

DIVERSITY OF GRASS SPECIES FROM KANHA TIGER RESERVE M.P.

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ABSTRACT

The grassland ecosystem is critical for the survival of herbivores and plays an important role in conservation and management of wildlife. In India, natural grasslands are not common and most of the present grasslands in the national parks are of anthropogenic origin. These grasslands were exposed to anthropocentric activities in the past like burning and grazing, and are now facing several changes like replacement of palatable species by unpalatable ones. As an attempt to understand the fodder potential of grasslands of this region, a comprehensive checklist of palatable and unpalatable grass species, based on field experience was compiled. Local field staffs of the Kanha core zone were interviewed for information on palatable and unpalatable grass species and their utility potentials. Various herbaria were consulted for confirmation of habitats and grass phenology. A total of 58 grass species was documented as palatable and unpalatable. The grasses were classified into 4 habitats and the palatability grade based on their use value is assessed. This documentation will be helpful to the staff of Forest department and for better management of grasslands with special reference to wildlife habitat

KEYWORDS: Kanha Tiger Reserve, Diversity of Grasses, Palatable & Unpalatable

INTRODUCTION

The grass family is a diverse and economically dominant group of monocotyledonous plants. It is difficult to calculate exact the number of species of grasses in India. Several workers have contributed to grass flora of India. Jain (1986) reported 266 genera and 1200 sp. for the country. Karthikeyan *et al.* (1989) listed 1254 sp. belonging to 260 genera. The Grasses and Bamboos of India by Moulik (1997) is the recent book on Indian poaceae. Pandey (2009) recently published “Floral Diversity of Kanha Tiger Reserve” in which pictorial key to grass genus identification is given. Various recently published district floras also reported several regional grass sp. The Botanical Survey of India (BSI) published a floristic account in Flora of Maharashtra state by Sharma *et al.* (1996) in which 373 sp. of grass belonging to 104 genera have been recorded. Very recently, Potdar *et al.* (2012) reported 415 sp. belonging to 125 genera.

The grasses are one of the most successful terrestrial life forms on the earth due to their adaptability with reference to the change in environmental factors. The grasses have the ability to coexist with grazing animals and change in climate. The grasses range from herbs to arborescent bamboos. Grasses are good soil binders and soil moisture conserved. Grasses constitute a major ground cover and make a significant contributions to biomass production. They play a crucial role in the maintenance of worlds ecosystems and biodiversity.

The Kanha tiger reserve is among the first nine national parks to be brought under the Project Tiger in 1973-74. Initially, the management of the national park was guided by two main objectives – tiger (*Panthera Tigris Tigris*) and hard ground barasingha (*Ruervus duvaucelii branderi*) conservation in the Kanha ecosystems. An ecological study on the grasslands of Kanha National Park (K.N.P) was conducted (Pandey, 1982) with special reference to wildlife management. On the basis of phytosociological studies, dominance and codominance of different grass sp.16 broad plant community was identified. The same study was reported in several prominent grasslands of the national park (Pandey and Hardaha, 2007) to evaluate the change in the plant communities of these grasslands. In Kanha, most of the present grasslands in the anthropogenic origin. These grasslands could be maintained as grasslands only as a result of assiduous efforts on the part of park management. A revival of hard ground barasingha or increase in the population of tigers in the Kanha tiger reserve could be made possible only due to these man -mad grasslands. However, with the passage of time, the herbivore population has increased considerably due to increased protection, thereby increasing the grazing pressure on the grasslands beyond their carrying capacity. As a result, changes in the overall ecology of these habitats. Palatable grasses are slowly replaced by unpalatable grasses (Moretto and Disel, 1991 and Yond and Solbring, 1993). To augment palatable species in grasslands is the biggest challenge in front of grasslands managers of this region.

Despite the utmost importance of grasses to mankind, the study on grasses continues to be a neglected. This is mainly because of the feeling that it is a difficult group for identification, a small size of floral organs, special terminologies and complicated structure of spikelets and inflorescence. Study on grasslands, wild grasses especially of fodder value have become very important for the management of wildlife. The present investigation is an attempt to study the diversity of grasses from Kanha tiger reserve with reference to habitat management of wildlife.

