

SUPPLEMENTARY DATA

Matrix of 51 morphological characters used in the phylogenetic analyses. –, Inapplicable character; ?, missing data; [], polymorphic character.

Taxon	Character																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Rupichloa acuminata</i>	5	1	0	0	–	0	1	0	–	–	0	1	–	0	0	1	–	–	–	–
<i>Ixophorus unisetus</i>	4	0	0	0	0	0	1	0	–	–	0	1	–	0	0	2	0	0	2	0
<i>Paspalidium geminatum</i>	3	2	0	1	0	0	1	0	–	–	0	1	–	0	0	2	0	0	0	0
<i>Setaria palmifolia</i>	3	1	0	0	0	1	1	0	–	–	0	1	0	0	0	2	0	0	2	0
<i>Setaria parviflora</i>	3	2	0	0	1	0	0	1	1	–	0	1	0	0	0	2	0	0	2	0
<i>Setaria sphacelata</i>	3	2	0	0	1	0	0	1	1	–	0	1	0	0	0	1	0	0	2	1
<i>Stenotaphrum secundatum</i>	3	1	0	0	0	0	0	2	–	–	1	1	–	0	–	–	0	0	2	0
<i>Odontelytrum abyssinicum</i>	?	0	0	0	1	0	0	2	0	0	1	0	0	0	1	–	–	0	2	0
<i>Cenchrus brownii</i>	[34]	1	0	0	1	0	0	2	0	1	1	0	0	0	1	–	–	1	[12]	1
<i>Cenchrus ciliaris</i>	3	2	0	0	1	0	0	0	0	1	1	0	0	0	1	–	1	0	1	1
<i>Cenchrus echinatus</i>	4	1	0	0	1	0	0	0	0	1	1	0	0	0	1	–	–	1	1	1
<i>Cenchrus incertus</i>	4	1	0	0	1	0	0	2	0	0	1	0	0	0	1	–	–	1	1	1
<i>Cenchrus myosuroides</i>	[36]	2	0	0	1	0	0	0	1	–	1	0	1	0	–	–	–	1	2	1
<i>Cenchrus pilosus</i>	4	1	0	0	1	0	0	0	0	1	1	0	0	0	1	–	1	0	1	1
<i>Cenchrus setigerus</i>	[34]	2	0	0	1	0	0	0	0	2	1	0	0	0	1	–	–	0	1	1
<i>Pennisetum alopecuroides</i>	3	1	0	1	1	0	0	1	0	1	1	0	0	0	1	–	1	0	2	0
<i>Pennisetum basedowii</i>	3	1	0	0	1	1	0	0	0	1	1	0	0	0	1	–	1	0	2	1
<i>Pennisetum chilense</i>	?	1	0	1	1	0	0	1	1	–	1	0	1	0	–	–	1	0	2	0
<i>Pennisetum clandestinum</i>	3	0	0	0	1	0	0	1	1	–	1	0	1	0	–	–	0	0	2	0
<i>Pennisetum flaccidum</i>	3	2	1	0	1	1	0	1	0	1	1	0	1	0	0	–	1	0	2	1
<i>Pennisetum foermeranum</i>	?	1	0	1	1	0	0	1	0	1	0	0	1	0	1	0	1	0	1	1
<i>Pennisetum frutescens</i>	3	2	0	0	1	0	0	0	1	–	1	0	1	0	–	–	1	0	2	0
<i>Pennisetum glaucocladum</i>	?	1	0	1	1	0	0	1	1	–	1	0	1	0	–	–	0	0	2	0
<i>Pennisetum glaucum</i>	1	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	1	1
<i>Pennisetum hordeoides</i>	3	2	0	0	1	1	0	0	1	–	1	0	1	1	–	–	0	0	2	0
<i>Pennisetum lanatum</i>	3	1	0	0	1	0	0	1	0	1	0	0	1	1	0	0	0	0	1	1
<i>Pennisetum latifolium</i>	3	2	1	1	1	0	0	1	0	1	[01]	0	0	0	1	0	[01]	0	2	1

