



## INVESTIGATION ON STUDY OF WILD RELATIVES OF GRASSES AND THEIR IMPORTANCE FOR GRAZING HABITAT OF WILD HERBIVORES IN TADOBA ANDHARI TIGER RESERVE MAHARASHTRA STATE

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### ABSTRACT:

Wild Relatives of grasses are naturally distributed in the grasslands of Tadoba Andhari Tiger Reserve , the wild relatives are the parental genera of cultivated crops, the diversity of wild relatives of grasses variable with the change in soil texture and soil ecology , soil physical properties. The important wild relatives of grasses reported from Tadoba Andhari Tiger Reserve are *Setaria pumilla* , *Setaria italica* , *Sorghum halpense* , *Panicum scorbiculatum* , *Oryza rufipogon* , *Elusine indica* , *Panicum milliaceum* , *Paspalum canare* , *Panicum notatum* , *Paspalum Paspalodes* , *Panicum sumatrense* , *Saccharum spontanium* , *Sorghum contraversum* , *Sorghum deccanense* , *Urochloa panicoides*. Wild relatives of grasses identification and conservation by seeds collection and enrichment useful to maintain composition of grasslands in Protected Areas. Wild relatives of grasses are nutritive and having good forage value with reference to grazing habitat of wild herbivores and play vital role in grasslands management.

**Keywords:** - Wild relatives Grasses , TATR.

### INTRODUCTION :

Grasses are one of the largest and most valuable groups of flowering plants, consisting of 610 genera and 10,000 species (Cope, 1982). Clayton and Renvoize (1986) put the total number of grasses in the world about 10,000 species, 651 genera were recognized and assigned numbers indicating their phylogenetic status based upon various evidences. It ranks third in number of genera after the Compositae and Orchidaceae and fifth in number of species after the Compositae, Orchidaceae, Leguminosae and Rubiaceae (Good, 1953). Grasses are widespread than any other family of flowering plants. The great adaptability of different species has enabled them to thrive under the most varied conditions. They form the climax vegetation of the semiarid prairies of the American continent, the steppes of Asia and the

savannas of Africa. Grasses exceed all other in the importance of its products. It provides food in the form of cereals for man and forage for most animals. Many species of native and introduced grasses are utilized in improved pastures (Salter, 1952). A grass is taxonomically defined as any species within the large family (Gramineae or Poaceae) of monocotyledonous plants having narrow leaves, hollow stems, and clusters of very small, usually wind-pollinated flowers. Grasses include many varieties of plants grown for food, fodder, and ground cover (Grass 2014). Grasses are often confused with sedges (Cyperaceae family) and reeds (Restionaceae family). However, sedges do not have a leaf sheath and their leaves are attached directly to the culm—a diagram of grass anatomy is provided in Appendix C. The culms of sedges are also angular, while grass culms

are circular. The grass family is the fifth largest plant family on earth with over 700 genera and 9700 species. About ten percent of the grass species worldwide can be found in southern and tropical Africa; the major genera of which are *Eragrostis*, *Pentaschistis*, *Panicum*, *Sporobolus*, *Aristida*, *Digitaria*, *Stipagrotis*, *Setaria*, *Brachiaria*, and *Hyparrhenia* (Van Oudtshoorn 2009).

Almost all animal species and food chains depend on grass because grass occurs across the world and is almost always edible. The groups of animals that depend most directly on grass for food are birds, insects, rodents, and grazers. There are many bird species, such as *Quelea* finches, the most common bird on earth with a population of over 1.5 billion in Africa alone, that solely eat grass seeds. Grass provides the only food source for seed-eating birds, and the birds play an integral role in seed dispersal. Insects use grass for both food and shelter. Disruption of these grassland ecosystems can cause a dangerous under or overabundance of insect species. Rodents consume grass seeds or the base of the plant where the most nutrients are stored. Grazers have the largest impact on grasslands and typically graze in large herds which makes spatially expansive impact. Grazers remove old plant material, stimulate new growth, and provide nutrients in the form of manure. Although predators and decomposers are also ultimately dependent on grass species, it is primary consumers- specifically herbivores- that have the biggest causal relationship with grass species. Herbivores and grass species composition are highly interdependent.

Evaluating a Grassland There are four main measures to evaluate a grassland: grazing

value, ecological indicator status, succession stage, and perenniality. Several factors that can help conservation managers determine whether their area is providing valuable grazing material. By identifying grass species in the area, grazing value can be determined. Grazing value is defined as the quality and quantity of material from an individual available for grazing (Van Oudtshoorn 2009).

