



# Inventory of Agrestals in Telangana, India: Their Impact and Management

Sateesh Suthari<sup>1</sup>, K. Omkar<sup>2</sup>, K. Jayaramulu<sup>3</sup>, E. Kiran<sup>4</sup>, S. Geetha<sup>5</sup>, M.T. Naidu<sup>6</sup>, N. Sreeramulu<sup>7</sup>

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## ABSTRACT

**Background:** Understanding the sociological structure of weeds in crop fields is a pre-requisite for effective management. Identification and quantification of weed species found in different crops are possible to provide strategies for weed control. The exploration studies of weeds in agro-ecosystems are meager in Telangana, so that the present study has initiated to explore the weeds and educate the local farmers about the impact of agrestals and it will be of immense helpful to control the loss of crop productivity first of its kind in the region.

**Methods:** The inventory of agrestals was carried out in 33 districts of Telangana State during 2016-2020 in two growing seasons (*kharif, rabi*) and it is an overview in agro-ecosystems.

**Result:** The study focuses on the documentation of weed taxa in agricultural fields and recorded ca. 249 plant taxa pertaining to 150 genera and 47 families. Cyperaceae is the predominant family with 38 plant species followed by Poaceae (33 spp.), Asteraceae (20 spp.), Euphorbiaceae (17 spp.), Amaranthaceae (16 spp.). *Echinochloa crus-galli* is the dominant taxon in paddy crop with its mimic, where *Cyperus rotundus* is a serious competitor in many cultivated crops. The present study is very climacteric for farmers, agronomists and plant breeders for cognizance, to know the intensity of weeds impact and management skills.

**Key words:** Agrestals, Agronomists, Agro-ecosystems, Crop productivity.

## INTRODUCTION

Agriculture is a major industry in India and ca. 70% of rural people depend on agriculture for their primary livelihood of which 82% farmers being small and marginal. India is one of the largest food producers on the planet earth after China, USA and Brazil and the largest producer of milk, jute and pulses, where ranks for second in the production of rice, wheat, sugarcane, cotton, groundnuts, fruits, vegetables and cattle (FAO, 2020). Indian agriculture plays an important role in the country's economy and accounts for 17.8% of Gross Value Added for 2019-2020. Agriculture in India has been witnessing changing trends with weed (agrestals) intrusion. Weeds account for about one-third of the total loss, so efforts should be made to decrease the loss (Anonymous, 2020).

Agrestals are ubiquitous, unwanted and compete for soil, water, space, sunlight and minerals. Weed is just a plant in the wrong location at the wrong time and it interferes with the activities or welfare of man (Patil *et al.*, 2010). The weeds reduce the crop yield and degrade quality and cost of production. Even, the lowest crop loss estimate of 10% would amount to a loss about 25 Mt of food grains, it costs about US\$ 13 billion (Yaduraju, 2012). Weeds are the major barriers to optimize the utility of available resources, resistant to herbicides and arid conditions. The weed flora knowledge is crucial for weed management strategy (Kacar and Özaslan, 2020). The seeds of the weeds can germinate under adverse soil-moisture conditions and mimic with the crop seeds and get transported from one place to other along with them. Agrestals act as alternate hosts for pests, insects and other microorganisms (*e.g.* Gram caterpillar host is

<sup>1</sup>Department of Botany, Vaagdevi Degree and PG College, Hanamkonda-506 001, Telangana, India.

<sup>2</sup>Department of Botany, Kakatiya Government Degree College, Hanamkonda-506 001, Telangana, India.

<sup>3</sup>Directorate of Rice Research, Hyderabad-500 030, Telangana, India.

<sup>4</sup>Department of Botany, Telangana University, Nizamabad-503 322, Telangana, India.

<sup>5</sup>Department of Botany, Kavitha Memorial Degree and PG College, Khammam-507 002, Telangana, India.

<sup>6</sup>Department of Botany Andhra University, Visakhapatnam-530 003 Andhra Pradesh, India.

