

Inventory Of Crop Weeds Of Anantapur District, Andhra Pradesh, India

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ABSTRACT:

This article presents an over view of crop weeds of Anantapur Dist, A.P. from point of agro ecological systems, those plants which are competing with agricultural crops and having short vegetative phase and high reproductive output are termed as weeds. In the present study, a total of 247 plant taxa, belonging to 165 genera and 43 families were identified as weeds in the Anantapur district, Andhra Pradesh. Of the 247 weed taxa, 185 are dicots, 62 are monocots. These taxa are recorded exclusively from the cultivated fields of herbaceous crops. The weeds of Anantapur district comprises 35% of the total weeds encountered in the state crop fields. A total of 40 weed taxa exclusively in habit in the rainfed crop fields, where as 62 weed taxa harbours in irrigated crop fields. The cultivated fields of the study area are infested with a large number of weeds, causing heavy loss to the crop yields. It is pertinent to note that the presence of weeds in herbaceous crops like rice, groundnut and legume crops inflict major losses. The key objective of the study is provision of a complete inventory of agricultural field weeds in Anantapur district.

Key words: *Agrestals, agro-ecological systems, crop productivity, Gregarious weeds, weed loss.*

I. INTRODUCTION

A weed is a plant 'out of place' or a plant growing where it is not wanted. While all weeds are unwanted plants, all unwanted plants may not be weeds. From the point of agro-ecological systems, those plants which are competing with agricultural crops and having short vegetative phase and high reproductive output are termed as weeds. They are able to grow in adverse habitats and easily invade agricultural fields, which are very fertile and a favorite ground for their colonization. Enormous seed production and power of vegetative propagation make them immortal in agro-ecosystems. Weed-crop competition is critical in obtaining optimum crop yields because of greater competing 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. Weeds have higher contents of nutrients than crop plants; they grow faster and absorb nutrients more efficiently. Reduction in crop yield has a direct correlation with weed competition. Depending on the degree of competition, weeds reduce crop yields by 10-25%. In tropical countries like India, the yield loss has been estimated to the tune of 30%. In general, one kilogram of weed growth corresponds to a reduction in one kilogram of crop growth. Besides affecting the yield of crops, weeds can affect the quality of crops. Despite of using modern mechanical methods for the past few decades, weeds are still posing major problems to agricultural productivity throughout the world. One of the most important reasons for the success of weeds is attributed for their biodiversity.

The effective use of control measures, whether cultural or chemical, requires an appreciation of the biological characteristics of the weeds concerned. For weeds, especially those re-produce by seeds, the time of their germination; fruit setting is an important aspect from the point of their control. Hence, correct identification of the weed species, knowledge on phenological attributes of the same are of primary concern in weed control measures. Towards this, an inventory of weeds of an area will be of immense help in controlling the weed loss to crop productivity

II. MATERIALS AND METHODS

The present study is aimed to provide an inventory of Weeds of different cultivars in Anantapur District .

II.1 Field Work

The area was explored extensively and weed plants from the cultivated fields of over 148 villages spread over 63 mandals in Anantapur district. The focus was primarily on herbaceous annual crops and herbaceous weeds that interfere with growth of crop plants. Plant specimens were collected in both vegetative and reproductive stages. Every plant was collected in quadruplicates and every attempt has been made to study the habit, habitat, colour of the flower, flowering and fruiting seasons and frequency of distribution of the species. Field numbers were given for every specimen after noting the characters of the collected specimens in the field notebook.

II.2 Herbarium Preparation

The specimens were collected in well-tied thick polythene bags. The collected specimens were made into herbarium according to the methodology described by Santapau (1995)[1] and Jain & Rao (1977)[2]. The whole plants or twigs were poisoned by dipping in a saturated solution of mercuric chloride in ethyl alcohol and placed immediately between blotting papers with the help of forceps. The blotters kept in iron pressers were changed after 24 hours for proper spreading. These spread specimens were changed once again into dried blotting papers until all the specimens were completely dried. The poisoned, pressed and dried specimens were pasted with glue (gum arabic) on a standard herbarium sheet (42x28cm). Labels with relevant information such as name of the plant, locality, altitude, date of collection and collector's name were affixed on the right hand bottom corner of the mounted sheets.

II.3 Identification of specimens

Every specimen was carefully studied regarding vegetative and reproductive features. Provisional identification was made following 'Flora of Presidency of Madras' (Gamble & Fischer, 1915-1935)[3] and other state, regional and local floras. All the plant families are arranged in sequence following Bentham and Hooker's classification (1862-83)[4] with certain exceptions to accommodate recent modifications adopted after Cronquist (1968)[5]. All the genera in a family and all the species under a genus are given in alphabetical order.