Grasses inhabit the earth in greater abundance than any other comparable group of plants. Some are adapted to warm, humid and tropical climate while others are established in the polar regions, where the growing season is two months or less and direct sunlight is absent for many months of the year. Some are important elements of marsh and swamp vegetation, and other inhabit desert regions where the annual precipitation is 5 inches or less. Even before the time of recorded history, the grains of grasses provided a staple food supply for the human race (Gould, 1968). The members of this group are present in all the conceivable habitats, suitable for growth of plant communities (Mitra and Mukherjee, 2005). Grasses are used as forage for domesticated, wild animals and soil conservation (Gould, 1968).

#### **Tadoba Andhari Tiger Reserve Forest Diversity :**

"Tadoba" is taken from the name of the god "Tadoba" or "Taru", worshipped by the [tribes](#) who live in the dense forests of the Tadoba and Andhari region, while "Andhari" refers to the [Andhari river](#) that meanders through the forest.

Tadoba Andhari Reserve is the largest national park in [Maharashtra](#). The total area of the reserve is 625.4 square kilometres (241.5 sq mi). This includes Tadoba National Park, with an area of 116.55 square kilometres (45.00 sq mi)

and Andhari Wildlife Sanctuary with an area of 508.85 square kilometres (196.47 sq mi). The reserve also includes 32.51 square kilometres (12.55 sq mi) of protected forest and 14.93 square kilometres (5.76 sq mi) of uncategorised land. Tadoba National Park and Andhari wildlife sanctuary together form the Tadoba-Andhari Tiger Reserve. The total area of the Tadoba-Andhari tiger reserve is about 1,727 km<sup>2</sup>.

Tadoba National Park was established in the year of 1955. Total area of the park is 116.55 Km<sup>2</sup>. The Andhari Wildlife Sanctuary was formed in the year 1986. Total area of the Andhari Wildlife Sanctuary is 508.85 Km<sup>2</sup>.

Total core area of the tiger reserve is 625.40 Km<sup>2</sup>. Total buffer area of the tiger reserve is 1101.60 Km<sup>2</sup>. The reserve also includes 32.51 Km<sup>2</sup> of protected forest and 14.93 Km<sup>2</sup> of other areas.

Tadoba Andhari Tiger Reserve is a predominantly southern tropical dry deciduous forest with dense woodlands comprising about eighty seven per cent of the protected area. Teak is the predominant tree species. Other deciduous trees found in this area include *ain* (crocodilebark), *bija*, *dhauda*, *salai*, *semal* and *tendu*. *Beheda*, *hirda*, *karaya* gum, *mahua* madhuca (crepe myrtle), *palas* (flame-of-the-forest, *Butea monosperma*) and *Lannea coromandelica* (wodier tree). Axlewood (*Anogeissus latifolia*, a fire-resistant species), black plum and *arjun* are some of the other tropical trees that grow in this reserve.

Aside from the keystone species, the Bengal tiger, Tadoba Tiger Reserve is home to other mammals, including: Indian leopards, sloth bears, gaur, nilgai, dhole, striped hyena, small Indian civet, jungle cats, sambar, barking deer, chital, chausingha and honey badger. Tadoba lake sustains the marsh crocodile, which was once common. Indian star tortoise, Indian cobra and Russel's viper also live in Tadoba. The

lake contains a wide variety of water birds, and raptors. 195 species of birds have been recorded, including three endangered species. The grey-headed fish eagle, the crested serpent eagle, and the changeable hawk-eagle are some of the raptors seen in the park.

Poaceae is the one of the largest family among the monocotyledons in the world. The grass vegetation broadly divided into two types depending upon their life-span, Ephemeral vegetation consisting mainly of the grasses that complete the life cycle during rainy season or after rainy season. Grasses autumn or long lived vegetation with species that grow with the rains but complete their life-cycle after rains. The species like *Arthraxon lancifolius*, *Arundenella pumila*, *Sporobolus coromondelianus*, *Digitaria ternata*, are the chief components of farmers category. On the contrary the species like *Heteropogon contortus*, *Andropogon pumulus*, *Chrysopogon fulvus*, *Dicanthium caricosum*, *Setaria forbesiana*, *Pennisitum hohenackeri* which form the autumn vegetation are either perennial vegetation forming large tufts.

**Tadoba-Andhari National Park/Coordinates**  
**20.2484° N, 79.3607° E**

#### OBJECTIVES:

- Identification and Enumeration of Wild Relatives grasses.
- To identify the wild grasses in the field by observations and morphological study.
- To determine diversity of wild grass plants and its ecological significance in forest ecosystem.
- Phenological study of the wild grasses plants.
- Ecological and morphological study of plants

#### METHODOLOGY

- To select the sites /area for the study of wild grasses plants present in forest and grasslands ecosystem.

