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STUDY ON IDENTIFICATION OF WEEDS AND WEED PATHOGENS IN AGRICULTURAL FIELDS IN VINUKONDA MANDAL AT GUNTUR DISTRICT

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ABSTRACT

A systematic field study was conducted in agriculture crop fields such as food, commercial, and pulses at Vinukonda mandal. A total of 35 weed pathogenic plants belongs to the 15 families are collected and identified. Weeds are very common, dominant, and wild spread in every agriculture crop fields. Weeds shows plant –pathogen relationship. The Weed species belongs to the family Amarananthaceae (7 species), Phyllanthaceae and Poaceae (4 species), Ateraceae (3 species), Convolvlaceae, Apocynaceae, Nyctaginaceae and Euphorbiaceae (2 species), Cyperaceae, Acanthaceae, Boraginaceae, Lamiaceae, Solanaceae, Caparidaceae, Fabaceae (1species). Weeds species belongs to the family Amaranthaceae, Phyllanthaceae and Asteraceae are shows the mycological diseases and which are very common in pulses and commercial crops.

KEYWORDS: Weeds, Agricultural crops, Guntur, plant –pathogens, mycology.

INTRODUCTION

Weeds are very common, dominant, wild spread in an every crop field. While weeds are unwanted plants, all unwanted plants may not be weed Dr. A.Lakshmaiah (2005).Weeds multiplies and reproduce by both vegetative and sexual methods. They grow faster and spread rapidly, reproduce at high rate and produce large quantities of seeds. From the point of agro-ecological systems, Weeds are shows short vegetative phase and high reproductive output. They are able to grow in adverse habitats and easily invade agricultural fields, which are very fertile and a favourite ground for their colonization Dr. A.Lakshmaiah (2005). Weeds are act as energy sources in an ecosystem, they are main components in the food chain system. Weeds are compete with crop for sunlight, space, water and nutrients in the soil Kiran and Rao (2013). The intensity of weed competition depends upon (a) type of the weed species, (b) severity of weed infestation, (c) duration of weed infestation, (d) competing ability of crop plant and, (e) climatic conditions which effect weed and crop growth Principals of weed species 2nd edition by V.S RAO (2000).

Weeds are classified into 3 broad groups; 1. Annuals 2. Biennials, 3. Perennials. in each group there are both broadleaf and grasses. Principals of weed species 2nd edition by V.S RAO (2000).

Weeds are the one of the major constraints in agricultural systems. As per the available estimates, weeds cause the 1/3rd of the total loss of the yield in agricultural fields. Reduction in the loos of the yield as direct correlation with weed competition. in India, the total yield loss of the crop by weed is 30-35% Ashitosh K shinde And Mrudang Y Shukla(2014). The second highest problem for agricultural yield is Weed pathology, epidemiology is the study of plant diseases in plant populations. Mycology is the study of the fungi. Fungal association with the living plants most likely began over425 million years ago when plants began to colonize land. There are well over 10,000 fungal species know to be associated with living plants. Michelle L. Pawlowski and Glen L. Hartman (2016). Weeds provide the habitat for insects and pathogens. They act as host for plant pathogens, micro -organism's such are Fungi, Viruses, Bacteria, Viroid's, plant parasites. Plant pathogens cause the disease to the main crop and ultimately decreases the yield of the crop. Fungal associations with plants can be characterized based on the different ways fungi infect and colonize host plants as well as how fungi use plants as a food source. Some fungal species cannot live without a host plant and called as obligate or biotropes. Fungi deriver their nutrition from dead tissues are called as necrotrophs. Weeds represent the greatest pest problem to most of the producers. Herbicides accounts for approximately 45% of total pesticides of the world. Powell and Jutsum (1993); Donaldson et al., (2002).

MATERIAL METHODS

Study area and information: Vinukonda. Is located at Guntur. Co-ordinates are 16°18° N AND 80˙27°E. Total density of city was 4,700/km² and population (2011) is 48, 87, 813. Common soil types are black cotton soils,

red soils, and loamy soils. Major Field crops cultivated are paddy, cotton, black gram, red gram, maize, chillies, ground nut, sugarcane and some minor crops of vegetable crops are also cultivated. Rice is the major food crop of the district. Guntur is famous for commercial crop chillies it is the most demanded crop of the India.

