GRASSY WEEDS OF DISTRICT RAJOURI, JAMMU ANDKASHMIR, INDIA

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ABSTRACT

This study was based on extensive and intensive field surveys conducted from September 2009 to September 2012 in 07 blocks i.e.Sunderbani, Budhal, Darhal, Nowshera, Manjakote, Rajouri and Kalokote of district Rajouri Jammu and Kashmir (J&K), India.A total of 5 sampling sites were randomly selected in each block for field observations and samples collection. During this course, interviews were conducted from farmers and agriculturists of each site about grassy weeds and their occurrence with wheat, maize, rice and vegetable crops. A total of 65 grassy weeds belonging to 05 monocot families were reported. Out of 5 angiospermic families of grassy weeds reported from all the selected sites the predominance was shown by family Poaceae having 39 grassy weeds followed by family Cyperaceaewith 20 weed species.

Key words: Agriculture, grassy weeds,Kashmir, poaceae.

Citation: Singh, A., L.R. Dangwal and T.Singh. 2014. Grassy weeds of district Rajouri, Jammu and Kashmir, India. Pak. J. Weed Sci. Res. 20(2): 265-277.

INTRODUCTION

The state Jammu and Kashmir is one of the important agricultural states of India having 22 districts. Agro climatically the state is divided into four distinct zones *i.e.* the cold arid zone of Ladakh region, temperate zone of Kashmir valley, sub-tropical zone of Jammu and intermediate zone comprising of Doda, Rajouri, Poonch and some parts of Udhampur district. The state has predominately an agricultural dependent economy and nearly 80% of its population is engaged in agriculture and allied occupation. Although wheat, paddy and maize are the major agricultural crops grown in the district, but barley, bajra and jowar are also grown in some parts on small scale. The per hectare yield of crops in this district is less as compared to other parts of country due to many factors like lack of irrigation

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facilities, quality of germplasm, poor weed management, shortage and high cost labor, lack of modern agricultural techniques etc. Out of these factors the problem of weed is the major contributor in the loss of production.

Weeds are generally defined as an unwanted, obnoxious plants growing along with the domesticated crops. They interfere with the healthy growth and development of crops (Qureshi *et al.,* 2009). They are non-indigenous plants that can invade or negatively alternative plant communities. Weed plants grow faster, spread rapidly, reproduce in high numbers and produce large quantity of seeds which enables them to establish a kingdom of their own within a short period of time (Dangwal *et al*., 2010).

Most of the grassy weeds belong to family Poaceae and Cyperaceae. Poaceae is one of the largest families among angiosperms having 620 genera and 10000 species. In India it is represented by 240 genera and about 1100 species (Gaur, 1999). Grasses are the most widely distributed of all flowering plants and are found in every phytogeographic region of the world. They have a wide range of diversity and inhabit the earth in greater abundance than any other comparable group of plants. The grassy weeds are highly conspicuous and often significant components of the flora of virtually every cropping system (Marwat *et al.,* 2012). They infest both rabi and kharif crops during respective seasons and are considered as the most destructive weeds. Their slender and apparently delicate growth forms increases their ability to compete with agricultural crops for resources.Earlier (Katewa *et al.,* 2001) studied the ethno medicinal and obnoxious grasses of India on the basis of local knowledge and information by local tribes. Saini *et al*. (2007) conducted experiments on morphological characters and nutritive value of grasses of Haryana and reported *Cenchrusciliaris* as grass with most nutritional value for use in the arid region of Haryana. Chaudhary (1989) worked on the grasses of Saudi Arabia and gave a synopsis of sub families, tribes, sub-tribes and genera of the family Gramineae. Sarfaraz *et al.* (2012) studied the biodiversity of grassy weeds and their ethno botanical importance in Dera Ismail Khan district of Pakistan and reported 28 weed species belonging to 22 genera having ethno botanical importance.