- To arrange the regular field visits in three different seasons of the year, rainy season, Winter season and summer season.
- To observe the open grassland with special reference to phyto-sociology.
- Grasses distribution and their ecological and environmental study.
- Ecological significance of grasses in forest ecosystem.
- To prepare the photographic album of wild grasses plants.

### Recognising the morphology of plant species

By using regional, local and national floras, the data from the herbarium specimens, the accounts on morphological details, diagnostic characters and range of variation studied. The grasses plants are observed at different stages vegetative and reproductive stages of the plants. The roots are observed from morphological point of view, to study the role of grasses in forest ecology and to modify the texture of soil. Observation of morphological characters under dissecting microscopes and magnifying lens. Study of root, stem, leaf and flowers morphology of the plants in specific season. Identification of grasses plants by using regional floras or national floras. Their identity requires a skill in systematic botany.

### Collection and Conservation of plants

Observations and collection of plants before approaching for the field collection directly. On spot identification of target species and seed collection, drying storage and broadcasting in different grasslands for the insitu conservation purposes in forest ecosystem or new species to the collection of valuable germplasm of wild species for gene bank conservation.

### Collection of Wild Relatives

The collection missions are primarily aimed at tapping germplasm variability in Plant Genetic resources of different agri-horticultural Wild relatives of Grasses in the entire genepool. The germplasm is collected on the basis of priority

for collection from targeted regions, and of species. The information on ecological distribution with precise location of species helps in collection of targeted gene pool

**Study area :** Core area grasslands of Tadoba Andhari Tiger Reserve .

1. Palasgaon grassland
2. Navegaon grassland
3. Jamni grassland
4. Pandhar pauni grassland
5. Botezari grassland.
6. Rantalodi rehabilitated village.

### OBSERVATIONS:

#### Finger Millet (*Eleusine coracana* (L.) Gaertn.)

Finger millet is commonly known as Ragi. It is a staple food for many people. There are two sub species - *E. africana* and *E. coracana*. *Eleusine* having only one wild relative in Madhya Pradesh *Eleusine indica* (L.) Gaertn. *E. indica* is the only wild species widely occurring which is morphologically and cytologically similar to *E. coracana* (Krishnaswamy, 1951). *E. indica* is of Indian origin and may be the immediate ancestor of finger millet (Mehra, 1963)

Proso millet (*Panicum milaceum* (L.) and Little Millet (*Panicum Sumatrense* Roth. ex Roem et Schult.)

Proso millet is commonly called kodo. It is supposed to be one of the oldest grain crops and is grown extensively in India. It is a quick growing drought resistance crop. It has two sub-species *psilopodium* and *sumatrense*. It is classified as *race-nana* and *robusta*, sub races-*laxa*, *erecta* and *compacta*. In Madhya Pradesh, *Panicum maximum* Jacq., *P. milare* L., *P. notatum* Retz., *P. psilopodium* Trin (related to *P. milare*), *P. repens* L., are present. Out of these species, *P. psilopodium* which is similar to the wild forms of *P. sumatrense* from which

the later species might have originated (Anonymous, 1966).

Kodo Millet (*Paspalum scrobiculatum* L.) Kodo millet is locally called kodo kutki. It has three races viz., regularis, irregularis and variables. In Madhya Pradesh wild related species, *Paspalum canarae* (Steud.) Veldk., *P. paspaloides* (Michx.) are present

Foxtail Millet (*Setaria italica* (L.) P. Beauv)

Foxtail millet is considered to be sweet, is used as a sedative to the gravid uterus. The grain is said to possess heating properties and when taken alone sometimes causes diarrhoea. The grain is astringent, diuretic and laxative and is useful externally in rheumatism. It is a popular remedy for alleviating the pains of parturition (Kirtikar and Basu, 1935). Foxtail millet is locally called as wild baara. It is also known as Italian millet. Cultivation of foxtail millet dated back to the third millennium BC. *S. italica* is not known in the wild state except as a weed which escapes from cultivation. *S. italica* is divided into sub species *viridis* and *italica*. *S. italica* is further classified into three races *moharia*, *maxima* and *indica*, *viridis* is the ancestral form of *S. italica* on the basis of chromosome number.

Sugarcane (*Saccharum officinarum* L.)

Sugarcane is derived from the Sanskrit word *shakkara*. This crop from the east provides a linguistic evidence of Indian origin of sugarcane. In Madhya Pradesh, many sweet based products are prepared from sugarcane. There is only one wild relative *Saccharum spontaneum* L. is present in TATR.