III. RESULTS AND DISCUSSION

In the present study, a total of 247 plant taxa, belonging to 165 genera and 43 families were identified as weeds in the Anantapur District. Of the 247 weed taxa, 185 are dicots, 62 are monocots. The taxonomic categorization of the weed species is presented in **Table:1**.

Of 43 weed families recorded in the presented study, 13 are monotypic, viz., representing only by one species as follows, Menispermaceae, Papaveraceae, Caryophyllaceae, Oxalidaceae, Balanitaceae, Rhamnaceae, Sapindaceae, Passifloraceae, Aizoaceae, Plumbaginaceae, Apocynaceae, Aristolochiaceae, Gentianaceae. The first 5 largest families with more than 10 species are presented. Poaceae is the largest representing 52 species. Fabaceae occupies the second position with 24 species followed by Asteraceae (17) Euphorbiaceae (16) and Amaranthaceae (15). Grasses and sedges (59 species) represent 24% of the total weed flora of Anantapur District. The first five largest families represent 50% of the total weed species.

III.1 Andhra Pradesh State weeds and the present study

A critical study on the flora of Andhra Pradesh (Pullaiah *et al.*, 1997)[6] has revealed the presence of 715 taxa as weeds in crop fields of the state. Pullaiah and Rao(1995)[7] recorded over 120 weed species of cultivated fields of Nizamabad district. PrakasaRao and Kumari (1996)[8] studied the weed flora of groundnut in Anantapur district of Andhra Pradesh and reported 55 species. Lakshmaiah(2006)[9] recorded a total of 509 weed species in the cultivated fields of Rayalaseema region. The weeds of Anantapur District (247 taxa) comprises 35% of the total weeds encountered in the state crop fields. Of the 284 total grass species recorded from the state, 52 (20%) of them are recorded from the crop fields of Anantapur District of Andhra Pradesh.

III.2 Longevity and life-forms

Out of 247 taxa, 218 are herbs, 21 shrubs and 8 falls under climbing category. The analysis on the life span of the weeds of cultivated fields in the Anantapur District revealed that 62.75% (155 species) are annuals and 37.25% (92 species) are perennials. The longevity and life-forms of the weeds category-wise are presented. It is interesting to note that monocots are equally divided in terms of longevity. Pertaining to grasses 34 species are annuals and 18 are perennials. Regarding Sedges 2 are annuals 5 are perennials.

III.3 Gregarious weeds

Ten weeds are found heavily infesting the crop fields in Anantapur District. *Parthenium hysterophorus*, *Coldenia procumbens* are predominant post-harvest weeds; *Tridax procumbens*, *Euphorbia hirta*, *E. heterophylla*, *Aristida adscensionis* and *Cynodon dactylon* are gregarious in all crop fields. *Cyperus rotundus* is menace to much rain fed crops. *Echinochloa colona* and *E. crus-galli* are causing heavy loss to rice crop. 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)[10]. Ten species cause the majority (at least 80%) of crop losses including *Cyperus rotundus*, *Echinochloa crus-galli* and *Imperata cylindrica*. All these weeds are reported in the present study and found common in crop fields.

III. 4 Rain fed crop weeds

The major rain fed crops in Anantapur District are Groundnut, Sunflower, Bengal gram, Red gram and Jowar. A total of 40 weed taxa exclusively inhabit in these crop fields . Of these, 23 are common including *Sida acuta*, *Mollugo cerviana*, *Striga angustifolia*, *Brachiaria distachya* and *Trachys muricata*. Twelve species are occasionally seen in the fields including *Cleome monophylla*, *Polyacarpaea corymbosa*, etc. Seven species are rare including *Cleome aspera*, *Tephrosia tinctoria*, *Cassia absus* and *Priva cordifolia*. Of these crops, Groundnut forms the major crop with respect to weed infestation and nearly 39% of weeds are exclusively recorded from this crop.

III.5 Irrigated field weeds

The major irrigated crop cultivated in the study area is Rice. Rice fields harbours exclusively 23 weed taxa. Of them, 13 are common. *Echinochloa colona*, *Echinochloa crus-galli*, *Panicum notatum* are prominent among them. Six species are occasional including *Oxalis corniculata*, *Cyperus difformis*, *Panicum trypheron* and *Eragrostis cilianensis*. The taxa rare in rice fields are *Diplachne fusca*, *Paspalidium flavidium* and *Paspalidium punctatum*.