MATERIALS AND METHODS
Study area

The study area of district Rajouri is located at western part of Jammu division in the foot hill of PirPanjal range. It lies in between 32^0-$58^\prime$ & 33^0-$35^\prime$ north latitude and 70^0 to 74^0-$10^\prime$ East longitude at

an elevation range of 470 – 6000m. asl. It covers an area of 2630 sq. kilometers. It is flanked by district Poonch in the north, district Jammu in the south, district Udhampur in the east and Mirpur (Pok) in the west. The district has peculiar physical features. The DhaulaDhar range runs across the north eastern part of it. The topography of district varies from place to place. Of the seven blocks Sunderbani, Nowshera and Kalakote blocks are mostly plain and are hot in summer. Whereas, Rajouri, Manjakote, Darhal, Budhal and part of Kalakote block consists of numerous hills and small valleys of meandering brooks. Kandi, literally means 'semi arid land' lies in the south of the district.
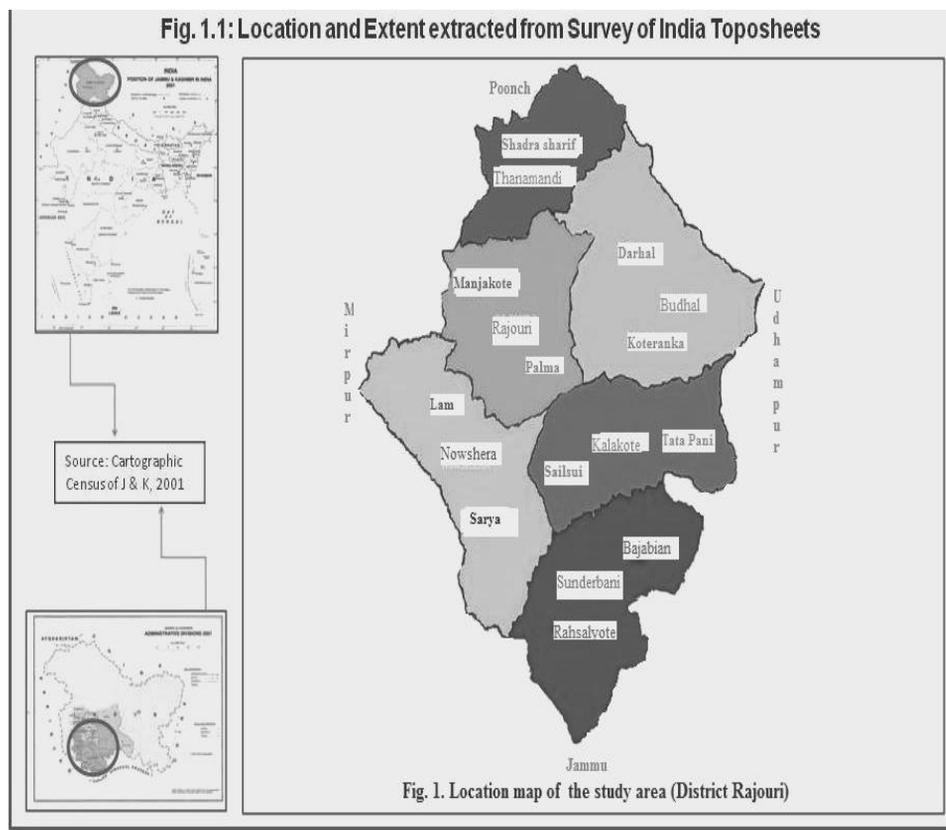