*Echinochloa colona* (L.) Link, hort. Berol. 2: 209. 1833; Blatt. & McC. Bombay Grass. 148. 1935; Bor, Grass.

Ind. 308. 1960. *Panicum colonum* L. Syst. Nat. ed. 10.2:870. 1759; Hook.f. Fl. Brit. India 7:32. 1896; Cooke, Fl. Pres. Bombay 3: 447. 1958 ( Repr. ed.). wild nachani grass.

Herbs, annual, decumbent- ascending; culms 40-90 cm long, rooting at base. Leaves 3-30 x 0.4-2.0 cm, linear – lanceolate, scabrid, apex acute to acuminate. Racemes spiciform, distant, 5-10, 1.5-2.0 cm long. Spikelets c 0.3 cm long ovoid; lower glume ½ as long as lower lemma, broadly ovate; upper glume cuspidate, hairy; lower lemma ovate, hairy; upper lemma polished. (Plate VI, Fig. 35)

- Palatable grass
- Flowering Season : September – November.
- Fruiting Season : December
- Ecological data : Common weed, best soil binder grass in forest.

#### Soil pH range required – 7.2 – 7.6

- Rainfall range : 950 mm – 1078 mm.
- Temperature range : 26 °c – 39 °c.
- Humidity required : 51 % - 67%.

Eleusine Gaertn. Fruct. Sem. Pl. 1:7. 1788  
*Eleusine indica* (L.) Gaertn. Fruct. 1:8. 1789; Hook.f. Fl. Brit. India 7: 293. 1896; Cooke, Fl. Pres. Bombay 3:560. 1958 ( Repr.ed.); Blatt.& McC. Bombay Grass. 259. 1935; Bor, Grass. Ind. 493. 1960. *Cynosurus indicus* L. Sp. Pl. 72. 1753. 'Nachni'. ( WILD NACHANI)

Herbs, annual, erect, tufted c 25 cm high; culms slightly compressed. Leaved 8-12 x 0.2-0.3 cm, linear, flat. Spikes 2-7 or more, 4. 0.5-5 cm long. Spikelets c 0.3 cm long, ovoid or oblong, green. Grains oblong or globose.

- Palatable grass
- Flowering Season : September – November.
- Fruiting Season : December
- Ecological data : Sporadic annual grass grows in cultivated soil.

**Soil pH range required – 7.2 – 7.6**

- Rainfall range : 950 mm – 1078 mm.
  - Temperature range : 26 °c – 39 °c.
  - Humidity required : 51 % - 67%.
- Field Note – Grass of dry soil , non palatable grass found in smaller grasslands.

ORYZA L.Sp. Pl.1:333.1753

*Oryza rufipogon* Griff. Notul. 3: 5. 1851; Bor, Grass. Bur. Cey. Ind. Pak. 605.1960; Laxmi. in Sharma et al. (eds.), Fl. Maharashtra, Monocot. 545. 1996; 151 Moulik, Grass. Bam. India 1: 47. 1997; Naik, Fl. Marathawada 2: 1065. 1998.

Annual, culms 30-70 cm tall, tufted, terete, erect or decumbent, spongy, rooting at lower nodes, nodes glabrous. Leaf sheath 6-09 cm long, terete or compressed, keeled, glabrous, smooth. Ligule 15-31 mm long, membranous, Leaf blade 15-30 x 0.6-1.6 mm, flat, linear to ovate, keeled, scabrid on nerves and margins, apex acuminate. Panicles 10-22 cm long.

- Palatable
- Flowering Season : October.
- Fruiting Season : November
- Uses : Seeds edible grass.
- Ecological data : Common in marshy places.

**Soil pH range required – 7.1 – 7.5**

- Rainfall range : 950 mm – 1180 mm.

- Temperature range : 26 °c – 39 °c.

- Humidity required : 68 % - 71%. *Panicum antidotale* Retz. Obs. Bot. 4:17. 1786. Hook.Fl.Brit. India 7: 52. 1896; Cooke , Fl. Pres. Bombay 3:453.1958 (Repr.ed); Blatt.&McC.Bombay Grass.163.1935.

Bor,Grass.Ind.322.1960.

Annual erect , diffusely branched, 1-2 mtr tall , creeping , grass. Leaves 10-40 cm long , linear – lanceolate . Panicle 15-22 cm long , Spikelets ovoid.

- Palatable
- Flowering Season : Septeber – November.
- Fruiting Season : December
- Uses : Seeds edible, Best soil binder grass.
- Ecological data : Common in marshy places.

