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Weeds richness species of cotton crop in Satpura plateau of Madhya Pradesh

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Abstract
Cotton is one of the most important commercial crops cultivated throughout India. Weeds interfere with the growth activities of cotton plants and compete with it for growth factors. All kinds of weeds (Grasses, sedges, and broad leaves *etc.*) have been noted to infest cotton crop. The present investigation is based on field research conducted from August, 2019 to December, 2019 in Sausar, Chhindhwara district of Madhya Pradesh, India. Multiple field visits were performed to investigate weed species in cotton crop. The plants were identified with the help of available literature and through comparison with the already identified plant species. Data record has been documented in the form of English name, Local name; Botanical name, Family, life form and habit.Total 44 weed species were collected, related to 44 genera and 12 families. Maximum number of species were of family Poaceae (15 species) followed by family Asteraceae (09 species) and Fabaceae (03 species). Out of the 44 weed species, therewere 46 annuals and 08 perennials. This study will be helpful as an additional tool in maintaining the floristic composition of Sausar region as well as in controlling the weed problem.

Keywords: weed flora, cotton crop

Introduction

Cotton (*Gossypium spp.* L.) is one of the predominant fibre crops and plays a pivotal role in agriculture, industrial development, employment generation and economic development of India. It is also called as "King of Fibres" and "White Gold" due to higher economical value among all cash crops in India. Cotton is gradually assuming the status of a preferred fibre even for fashion fabrics. Cotton cultivation needs to be sustainable, offering livelihood security to millions of people in the country. India is the leading country in terms of area under cotton in the world. Gujarat, Maharashtra and Telangana are the major cotton growing states contributing around 70% of the area and 67% of cotton production in India. Cotton crop is the main *Kharif* crop in irrigated middle-western plain of Gujarat. It covers around 27.61 lakh ha area, which is next to Maharashtra in India (Anonymous 2015) [2]. Yield in cotton is dependent on the climatic conditions, rainfall pattern, weed competition and incidence of pests and diseases. Weeds are a potential problem in cotton cultivation and reduce yield by depending upon the nature and intensity and poor weed management in cotton can lead to a significant yield reduction; depending on weed management, yield reductions can range from 10 to 90% (Dogan *et al*., 2015) [3]. Weeds also enhance production costs posing an income risk to the farmers (Frisvold *et al.* 2009) [4].

The most prevalent weeds across cotton fields in India are reported by Ali *et al.,* (2005) [1] *Euphorbia prostrata, Convolvulus arvensis, Cynodon dactylon, Cyperus rotundus, Portulaca oleracea, Sorghum halepense, Trianthema monogyna, Amaranthus viridis, Echinochloa colonum, Setaria viridis, Euphorbia helioscopia, Corchorus tridens, Digeria muricata* and *Tribulus terrestris*as the predominantweed flora in *khari f*season. According to Patil *et al.* (2003) [9], *Cynodon dactylon, Cyperus rotundus, Poa annua, Parthenium hysterophorus, Digera arvensis, Lagascea mollis* and *Euphorbia* sp. were the major weed flora found in cotton fields at Akola region of Maharashtra. The predominant weed species identified were *Dactyloctenium aegyptium, Echniochloa colona* and *Digitaria sanguinalis* in grasses; *Cyperus rotundus* in sedges and *Trianthema portulacastrum, Acalypha indica, Cleome viscose* and *Boerhaavia diffusa*in broad leaved weeds inTamil Nadu (Srinivasan, 2003) [11]. Sausar (Saunsar) is a tehsil in Chhindwara district in the state of Madhya Pradesh. It is famous for its oranges. More than 90 per cent of farmers produce oranges and cotton is grown in large quantities in the local area. The present work is an attempt to explore weeds diversity in Sausar regions. The main purpose of the study was to achieve knowledge about availability of total number of weed species present in this region, because survey, identification and documentation of weed diversity is necessary before solving the menace of weeds in a particular region. Many botanical studies have been conducted by various researchers in different regions of India like Duthie (1929), Hooker (1875) [5], Jain *et al.* (2000) and Maheshwari (1963). However, Sausar region is very less explored as to weed flora. So, keeping in view the diversity and status of weeds, this study was conducted in order to record the severity of weed infestation.

Materials and methods

The study was conducted during August, 2019 to December, 2019 to explore weed diversity. Standard methods were followed for collection of specimens, preservation and preparation of herbarium (Jain and Rao, 1977).