SAMPLING AND EXPERIMENTAAL PROCEDURE

1. **Physic - chemical analysis of soil:** Soil test was conducted in four different crops such as paddy, chilli, sugarcane, and red gram. Most of pH was in between 8.0-8.5, all are alkaline soils. The major compounds like nitrogen and phosphorus shows low percentage in the soils. Boran, zinc, and carbon was at very low concentrations. Nitrogen was at high percentage. Refer table (1).

2. Study design: The cross-examination of the study area includes planned field trips to different cop fields for weed and pathogenic weed identification, classification and collection of weed and pathogenic weeds. Two to three field trips are conducted in karif and Rabi seasons. The random sampling method was used to assume to note down the presence of weed species among in different crop fields in this study. All weed individuals were cut at the soil surface and taken to the laboratory for sorting and counting. Species that could be identified at genus level and all grass species were also included in the examination of total weed density only. Every species was carefully studied regarding vegetative and reproductive features. Some of the pathogenic weeds are isolated and cultured in in-vitro conditions for future studies.

3. Data analysis: Each field trip includes about 3 to 6 days during the karif and Rabi season. Fields are surveyed at four to six weeks before and after planting. The weed survey includes different crop fields of food, commercial, pulses. All the weeds are encountered in karif reason (july-octobar) and Rabi (October-march). The weed density was measured by placing a quadrat (1 m^2 size) randomly on the survey spots. Ten quadrats were placed at each site of the survey spots. Weed species within each quadrat were counted. The weed density were calculated based on the formula applied by **Muhammad Tauseef1*, Fahad Ihsan1, Wajad Nazir2 and Jahanzaib Farooq et al., (2012).**

Density =Total number of individual species/Total sampled area

4. Analysis: After completing the weed collection from the different weed surveys in crop fields, weed plants were identified correctly by help of flora, monographs, literature and as a result correct scientific and common names are provided to each plant. Each plant was critically studied and identified by using the FLORA OF PRESEDENCY OF MADRAS Gamble and Fischer (915-1935), flora of British India HOKKER (1982-1987), flora of Andhra Pradesh pullaiha and chennaiha (1997), flora and vegetation of Andhra Pradesh T.Pullaiah and Ravi Prasad Rao (2008), and local floras of flora of Guntur district by T.Pullaiah, V.Rama Krishnaiah, S.Sandhya Rani, and P.N.Rao (2002).

5. Isolation of pathogenic weeds: Pathogenic weeds like *Croton bonplandium* and *Pergularia tomentosa* from the study area were taken for the isolated the pathogen because these two plants show the maximum diseased leaves in plants. The leaves of the pathogenic plants were washed thoroughly in running tap water to remove unwanted dust or soil particles from the leaves. The infected portions of the leaves were cut into 1.0 to 1.5 cm fragments. The diseased leaf bites were surface sterilized by 70% ethyl alcohol for 1-2 minutes for 2-3 times and then rinsed in sterile distilled water for three to four times. Then the leaf bits were rinsed in 0.01% mercuric chloride solution for 1 or 2 minutes followed by washing with sterile autoclaved double distilled water for 2 or 3 times. These leaves bites were transferred into Potato dextrose agar (PDA) plates supplemented with 1% streptomycin sulphate (antibiotic) under sterile conditions in an inoculation chamber. After inoculation plates were incubated at 25 ± 2°C for 21 days under a 12 h light/dark photoperiod. The mycelium growth was noticed with in 1 or 2 days after the isolation of the pathogens.

A **B** **C**

A.Croton bonpladium **diseased plant B. Diseased leaves *C.Cult*ured pathogen (in-vitro)**

A **B** **C**

A. Pergularia tomentosa **diseased plant B. Diseased leaves C. Cultured pathogen (in-vitro)**

RESULTS AND CONCLUSIONS

Guntur district contain major crops of paddy, cotton, maize, black gram, red gram, chilli sugarcane. Minor crops of some vegetative and commercial crops were cultivated and they were highly infected by weeds and weed pathogens. My work was done on food crops i.e. paddy, sugarcane, pulses like red gram and Commercial crop like chilli in Vinukonda mandal at Guntur district.

