1.96	0.48
14.	<i>Euphorbia hirta</i> Linn	7.8	70	11.14	6.86	7.51
15.	<i>Euphorbia thymifolia</i> Linn	0.6	30	2	2.94	0.57
16.	<i>Vicoa indica</i> (L.) DC	0.7	20	3.5	1.96	0.67
17.	<i>Commelina lenearis</i> L.	0.7	20	3.5	1.96	0.67
18.	<i>Tridax procumbens</i> L.	0.4	10	4	0.98	0.38
19.	<i>Dactyloctenium aegyptiacum</i> L.	0.8	10	8	0.98	0.77
20.	<i>Sida acuta</i> Burm . F	1.6	40	4	3.92	1.54
21.	<i>Borreria articularis</i> (Linn f.)	1	30	3.33	2.94	0.96

the species that grows at a place to form a community, number of plant species present and area covered by each species, relative position of each species with others (Ambasht, 1984). The Zurich-Montpellier school of vegetational analysis led by Braun-Blanquet (1932) has developed detailed methods, grouping them into "phyto sociology". A Plant may react with close proximity of neighbors (weed) by failure to set seed, to have high post seed germination death

of seedlings or survival with plastic development (Harper, 1963). Jones (1992) studied weed Phytosociology and crop husbandry, identifying a contrast between ancient and modern practice.

In India, weeds pose a serious problem in crop production. Because of lack of knowledge and financial resources, the smaller farmers cannot afford to remove them from their fields. Weeds growing among crop plants adversely affect yield and quality of the harvest and increase production

Figure 1: Phytosociology of *Celosia argentea* L.

costs, resulting in high economic losses (Alam, 1991). *Celosia argentea* L. is one of the most dominating herbaceous annual weed found in all semi arid land crops such as Groundnut (*Arachis hypogaea* L.), Finger Millet (*Eleusine coracana* L.) Maize (*Zea mays* L.) Radish (*Raphanus sativus*), jowar (*Sorghum bicolor*), hyacinth bean (*Dolichos lablab*), cowpea (*Vigna unguiculata*), red gram (*Cajanus cajan*), green gram (*Phaseolous aureus*). The economic importance of these plants has been documented (Ayensu, 1978; and Nwalozie, 1984).

Groundnut is one of the important soil seed crops occupying an area of 7.5 million ha, in India with a production of 6 million tones groundnut, normally a rain fed crop, is sown without sufficient tillage due to infrequent rains. As a result the crop is infested with weeds. It has been estimated that the reduction in yield is 77% due to weed infestation (Kulkarni *et al.*, 1963).

In the present study, more number of

C. argentea plants were identified in the groundnut fields (Table 1). They may cause severe loss to groundnut crop. It has prolonged seed viability. It can set seeds under wide range of conditions and make them distribute continuously into the environment. Generally weeds have high relative growth rates of seedling than crop. By their high rates of photosynthesis, weeds compete with crop and able to thrive well.

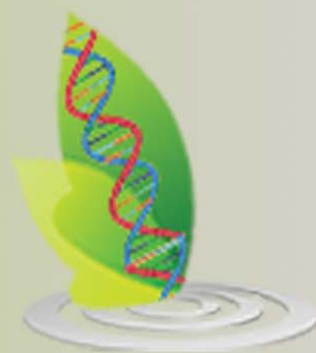
CONCLUSION

Phyto sociological studies of above crop fields of Chittoor District showed the dominance of *Celosia argentea* L., grasses and other weeds, creating direct economic loss to the farmer. In wastelands, the grasses were reported with lower IVI, creating direct impact on grazing animals.

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