

Studies on Weed Diversity of Coastal Rice (*Oryza sativa* L.) Fields in Lucknow Region

Swati Verma

Abstract

A survey was conducted at fifty different rice fields in coastal areas of Lucknow region to identify most common and prevalent weeds associated with rice. Fields surveyed were done according to the quantitative survey method by using 0.5m× 0.5m size quadrat with twenty samples from each field. Total thirty weed species were collected which related to fifteen families and twenty six genera from the rice field in the Lucknow region. The weed survey of this region was made during August to November 2013. Maximum number of species (eight) belongs to family Euphorbiaceae, followed by Family Asteraceae (three species), Amaranthaceae and Cyperaceae (three each species). Three species were found to be Poaceae, two Solanaceae and Molluginaceae. One species were found to be remaining families. In floristic survey, two weeds were found to be climber, six were prostrate and remaining was erect. Thirteen weeds were found to be common, eleven were occasional and six were rare in kharif season rice fields.

Keywords: Weed Diversity; Rice Field; Lucknow Region; Weed Survey.

Introduction

Weeds are notorious pest of rice causing serious yield reduction in rice worldwide. Rice (*Oryza Sativa*) belongs to family 'Graminae'. Among the food crops, Rice is a staple food and one of the most important cereals of the world. It is grown approximately one-third of the total world population (Johnson, 1984). The average per hectare yield of rice in India of 2.71 tons per hectare (Anonymous, 1997). Annual worldwide rice yield loss by weeds is 15-21% (Karim et al., 2004). Losses caused by weeds vary from one location to another, depending on the predominant weed flora and on the control methods practiced by farmers. A crop loss due to weed competition varies with the duration of weed infestation of the crop. The crop is likely to experience yield reduction, unless field is kept weed free during a part of its growing period (Azmi et al., 2007). The main factors for which crops and weeds compete are light, water and nutrients. Weeds commonly absorb added nutrients as much or more rapidly than crops (Moody, 1990). Salinity is another dramatic factor causing yield reduction

Author's Affiliation: Assistant Professor, Department of Botany, Th. H.N. Singh P.G. College, Prayagraj, Uttar Pradesh 211016, India.

Corresponding Author: Swati Verma, Assistant Professor, Department of Botany, Th. H.N. Singh P.G. College, Prayagraj, Uttar Pradesh 211016, India.

E-mail: dr.vermaswati@gmail.com

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in rice. Weeds also are adversely affected by a combination of increased salinity and high temperatures (Greenwood and Mac Farlane, 2006). The composition of weed flora is also expected to differ depending on location (Uddin et al., 2010). Salinity could also cause changes in weed in coastal areas. The distribution and nature of weeds in coastal areas would be different from non-saline areas.

The present study was therefore undertaken to investigate the distribution and severity of weed flora prevailing in major coastal rice growing areas of Lucknow region. The Lucknow zone of Province Uttar Pradesh is situated at Latitude and Longitude 26.8470°N and 80.9470°E respectively. The aim of

the study is the diversity of weeds in the rice fields and find out the common and dominant, occasional and rare weeds in rice crop fields of Lucknow region.

Materials and Methods

The survey were conducted in some selected coastal rice field areas in Lucknow region to identify and evaluate the major weed species in rice fields during August to November 2013. The age of rice plants was around 60 days at the time of survey, and fields were flooded with 2-4 cm of water. The soil salinity was measured using a conductivity meter (Model: ECTestr, Spectrum Technologies, Inc). The quantitative field survey was performed according to the method described by (Thomas, 1985). An inverted "W" pattern was used to systematically walk through each sample field. Fifty rice fields were sampled with a total of 20 quadrats per field. Rice field size ranged from 1.1 to 2.8 acre. A quadrat of 0.5×0.5 m size was used. The distance between quadrats was fixed based on the size and shape of the field. All weeds in each quadrat were identified, counted, and recorded.

Species that could not be identified in the field were tagged and transported for later identification (Chancellor and Froud-Williams, 1982; 1984). Probable anomalies in sampling areas, such as shoulder and foot slopes, potholes, ditches, bluffs, power lines, and paths were avoided. The identified weeds were categorized as herbs and climbers as per the methods described by (Bisht, 2004) and also separated into common, occasional and rare weeds described methods (Siddique, 2005): (Dalvi, 2010).