<sup>7</sup>Department of Botany, Kakatiya Mahila Degree and PG College, Hanamkonda-506 001, Telangana, India

**Corresponding Author:** Sateesh Suthari, Department of Botany, Vaagdevi Degree and PG College, Hanamkonda-506 001, Telangana, India. Email: suthari.botany@gmail.com

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redgram where *Amaranthus*, *Datura*, act as alternate hosts) and also reduce land cost.

Of the total annual loss of agricultural produce caused by various pests, weeds have a prominent share of over 45%. In India, the yield loss has been estimated to the tune over 30%. Few studies were conducted on the exploration of weeds in various agricultural crops such as rice, sugar

cane (Nagaraju *et al.*, 2014), cotton (Nagaraju *et al.*, 2017) crops from Nellore (Rajeswaramma, 2001), Visakhapatnam and Anantapuramu districts (Lakshmaiah, 2006; 2015). Rao *et al.* (1982) documented the common weeds of sugarcane fields in Nizamabad district while Kondap *et al.* (1983) recorded the weed flora of Telangana and studied weed infestation problems more in sorghum, maize and groundnut than in rice. Pullaiah and Rao (1995) recorded over 120 weed taxa of cultivated fields of Nizamabad district. Raju and Reddy (1998) conducted phytosociological survey in Godavari delta of Andhra Pradesh and reported 38 weed species. Venkateswarlu and Saheb (2017) studied on the phytosociological attributes of agrestals of groundnut crop in Gadwal district. An ecological survey of weed flora is must for a comprehensive idea of weed problem. The exploration studies of weeds in agro-ecosystems are scanty in Telangana so that the present study has taken up to explore status, impact of weeds in agro-ecosystems and educate the local people. The study will be of enormous help to control the loss of crop productivity.

### Study area

Telangana is the youngest state in India and is bound on the north-west by Maharashtra, west by Karnataka, east and south by Andhra Pradesh. The total geographical area is 276.96 lakh acres with a population of ca. 4 crore and mainly depend on agriculture for their livelihood. The major soil types in the region are red, black cotton, alluvial, rocks and boulders where red soils are predominated (48%) among all. Paddy, cotton, maize, soybean and pulses are major crops during kharif (*vanakalam*) and paddy, groundnut, bengal gram during rabi (*yasangi*) in the state. Agricultural sector in Telangana State, mainly depends on south-west monsoon, the average rainfall is recorded as 1262.1 mm against the normal of 863.4 mm from June 2020 to March 2021 where the highest rainfall was received in Mulugu (2054.2 mm) and lowest was recorded from Nalgonda districts (863.4 mm) (Anonymous, 2021).

### MATERIALS AND METHODS

Extensive field trips were conducted during 2016-2020 covering two seasons (*kharif*, *rabi*) and visited about 500+ villages across 33 districts of Telangana and recorded the occurrence of weeds in various crops such as paddy, maize, jowar, wheat, bajra, millets, redgram, greengram, bengalgram, blackgram, horsegram, groundnut, sesamum, sunflower, safflower, tobacco, sugarcane, chilli, cotton, banana, turmeric, onion, vegetable and orchards, etc. The observed weeds were identified in the field itself and the unidentified plant specimens were identified using standard floras, e-floras, revisions. The nomenclature of the plant species was updated using [www.worldfloraonline.com](http://www.worldfloraonline.com), [www.theplantlist.org](http://www.theplantlist.org).

### RESULTS AND DISCUSSION

The present study reports a total of 249 plant taxa pertaining to 150 genera of 47 families. The weed species pertaining