MATERIALS AND METHODS

Study Area

Kanha tiger reserve, part of Deccan peninsula-Central High-Lands Biogeography zone (Rodgers and Panwar, 1988; Negi and Shukla, 2011), is spread across Mandla and Balaghat districts of Madhya Pradesh. The tiger reserve consists of a core zone of around 917 km² and a buffer zone of around 1134 km². The core zone comprises a mosaic of meadows and forests in the plain, extensive grasslands on the plateaus, and forests in the rolling hills (Kanoje, 2006). According to Champion and Seth (1968), the forest type of the core zone mainly consists of moist peninsular Sal forest: (forest type 3C/C2), southern tropical moist deciduous forest: (forest type 3A/C2a) and southern tropical dry mixed deciduous forest (forest type 5A/C3). For the convenience, the study area is divided into 6 ranges of the core zone.

During the present taxonomical study on grasses, several field trips of short duration have been undertaken for the collection of grasses. Over 90 grass specimens were collected from the selected locality during the month from August to March. During the study period, the relevant field notes were written on the

spot. By using regular drying method collected grasses were properly processed, poised and the specimen were mounted on herbarium sheets and deposited in the herbarium of botany department after confirmation of their identity.

The grasses collected have been described, illustrated and photographed. For classification and identification, the method given by Potdar *et al.* (2012) has been adopted.

RESULTS AND DISCUSSIONS

In the present study 58 species of 39 genera were found in the study area during the study period. Table 1- represents the floral phenology, habitats and diversity of grasses in the studied locality. 4 types of habitats were categorized where grass species are seen to grow (Table. 1). A total of 21 grass are exclusive to a single habitat while remaining 37 grass share 2 or more habitat. The classification of grasses in these 4 habitats revealed a maximum number of grasses exclusive to moist areas. The highest number of palatable grasses was found in moist habitat, which may be attributed to water availability throughout the year.

Based on palatability potential, grasses are provided with 3 grades out of 58 grass. Detail about these grades is given in Table-2.

CONCLUSIONS

A checklist of palatable and unpalatable grass species from Kanha Tiger Reserve was compiled to understand the status of fodder potential of grasslands and other habitats. The grassland is dominated by unpalatable species as these species are slowly replacing palatable species, due to anthropogenic pressure like burning and grazing. All palatable grass species show a different palatable grade which can be assessed based on their consumption and wild animal preference to eat them. A large number of palatable grasses occur in moist habitat.

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Table 1: List of Palatable and Unpalatable Grass Sp. From Kanha National Park with Details like Floral Phenology, Vernacular Name, Status of Occurrence and Botanical Name as Per Recent Nomenclature