Figure 1. Location map of the study area

The study was based on extensive and intensive field surveys conducted during September 2009 – September 2012. The surveys were conducted in districtRajouri Jammu and Kashmir, India to predict the area under grassy weeds and to understand the biology of invasion

process. After conducting intensive surveys of 7 blocks *i.e.*Sunderbani, Budhal, Darhal, Nowshera, Manjakote, Rajouri and Kalokote,5 sampling sites were randomly selected in each block making a total of 35 sites for field observation and sample collection. The selected sites were visited twice a month and the weed samples were collected at the time of flowering. During this courseinterviews were conducted from farmers and agriculturists of each site about grassy weeds and field notes on some of the important characters like vernacular names (if any), their occurrence with particular crops and flowering and fruiting seasons were recorded carefully. The collected weedswere dried, pressed, preserved and properly identified with the help of available literature, monographs by Sharma and Kachroo (1983), Swami and Gupta (1998), Kaul (1986) and confirmed from the Botanical Survey of India, Northern Circle (BSD), Dehradun, Forest Research Institute Herbarium (DD), Dehradun. These samples were deposited in the H.N.B. Garhwal Central University Herbarium, Department of Botany, S.R.T. Campus, Badshahithaul, TehriGarhwal, Uttarakhand, India.

RESULTS ANDDISCUSSION

During the study period a total of 65 grassy weeds belonging to 05 monocot families were collected. In all the 05 angiospermic families of the grassy weeds reported from the target site the predominance was shown by family Poaceae having 39 grassy weeds followed by family Cyperaceae with 20 weed species. The family Commelinaceae had 03 grassy weeds while, Plantaginaceae contained 02 weed species. The remaining family i.e. Juncaceae family had 01 grassy weed in the study area (Table-1). The relative percentage of the different families exhibited 60% for family Poaceae and 30.76% for family Cyperaceae. Commelinaceae, Plantaginaceae andJuncaceaefamilies showed 4.61%, 3.07% and 1.53 % respectively grassy weed flora of the target site (Fig. 2).

District Rajouri is one of the important agricultural districts of J & K state, whose economy is based on production of agricultural crops. Majority of its population is engaged in agriculture for livelihood. Maize and rice are the major kharif crops of the district while, wheat is the major rabi crop grown in this district. But due to heavy weed infestation the per hectare yield of crops in this district is less. Some of the grassy weeds grow along with the agricultural crops and compete with them for all available resources and reduced their yield. Since the management of these weeds is cost intensive therefore, it reduces the value of production. The grassy weeds like *Avena fatua, Avena sativa*, *Phalaris minor* and *Lolium temulentum* etc. cause heavy infestation in wheat fields and it is very difficult to identify them in early stages

(before flowering) because of their similar appearance with crop plants. The grassy weeds like *Echinochloa colona* and *Echinochloa crus-galli* mimic with rice seedlings and get transplanted with them in the fields. They cause enormous loss to the crops by competing for resources. Moreover, in paddy fields more soil moisture increases the indices of grassy weeds belonging to family Cyperaceae and Poaceae because most of dicot weeds are susceptible to submerged conditions. During the study period it was reported that the grassy weeds like *Commelina benghalensis, Cyanotis vaga, Echinochloa colona, Eleusine indica, Setaria glauca* and *Cyperus rotundus,* etc. were the most frequently occurring weeds of maize fields.

The most common and densely populated weed of maize field was *Echinochloa colona.* The present findings are in analogy with the previous work of Singh and Dangwal (2012) who surveyed the weed flora of wheat fields in District Rajouri and reported a total of 104 weeds belonging to 02 monocot and 28 dicot families and observed that the grassy weeds like *Avena fatua*, *Phalaris minor* and *Lolium temulentum* shows maximum infestations in all the selected sites. The study also show correlation with the findings of Singh and Dangwal (2013) who investigated the weed flora of maize fields of district Rajouri and reported a total of 104 weed species belonging to 03 monocot and 30 dicot families. The dominant grassy weed families were Poaceae and Commelinaceae*.* Our findings are in a great eranalogy with the previous work of Sandhu *et al.* (1999) who studied the weed composition in maize fields of Punjab and reported 75 weed species; the predominant weeds associated with the crop were *Eleusine aegyptiacum, Eragrostis tenella* and *Cyperus rotundus* etc. The present investigation is localized in a limited area of the district Rajouri, hence the flora is less diverse. In spite of negative impact on agricultural crops some of the grassy weeds like *Commelina benghalensis, Cyanotis vaga, Cynodon dactylon, Dicanthium annulatum, Eleusine indica, Setaria glauca, Setaria verticillata, Heteropogon contortus* and *Digitaria ciliaris* etc. are used to fulfill the demand of the fodder in the study area. The weeds like *Sorghum halepense* and *Saccharum spontaneum* are used in the construction of mud houses.