**Table 1:** List of agrestals in agri-crops of Telangana with family, scientific name and habitat.

| Family          | Weed species                      | Prominent habitat |
|-----------------|-----------------------------------|-------------------|
| Marsileaceae    | <i>Marsilea quadrifolia</i>       | Paddy             |
| Menispermaceae  | <i>Cocculus hirsutus</i>          | Sugarcane         |
| Papaveraceae    | <i>Argemone mexicana</i>          | Cotton            |
|                 | <i>Fumaria indica</i>             | Cotton            |
| Brassicaceae    | <i>Brassica nigra</i>             | Chilli            |
|                 | <i>Lepidium didymum</i>           | Vegetable         |
|                 | <i>Rorippa indica</i>             | Chilli            |
| Cleomaceae      | <i>Cleome aspera</i>              | Groundnut         |
|                 | <i>Cleome chelidonii</i>          | Paddy             |
|                 | <i>Cleome felina</i>              | Cotton            |
|                 | <i>Cleome gynandra</i>            | Groundnut         |
|                 | <i>Cleome monophylla</i>          | Sugarcane         |
|                 | <i>Cleome rutidosperma</i>        | Maize             |
|                 | <i>Cleome simplicifolia</i>       | Greengram         |
|                 | <i>Cleome viscosa</i>             | Coarse cereals    |
| Violaceae       | <i>Hybanthus enneaspermus</i>     | Cotton            |
| Polygalaceae    | <i>Polygala arvensis</i>          | Cotton            |
|                 | <i>Polygala wightiana</i>         | Cotton            |
| Caryophyllaceae | <i>Polycarpaea corymbosa</i>      | Maize             |
|                 | <i>Vaccaria pyramidata</i>        | Groundnut         |
| Portulacaceae   | <i>Portulaca oleracea</i>         | Chilli            |
|                 | <i>Portulaca brevifolia</i>       | Chilli            |
|                 | <i>Portulaca quadrifida</i>       | Cotton            |
| Elantianaceae   | <i>Bergia capensis</i>            | Paddy             |
| Malvaceae       | <i>Abelmoschus ficulneus</i>      | Cotton            |
|                 | <i>Abutilon hirtum</i>            | Cotton            |
|                 | <i>Abutilon indicum</i>           | Cotton            |
|                 | <i>Hibiscus cannabinus</i>        | Cotton            |
|                 | <i>Hibiscus radiatus</i>          | Vegetables        |
|                 | <i>Malachra capitata</i>          | Paddy             |
|                 | <i>Malvastrum coromandelianum</i> | Cotton            |
|                 | <i>Melochia corchorifolia</i>     | Cotton            |
|                 | <i>Pavonia odorata</i>            | Groundnut         |
|                 | <i>Pavonia zeylanica</i>          | Cotton            |
|                 | <i>Sida acuta</i>                 | Cotton            |
|                 | <i>Sida cordata</i>               | Cotton            |
|                 | <i>Sida cordifolia</i>            | Groundnut         |
|                 | <i>Sida spinosa</i>               | Turmeric          |
| Tiliaceae       | <i>Corchorus aestuans</i>         | Cotton            |
|                 | <i>Corchorus fascicularis</i>     | Cotton            |
| Zygophyllaceae  | <i>Tribulus terrestris</i>        | Chilli            |
|                 | <i>Tribulus lanuginosus</i>       | Cotton            |
| Oxalidaceae     | <i>Biophytum nervifolium</i>      | Cotton            |
|                 | <i>Biophytum sensitivum</i>       | Cotton            |
|                 | <i>Oxalis corniculata</i>         | Paddy             |
| Sapindaceae     | <i>Cardiospermum halicacabum</i>  | Cotton            |

Table 1: Continue...

Table 1: Continue...