S. No.	Name of Grasses	Local Name	Annual/ Perennial	Floral Phenology	Habitats	Status of occurrence
1	<i>Arthraxon hispidus</i>	Basin	Annual	Aug -Jan	1,2	Threatened
2	<i>Arthraxon lanciofolius</i>	Basin	Annual	Aug -Jan	1,2	Threatened
3	<i>Apluda mutica</i>	Fulera	Perennial	Aug -Des	1,4	Common
4	<i>Aristida setacea</i>	Khadda	perennial	Aug -Des	4	Common
5	<i>Arundinella pumila</i>	-	Annual	Jan - Nov	3	Common
6	<i>Arundo donax</i>	-	Perennial	Feb –Mar	1,2	Rare
7	<i>Bothriochloa intermedia</i>	Bhainskandi	Perennial	Aug – Nov	1	Common
8	<i>Bothriochloa kuntzeana</i>	Bhainskandi	Perennial	Oct – Des	1,4	Common
9	<i>Bothriochloa odorata</i>	Bhainskandi	Perennial	Jul -Oct	1,4	Common
10	<i>Bothriochloa pertusa</i>	Bhainskandi	Perennial	Sept -Nov	1,4	Endemic
11	<i>Bothriochloa tuberosa</i>	Bhainskandi	Perennial	Aug -Jan	1,2	Endemic
12	<i>Brachiaria reptans</i>	-	Annual	Aug -Jan	4	Common
13	<i>Carex phacota</i>	-	perennial	July - Sept	2,3	Rare
14	<i>Chloris dolichostachya</i>	Sikka	Perennial	Aug -Des	2,4	Common
15	<i>Chloris virgata</i>	Gondli	Annual	Aug -Des	1,4	Common
16	<i>Chrysopogon polyophyllus</i>	-	perennial	Sept -Nov	1,4	Endemic
17	<i>Chrysopogon fulvus</i>	-	Annual	Aug -Jan	1,4	Endemic
18	<i>Coix gigantea</i>	Coix	Perennial	Aug -Des	1	Endemic
19	<i>Cymbopogon martinii</i>	Rosa	Perennial	Aug -Jan	4	Threatened
20	<i>Cynodon dactylon</i>	Doob	perennial	Aug -Des	1	Common
21	<i>Cyperus halpan</i>	Gangarua	Perennial	Aug -Des	1	Common
22	<i>Desmostachya bipinnata</i>	Kus	Perennial	Aug -Mar	4	Endemic
23	<i>Dichanthium annulatum</i>	Choti kandi	perennial	Aug -Jan	1,4	Common
24	<i>Dichanthium aristatum</i>	Kandi	Perennial	Aug -Jan	1,4	Rare
25	<i>Dichanthium caricosum</i>	Kandi	Perennial	Aug -Nov	1,2	Common
26	<i>Digitaria stricta</i>	Daalgutni	Annual	Aug -Jan	1,2	Rare
27	<i>Digitaria abludens</i>	-	Annual	Aug -Des	1,4	Common
28	<i>Eleusine indica</i>	Crow foot grass	Annual	Aug –Mar.	2,4	Common
29	<i>Eragrostis japonica</i>	Bhurbhusi	Perennial	Aug -Jan	3,4	Common
30	<i>Eragrostis nutans</i>	Bhurbhusi	Annual	Aug -Jan	1,3,4	Common

31	<i>Hemarthria compressa</i>	-	Perennial	Sept - Des	1,4	Common
32	<i>Heteropogon contortus</i>	Sukra	Perennial	Aug -Jan	1,4	Common
33	<i>Imperata cylindrica</i>	Chir	Perennial	Aug -Jan	3,4	Endemic
34	<i>Ischaemum indicum</i>	Ber	Perennial	Aug -Des	1,4	Common
35	<i>Iseilema laxum</i>	-	Perennial	Aug -Des	4	Rare
36	<i>Manisuris clarkei</i>	-	Annual	Sept –Des	1,4	Rare
37	<i>Narenga porphyrocoma</i>	Bisad	Perennial	Oct - Feb	1,2,4	Rare
38	<i>Oplimemus burmanni</i>	-	Annual	Aug -Jan	1,2	Endemic
39	<i>Oplimemus compositus</i>	-	Perennial	Sept – Nov	1,2	Endemic
40	<i>Pennisetum hohenackeri</i>	Moua	Perennial	Sept –Nov	4	Endemic
41	<i>Pennisetum pedunculatum</i>	Deenanath	Perennial	Sept – Oct	4	Endemic
42	<i>Pseudo dichanthium</i>	Fals kandi	Perennial	Aug –Des	4	Threatened
43	<i>Rottbollia exaltata</i>	-	Annual	Aug –Jan	3,4	Rare
44	<i>Saccharum spontanem</i>	Kans	Perennial	Aug –Jan	1,4	Common
45	<i>Saccharum munja</i>	Munj	Perennial	Sept - Nov	4	Rare
46	<i>Sacciolepis indica</i>	-	Annual	Aug -Jan	1,4	Rare
47	<i>Scleria levis</i>	Churia	Perennial	Aug -Jan	1,4	Common
48	<i>Setaria glauca</i>	Niwri	Annual	Aug -Oct	1,4	Endemic
49	<i>Setaria intermedia</i>	Chippa	Annual	Aug -Jan	4	Rare
50	<i>Setaria pumila</i>	Van bajra	Perennial	Aug –Des	4	Rae
51	<i>Sorghum halepense</i>	Baru	perennial	Aug -Jan	1,4	Endemic
52	<i>Spodiopogon rhizophorus</i>	Pochti	Annual	Sept -Des	1,4	Rare
53	<i>Themeda laxa</i>	Bhond	Perennial	Aug -Jan	4	Rare
54	<i>Themeda arundinacea</i>	Hathighas	perennial	Oct - Mar	4	Rare
55	<i>Themeda quadrivalvis</i>	Bhond	Annual	Aug -Des	4	Common
56	<i>Themeda triandra</i>	Bhond	Perennial	Aug -Des	4	Rare
57	<i>Thysanolaena maxima</i>	Phulbahari	Perennial	Sept - Mar	1,2	Common
58	<i>Vetiveria zizanioidies</i>	Khas	Perennial	Aug -Jan	1	Rare