The present study is useful for taxonomists, agriculturists and scientists involved in the management of weeds.
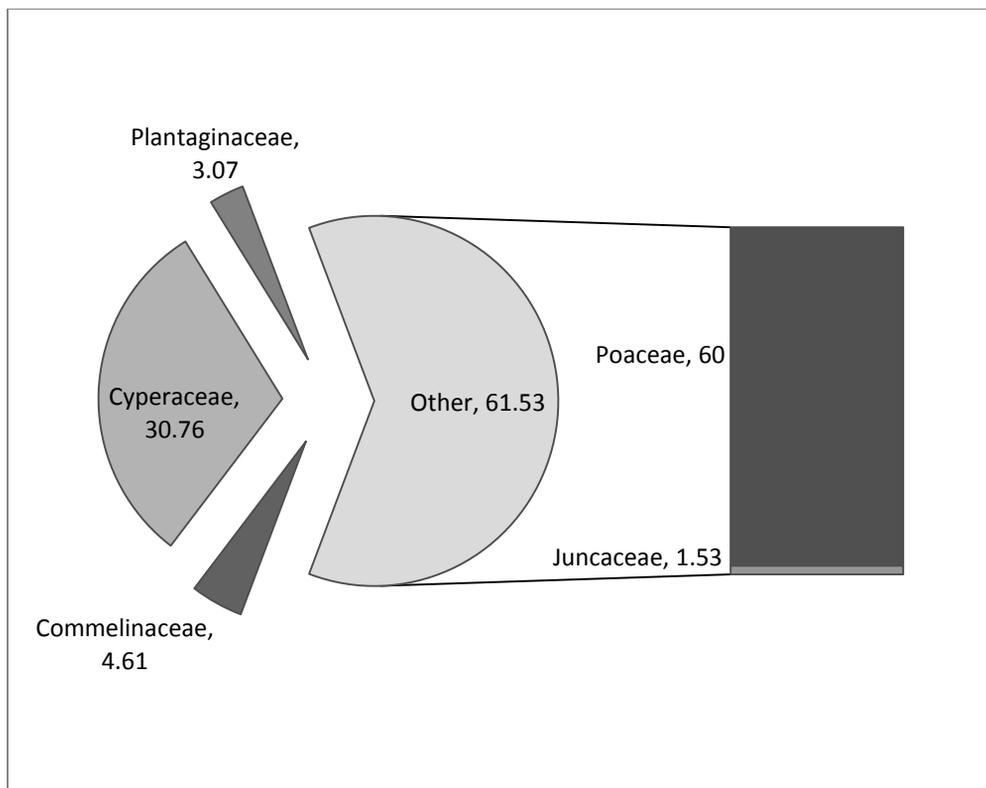
Plantaginaceae, 3.07

Cyperaceae, 30.76

Other, 61.53

Poaceae, 60

Juncaceae, 1.53

Commelinaceae, 4.61

Figure 2. Comparative percentage of different families representing grassy weeds

Table-1. List of the 65 weed species along with their families,botanical names, available vernacular names, flowering and fruiting season and occurrence with particular crops in Sunderbani, Budhal, Darhal, Nowshera, Manjakote, Rajouri and Kalokote blocks.