|                |                                  |            |
|----------------|----------------------------------|------------|
| Fabaceae       | <i>Aeschynomene indica</i>       | Cotton     |
|                | <i>Alysicarpus longifolius</i>   | Cotton     |
|                | <i>Alysicarpus monilifer</i>     | Chilli     |
|                | <i>Cajanus scarabaeoides</i>     | Cotton     |
|                | <i>Crotalaria medicaginea</i>    | Sugarcane  |
|                | var. <i>neglecta</i>             |            |
|                | <i>Macroptilium</i>              | Cotton     |
|                | <i>atropurpureum</i>             |            |
|                | <i>Medicago lupulina</i>         | Sunflower  |
|                | <i>Melilotus albus</i>           | Cotton     |
|                | <i>Melilotus indicus</i>         | Chilli     |
|                | <i>Rhynchosia minima</i>         | Cotton     |
|                | <i>Rothia indica</i>             | Cotton     |
|                | <i>Sesbania procumbens</i>       | Tobacco    |
|                | <i>Senna uniflora</i>            | Cotton     |
|                | <i>Tephrosia purpurea</i>        | Cotton     |
|                | <i>Teramnus labialis</i>         | Cotton     |
| Lythraceae     | <i>Ammannia baccifera</i>        | Paddy      |
|                | <i>Rotala indica</i>             | Paddy      |
|                | <i>Rotala rotundifolia</i>       | Paddy      |
| Onagraceae     | <i>Ludwigia perennis</i>         | Paddy      |
| Passifloraceae | <i>Passiflora foetida</i>        | Cotton     |
| Cucurbitaceae  | <i>Luffa tuberosa</i>            | Groundnut  |
|                | <i>Mukia maderaspatana</i>       | Blackgram  |
| Molluginaceae  | <i>Mollugo nudicaulis</i>        | Cotton     |
|                | <i>Mollugo pentaphylla</i>       | Cotton     |
| Gisekiaceae    | <i>Gisekia pharnaceoides</i>     | Cotton     |
| Aizoaceae      | <i>Trianthema portulacastrum</i> | Chilli     |
| Rubiaceae      | <i>Neanotis montholoni</i>       | Bengalgram |
| Asteraceae     | <i>Oldenlandia lactea</i>        | Cotton     |
|                | <i>Oldenlandia umbellata</i>     | Cotton     |
|                | <i>Spermacoce articularis</i>    | Sesame     |
|                | <i>Acmella oleracea</i>          | Tobacco    |
|                | <i>Acmella paniculata</i>        | Paddy      |
|                | <i>Ageratum conyzoides</i>       | Paddy      |
|                | <i>Blumea lacera</i>             | Cotton     |
|                | <i>Blumea obliqua</i>            | Cotton     |
|                | <i>Chromolaena odorata</i>       | Cotton     |
|                | <i>Cyanthillium cinereum</i>     | Sunflower  |
|                | <i>Cyathocline manilaliana</i>   | Cotton     |
|                | <i>Echinops echinatus</i>        | Groundnut  |
|                | <i>Eclipta prostrata</i>         | Paddy      |
|                | <i>Grangea maderaspatana</i>     | Chilli     |
|                | <i>Launaea procumbens</i>        | Cotton     |
|                | <i>Parthenium hysterophorus</i>  | Soybean    |
|                | <i>Sonchus asper</i>             | Tobacco    |
|                | <i>Sphaeranthus indicus</i>      | Paddy      |
|                | <i>Synedrella nodiflora</i>      | Chilli     |
|                | <i>Taraxacum javanicum</i>       | Cotton     |
|                | <i>Tridax procumbens</i>         | Chilli     |
|                | <i>Xanthium strumarium</i>       | Cotton     |

Table 1: Continue...

Table 1: Continue...