**Soil pH range required – 7.1 – 7.5**

- Rainfall range : 950 mm – 1000 mm.
- Temperature range : 26 °c – 39 °c.

- Humidity required : 68 % - 71%. *Panicum maximum* Jacq. Ic. Pl.Rar.1:2, t. 13. 1781-86 7 Coll. Bot. 1:76.1786. Hook.Fl.Brit. India 7: 52. 1896; Cooke , Fl. Pres. Bombay 3:453. 1958 (Repr.ed); Blatt.& McC.Bombay Grass.163.1935. Bor,Grass.Ind.322.1960.

Perennial densly tufted , erect , branched, 1-2 mtr tall , grass. Leaves 10-40 cm long , linear – lanceolate . Panicle 30-55 cm long , Spikelets oblong.

- Palatable cultivated grass.
- Flowering Season : November.
- Fruiting Season : December
- Uses : Fodder grass,

- Ecological Data : Common in marshy places.

**Soil pH range required – 7.1 – 7.5**

- Rainfall range : 950 mm – 1000 mm.
- Temperature range : 26 °c – 39 °c.
- Humidity required : 68 % - 71%.

*Saccharum spontaneum* L. Mant. Alt. 2: 183. 1771. Hook. f. Fl.Brit. India 7: 118. 1896; Cooke , Fl. Pres. Bombay 3:465. 1958 (Repr.ed.); Blatt.& McC.Bombay Grass.45.1935. Bor,Grass.Ind.214.1960. Kans grass Wild relative of Sugarcane Perennial rhizomatous tall tufted , 1-2.5 m tall, erect grass. Leaves narrow linear , sheath smooth , ligule ovate.Panicle large , silvery , Spikes with silver hairs, spikelets sessile.

- Palatable grass.
- Flowering Season : October.
- Fruiting Season : December
- Uses : Soil binder grass
- Ecological Data : Distributed in moist, marshy soil along the bank of river.

**Soil pH range required – 7.5 – 7.8**

- Rainfall range : 950 mm – 1000 mm.
- Temperature range : 28°c – 39 °c.
- Humidity required : 68 % - 71%.

Field Note – Grass indicator of wet soil with more water holding capacity.

*Setaria pumila* (Poir.) R. & S. Syst. Veg. 2:481.1817; T. A. Cope in Nasir Ali, Fl. Pak.143:181. 1982. *Panicum pumilum* Poir.in Lam. Encycl. 4:273.1816. *Setaria pallid-fusca* (Schumach.) Stapf & C.E. Hubb.in Kew Bull.1930: 259.1930; Bor,Grass.Ind.363.1960.S. *glauca non* (L.)P.Beauv.1812;Hook.f.Fl.Brit.India 7: 78.1960; Cooke,Fl.Pres.Bombay 3:

435.1958 ( Repr.ed.); Blatt.& McC.Bombay

Grass.172.1935;bor,op.cit.360. 'Kolu'. Herbs,20-60 cm high,tufted;culms many,spreading,ascending.Leaves 3-10 X 0.2-0.5 cm , linear. Spikes 1.5-5.0 X 0.3-0.7 cm. Spikelets 0.2-0.3 cm long, ovoid or ellipsoid, subacute;upper lemma rugose. Grains plano-convex. )

- Palatable grass
  - Flowering Season : August – October
  - Fruiting Season : December
  - Uses : Fodder grass
  - Ecological data : Soil pH range required – 7.5 – 7.8
  - Rainfall range : 950 mm – 1270 mm.
  - Temperature range : 26 °c – 39 °c.
  - Humidity required : 68 % - 71%.
- Field Note – Annual , palatable grass , grains are edible , grass of smaller grassland , distributed in acidic soil.

*Setaria verticillata* (L.) P. Beauv. Ess. Agrost.51,178.1812; Hook. f. Fl. Brit.India 7:80.1996; Cooke, Fl.Pres. Bombay 3:436 .1958 ( Repr.ed.); Blatt.& McC. Bombay Grass .174.1935; Bor, Grass. Ind. 365.1960. *Panicum verticillatum* L.Sp.Pl.ed. 2:82.1762. (Chiktna gawat)

Annual herbs, 1m high, erect, rooting at lower nodes.Leaves 8-20 X 1.2-4.0 cm, linear or linear-lanceolate .panicals 2.5-9.5 cm long. Spikelets c 0.2 cm long, ovoid, sub acute ; upper lemma finely rugose. Grains 0.2-0.23 cm long, ellipsoid.