Note: Abbreviations:Habitats- 1. Moist area, 2. Under growth of forests,3. Dry rocky area, 4. Grassland grass

Table 2: List of the Main Grass Sp. that Occurs in the Kanha National Park and the Ungulates Overall Annual Palatability Responses to the Species Categorized as High (H) Medium (M) and Low (L) are as under.

S. No.	Name of Grasses	Local Name	Gaur	Sambhar	Barasingha	Chital
1	<i>Arthraxon hispidus</i>	Basin	L			L
2	<i>Arthraxon lanciofolius</i>	Basin				
3	<i>Apluda mutica</i>	Fulera			M	M
4	<i>Aristida setacea</i>	Khadda				L
5	<i>Arundinella pumila</i>					
6	<i>Arundo donax</i>					
7	<i>Bothriochloa intermedia</i>	Bhainskandi			H	H
8	<i>Bothriochloa kuntzeana</i>	Bhainskandi	M	H	H	M
9	<i>Bothriochloa odorata</i>	Bhainskandi	M	M	H	H
10	<i>Bothriochloa pertusa</i>	Bhainskandi			L	M
11	<i>Bothriochloa tuberosa</i>	Bhainskandi			H	M
12	<i>Brachiaria reptans</i>		L	L		M
13	<i>Carex phacota</i>					
14	<i>Chloris dolichostachya</i>	Sikka				L
15	<i>Chloris virgata</i>	Gondli	L	L		L
16	<i>Chrysopogon polyophyllus</i>					
17	<i>Chrysopogon fulvus</i>				M	
18	<i>Coix gigantea</i>	Coix	M	M		
19	<i>Cymbopogon martinii</i>	Rosa				
20	<i>Cynodon dactylon</i>	Doob	H	H	M	H
21	<i>Cyperus halpan</i>	Gangarua				
22	<i>Desmostachya bipinnata</i>	Kus				
23	<i>Dichanthium annulatum</i>	Choti kandi	H	H	M	H
24	<i>Dichanthium aristatum</i>	Kandi	H	H	M	H
25	<i>Dichanthium caricosum</i>	Kandi				M
26	<i>Digitaria stricta</i>	Daalgutni			L	M
27	<i>Digitariya abludens</i>					
28	<i>Eleusine indica</i>	Crow foot grass				
29	<i>Eragrostis japonica</i>	Bhurbhusi				
30	<i>Eragrostis nutans</i>	Bhurbhusi				
31	<i>Hemarthria compressa</i>					M
32	<i>Heteropogon contortus</i>	Sukra	H	H	M	H
33	<i>Imperata cylindrica</i>	Chir	M	L	L	L
34	<i>Ischaemum indicum</i>	Ber			L	M
35	<i>Iseilema laxum</i>		M	M	M	M
36	<i>Manisuris clarkei</i>					