|                |                                  |            |
|----------------|----------------------------------|------------|
|                | <i>Youngia japonica</i>          | Cotton     |
| Sphenocleaceae | <i>Sphenoclea zeylanica</i>      | Cotton     |
| Primulaceae    | <i>Anagallis arvensis</i>        | Chilli     |
| Apocynaceae    | <i>Calotropis gigantea</i>       | Cotton     |
|                | <i>Catharanthus pusillus</i>     | Cotton     |
|                | <i>Pergularia daemia</i>         | Cotton     |
|                | <i>Hemidesmus indicus</i>        | Chilli     |
|                | <i>Canscora alata</i>            | Paddy      |
| Gentianaceae   | <i>Canscora roxburghii</i>       | Paddy      |
| Boraginaceae   | <i>Coldenia procumbens</i>       | Paddy      |
|                | <i>Heliotropium curassavicum</i> | Paddy      |
|                | <i>Heliotropium ovalifolium</i>  | Paddy      |
|                | <i>Heliotropium supinum</i>      | Paddy      |
|                | <i>Trichoderma indicum</i>       | Tobacco    |
| Convolvulaceae | <i>Convolvulus arvensis</i>      | Cotton     |
|                | <i>Ipomoea aquatica</i>          | Paddy      |
|                | <i>Ipomoea pes-tigridis</i>      | Cotton     |
|                | <i>Merremia emarginata</i>       | Groundnut  |
|                | <i>Physalis angulata</i>         | Maize      |
| Solanaceae     | <i>Solanum americanum</i>        | Cotton     |
|                | <i>Solanum virginianum</i>       | Chilli     |
| Linderniaceae  | <i>Lindernia antipoda</i>        | Turmeric   |
|                | <i>Lindernia crustacea</i>       | Tobacco    |
| Plantaginaceae | <i>Scoparia dulcis</i>           | Cotton     |
| Orobanchaceae  | <i>Orobanche cernua</i>          | Cotton     |
|                | <i>Striga asiatica</i>           | Cotton     |
|                | <i>Striga sulphurea</i>          | Cotton     |
| Acanthaceae    | <i>Hygrophila polysperma</i>     | Paddy      |
|                | <i>Lepidagathis cristata</i>     | Sugarcane  |
|                | <i>Rostellularia prostrata</i>   | Bengalgram |
| Verbenaceae    | <i>Phyla nodiflora</i>           | Cotton     |
| Lamiaceae      | <i>Hyptis suaveolens</i>         | Chilli     |
|                | <i>Lantana camara</i>            | Cotton     |
|                | <i>Leucas biflora</i>            | Redgram    |
|                | <i>Leucas cephalotes</i>         | Cotton     |
|                | <i>Ocimum americanum</i>         | Jowar      |
| Nyctaginaceae  | <i>Boerhavia diffusa</i>         | Cotton     |
|                | <i>Boerhavia erecta</i>          | Cotton     |
| Amaranthaceae  | <i>Achyranthes aspera</i>        | Maize      |
|                | <i>Aerva javanica</i>            | Tobacco    |
|                | <i>Aerva lanata</i>              | Greengram  |
|                | <i>Allmania nodiflora</i>        | Paddy      |
|                | <i>Alternanthera</i>             | Redgram    |
|                | <i>paronychioides</i>            |            |
|                | <i>Alternanthera pungens</i>     | Turmeric   |
|                | <i>Alternanthera sessilis</i>    | Paddy      |
|                | <i>Amaranthus graecizans</i>     | Cotton     |
|                | <i>Amaranthus spinosus</i>       | Chilli     |
|                | <i>Amaranthus viridis</i>        | Chilli     |
|                | <i>Celosia argentea</i>          | Greengram  |
|                | <i>Chenopodium murale</i>        | Sunflower  |

Table 1: Continue...

