

GRASS DIVERSITY OF KERALA

ENDEMISM AND ITS PHYTOGEOGRAPHICAL SIGNIFICANCE

KIRAN RAI, M. S., M. SIVADASAN & *N. RAVI

Department of Botany, University of Calicut, 673 635, Kerala, India
*Verbena¹, Mundakkal Middle, Kollam-1, Kerala

Grass World

Grasses belong to the family Poaceae. They form the fifth largest angiosperm family in the World, having over 10,000 species belong to 650 genera.

Poa L. (ca. 500 spp.), *Panicum* L. (ca. 470 spp.) and *Festuca* L. (380 spp.) are the largest genera in the family.



Wheat

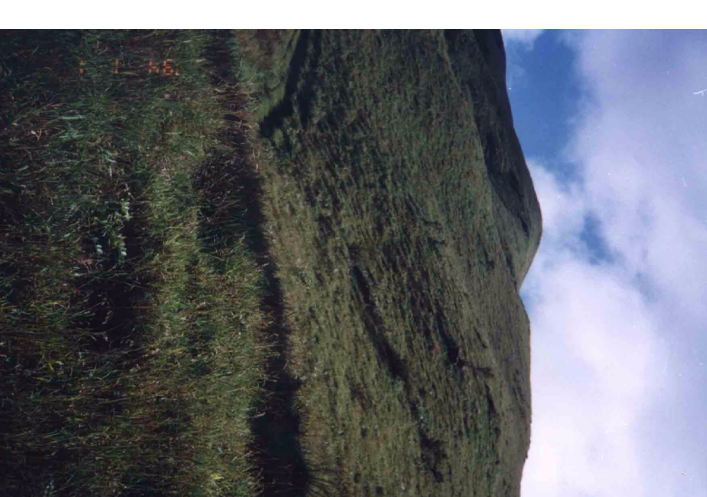
Supply 50% of the World's food, and made civilizations through the triploid endosperm of the grasses like Wheat, Barley, Rice, Oats, Maize & Millets.

One of the most successful families, enjoys cosmopolitan distribution.

"Grass is the flesh..."

Grass is the King.
It rules and governs the World.
It is the very foundation of all commerce; without it the earth would be a barren waste, and cotton, gold, and commerce of all dead"

-Robinson-



Kerala File

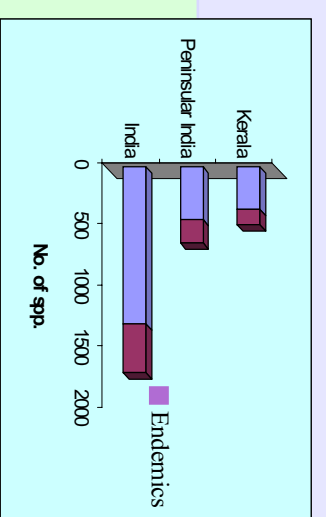
Kerala is blessed with wide diversity of ecosystems, species and genetic resources and it represents an epitome of Biodiversity of the Western Ghats. About 4000 species of flowering plants are represented here, of which 6% are strictly endemic to the State.

Though the State represents only 1.8% of the total geographic area of India, it holds about 22% of the total angiosperm diversity.

Atu gillivasa...

The largest family in the Kerala State, comprises over 340 spp, belonging to 108 genera. *Ischaemum* L. (32 spp.) and *Dimeria* R. Br. (21 spp.) are being the largest genera.

The State holds about 27% of the total grass species of India and 31% of total endemic grass species.