S. No	Family	Botanical name	Available vernacular name	Flowering and Fruiting season	Occurrence
1.	Commelinaceae	*Commelina benghalensis* L.	Badakha	Jul.-Nov.	Maize fields
		Cyanotis vaga Lour.	-	Jul.-Oct.	Maize and paddy fields
		Murdannia nudiflora L.	Ghass	Aug.-Nov.	Orchards and maize fields.
2.	Cyperaceae	*Carex wallichiana* Sprengel	-	Mar.-June	Orchards and open grassy localities
		Cyperus cuspidatus Kunth	-	July-Sept.	Paddy fields
		Cyperus difformis L.	-	Aug.-Nov.	Paddy fields and marshy places
		Cyperus iria L.	-	July-Sept.	Maize and paddy fields
		Cyperus rotundus L.	Dheela	Jul.-Dec.	Fields of maize, paddy &kharif pulses
		Cyperus michelianus (L.)Link	-	Aug.-Oct.	Maize and paddy fields
		Eriophorum comosum Wallich	Babuli	Jul.-Dec.	Forest floors & orchards nearby forests.
		Fimbristylis bisumbellata Forsk.	-	Aug.-Sept.	Marshy places and paddy fields.
		Fimbristylis complanata (Retz.) Link.	-	June-Oct.	Paddy fields
		Fimbristylis falcata (Vahl)Kunth	-	Jun.-Nov.	Waste marshy places and paddy fields
		Fimbristylis ferruginea Vahl	-	Jul.-Sept.	Paddy fields
		Fimbristylis ovata (Burm. f.)	-	June-Sept.	Upland paddy fields and grassy localities.
		Fimbristylis quincuangularis (Vahl) Kunth	-	July-Nov.	Paddy fields
		Isolepis setacea (L.)R. Br.	-	July-Oct.	Paddy fields
		Kyllinga brevifolia Rottboell	-	July-Nov.	Paddy fields
		Mariscus paniceus Rottboell	-	Aug.-Nov.	Paddy fields
		Pycerus flavidus Retz.	-	Jul.- Nov.	Margins of maize fields
		Pycerus sanguinolentus Vahl.	-	July-Sept.	Margins of maize and paddy fields
		Rikiella squarrosa L.	-	July-Oct.	Paddy fields and open grazing slopes
3.	Juncaceae	*Juncus bufonius* L.	Piddu	Mar.-Sept.	Irrigated wheat fields
4.	Plantaginaceae	*Plantago erosa* Wallich	Badighass	May-Oct.	Meadows, orchards and margins of crop fields
		Plantago lanceolata L.	-	Apr.-Oct.	Marshy places, near water streams and fallow fields.