TABLE : 1 ANALYSIS OF WEED TAXA OF ANANTAPUR DISTRICT

TRADITIONAL PLANT GROUP	FAMILIES	GENERA	SPECIES
Dictotylegous:			
Polypetalae	21	45	79
Gamopetalae	15	62	73
Monochlamydae	04	20	33
Monocotyledons:	03	38	62
Total	43	165	247

TABLE: 2 ANALYSIS OF WEED FAMILIES AND TAXA OF ANANTAPUR DISTRICT

S. No	Plant family / Taxon	29	<i>Tribulus terrestris</i>	62	<i>C. occidentalis</i>
	MENISPERMACEAE		OXALIDACEAE	63	<i>C. pumila</i>
1	<i>Cocculus hirsutus</i>	30	<i>Oxalis corniculata</i>		MIMOSACEAE
	PAPAVERACEAE		BALANITACEAE	64	<i>Mimosa praineana</i>
2	<i>Argemone mexicana</i>	31	<i>Balanites aegyptiaca</i>	65	<i>M. pudica</i>
	CLEOMACEAE		RHAMNACEAE		LYTHRACEAE
3	<i>Cleome gynandra</i>	32	<i>Ziziphus mauritiana</i>	66	<i>Ammannia baccifera</i>
4	<i>C. monophylla</i>		SAPINDACEAE	67	<i>A. multiflora</i>
5	<i>C. viscosa</i>	33	<i>Cardiospermum helicacabum</i>		PASSIFLORACEAE
	POLYGALACEAE		FABACEAE	68	<i>Passiflora foetida</i>
6	<i>Polygala arvensis</i>	34	<i>Abrus precatorius</i>		CUCURBITACEAE
7	<i>P. elongata</i>	35	<i>Aeschynomene indica</i>	69	<i>Blastania garcinii</i>
	CARYOPHYLLACEAE	36	<i>Alysicarpus bupleurifolius</i>	70	<i>Citrullus colycinthus</i>
8	<i>Polycarpea corymbosa</i>	37	<i>A. heterophyllus</i>	71	<i>Coccinia grandis</i>
	PORTULACACEAE	38	<i>A. monilifer</i>	72	<i>Luffa turberosa</i>
9	<i>Portulaca olaracea</i> var. <i>olaracea</i>	39	<i>A. rugosus</i>	73	<i>Momordica dioica</i>
10	<i>P. quadrifida</i>	40	<i>Clitoria ternatea</i>		AIZOACEAE
	MALVACEAE	41	<i>C. medicaginea</i>	74	<i>Trianthema portulacastrum</i>
11	<i>Abutilon crispum</i>	42	<i>C. ramosissima</i>		MOLLUGINACEAE
12	<i>A. hirtum</i>	43	<i>Goniogyna hirta</i>	75	<i>Gisekia pharnaceoides</i>
13	<i>A. indicum</i>	44	<i>Indigofera cordifolia</i>	76	<i>Glinus lotoides</i>
14	<i>Pavonia odorata</i>	45	<i>I. hirsuta</i>	77	<i>G. oppositifolius</i>
15	<i>P. procumbens</i>	46	<i>I. linifolia</i>	78	<i>Mollugo cerviana</i>
16	<i>P. zeylanica</i>	47	<i>I. linnaei</i>	79	<i>M. nudicaulis</i>
17	<i>Sida acuta</i>	48	<i>I. trita</i>	80	<i>M. pentaphylla</i>
18	<i>S. cordata</i>	49	<i>Macropetium atropurpurium</i>		RUBIACEAE
19	<i>S. cordifolia</i>	50	<i>Mukuna pruriens</i>	81	<i>Borreria articularis</i>
20	<i>S. ovata</i>	51	<i>Psoralea corylifolia</i>	82	<i>Dentella repens</i>
	STERCULIACEAE	52	<i>Rhynchosia minima</i>	83	<i>Hedyotis corymbosa</i>
21	<i>Melochia corchorifolia</i>	53	<i>Sesbania procumbens</i>	84	<i>H. puberula</i>
22	<i>Waltheria indica</i>	54	<i>Tephrosia purpurea</i>		ASTERACEAE
	TILIACEAE	55	<i>T. strigosa</i>	85	<i>Acanthospermum hispidum</i>
23	<i>Corchorus aestuans</i>	56	<i>T. villosa</i>	86	<i>Ageratum conyzoides</i>
24	<i>C. capsularis</i>	57	<i>Teramnus labialis</i>	87	<i>Bidens biternata</i>
25	<i>C. oltorius</i>		CAESALPINACEAE	88	<i>Caesulia axillaris</i>
26	<i>C. trilocularis</i>	58	<i>Cassia absus</i>	89	<i>Echinops echinatus</i>
27	<i>Triumfetta rhomboidea</i>	59	<i>C. auriculata</i>	90	<i>Eclipta prostrata</i>
	ZYGOPHYLLACEAE	60	<i>C. hirsuta</i>	91	<i>Grangea maderaspatana</i>
28	<i>Fagonia cretica</i>	61	<i>C. italica</i>	92	<i>Lagascea mollis</i>