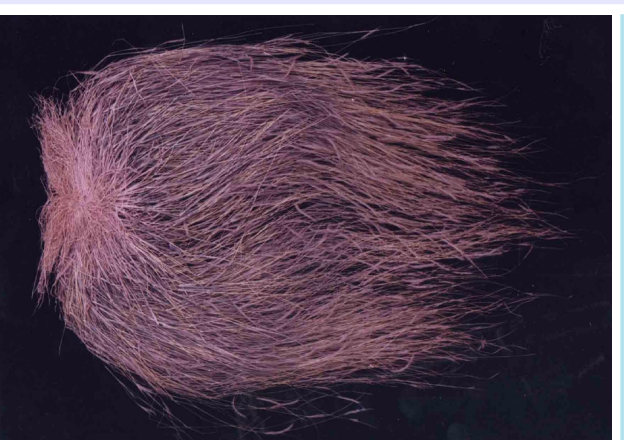
Indian Scenario

FACTS & FIGURES

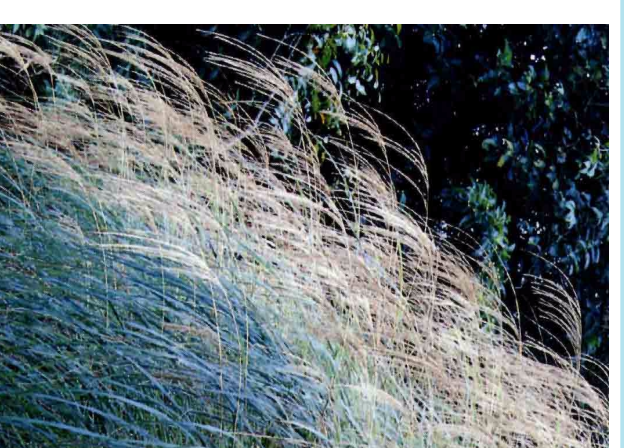
The largest family of the country, has about 1250 species under 266 genera. *Poa* L. (ca. 50 spp.), *Ischaemum* L. (32 spp.) and *Dimeria* R. Br. (46 spp.) are the largest genera

Endemism ...

About 400 species are strictly endemic to India. 15 endemic genera occurring here, of which 13 are monotypic. Most of the endemics are concentrated in Peninsular India especially in Western ghat region.



< Dimeria toversonii (Hook.) J.C.E. Fischer, an endemic grass from dry grasslands.



> Silenvalleya nairii Nair et al., a monotypic grass found exclusively in Silent Valley National Park.

Endemic diversity

About 120 endemic species of the Western ghats are represented in the State, of which 52 species are strictly confined to the State.

- | Exclusive endemics | (A) Annual | (P) Perennial | (M) Multianual |
|---|---|---------------|----------------|
| 1. <i>Arundinella cananorica</i> Nair et al. (A) | 27. <i>Ischaemum copayanum</i> Steek. (A) | | |
| 2. <i>Bhida fischeri</i> Steek. & Shetty (A) | 28. <i>Ischaemum eimudayanum</i> Steek. (P) | | |
| 3. <i>Borrichia parsonsii</i> Steek. et al. (P) | 29. <i>Ischaemum jayachandranii</i> Anasari (P) | | |
| 4. <i>Chrysopogon parsonsii</i> Steek. et al. (P) | 30. <i>Ischaemum kerolensis</i> Steek. (A) | | |
| 5. <i>Chrysopogon vadaliyanii</i> Steek. et al. (P) | 31. <i>Ischaemum kumaradostensis</i> Ravi et al. (P) | | |
| 6. <i>Dimeria agasthyamalaiyana</i> Kani Raj & Ravi (A) | 32. <i>Ischaemum furtum</i> Ravi et al. (A) | | |
| 7. <i>Dimeria kani</i> Steek. et al. (A) | 33. <i>Ischaemum mullarkeream</i> Steek. (A) | | |
| 8. <i>Dimeria chidamborensis</i> Kani (P) | 34. <i>Ischaemum nagurni</i> Nair & Steek. (P) | | |
| 9. <i>Dimeria copaya</i> Steek. (P) | 35. <i>Ischaemum papayamensis</i> Ravi et al. (A) | | |
| 10. <i>Dimeria egypti</i> Ravi (A) | 36. <i>Ischaemum quilonensis</i> Ravi & Shaju (P) | | |
| 11. <i>Dimeria eradii</i> Ravi (A) | 37. <i>Ischaemum pari</i> Steek. et al. (A) | | |
| 12. <i>Dimeria thakkensis</i> Ravi & Anil (A) | 38. <i>Ischaemum vadaliyanii</i> Nair & Steek. (A) | | |
| 13. <i>Dimeria jaintii</i> Steek. et al. (A) | 39. <i>Ischaemum verbandulensis</i> Padil & D Cruz (P) | | |
| 14. <i>Dimeria joshihii</i> Ravi & Mohanan (A) | 40. <i>Ischaemum yambayamense</i> Ravi et al. (P) | | |
| 15. <i>Dimeria kalyandorensis</i> Ravi (A) | 41. <i>Ochlandra bealtonii</i> Ganbhe (M) | | |
| 16. <i>Dimeria keralae</i> Nair et al. (A) | 42. <i>Ochlandra ebovactana</i> Karzala & Chatterji (M) | | |
| 17. <i>Dimeria kurumbitricladia</i> Kani (A) | 43. <i>Ochlandra kerolensis</i> Muktesh & Stephen (M) | | |
| 18. <i>Dimeria kurumbitricladia</i> Kani (A) | 44. <i>Ochlandra sodorstromiana</i> Muktesh & Stephen (M) | | |
| 19. <i>Dimeria mazdae</i> Nair et al. (A) | 45. <i>Ochlandra sriparvathi</i> Muktesh et al. (M) | | |
| 20. <i>Dimeria sreevargani</i> Mohanan & Ravi (A) | 46. <i>Pseudocyperum tharvathii</i> (Gambhe) Nair (M) | | |
| 21. <i>Dimeria sreevargani</i> Ravi & Anil (A) | 47. <i>Silenthillya nairii</i> Nair et al. (P) | | |
| 22. <i>Ischaemum fischeri</i> Bor (A) | 48. <i>Tripsogon nagurnii</i> Steek. et al. (P) | | |
| 23. <i>Ischaemum hantii</i> Sreeni. & Steek. (A) | 49. <i>Tripsogon sivaragani</i> Suali (P) | | |
| 24. <i>Ischaemum gadahiyadayanum</i> Steek. (P) | 50. <i>Tripsogon velatians</i> Pradeep (P) | | |
| 25. <i>Ischaemum cultratus</i> Steek. (P) | 51. <i>Themeda subarimalayanana</i> Steek. et al. (P) | | |
| 26. <i>Ischaemum commersonensis</i> Steek. (P) | 52. <i>Themeda jaintii</i> Nair et al. (P) | | |