Total 35 weed species are carefully identified and recorded. The weed infestation was affected by the irrigation (or) water resources, agricultural practices and climatic conditions. The density of weed species belongs to the family Amaranthaceae (7 species) followed by Phyllanthaceae (4 species) and Poaceae (4 species). Then families of Asteracece (3 species), Euphorbiaceae (3species) Convolvelaceae (2 species), Apocynaceae (2 species), and Nyctaginaceae (2 species) were identified. And only one weed species are found in Cyperaceae, Acanthaceae, Solanaceae, Fabaceae, Caparidaceae, Lamiaceae and Boraginaceae. (Table 2).

Cyperus esculents and *Digitaria sanguinalis* weed species were the most dominated species than other weeds species. The crop plants were heavily infested with broad leaved weed plants during pre-monsoon,

monsoon and post-monsoon seasons. The weed species belonging to the family Asteraceae, Euphorbiaceae and Amaranthaceae were more common in all vegetable crops, pulses and other crops. Grass weeds like *Digitaria sanguinalis, Bouteloua gracilis, Saccharum spontaneum, Eleusine indica* and *Panicum rapens* were commonly present in the Paddy. Sedges like *Cyperus esculents* are found in the paddy and sugarcane widely. Board leaved weeds like *Phyllanthus niruri, Phyllanthus maderaspatensis, Amaranthus viridis, Parthenium hysterophorus, Cascuta alta, Asclepias syriaca, Phyllanthus virgatus, Thunbergia alata, Tridax procumbens, Chenopodium opulifolium, Amaranthus spinosus, Lithospermum arvense, Perilla frutescens, Pergularia tomentosa, Alternaria sessile, Digera muricata, Boerhavia erecter, Boerhavia diffusa, Eleuisia indica, Croton bonplandium, Physalis mimima, Leica aspera, Cleom viscosa, Amaranthus aspera, Acanthospermum hispidum, Acalpa lanceolata, Phyllanthus urinaria, Acalypha indica*, were identified and recorded in agricultural crop fields of paddy, sugarcane, chilli, red –gram crops in field trips.

From these Weeds, some diseased weeds were also recorded (table 3). In recent years there are number of herbicides and pesticides developed to reduce the weed population in crop fields. *Pergulari tomentosa* and *Croton bonplandium* were shows the maximum diseased leaves in agriculture crop fields. And other species *like Saccharum spontaneum, Digitaria sanguinalies, Panicum rapens* (Poaceae), *Achyranthus aspera, Digera muricata* (Amaranthaceae], *Cyprus rotundus* (Cyperaceae), *phyllanthus maderaspatens, phyllanthus niruri, phyllanthus urinaria (*Phyllanthus) shows the pathogenicity at high rates. (Table 3). Some of the weeds are also identied by. T.Pullaiah, V.Rama Krishnaiah, S.Sandhya Rani, and P.N.Rao. FLORA OF GUNTUR DISTRICT., Inventory of crop weeds of Anantapur district, Andhara Pradesh 2015 Dr. A. Lakshmaiah. And Kiran, G.G.R and Rao, A.S. (2013) (table -4).

I chose 2 diseased weed plants i.e. *Croton bonplandium* and *Pergularia tomentosa* because they have shown the maximum diseased leaves in plants in crop fields. *Croton bonplandium* were shows major weed pathogenicity in red gram, chilli and *Pergularia tomentosa* shows maximum weed pathogenicity in red gram only and they shows decrease of the crop yield. These leaves bites were transferred into Potato dextrose agar (PDA) plates supplemented with 1% streptomycin sulphate (antibiotic) under sterile conditions in an inoculation chamber. After inoculation plates were incubated at 25 ± 2°C for 21 days under a 12 h light/dark photoperiod.[11] The mycelium growth was noticed with in 1 or 2 days after the isolation of the pathogens.