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|                  |                                    |            |
|------------------|------------------------------------|------------|
|                  | <i>Digera muricata</i>             | Tobacco    |
|                  | <i>Nothosaerva brachiata</i>       | Cotton     |
|                  | <i>Pupalia lappacea</i>            | Chilli     |
|                  | <i>Trichuriella monsoniae</i>      | Maize      |
| Polygonaceae     | <i>Polygonum plebeium</i>          | Paddy      |
| Aristolochiaceae | <i>Aristolochia bracteolata</i>    | Maize      |
| Euphorbiaceae    | <i>Acalypha indica</i>             | Chilli     |
|                  | <i>Acalypha lanceolata</i>         | Cotton     |
|                  | <i>Andrachne telephioides</i>      | Cotton     |
|                  | <i>Chrozophora prostrata</i>       | Tobacco    |
|                  | <i>Chrozophora rottleri</i>        | Maize      |
|                  | <i>Croton bonplandianum</i>        | Sunflower  |
|                  | <i>Euphorbia corrigioloides</i>    | Tobacco    |
|                  | <i>Euphorbia cristata</i>          | Cotton     |
|                  | <i>Euphorbia cyathophora</i>       | Cotton     |
|                  | <i>Euphorbia dracunculoides</i>    | Cotton     |
|                  | <i>Euphorbia heterophylla</i>      | Cotton     |
|                  | <i>Euphorbia heyneana</i>          | Cotton     |
|                  | <i>Euphorbia hirta</i>             | Cotton     |
|                  | <i>Euphorbia indica</i>            | Sunflower  |
|                  | <i>Euphorbia prostrata</i>         | Cotton     |
|                  | <i>Euphorbia rothiana</i>          | Cotton     |
|                  | <i>Tragia involucrata</i>          | Bengalgram |
| Phyllanthaceae   | <i>Phyllanthus amarus</i>          | Chilli     |
|                  | <i>Phyllanthus fraternus</i>       | Cotton     |
|                  | <i>Phyllanthus maderaspatensis</i> | Cotton     |
| Commelinaceae    | <i>Commelina benghalensis</i>      | Paddy      |
|                  | <i>Commelina caroliniana</i>       | Cotton     |
|                  | <i>Commelina erecta</i>            | Chilli     |
|                  | <i>Cyanotis axillaris</i>          | Cotton     |
|                  | <i>Cyanotis cucullata</i>          | Sunflower  |
|                  | <i>Murdannia edulis</i>            | Cotton     |
|                  | <i>Murdannia nudiflora</i>         | Jowar      |
| Cyperaceae       | <i>Actinoscirpus grossus</i>       | Paddy      |
|                  | <i>Courtoisina cyperoides</i>      | Paddy      |
|                  | <i>Cyperus alopecuroides</i>       | Paddy      |
|                  | <i>Cyperus alulatus</i>            | Paddy      |
|                  | <i>Cyperus amabilis</i>            | Paddy      |
|                  | <i>Cyperus castaneus</i>           | Paddy      |
|                  | <i>Cyperus cephalotes</i>          | Paddy      |
|                  | <i>Cyperus compressus</i>          | Paddy      |
|                  | <i>Cyperus cuspidatus</i>          | Paddy      |
|                  | <i>Cyperus difformis</i>           | Paddy      |
|                  | <i>Cyperus distans</i>             | Paddy      |
|                  | <i>Cyperus exaltatus</i>           | Paddy      |
|                  | <i>Cyperus haspan</i>              | Paddy      |
|                  | <i>Cyperus iria</i>                | Paddy      |
|                  | <i>Cyperus michelianus</i>         | Paddy      |
|                  | <i>Cyperus pilosus</i>             | Paddy      |
|                  | <i>Cyperus rotundus</i>            | Paddy      |
|                  | <i>Cyperus tenuispica</i>          | Paddy      |
|                  | <i>Eleocharis atropurpurea</i>     | Paddy      |

Table 1: Continue...