Selection of sites: For convenience, six cotton growing localities (villages) in Sausar region were surveyed, *viz.* 1. Bothiya 2. Chicholi 3.Anjangaon 4. Saikheda 5. Thoka Rangari 6. Tinkheda. All villages are within the radius of 15km from Sausar town.

Field visits were performed multiple times in each village. Fifty quadrates each measuring $1m^{-2}$ size were randomly placed in each village for exploring the weed diversity (Hussain, 1989). Local inhabitants were also interviewed to get local/vernacular names of weeds (Waheed *et al*., 2009).

Plant collection: Various parts (roots, twigs, leaves, flowers and fruits) of each specimen were collected and kept in polythene bags. Thereafter, collected specimens were placed in thick paper sheets.

Herbarium preparation: Then plant specimens were pressed using herbarium press. The paper sheets were changed at regular interval of ten days. After drying and pressing, specimens were mounted on herbarium sheets for preparation of herbarium.

Preservation of specimen and sheets: Herbarium sheets were protected against damages from insectand fungal attack by poison-treating them with 1% Mercuric Chloride solution. Naphthalene balls were also used to protect herbarium from insects.

Plant Identification: The collected plant species were identified on the basis of available literature like Jain *et al.* (2000), Kumar (2001) [7], Sharma *et al*. (2006) [10], Marwat (2013) [8]. The specimens were identified by observing the morphological and anatomical feature of vegetative and of reproductive parts also.

Results and Discussion

During the survey, 45 weed species belonging to 45 genera and 12 families were recorded (Table 1). The major families which contributed to the weed flora were Poaceae with 15 species, Asteraceae with 09 species and Fabaceae with 03 species *etc*. (Table 2). Most of the synonyms mentioned in different flora and research papers have been included here. These synonyms often refer to populations where plants vary in height, leaf shape, flower color, fruit size and branching pattern of shoots depending upon soil and climatic conditions. *Celosia argentea*was reported in all localities followed by *Tridax procumbens* and *Eragrostis pilosa* other dominant species were *Parthenium hysterophorus*, *Euphorbia hirta and Sorghum halepense etc*. Presence of *Celosia argentea* as dominant species indicates the well irrigated soil conditions. *Celosia argentea* being the dominant weed may decrease the yields of cotton considerably if this weed happens to attain a dense growth. Sausar region has been characterized by both types of weed i.e. grassy weed and broad leaved weeds. Therefore, soil properties as well as mode of irrigation like ground water, system also affects the weed diversity in study area. It indicates the great adaptability of weeds to wide range of soil environment. The problem of weed control, especially in the canal irrigated areas is very much intricate. Canal water is principal sources of dissemination of weed seeds (Marwat *et al*., 2013) [8]. The noxious weeds have certain specific features that help in their survival better than other weeds. There may be deep root system (*Eleusine indica*), different mode of propagation like root suckers (*Cynodon dactylon, Cyprus rotundus*), twining habit (*Lathyrus aphaca*).

Table 1: Weeds of cotton crop recorded in Sausar region during the present study.

English name	Local name	Life form	Growth habit	Botanical name	Family
Annual Bread Grass	Annual Bread Grass	Annual	Herb	*Polypogon monspeliensis* L.	Poaceae (Gramineae)
Stink Grass	chimanchara	Annual	Herb	*Eragrostis cilianesis*	
Little love grass	Chota chamanchara	Annual	Herb	*Eragrostis minor* Host.	
Annual bluegrass	Annual Bread Grass	Annual	Herb	*Poaa nnua*L.	
Crow foot grass	Pandhale gawat	Annual	Herb	*Dactyloctenium aegyptium*	
Indian goose grass	Raee	Annual	Herb	*Eleusine indica*	
Bermuda grass	Hariali	Perennial	Creeping herb	*Cynodon dactylon L.*	
Silver grass	Kusali gawat	Perennial	Herb	*Bothriochloapertusa L.*	
Santa Barbara grass	Kudali gawat	Annual	Herb	*Dichanthium annulatum*	
Redsprangletop	Lonkhdya	Annual	Herb	*Leptochloa chinensis*	
Poison rye grass	Kasayi	Annual	Herb	*Lolium temulentum*	
Jhonson grass	Johnson grass	Perennial	Herb	*Sorghum halepense*	
Jungle rice	Jungle rice	Annual	Herb	*Echinochloa colona*	
Large crab grass	Large crab grass	Annual to perennial	Herb	*Digitaria sanguinalis*	
Goose grass	Macad limbu	Annual	Herb	*Acrachne racemosa*	
Yellow pea	Laakh	Annual	Herb	*Lathyrus aphaca* L.	Fabaceae (Sub.F. Papilionatae)
JangliMetha	Methi	Annual	Shrub	*Trigonella polycerata*	
broad bean	Balka	Annual	Herb	*Vicia faba* L.	