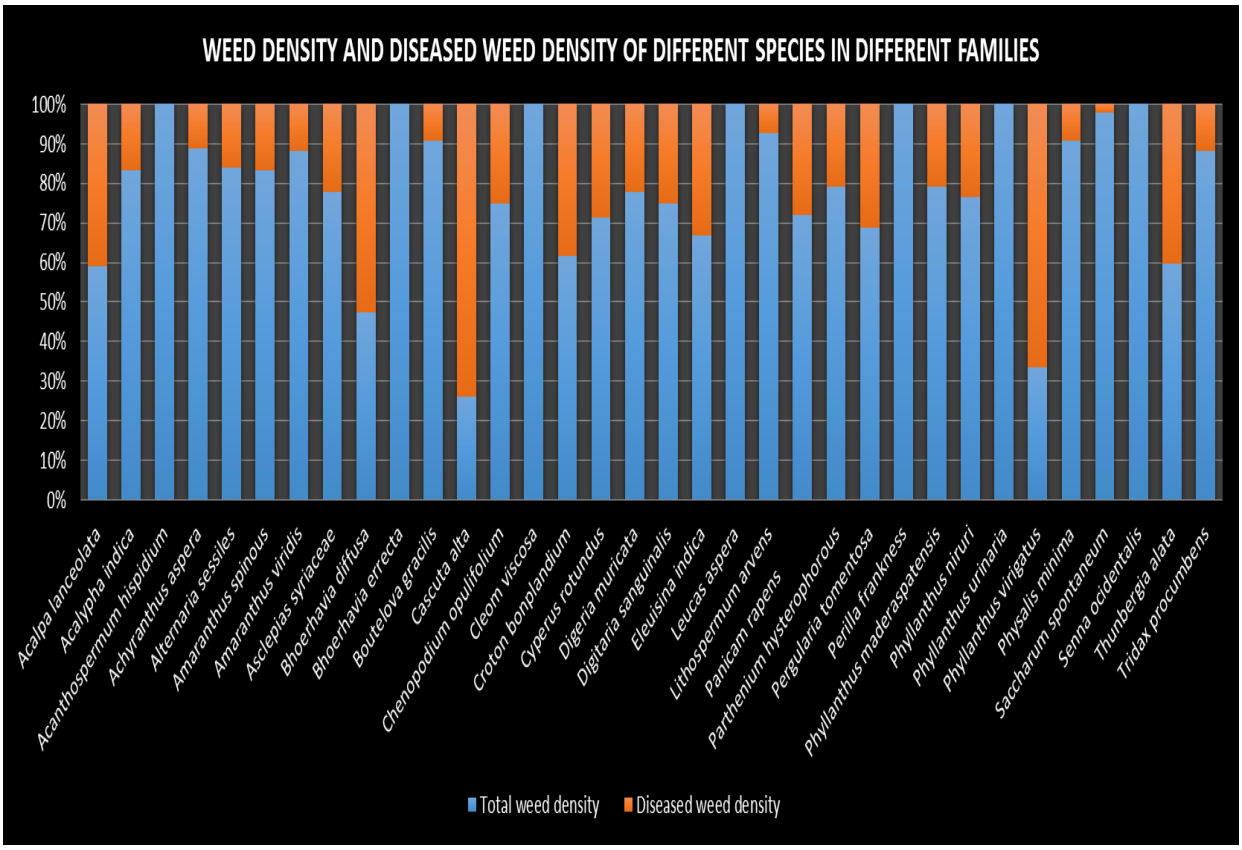
SOIL ANALYSIS OF PADDY, SUGER CANE, RED GRAM, AND MIRCHI
TABLE 1

Parameters	**Paddy**	**Mirchi**	**Suger cane**	**Red gram**
pH	8.50	8.20	8.30	**8.00**
EC(**Ds/M**)	0.40	**0.15**	0.25	0.22
Available carbon(C) (**%**)	0.81	**0.16**	0.20	0.20
Available Nitrogen(N) (**KG/HA**)	**226.00**	**226.00**	238.00	238.00
Available Phosphorus(P) **(KG/HA)**	17.00	34.00	34.00	**5.00**
Available Potassium (K) (**KG/HA**)	630.00	**260.00**	312.00	416.00
Available sulphur (S) (**PPM)**	25.00	**8.00**	9.00	**8.00**
Available Zink (ZN) **(PPM)**	0.79	0.54	0.81	**0.39**
Available Boran(B) (**PPM)**	**0.55**	0.77	**0.55**	0.66
Available Iron (I) **(PPM)**	27.90	13.29	14.29	**6.72**
Available Manganese (MN) **(PPM)**	19.41	5.34	7.06	**4.64**
Available Copper (CU) (**PPM)**	1.21	0.80	0.89	**0.65**