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|         |                                      |            |
|---------|--------------------------------------|------------|
|         | <i>Eleocharis geniculata</i>         | Paddy      |
|         | <i>Eleocharis retroflexa</i>         | Paddy      |
|         | <i>Eleocharis zatei</i>              | Paddy      |
|         | <i>Fimbristylis aestivalis</i>       | Paddy      |
|         | <i>Fimbristylis bisumbellata</i>     | Paddy      |
|         | <i>Fimbristylis complanata</i>       | Groundnut  |
|         | <i>Fimbristylis dichotoma</i>        | Greengram  |
|         | <i>Fimbristylis ferruginea</i>       | Paddy      |
|         | subsp. <i>sieberiana</i>             |            |
|         | <i>Fimbristylis quinquangularis</i>  | Sunflower  |
|         | <i>Fimbristylis ovata</i>            | Paddy      |
|         | <i>Fuirena trilobites</i>            | Paddy      |
|         | <i>Lipocarpa chinensis</i>           | Paddy      |
|         | <i>Lipocarpa squarrosa</i>           | Paddy      |
|         | <i>Pycnus polystachyos</i>           | Paddy      |
|         | <i>Pycnus puncticulatus</i>          | Paddy      |
|         | <i>Pycnus sanguinolentus</i>         | Paddy      |
|         | <i>Schoenoplectiella lateriflora</i> | Paddy      |
|         | <i>Schoenoplectiella roylei</i>      | Paddy      |
|         | <i>Schoenoplectus juncooides</i>     | Paddy      |
| Poaceae | <i>Brachiaria distachya</i>          | Paddy      |
|         | <i>Brachiaria eruciformis</i>        | Paddy      |
|         | <i>Brachiaria kurzii</i>             | Paddy      |
|         | <i>Brachiaria mutica</i>             | Paddy      |
|         | <i>Brachiaria ramosa</i>             | Paddy      |
|         | <i>Brachiaria reptans</i>            | Paddy      |
|         | <i>Chloris barbata</i>               | Sugarcane  |
|         | <i>Chloris gayana</i>                | Paddy      |
|         | <i>Chloris virgata</i>               | Maize      |
|         | <i>Cynodon dactylon</i>              | Pulses     |
|         | <i>Dactyloctenium aegyptium</i>      | Cotton     |
|         | <i>Dichanthium caricosum</i>         | Paddy      |
|         | <i>Dichanthium foveolatum</i>        | Paddy      |
|         | <i>Digitaria setigera</i>            | Paddy      |
|         | <i>Dinebra retroflexa</i>            | Paddy      |
|         | <i>Echinochloa colona</i>            | Paddy      |
|         | <i>Echinochloa crus-galli</i>        | Paddy      |
|         | <i>Echinochloa frumentacea</i>       | Paddy      |
|         | <i>Echinochloa oryzoides</i>         | Paddy      |
|         | <i>Echinochloa picta</i>             | Paddy      |
|         | <i>Eleusine indica</i>               | Cotton     |
|         | <i>Eragrostis aspera</i>             | Groundnut  |
|         | <i>Eragrostis minor</i>              | Groundnut  |
|         | <i>Eriochloa procera</i>             | Cotton     |
|         | <i>Hackelochloa granularis</i>       | Turmeric   |
|         | <i>Ischaemum pilosum</i>             | Tobacco    |
|         | <i>Iseilema anthephoroides</i>       | Vegetables |
|         | <i>Oplismenus burmanni</i>           | Pulses     |
|         | <i>Panicum repens</i>                | Paddy      |
|         | <i>Paspalidium flavidum</i>          | Paddy      |
|         | <i>Setaria verticillata</i>          | Paddy      |
|         | <i>Trachys muricata</i>              | Bajra      |
|         | <i>Urochloa panicoides</i>           | Sunflower  |

to various families were recorded in coarse cereals, vegetables, flower farms, pulses and other crops. Cyperaceae is the largest family representing 38 plant species and Poaceae positioned second with 33 species followed by Asteraceae (20 spp.), Euphorbiaceae (17 spp.), Amaranthaceae (16 spp.) and Fabaceae (15 spp.). First nine positions were placed by single families where tenth rank was positioned by two families, viz., Boraginaceae and Lamiaceae. About 15 families, namely, Aizoaceae, Aristolochiaceae, Elantiaceae, Gisekiaceae, Onagraceae, Marsileaceae, Menispermaceae, Passifloraceae, Plantaginaceae, Polygonaceae, Primulaceae, Sapindaceae, Sphenocleaceae, Verbenaceae, Violaceae were distributed with single species each. Among these, predominantly distributed by the dicotyledonous plants with 67.87% (169 spp.), where monocotyledonous plants were recorded as 31.73% (79 spp.) and a pteridophyte (0.40%). Most of the species were herbaceous and all the plant taxa were arranged in the order of phylogenetic system of classification.

The plant taxa such as *Marsilea quadrifolia*, *Cocculus hirsutus*, *Argemone mexicana*, *Cleome gynandra*, *Cleome viscosa*, *Polygala wightiana*, *Abutilon indicum*, *Hibiscus radiatus*, *Malvastrum coromandelica*, *Melochia corchorifolia*, *Pavonia odorata*, *Sida cordifolia*, *Tribulus terrestris*, *Cajanus scarabaeoides*, *Tephrosia purpurea*, *Trianthema portulacastrum*, *Acmella paniculata*, *Ageratum conyzoides*, *Eclipta prostrata*, *Sphaeranthus indicus*, *Tridax procumbens*, *Xanthium strumarium*, *Calotropis gigantea*, *Hemidesmus indicus*, *Heliotropium indicum*, *Convolvulus arvensis*, *Ipomoea pes-tigridis*, *Physalis angulata*, *Hyptis suaveolens*, *Hyptis suaveolens*, *Boerhavia diffusa*, *Achyranthes aspera*, *Amaranthus spinosus*, *A. viridis*, *Celosia argentea*, *Digera muricata*, *Acalypha indica*, *Chrozophora rottleri*, *Euphorbia hirta*, *Tragia involucrata*, *Commelina benghalensis*, *Setaria verticillata*, etc. as the very common broad leaved agrestals in the study area. *Marsilea quadrifolia*, is the one and only pteridophyte infested as weed in paddy crops (Table 1).