93	<i>Oligocheta ramosa</i>
94	<i>Parthenium hysterophorus</i>
95	<i>Pulicaria wightiana</i>
96	<i>Spaeranthus indicus</i>
97	<i>Synedrella nodiflora</i>
98	<i>Tricholepis radicans</i>
99	<i>Tridax procumbens</i>
100	<i>Vernonia cineria</i>
101	<i>Xanthium strumarium</i>
	PLUMBAGINACEAE
102	<i>Plumbago zeylanica</i>
	APOCYANACEAE
103	<i>Catharanthus pusillus</i>
	ASCLEPIDACEAE
104	<i>Calotropis procera</i>
105	<i>Pergularia daernia</i>
106	<i>Tylophora indica</i>
	GENTIANACEAE
107	<i>Encicostemma axillare</i>
	BORAGINACEAE
108	<i>Coldenia procumbens</i>
109	<i>Heliotropium indicum</i>
110	<i>Trichodesma indicum</i>
	CONVOLVULACEAE
111	<i>Convolvulus arvensis</i>
112	<i>C. rotlerianus</i>
113	<i>Evolvulus alsinoides</i>
114	<i>Ipomea carnea</i>
115	<i>I. pestigridis</i>
116	<i>Merrimia gangetica</i>
117	<i>M. tridentate</i>
	SOLANACEAE
118	<i>Datura innoxia</i>
119	<i>D. stramonium</i>
120	<i>Physalis minima</i>
121	<i>Solanum nigrum</i>
122	<i>S. surattense</i>
	SCROPHULARIACEAE
123	<i>Bacopa monnieri</i>
124	<i>Limnophila indica</i>
125	<i>Sopubia delphinifolia</i>
126	<i>Striga angustifolia</i>
127	<i>S. asiatica</i>
	PEDALIACEAE
128	<i>Martynia annua</i>
129	<i>Petalium murex</i>
130	<i>Sesamum alatum</i>
	ACANTHACEAE
131	<i>Asystasia gangetica</i>
132	<i>Barleria prionitis</i>
133	<i>Blepharis repens</i>
134	<i>Dipteracanthus patulus</i>
135	<i>Indoneesiella echioides</i>
136	<i>Justicia procumbens</i>
137	<i>J. prostrata</i>
138	<i>Lepidagathis cristata</i>
139	<i>Peristrophe paniculata</i>
140	<i>Rungia repens</i>
	VERBENACEAE
141	<i>Lantana camera</i>
142	<i>Phyla nodiflora</i>
143	<i>Priva cordifolia</i>
	LAMIACEAE
144	<i>Anisochilus carnosus</i>
145	<i>Anisomeles malabarica</i>
146	<i>Hyptis suaveolens</i>
147	<i>Leonotis nepetifolia</i>
148	<i>Leucas aspera</i>
149	<i>Ocimum americanum</i>
150	<i>O. gratissimum</i>