- Palatable grass.
- Flowering Season : August – October

- Fruiting Season : December
- Ecological data : Soil pH range required – 7.5 – 7.8
- Rainfall range : 950 mm – 1270 mm.
- Temperature range : 26 °c – 39 °c.
- Humidity required : 68 % - 71%.

*Setaria italica* (L.) P. Beauv. Ess. Agrost. 51, 170, 178. 1812; Hook. f. Fl. Brit. India 7: 78. 1896; Cooke, Fl. Pres. Bombay 3: 437. 1958 (Repr. ed.); Blatt. & McC. Bombay Grass. 175. 1935; Bor, Grass. Ind. 362. 1960. *Panicum italicum* L. Sp. Pl. 56. 1753.

Erect annuals, 60-100cm tall. Leaves 15-30 X 0.4-2.5 cm, Linear-lanceolate, minutely scaberulous on both sides and along margin. Panicles 8-12 cm long, compact. Spikelets 0.25 cm long, ellipsoid; lower glumes c 0.05 cm long, ovate, 1-nerved, upper glumes c 0.15 cm long, ovate, glabrous, rounded.

- Palatable grass.
- Flowering Season : August – October
- Fruiting Season : December
- Ecological data : Soil pH range required – 7.5 – 7.8
- Rainfall range : 950 mm – 1270 mm.
- Temperature range : 26 °c – 39 °c.
- Humidity required : 68 % - 71%.

SORGHUM Moench. Methodus 207. 1794  
*Sorghum halepense* (L.) Pers. Syn. Pl. 1: 101. 1805; Blatt. & McC. Bombay Grass. 5. 1953; Bor, Grass. Ind. 222. 1960; T.A. Cope in Nasir & Ali, Fl. Pak. 143: 295. 1982. *Holcushalepensis*

L. Sp. Pl. 1047. 1753. *Andropogon halepensis* (L.) Brot. Fl. Lusit. 1: 89. 1804; Hook. f. Fl. Brit. India 7: 182. 1896; Cooke, Fl. Pres. Bombay 3: 502. 1958 (repr. ed.). *Sorghum miliaceum* (Roxb.) Snowden in J. Linn. Soc. 55: 207. 1955; Bor, op. cit. 223. *S. miliaceum* var. *parvispiculum* Snowden, op. cit. 209; Bor, op. cit. 'Boru'. (Ran Jawari)

- Perennial, 3 m high, erect; culms simple or branched, solid. Leaves 10-45 x 1.5 cm, linear-lanceolate; sheaths striate; ligules short, membranous, ciliate. Panicles 15-35 cm long, decompounds. Sessile spikelets 0.4-0.5 cm long, ovoid-lanceolate; pedicelled spikelets as long as sessile but narrower. Grains terete, dark brown.
- Flowering Season : August – October
- Fruiting Season : December
- Ecological Data : Soil pH range required – 7.5 – 7.8
- Rainfall range : 950 mm – 1270 mm.
- Temperature range : 26 °c – 39 °c.
- Humidity required : 68 % - 71%.

Conservation of wild relatives of crops is the most important task to match the challenges of erosion of species. The existence of these wild relatives are shrinking fast due to various bio-edaphic factors and disturbed habitats. In the present rate of threat of genetic erosion, we must collect all requisite information of the wild relatives to make use of their wider adaptability/tolerance/resistance to diseases and insect-pests, yield,



quality attributes and other biotic and abiotic characters. In comparison to the cultivated land races, conservation and utilization.

#### Diversity in Wild Relatives

- Finger Millet (*Eleusine coracana*) – *Eleusine africana*
- Barley (*Hordeum vulgare*) – *Hordeum arizonicum*
- Rice (*Oryza sativa*) – *Oryza rufipogon*
- Pearl Millet (*Pennisetum glaucum*) – *Pennisetum purpureum*
- Sorghum (*Sorghum bicolor*) – *Sorghum halepense*
- Broom millet (*Panicum miliaceum*) – *Panicum fauriei*

#### RESULTS & DISCUSSION:

Findings of research work in grasslands of TATR :In the current exploration of wild relatives of grasses from the different grasslands of Tadoba Andhari Tiger Reserve the genetic and species diversity is in the following manner.