Phytogeographical affinities

About 45% of the species show affinity with Sri Lanka grass flora. The genera like *Dimeria* R. Br., *Zenkeria* Trin., *Ochlandra* Thw. have common range of distribution with Sri Lanka and share many endemic species.

About 24% of the species show affinity with Tropical Africa including Madagascar. *Eragrostia* Bor., *Melinis* P. Beauv., *Pseudochhololena* Stapf, *Dimeria* R. Br., *Cleistachne* Benth., *Lepturis* Bory., *Heteropogon* Pers., *Microchloa* R. Br., *Schizachyrium* Nees, *Cymbopogon* Spreng. etc. are some important genera, and their species diversity show maximum affinity with that of the State.

Grass dominated ecosystems of Kerala

Comprise about 250 sq. km. geographical area of the State.

Two major Grassland types

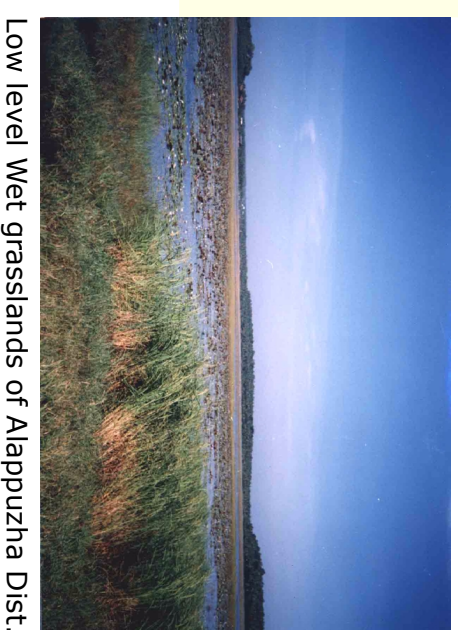
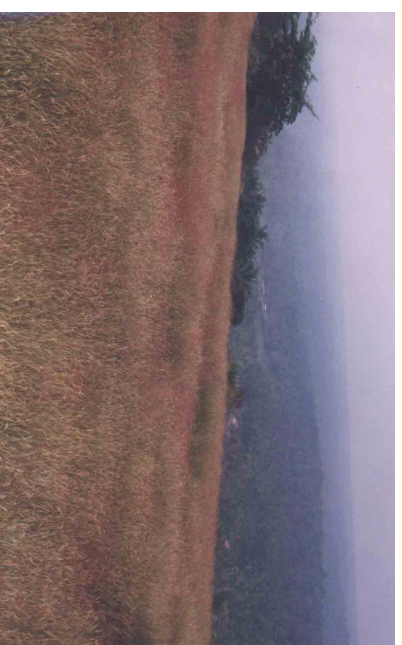
1. Low level grasslands:- Occuring below 1000 m altitude, holds highest number of endemic species in the state (31 spp.). Two types viz,

- Wet grasslands of Southern Kerala: Usually found along coastal areas, back waters, wet lands and pools. *Phragmites* sp., *Arundo* spp., *Ischaemum* spp., *Saccharum* sp. etc are common.
- Dry grass lands of Northern Kerala: Usually laterite rocky areas of the lowland region. *Arundinella* spp., *Aristida* sp., *Dimeria* sp., *Dichanthium* spp. etc are common.