It was estimated that generally weeds cause 5% loss of production in developed countries where it was 10% and



**Fig 1:** Some prominent agrestals in paddy crops of Telangana, India. (A) *Brachiaria mutica*; (B) *Cyperus difformis*; (C) *Cyperus iria*; (D) *Dinebra retroflexa*; (E) *Echinochloa crus-galli*; and (F) *Fimbristylis quinquangularis*.

25% in developing and undeveloped countries, respectively. The yield loss is more than 50% in some crops, especially in cotton, onion due to weed infestation in India. The yield reduction was also reported various crops such as carrot, rice, maize, sugarcane, groundnut, soybean, millets, wheat in a percentage of 47.5%, 41.6%, 39.8%, 34.2%, 33.8%, 30.5%, 29.5% and 16%, respectively (Anonymous, 2017).

Agrestals can deprive the crops 47% nitrogen, 42% phosphorus, 50% potassium, 39% calcium and 24% magnesium of their nutrient uptake from the soil. In rice crops, *Echinochloa* and *Panicum* taxa are the best hosts for stem borer (Fig 1). In addition to these adverse affects on plants, the weeds can also highly harmful to human beings as well animal husbandry, water flow in canals, drain system, etc. and pollute water bodies by the reduction of dissolved oxygen (Gnanavel and Kathires, 2006). Allergenic pollen weeds (*Parthenium hysterophorus*, *Ageratum conyzoides*, etc.) cause various health problems like dermatitis, asthma, sinusitis, rhinitis in humans (Devarinti, 2015).

An integrated and eco-friendly approach is highly important for the management of agrestals. The land use efficiency and weed suppression through intercropping plays important role in the management (Pradhan *et al.*, 2018). Though there are many methods to reduce the impact of agrestals like mechanical, biological and chemical, mechanical weed control (hand weeding) method is highly suitable for the complete removal of weeds along with root system prior to flowering which is an age old practice in India. Recent times, along with the hand weeding, some other alternatives like blade harrow and utilization of herbicides are adopted to control the weeds in agro-ecosystems. An integrated agrestal management (IAM) is multidisciplinary ecological approach to manage unwanted plant taxa in agricrops (Mahadevaiah and Sagar, 2014) and provides the best long-term management for the prevention and control of noxious weeds.

## CONCLUSION

The present study was conducted as first of its kind to explore the occurrence of weeds and their infestation in different agricultural crops from Telangana State in *kharif* and *rabi* seasons. The study was noticed the high and significant diversity of agrestals and distribution pattern and most of the species were intruded into different crops and commonly compete with the crops. *Cyperus rotundus* is one of the notorious and serious agrestals due to its appearance beginning from the pre-plough stage to harvesting time because of its tuberous root system. Cotton and groundnut are the very important crops which cover two-third of agrestals throughout the crop season. It is also observed that due to the association of the weeds with the crops, the quality and quantity of the yielding were drastically decreased. The present study is highly important for awareness, suitable control measures, effective management and high yielding. Eradication of agrestals by physical method is highly encouraged before the flowering

of particular weeds. The present study is highly important to farmers, plant breeders and agronomist for awareness, impact and management of weeds. The present study also suggests further exploration studies on agrestals distributed in Telangana regarding their way of intrusion, phytosociological aspect, ecology, impact on various crops in quality and yielding, control measures and effective management.

**Conflict of interest:** None.

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