TABLE- 2

Sr.No	Weed name	Family of weed	Common name	Weed density of paddy/diversity of diseased plants in paddy	Weed density of sugarcane/diversity of diseased plants in sugar cane	Weed density of mirchi/diversity of diseased plants in mirchi	Weed density of red gram/diversity of diseased plants in red gram
1	*Cyperus rotundus*	Cyperaceae	Nut sedge, Coco grass, Nut grass, Purple nutsedge, Bhadra-tungamuste.	**30.5/11.2**	**29.8/12.4**	16./7	0
2	*Digitaria sanguinalis*	Poaceae	Hairy crabgrass, Hairy finger-grass, Large crabgrass, Crab finger grass, Purple crabgrass	27.3/8.4	17.2/3.6	**24.8/11.1**	0
3	*Phyllanthus niruri*	Phyllantaceae	Gale of the wind, Stonebreaker, Seed-under-leaf	0.1/0	3.4/0.8	1.9/0.3	2.1/0.9
4	*Phyllanthus maderaspatensis*	Phyllanthaceae	Madras leaf flower, Hajarani, Kanocha, Nia –newly, Nalla – usirika, Kachora	0.4/0.1	4.2/0.9	1.4/0.5	1.9/0.6
5	*Amaranthus viroid's*	Amaranthaceae	Slender amaranth, Green amaranth	0	3/0.4	0	0
6	*Parthenium hysterophorous*	Asteraceae	Santamaria, Santa –Maria feverfew, white top weed, carrot grass, congress grass	1.3/0.3	0.4/0	1.3/0.5	0.8/0.2
7	*Cascuta alta*	Convolvlaceae	Dodder	0	2.7/0.4	0	0
8	*Bouteloua gracilis*	Poaceae	Blue grama	0	1/0.1	0	0
9	*Asclepias syriaca*	Apocynaceae	Milk weed, Butterfly flower, Silkweed, Silky swallow – worth, Virginia silkweed	0	0.7/0.2	0	0
10	*Phyllanthus virgatus*	Phyllanthaceae	Seed under leaf, Virgate leaf flower	0	0.5/0.1	0.6/01	0
11	*Thunbergia alata*	Acanthaceae	Black eyed susan vine	0	2.8/1.9	0	0
12	*Tridax procumbens*	Asteraceae	Coat buttons, Traded daisy, Jayanthi, Thidhara, karani, vettukaaya poondu, Knatruppasan	1.7/0.5	1/0	1/0	0
13	*Chenopodium opulifolium*	Amaranthaceae	Seaport goosefoot, Grey goosefoot	0	**0.3/0.1**	0	0
14	*Amaranthus spinosus*	Amaranthaceae	Spiny amaranth, Spiny pigweed, Prickly amaranth, Thony amaranth	1.2/0.3	**0.3/0**	0	0
15	*Lithospermum arvense*	Boraginaceae	Field gromwell, Cron gromwell, Bastardalkanet	0	0	1.3/0.1	0
16	*Perilla frutescens*	Lamiaceae	Shiso	0	0	**0.2/0**	0
17	*Pergularia tomentosa*	Apocynaceae	palla thiga (in telugu)	0	0	0.1/0	0
18	*Saccharum spontaneum*	Poaceae	Kans grass, Kaans, Pekkarimpu, Kakiceruku, Kamis kansh, Kadu kabbu, Nannana kansado	0	0	13/0.3	0
19	*Alternanthera sessiles*	Amaranthaceae	Ponnanganni, Ponnaganti akku, Mukunuwenna, sessile yoyweed, Dwarf coper leaf	0	0	2.6/0.5	0
20	*Digera muricata*	Amaranthaceae	False amaranth, Kanjaro, Chanchali, Lahsuva, tandala, chenchalicettu, Ieswa	1..4/0.2	0	2.1/0.8	0
21	*Boerhavia erecta*	Nyctaginaceae	Errect spinderling	0	0	0.2/0	0
22	*Boerhavia diffusa*	Nyctaginaceae	Punarnava, Redspindrling, Tarvine	0	0	0.9/0.1	00
23	*Eleusine indica*	Poaceae	Yard grass, Indian goosegrass, Wire grass, Crowfoot grass	0	**0**	**0.2/0.1**	0
24	*Croton bonplandianus*	Euphorbiaceae	Ban tulsi, alpa bendhi soppu, Mirchaiya Jhaar.	0	**0**	**0**	**3.7/2.3**
25	*Physalis minima*	Solanaceae	Cape gooseberry, Pygmy groundcherry	0.2/0	0	0	0.8/0.1
26	*Leucas aspera*	Lamiaceae	Thumbai				0.6/0
27	*Panicam rapens*	*Poaceae*	Torpedo grass, Creeping panic, Panic rampant, Couch panicum, Dog-tooth grass, Bullet grass	2.4/1.1	0	0.7/0.1	0
28	*Cleom viscosa*	Capparidaceae	Asian spider flower, Yellow spider flower, cleom, Bagra, tickweed, kukkavaminta,	0	0	0	0.4/0
29	*Senna occidentalis*	Fabaceae	coffee senna, negro coffee, mogdad coffee, bana chakunda	0	0	0	0.3/0
30	*Achyranthus*	Amaranthaceae	Chaff-flower, pricky chaff	0	0	0	0.8/0.1