151	<i>O.tenuiflorum</i>
	NYCTAGINACEAE
152	<i>Boerhavia diffusa</i>
153	<i>B. erecta</i>
	AMARANTHACEAE
154	<i>Achyranthes aspera</i>
155	<i>Aerva javanica</i>
156	<i>A.lanata</i>
157	<i>Almania nodiflora</i>
158	<i>Altermanthera pungens</i>
159	<i>A.sessilis</i>
160	<i>Amaranthus spinosus</i>
161	<i>A.tricolor</i>
162	<i>A.viridis</i>
163	<i>Celosia argentea</i>
164	<i>C.polygonoides</i>
165	<i>Digera muricata</i>
166	<i>Gomphrena serrata</i>
167	<i>Pupulia lappacea</i>
168	<i>Trichurus monsosiae</i>
	ARISTOLOCHIACEAE
169	<i>Aristolochia bracteolata</i>
	EUPHORBIACEAE
170	<i>Acalypha alnifolia</i>
171	<i>A.indica</i>
172	<i>Chrozophora rottleri</i>
173	<i>Croton bonplandianum</i>
174	<i>Euphorbia dracunculoides</i>
175	<i>E.heterophylla</i>
176	<i>E.hirta</i>
177	<i>E.hypericifolia</i>
178	<i>E.prostrata</i>
179	<i>E.thymifolia</i>
180	<i>Jatropha glandulifera</i>
181	<i>Phyllanthus amarus</i>
182	<i>P.mederaspapensis</i>
183	<i>P.virgatus</i>
184	<i>Sebastiana chamaelea</i>
185	<i>Tragia involucrata</i>
	COMMELINACEAE
186	<i>Amischophacelus cucullata</i>
187	<i>Commelina benghalensis</i>
188	<i>Cyanotis fasciculata</i>
	CYPERACEAE
189	<i>Bulbostylis barbata</i>
190	<i>Cyperus corymbosus</i>
191	<i>C.digitatus</i>
192	<i>C.rotundus</i>
193	<i>Fimbristylis bis – umbellata</i>
194	<i>F.complanata</i>
195	<i>Mariscus madaraspatanus</i>
	POACEAE
196	<i>Aristida adscensionis</i>
197	<i>A.hystrix</i>
198	<i>Brachiaria distachya</i>
199	<i>B.eruciformis</i>
200	<i>B.ramosa</i>
201	<i>B.reptans</i>
202	<i>Cenchrus biflorus</i>
203	<i>C.setigerus</i>
204	<i>Chloris inflata</i>
205	<i>Cymbopogon coloratus</i>
206	<i>Cynodon dactylon</i>
207	<i>Dactyloctenium aegyptium</i>
208	<i>Dichanthium annulatum</i>
209	<i>Digitaria bicornis</i>
210	<i>D.ciliaris</i>

211	<i>Dinebra retroflexa</i>
212	<i>Diplachne fusca</i>
213	<i>Echinochloa colona</i>
214	<i>E.crus-galli</i>
215	<i>E.frumentacea</i>
216	<i>Eleusine indica</i>
217	<i>Eragrostis aspera</i>
218	<i>E.cilianensis</i>
219	<i>E.ciliaris</i>
220	<i>E.tenella</i>
221	<i>E. tremula</i>
222	<i>E.viscosa</i>
223	<i>Eremopogon foveolatus</i>
224	<i>Eriochloa procera</i>
225	<i>Hackelochloa granularis</i>
226	<i>Heteropogon contortus</i>
227	<i>Imperata cylindrica</i>
228	<i>Ischaemum pilosum</i>
229	<i>Iseilema antheperoides</i>
230	<i>I.prostratum</i>
231	<i>Oropetium thomaeum</i>
232	<i>Panicum notatum</i>
233	<i>P.repens</i>
234	<i>P.trypheron</i>
235	<i>Paspalidium flavidum</i>
236	<i>P.geminatum</i>
237	<i>P.punctatum</i>
238	<i>Paspalum paspaloides</i>
239	<i>P.scrobiculatum</i>
240	<i>Pennisetum hohenackeri</i>
241	<i>Perotis indica</i>
242	<i>Seteria intermedia</i>
243	<i>S.pumila</i>
244	<i>S.verticillata</i>
245	<i>Sporobolus coromandelianus</i>
246	<i>Trachys muricata</i>
247	<i>Urochloa panicoides</i>

IV. CONCLUSION

The documentation of weeds encountered in Anantapur District in the present study has brought out the valuable information to light. Since, the information on the distribution of weed species in different cropping systems of the district is a pre-requisite for effective weed management, the present study hold immense significance.

A record of 247 taxa were reported in the present study. Such a great diversity of weeds in the region perhaps may be attributed to the availability of wide range of ecological conditions. Of the 247 species, 185 dicots, and 62 monocots. The members of Poaceae, Fabaceae, Asteraceae, Amaranthaceae and Euphorbiaceae dominates the weed flora of the region. The former two groups are predominant in crop fields and had a great contribution to the weed biomass in all the crop fields under study. The analysis on crop weed association revealed that 169 out of 247 weed taxa (approx. 68%) are found common to all crop fields. The present study recorded a total of 23 species of weeds in Rice crop fields, of which 12 are exclusive to the crop. The groundnut fields harbour 57 weed species of which 28 are encountered exclusively in the crop fields.

The results obtained regarding the taxonomy of weeds in Anantapur District have 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 State has also revealed the high concentration of weeds in the study area compared with the other areas. The knowledge and information regarding the taxonomy of weeds of the Anantapur District will be communicated to the concerned governmental and non-governmental agencies for effective weed management strategies.

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