Table 2: Weeds of cotton crop recorded in Sausar region during the present study.

English name	Local name	Life form	Growth habit	Botanical name	Family
Wild carrot	Gajar gawat	Annual to Perennial	Herb to Shrub	*Parthenium hysterophorus*	Asteraceae (Compositae)
Kakronda	Bhamurda	Annual	Herb	*Blumea eriantha*	
Canada thistle	Kandai	Annual	Herb	*Cirsium arvense* (L.)	
prickly sow-thistle	Bilai	Annual	Herb	*Sonchus asper* (L.)	
Cockle bur	Gokharu	Annual	Herb	*Xanthium strumarium*	
Blue daisy	Kachani	Perennial	Herb	*Cichorium intybus* L.	
Goat weed	Osadi	Annual	Herb	*Ageratum conyzoides* L.	
Creeping Launea	Patra	Annual to Perennial	Herb	*Launaeaprocumbense*	

Tridex daisy	Kambarmodi	Annual	Herb	*Tridax procumbens*	
Day flower	Kena	Annual	Herb	*Commelina benghalensis*	Commelinaceae
Spreading day flower	Kena	Annual	Herb	*Commelina diffusa*	
Wild jute	Jungali jute	Annual	Shrub	*Corchorus tridens*	Tiliaceae
Smooth pigweed	Jungli chawlayi	Annual	Herb	*Amaranthus viridis*	Amaranthaceae
Spiny pigweed	Kate chawlayi	Annual	Herb	*Amaranthus spinosus*	
Creeping chaff weed	Reshimkata	Annual	Herb	*Alternanthera sessilis*	
silver cock's comb	Kombda	Annual	Herb	Celosia argentea	
Globe amaranth	Gul-e-makhmal	Annual	Herb	*Gomphrena celosioides*	

Table 3: Weeds of cotton crop recorded in Sausar region during the present study.

English name	Local name	Life form	Growth habit	Botanical name	Family
Carpet weed	Jharasi	Annual	Herb	*Mollugo pentaphylla*	Molluginaceae
Pill pod spurge	Medium dudhi	Annual	Herb	*Euphorbia hirta*	Euphorbiaceae
Painted spurge	Mothi dudhi	Annual	Herb	*Euphorbia heterophylla*	
Shrubby spurge	Lahan dudhani	Annual	Herb	*Euphorbia microphylla*	
Gulf leaf flower	Hajardani	Annual	Herb	*Phyllanthus niruri*	
Ground cherry	Ran popat	Annual	Herb	*Physalis minima*	Solanaceae
Desert horse purslane	Vishkhapra	Annual	Herb	*Trianthema portulacastrum*	Aizoaceae
Tiger foot morning glory	Beshram	Annual	Herb	*Ipomoea pestigridis*	Convolvulaceae
Hedgehog sedge	Lawada,nagarmitha,lavhi	Annual	Sedge	*Cyperus compressus*	Cyperaceae
Rice flat sedge	Lawada, nagar mitha, lavhi	Annual	Sedge	*Cyperus iria*	

Table 4: Taxonomic data of explored weed plants with their families, genera and species.

Sr. No.	Families Species	Genera	Species
1	Poaceae (Gramineae)	15	15
2	Fabaceae (Sub.F. Papilionatae)	3	3
3	Asteraceae (Compositae)	9	9
4	Commelinaceae	2	2
5	Tiliaceae	1	1
6	Amaranthaceae	5	5
7	Molluginaceae	1	1
8	Euphorbiaceae	4	4
9	Solanaceae	1	1
10	Aizoaceae	1	1
11	Convolvulaceae	1	1
12	Cyperaceae	2	2

Conclusion

The present work shows that many species of weeds with respect to habitat, habit and edaphography, are infesting the cotton crop in Sausar region. These weeds cause heavy losses to yield of cotton crop. In order to obtain better yield, it is necessary to employ appropriate and sustainable management strategies including biological, mechanical and chemical, for weed control and this information can be a useful tool for selection of weed control methods.

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