Results and Discussion

India has a characteristic geographic location at the junction of the three major biogeographic realms, namely, the Indo-Malayan, the Eurasian and the Afro-tropical region. It is considered to be one of the twelve centres of origin and diversity of several plant species in the world. Phytogeographically the Indian mainland may be divided into three distinct regions: the Himalaya, the Indo-Gangetic plain, and the Peninsular India. The Indo-Gangetic plain comprises alluvial low lands Gangetic plain to the south of the Himalaya. This region is agriculturally more productive. India is

Table 1: Studies on weed diversity in the field of Rice crop

S. No.	Name of the weeds	Common Name	Family	Habit	Category
1.	<i>Ageratum conyzoids</i> L.	Billygoat weed	Asteraceae	Erect	Rare
2.	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC	Sessile joyweed	Amaranthaceae	Prostrate	Occasional
3.	<i>Amaranthus Polygamus</i> L.	Pigweed	Amaranthaceae	Prostrate	Common
4.	<i>Calotropis gigantea</i> (L.) R.Br.	Milkweed	Asclepiadaceae	Erect	Rare
5.	<i>Cardiospermum helicacabum</i> L.	Balloon vine	Sapindaceae	Climber	Common
6.	<i>Cassia tora</i> L.	Sickle pod	Caesalpiniaee	Erect	Occasional
7.	<i>Chrozophora rotleri</i> (Geis.) Juss.ex	Suryavarti	Euphobiaceae	Erect	Rare
8.	<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	Poaceae	Erect	Common
9.	<i>Cyperus rotundus</i> L.	Nut-grass	Cyperaceae	Erect	Common
10.	<i>Cyperus triceps</i> Endl.	White water sedge	Cyperaceae	Erect	Rare
11.	<i>Digera muricata</i> (L.) Mart.	Kanejaro	Amaranthaceae	Erect	Common
12.	<i>Eragrotis tenella</i> Roem. & Schult.	Lovegrass	Poaceae	Erect	Common
13.	<i>Euphorbia heterophylla</i> L.	Mole plant	Euphobiaceae	Erect	Common
14.	<i>Euphorbia hirta</i> L.	Asthma plant	Euphobiaceae	Erect	Common
15.	<i>Euphorbia prostrata</i> Ait.	Prostrate sandmat	Euphobiaceae	Prostrate	Occasional
16.	<i>Fembristylis aestivalis</i> Retz.	Hurricanegrass	Cyperaceae	Erect	Occasional
17.	<i>Grangea maderaspatana</i> (L.) Poir.	Madras carpet	Asteraceae	Prostrate	Rare
18.	<i>Mollugo disticha</i> L.	Green carpetweed	Molluginaceae	Erect	Occasional
19.	<i>Mollugo nudicaulis</i> Lamk.	Daisy leaved chickweed	Molluginaceae	Erect	Occasional
20.	<i>Oryza sativa</i> complex (weedy rice)	Weedy rice	Poaceae	Erect	Common
21.	<i>Parthenium hysterophorus</i> L.	Whitetop weed	Asteraceae	Erect	Common
22.	<i>Phyllanthus amarus</i> Schumach & Thonn.	Hurricane weed	Euphobiaceae	Erect	Common
23.	<i>Phyllanthus madewraspatensis</i> L.	Velvet bushwillow	Euphobiaceae	Erect	Occasional
24.	<i>Phyllanthus niruri</i> Linn.	Pick-a-back	Euphobiaceae	Erect	Occasional
25.	<i>Portulaca oleracea</i> L.	Hogweed	Portulacaceae	Prostrate	Common
26.	<i>Solanum nigrum</i> auct.	Black nightshade	Solanaceae	Erect	Occasional
27.	<i>Solanum xanthocarpum</i> Schrad.	Yellow-fruit nightshade	Solanaceae	Erect	Rare
28.	<i>Tragia plukenetii</i> A.R. Sm	Cannabis leaf nettle	Euphobiaceae	Climber	Occasional
29.	<i>Tribulus terrestris</i> L.	Tackweed	Zygophyllaceae	Prostrate	Occasional
30.	<i>Vicoa indica</i> (L.) DC.	Sonkadi	Asteraceae	Erect	Common

mainly a tropical country but due to great altitudinal variations, almost all climatic condition from hot deserts to cold deserts exists. Of the fifty fields surveyed, a total thirty weeds were collected which belong to fifteen families and twenty six genera from the kharif season of rice fields. Two weeds were found to be climber, six were prostrate and remaining was erect. Thirteen weeds were found to be common and dominant, eleven were occasional and six were rare in kharif season rice fields.

Conclusion

Weeds compete for light, nutrients, moisture and space with the crop and thus cause severe losses to yield. As mentioned in the title of the present proposal was therefore undertaken to investigate the distribution and severity of weed flora prevailing in major coastal rice growing areas of Lucknow region. This study is based on diversity of weeds of kharif rice crop fields, which provides a preliminary data of the different categories of weeds in rice crop fields. It will be helpful to farmers, students and researchers related to this field for identification of weeds and their weed specificity. Further study is required for distribution and quantification of weeds for ecological management.

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