In the present research study it is observed that the species diversity of wild grass genera depends upon the soil texture, moisture , humidity , water holding capacity. The composition and association of grasses also determines the wild relatives of grasses diversity. Generally it is found that the wild relatives of grasses are associated with soft palatable grasses with high percentage of fibre , ash , protein and moisture. The associates of wild relatives of grasses are : *Dicanthium annulatum* , *Digitaria stricta* , *Digitaria abludens* , *Iselima laxum* , *Cynodon dactylon* , *Ischemum indicum* . The herbivores depend on soft palatable grasses as a primary consumers, Spotted deers , Barking deers , Chousinga , Black bucks mostly feed on soft palatable grasses which play an important role in grazing habitat of soft feeding

herbivores. Grazing habitat of soft feeding herbivores associated with composition of grasslands, the grasslands are of three types ; smaller , intermediate and taller grasslands. Wild relatives of grasses shows distribution in smaller and moist grasslands.

Threats to wild relatives of grasslands are : loss of natural habitats due to soil degradation , fragmentation of grasslands , loss of soil moisture due to climate change , changes in composition of grassland , invasion of woody species in grasslands , soil microbial composition and associates which grasses i.e soil mychorhiza and microorganisms which promotes the growth of grasses.

#### Conservation of wild relatives of grass genetic resources

The adequacy of the conservation technologies in use is key to meeting the objectives of long-term conservation of genetic diversity:

- Preparation of inclusion plot of one hectare to conserve wild relatives of grasses.
- The adequate long-term conservation of germplasm , preservation of essential forage biodiversity.

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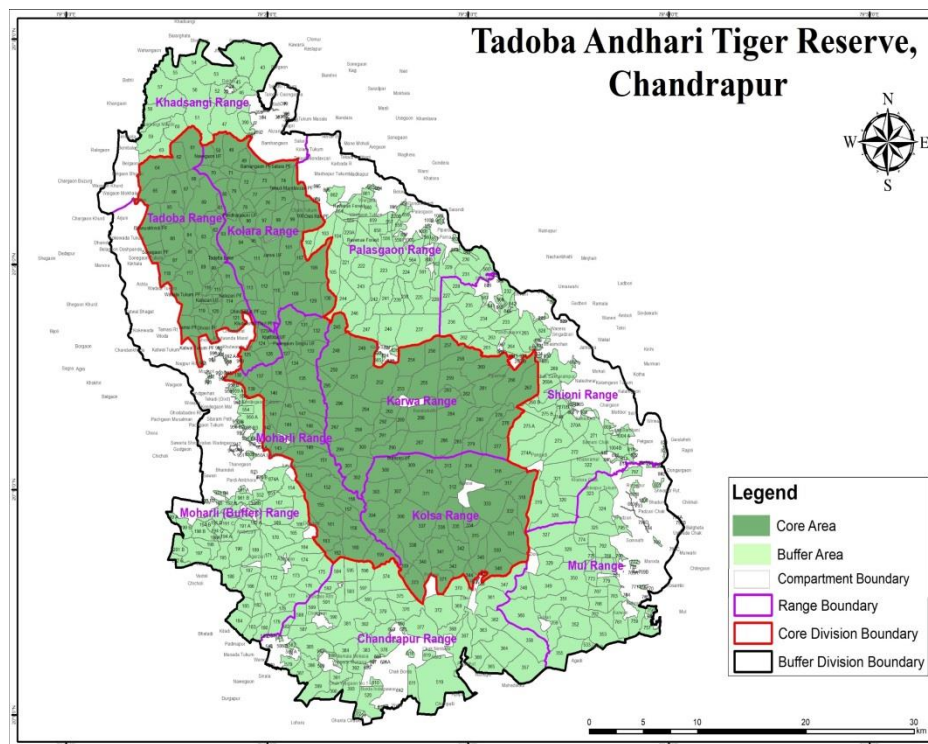
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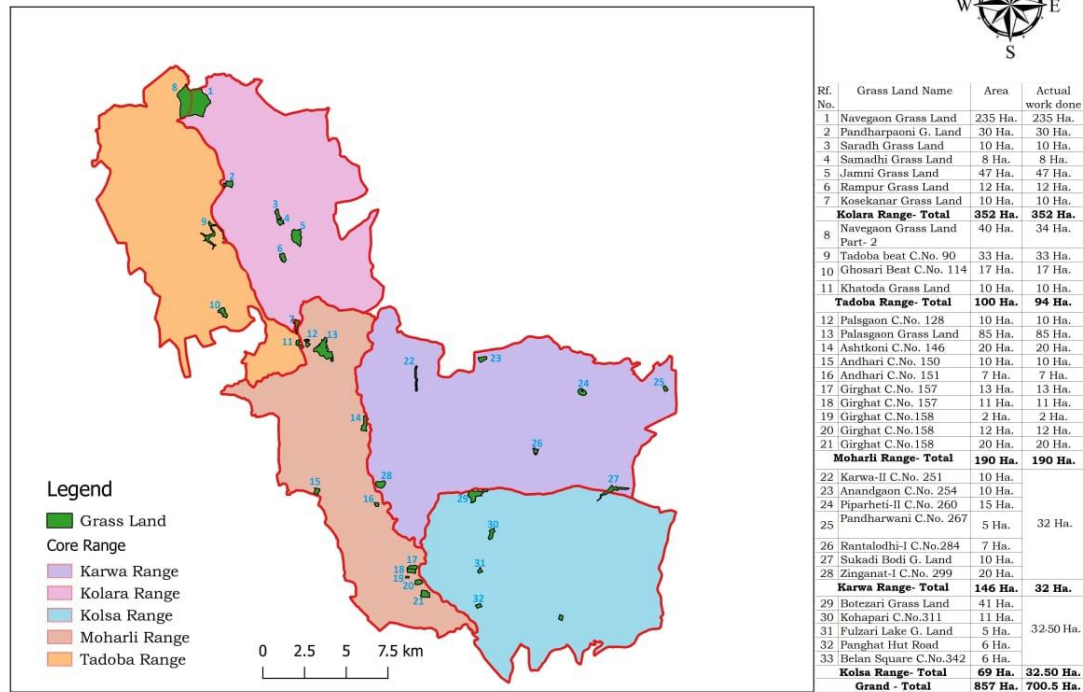
Institute of Sciences, Bangalore, India.