5.	Poaceae	*Apluda aristata* L.	Bhanjura	Aug.-Sept	Margins of maize fields
		Anthraxon lancifolius (Trinius)	Chotakha	Sept.-Nov.	Old walls and margins of maize fields
		Avena fatua L.	Gandial	Mar.-May	Wheat fields
		Avena sativa x Sterlis	Desigandial	Feb.-May	Wheat fields
		Brachiaria ramosa (L.) Stapf.	-	Aug.-Sept.	Orchards, fields of maize and kharif vegetables
		Brachiaria reptans (L.)	-	Jul.-Sept.	Maize and margins of paddy fields
		Cenchrus ciliaris L.	Guldasta	Aug.-Sept.	Orchards, road sides and margins of crop fields
		Cymbopogon martini Roxb.	Piriya	Sept.-Nov.	Margins of maize fields and orchards
		Cynodon dactylon (L.) Persoon	Khabbal	Jan.-Dec.	Orchards and crop fields
		Dactyloctenium aegypticum (L.) P.Beauv.	-	May-Nov.	Paddy fields
		Dicanthium annulatum Forsk.	Badadoob	Jan.-Dec.	Orchards, maize and wheat fields.
		Digitaria ciliaris Retz.	-	Aug.-Nov.	Maize, Paddy and fields of kharif pulses
		Echinochloa colona L.	Sairh	Jul.-Oct.	Maize and paddy fields
		Echinochloa crus-galli (L.) P. Beauv.	-	Aug.-Oct.	Paddy fields
		Eleusine indica (L.) Gaertner	-	June-Oct.	Fields of maize, paddy and kharif pulses
		Eragrostis minor Host, Icon.	-	May-Aug.	Maize and pulses fields
		Eragrostistenella (L.) P. Beauv.	-	Jul.-Sept.	Maize and pulses fields
		Eulalia mollis Grisebach	Chittakha	Sept.-Nov.	Crop fields and orchards nearby forests
		Heteropogon contortus (L.) P.Beauv.	Saryalaghass	Aug.-Nov.	Margins of maize fields
		Imperata cylindrica (L.) P.Beauv.	Kai	Jan.-Dec.	Margins of paddy fields
		Koeleria phleoides (Vill.) Pers.	Badisitti	Mar.-July	Wheat fields
		Lolium temulentum L.	Jungalikanak	Feb.-Apr.	Wheat fields
		Oplismenus composites (L.) P. Beauv.	-	Aug.-Nov.	Maize fields
		Ophiurus corymbosus Gaertn.	-	July-Oct.	Margins of paddy fields
		Paspalidium flavidum Retz.	Dana ghass	Jul. Nov.	Maize and paddy fields
		Paspalum scorbiculatum L.	Kodra	Jul.-Nov.	Paddy fields
		Paspalum paspalodes Michaux	-	Jan.-Dec.	Paddy fields

		Phalaris minor Retz.	Sitti	Mar.-June	Wheat and mustard fields
		Phleum paniculatum Hunds	-	Apr.-Aug.	Irrigated wheat fields
		Pogonatherum paniceum Lam.	Ringalia	Jul.-Nov.	Margins of irrigated maize fields and orchards
		Saccharum rufipilum Steudel	Chottamunja	Sept.-Dec.	Orchards and grassy slopes
		Saccharum spontaneum L.	Munja	Sept.-Nov.	Margins of paddy fields and orchards
		Saccharum bengalensis Retz.	-	Oct.-Jan.	Orchards and margins of paddy fields
		Seteria glauca (L.) P. Beauv.	Ban teenea	Aug.-Nov.	Maize and paddy fields
		Seteria verticillata (L.) P. Beauv.	Chichra	Aug.-Oct.	Maize fields
		Sorghum halepense (L.) Pers.	Barun	Sept.-Nov.	Maize fields
		Sporobolus diander (Retz.) P.Beauv.	Sityaghass	Mar.-Sept.	Orchards and maize fields
		Tripogon filiformis Nees.	-	Aug.-Sept.	Maize and Paddy fields
		Tragus roxburghii Panigrahi	Geendu	Jul.-Dec.	Maize fields and roofs of mud houses.

Figure 3. *Echinochloa colona*

Figure 4. *Sorghum halepense*

Figure 5. *Fimbristylis ovata*

Figure 6. *Cyanotis vaga*

Figure 7. *Cyperus iria*

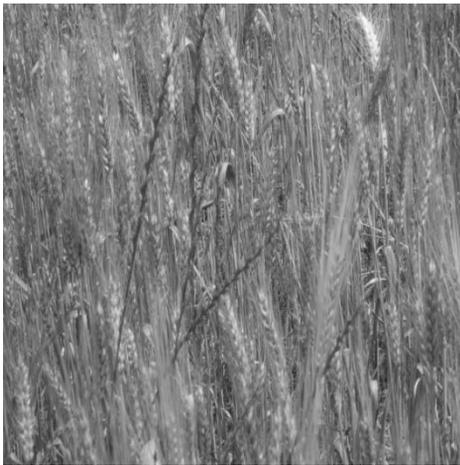**Figure 8.** *Dicanthium annulatum*

Figure 9. *Lolium temulentum*

Figure 10. *Phalaris minor*

Figure 11. *Avena fatua*

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