37	<i>Narenga porphyrocoma</i>	Bisad			L	
38	<i>Oplimetus burmanni</i>					
39	<i>Oplimetus compositus</i>					
40	<i>Pennisetum hohenackeri</i>	Moua				
41	<i>Pennisetum pedunculatum</i>	Deenanath				
42	<i>Pseudo dichanthium</i>	Fals kandi	M	M		
43	<i>Rottbollia exaltata</i>					
44	<i>Saccharum spontanem</i>	Kans	H	H	H	L
45	<i>Saccharum munja</i>	Munj				
46	<i>Sacciolepis indica</i>					L
47	<i>Scleria levis</i>	Churia				
48	<i>Setaria glauca</i>	Niwri	L	L	M	L
49	<i>Setaria intermedia</i>	Chippa				
50	<i>Setaria pumila</i>	Van bajra	M			L
51	<i>Sorghum halepense</i>	Baru				
52	<i>Spodiopogon rhizophorus</i>	Pochti				
53	<i>Themeda laxa</i>	Bhond				
54	<i>Themeda arundinacea</i>	Hathighas				
55	<i>Themeda quadrivalvis</i>	Bhond	H	H	H	M
56	<i>Themeda triandra</i>	Bhond	H	H	H	H
57	<i>Thysanolaena maxima</i>	Phulbahari				
58	<i>Vetiveria zizanioidies</i>	Khas	M		M	L

PHOTOGRAPHS OF GRASSES FROM KANHA TIGER RESERVE (M.P.)



Figure 1: Arthraxon Hispidus



Figure 2: Arthraxon Lanciofolius



Figure 3: Apluda Mutica



Figure 4: Aristida Setacea



Figure 5: Arundinella Pumila



Figure 6: Arundo Donax



Figure 7: Bothriochloa Intermedia



Figure 8: Bothriochloa Kuntzeana



Figure 9: Bothriochloa Odorata



Figure 10: Bothriochloa Pertusa



Figure 11: Bothriochloa Tuberosa



Figure 12: Brachiaria Reptans



Figure 13: Carex Phacota



Figure 14: Chloris Dolichostachya



Figure 15: Chloris Virgata



Figure 16: Chrysopogon Polyophyllus



Figure 17: Chrysopogon Fulvus



Figure 18: Coix Gigantea



Figure 19: Cymbopogon Martinii



Figure 20: Cynodon Dactylon



Figure 21: Cyperus Halpan



Figure 22. Desmostachya Bipinnata



Figure 23. Dichanthium Annulatum



Figure 24. Dichanthium Aristatum



Figure 25: *Dichanthium Caricosum*



Figure 26: *Digitaria Stricta*



Figure 27: *Digitaria Abludens*



Figure 28: *Eleusine Indica*



Figure 29: *Eragrostis Japonica*



Figure 30: *Eragrostis Nutans*



Figure 31: *Hemarthria Compressa*



Figure 32: *Heteropogon Contortus*



Figure 33: *Imperata Cylindrica*



Figure 34: *Ischaemum Indicum*



Figure 35: *Iseilema Laxum*



Figure 36: *Manisuris Clarkei*



Figure 37: *Narenga Porphyrocoma*



Figure 38: *Oplimenus Burmanni*



Figure 39: *Oplimenus Compositus*



Figure 40: *Pennisetum Hohenackeri*



Figure 41: *Pennisetum Peduncalum*



Figure 42: *Pseudo Dichanthium*



Figure 43: *Rottbollia Exaltata*



Figure 44: *Saccharum Spontanem*



Figure 45: *Saccharum Munja*



Figure 46: *Sacciolepis Indica*



Figure 47: *Scleria Levis*



Figure 48: *Setaria Glauca*



Figure 49: *Setaria Intermedia*



Figure 50: *Setaria Pumila*



Figure 51: *Sorghum Halepense*



Figure 52: *Spodiopogon Rhizophorus*



Figure 53: *Themeda Lxa*



Figure 54: *Themeda Arundinacea*



Figure 55: *Themeda Quadrivalvis*



Figure 56: *Themeda Triandra*



Figure 57: *Thysanolaena Maxima*



Figure 58: *Vetiveria Zizanioidies*