Sr. No.	Name of grassland	Area in Hectares
<b>Kolara Range grasslands</b>		
1	<b>Navegaon part 1 (Rehabilitated Site)</b>	235 Hectare
2	Kosekanar	10 Hectare
3	Pandharpauni	30 Hectare
4	<b>Jamni (Rehabilitated Site)</b>	47 Hectare
5	Samadhi	08 Hectare
6	Rampur	12 Hactre
7	Saradh	10 Hectare
<b>Tadoba Range Grasslands</b>		
1	Navegaon part II	40 Hectare
2	Tadoba beat Comp. No. 90	33 Hectare
3	Khatoda	10 Hectare
<b>Moharli Range Grasslands</b>		
1	<b>Palasgaon (Rehabilitated Site)</b>	95 Hectare
2	Girghat	58 Hectare
3	Astkoni Com. No. 146	20 Hectare
<b>Karwa Range</b>		
1	Sukdobodi	10 Hectare
	Rantalodi	39. 41Hectare

Kolsa Range Grasslands		
1	Botezari	41 Hectare
2	Kohapari	11 Hectare
	Doni	65 Hectare
	<b>Kolsa (Rehabilitated village)</b>	<b>150 Hectare</b>

Map Showing Campa Work Year 2020- 21 in TATR Core area



Wild Relatives of Grasses of Tadoba Andhari Tiger Reserve

Sr. No.	Botanical Name	Vernacular Name	Flowering Season	Fruiting Season
1	<i>Brachiaria reptans</i>	Ran Sama	August	Sept. –Oct.
2	<i>Brachiaria distachya</i>	Ran Sama	August	October
3	<i>Setaria intermedia</i>	Ran Bajara	August	October
4	<i>Setaria verticellata</i>	Ran Bajara	August	October
5	<i>Sorghum halpens</i>	Ban Jawar	September	November
6	<i>Echinochloa colona</i>	Ban sama	August	October
7	<i>Elusine indica</i>	Ban Nachani	September	November
8	<i>Panicum sumatrense</i>	Ban Kutki	August	November
9	<i>Panicum notatum</i>	Ban Kutki	September	November
10	<i>Oryza rufipogon</i>	Ban Dhan/ Chawal	August	November
11	<i>Paspalum Paspalodes</i>	Ban Kutki	cutki	October
12	<i>Paspalum canare</i>	Ban Kodo	August	October
13	<i>Saccharum spontanium</i>	Ganna origin	September	November
14	<i>Setaria pumilla</i>	Ban Bajara	August	September
15	<i>Urochloa panicoides</i>	Ban Kutki	August	October

Sr. No.	Name of grass genera	Number of species
1	<i>Brachiaria reptans</i> <i>Brachiaria distachya</i>	Two species
2	<i>Setaria intermedia</i> <i>Setaria verticellata</i> <i>Setaria pumilla</i>	Three species
3	<i>Panicum sumatrense</i> <i>Panicum notatum</i>	Two species
4	<i>Paspalum Paspalodes</i> <i>Paspalum canare</i>	Two species
5	<i>Urochloa</i>	One species
6	<i>Echinochloa</i>	One species
7	<i>Elusine</i>	One species
8	<i>Oryza</i>	One species
9	<i>Sorghum</i>	One species