	aspera		flower, Devils horsewhip				
31	*Acanthospermum hispidum*	Asteraceae	Bristly starbur, goats head, hispid starburr, palleru(telugu)	0	0	0	0.2/0
32	*Acalpha lanceolata*	Ephorbeaceae	Thoothed bract indian copper leaf	0	0	0	**1.3/0.2**
33	*Phyllanthus urinaria*	Phyllanthaceae	Chamber bitter, Gripe weed, Stone breaker	0	**0**	**0.1/**	0
34	*Acalypha indica*	Euphorbiaceae	Indian acalphy, Indian mercury, Indian coperleaf, Indian nettele, Three-seeded mercury	0	0	0	1.5/0.3



Graph 1: Graphical representation of diversity of Weeds and Diseased weeds in different Families.

Table-3

Weed name	**Family name**	**References**
Cyperus rotundus	Cyperaceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Phyllanthus niruri	Phyllantaceae	**G.G.R. Kiran & A.S. Rao**, *Survey of weed flora in Pak. J. Weed Sci. Res. 19(1): 45-51, 2013*
Amaranthus viridis	Amaranthaceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Parthenium hysterophorous	Asteraceae	**G.G.R. Kiran & A.S. Rao**, *Survey of weed flora in Pak. J. Weed Sci. Res. 19(1): 45-51, 2013*
Tridax procumbens	Asteraceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Amaranthus spinosus	Amaranthaceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Saccharum spontaneum	Poaceae	**T.Pullaiah and Ravi Prasad Rao,** FLORA AND VEGETATION OF ANDHRA PRADESH 2008
Alternaria sessiles	Amaranthaceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities

		(IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Luces aspera	Lamiaceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Panicam rapens	*Poaceae*	**G.G.R. Kiran & A.S. Rao,** *Survey of weed flora in Pak. J. Weed Sci. Res. 19(1): 45-51, 2013*
Cleom viscosa	Capparidaceae	**G.G.R. Kiran & A.S. Rao,** *Survey of weed flora in Pak. J. Weed Sci. Res. 19(1): 45-51, 2013*
Amaranthus spinous	Amaranthaeceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Achyranthus aspera	Amaranthaceae	**G.G.R. Kiran & A.S. Rao,** *Survey of weed flora in Pak. J. Weed Sci. Res. 19(1): 45-51, 2013*
Acanthospermum hispidium	Asteraceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275X
Acalypha indica	Ephorbiaceae	**Dr. A. Lakshmaiah**. International Journal of Social Sciences & Humanities (IJSSH), Volume 1 Issue 2 October 2015, ISSN (Online): 2395-5996, ISSN (Print): 2454-275 X and. **T.Pullaiah and Ravi Prasad Rao,** FLORA AND VEGETATION OF ANDHRA PRADESH 2008.

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