2. High altitude grasslands: Commonly known as 'Montane grasslands', found above 1000 m altitude. *Cymbopogon* spp., *Themeda* spp., *Tripsogon* spp., *Chrysopogon* spp., etc. are common.

Many grasslands of the highlands are dotted with patches of evergreen forests that form the 'Shola-grasslands', which constitute to a unique ecological entity. Many grass elements are endemic to these 'Rolling grasslands'.

Four types of grassland communities, viz. *Selina-Dichanthium* type (Usually found in Dry grasslands), *Cymbopogon-Themeda* type (found in High altitude grasslands) *Saccharum-Imperata-Phragmites* type (Usually found in Wet grasslands) and *Zoysia-Sporobolus* type (found in Low level grasslands)



Shola-Grasslands of Paksimpaddanam, Waynad Dist.



Dimeria eradii Nair, an endemic grass from Dry grasslands of Kaniur Dist.



Low level grasslands of northern Kerala holds about 26 exclusive endemic grass from the State. Best fit in Background



High altitude grasslands of Sabarigiri Hills, Pathanamthitta Dist.

Western Ghats - A 'Cradle' of Grass evolution?

Criteria

Occurrence of primitive Bamboo genus - *Ochlandra* Thw. and the highest concentration of advanced group - Andropogonoids (ca. 82 % world spp.) in Peninsular India, especially W. Ghats

*

Occurrence of isolated endemic genera like *Glyphochloa*, *Bhida* Stapf, etc. Out of the 5 endemic genera of the country, 13 are strictly confined to Western Ghat region.

*

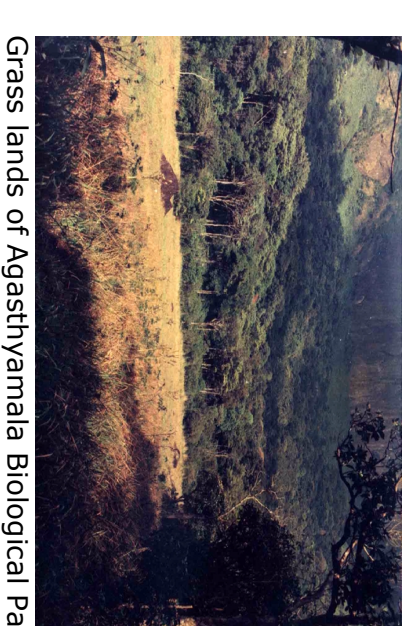
Supposed to be the center of origin of many genera, viz. *Zenkeria* Trin. (100 % of the World spp.), *Mnesithea* Kunth (100%), *Heteropogon* Pers. (100%), *Pseudanthistiria* (Haack) Hook f. (100%), *Eragrostiella* P.Beauv. (90%), *Ochlandra* Thw. (88%), *Ahraxxon* P.Beauv (60%), *Ischaemum* L. (60%), *Dimeria* R.Br. (55 %), *Dichanthium* Willenret (55%), *Isachne* R. Br. (48 %), *Tripsogon* Roem. et Schult. (56%), *Chrysopogon* Trin. (51%).

High concentration of endemic grasses of India (43%).

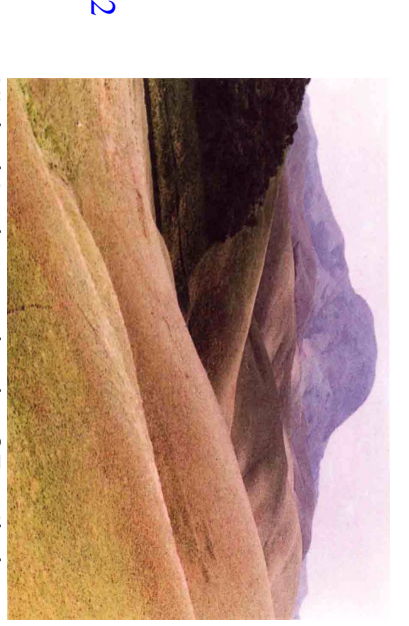
* Occurrence of 24 monotypic genera. Of this, 11 are endemic.



Ischaemum quilonensis Ravi & Shaju, an endemic grass from low level wet grasslands of Southern Kerala.



Grass lands of Agasthyamala Biological Park



High altitude grasslands of Eravikulam National Park, Anaimudi- in background

Acknowledgement: C. S. I. R., New Delhi for the award of Senior Research Fellowship.

Conceived by MSK.RAJ