<i>Pennisetum macrourum</i>	3	1	0	1	1	0	0	0	1	–	1	0	1	0	–	–	0	0	2	0
<i>Pennisetum massaicum</i>	2	1	0	1	1	0	0	0	0	0	1	0	1	0	0	–	0	0	2	1
<i>Pennisetum mezianum</i>	2	2	0	0	1	0	0	1	1	–	1	0	1	0	–	–	0	0	2	0
<i>Pennisetum montanum</i>	2	2	0	0	1	1	0	0	0	1	1	0	1	0	0	–	0	0	2	0
<i>Pennisetum natalense</i>	?	1	0	1	1	0	0	0	0	1	0	0	0	0	1	0	1	0	2	1
<i>Pennisetum nervosum</i>	3	0	0	0	1	0	0	1	0	1	1	0	0	0	1	–	1	0	2	1
<i>Pennisetum orientale</i>	3	1	0	1	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1
<i>Pennisetum pedicellatum</i>	3	1	0	0	1	1	0	0	1	–	0	0	1	1	–	0	0	0	0	1
<i>Pennisetum polystachion subsp. atrichum</i>	3	0	0	0	1	0	0	0	1	–	1	0	1	1	–	–	0	0	1	0
<i>Pennisetum polystachion subsp. polystachyon</i>	3	2	0	0	1	0	0	0	1	–	1	0	1	1	–	–	0	0	1	1
<i>Pennisetum purpureum</i>	1	1	0	1	1	0	0	0	0	1	0	0	0	0	1	0	1	0	1	1
<i>Pennisetum ramosum</i>	0	1	?	0	1	?	0	0	?	?	1	0	1	?	?	–	0	0	2	0
<i>Pennisetum schweinfurthii</i>	1	1	0	0	1	0	0	1	0	1	0	0	1	0	0	0	1	0	1	1
<i>Pennisetum setaceum</i>	[34]	1	0	0	1	[01]	0	1	0	1	0	0	0	0	1	0	1	0	1	1
<i>Pennisetum sieberianum</i>	?	1	1	0	1	0	0	1	0	1	0	0	0	0	1	0	1	0	1	1
<i>Pennisetum sphacelatum</i>	3	1	0	1	1	0	0	0	1	–	1	0	1	0	–	–	0	0	[12]	0
<i>Pennisetum squamulatum</i>	[13]	1	0	1	1	0	0	1	1	–	0	0	1	0	–	0	1	0	1	1
<i>Pennisetum thunbergii</i>	3	1	1	1	1	0	0	1	1	–	1	0	1	0	–	–	0	0	2	0
<i>Pennisetum trachyphyllum</i>	?	0	0	0	1	1	0	1	0	1	0	0	0	0	1	0	0	0	2	1
<i>Pennisetum tristachyum</i>	?	2	1	0	1	1	0	0	0	1	1	0	0	0	1	–	1	0	2	0
<i>Pennisetum unisetum</i>	3	1	0	0	1	1	0	1	1	–	1	0	1	0	–	–	0	0	2	0
<i>Pennisetum villosum</i>	3	2	0	1	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1
<i>Pennisetum violaceum</i>	1	1	?	?	1	?	0	1	?	?	1	0	?	?	?	–	1	0	1	1

Taxon	Character																			
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<i>Rupichloa acuminata</i>	–	–	–	0	1	2	2	1	0	2	4	1	0	3	1	0	1	2	0	1
<i>Ixophorus unisetus</i>	0	3	–	0	1	2	1	0	0	2	4	1	0	3	1	0	1	2	0	1
<i>Paspalidium geminatum</i>	0	2	–	0	1	2	2	1	2	2	3	2	0	3	2	0	1	2	0	1
<i>Setaria palmifolia</i>	0	3	–	0	0	2	1	0	0	2	1	0	0	3	1	0	1	[12]	0	1
<i>Setaria parviflora</i>	0	3	–	0	0	2	[12]	0	0	2	[23]	0	0	3	0	0	1	2	0	1
<i>Setaria sphacelata</i>	0	3	–	0	1	2	2	0	2	2	3	0	2	3	1	0	1	2	0	1
<i>Stenotaphrum secundatum</i>	0	2	–	0	1	[12]	1	0	2	2	4	1	0	3	2	0	1	2	0	1
<i>Odontelytrum abyssinicum</i>	3	1	0	0	1	0	–	–	–	[12]	[12]	1	0	3	1	0	1	1	1	1
<i>Cenchrus brownii</i>	2	2	1	0	1	[01]	0	–	2	2	3	1	0	3	1	0	1	2	1	1
<i>Cenchrus ciliaris</i>	1	1	[01]	0	[01]	2	2	0	0	2	2	0	0	3	[01]	0	1	[01]	0	1
<i>Cenchrus echinatus</i>	2	2	1	0	1	2	[12]	1	0	2	4	1	0	3	1	0	1	2	1	1
<i>Cenchrus incertus</i>	3	2	1	0	1	2	2	0	1	2	3	1	0	3	1	0	1	2	1	1
<i>Cenchrus myosuroides</i>	1	2	0	0	[01]	2	[12]	0	0	2	3	1	0	3	1	0	1	1	0	1
<i>Cenchrus pilosus</i>	2	1	1	0	0	2	2	0	0	2	3	1	0	3	1	1	1	2	1	1
<i>Cenchrus setigerus</i>	2	2	1	0	1	2	2	0	0	2	2	0	0	3	1	0	1	1	[14]	1
<i>Pennisetum alopecuroides</i>	0	1	0	0	0	1	0	–	–	2	2	1	0	3	1	0	1	1	0	1
<i>Pennisetum basedowii</i>	0	1	0	0	0	0	–	–	–	2	4	1	1	3	2	1	1	1	1	1
<i>Pennisetum chilense</i>	0	3	0	0	1	1	0	–	2	2	1	[01]	0	3	1	[01]	[01]	1	1	[01]
<i>Pennisetum clandestinum</i>	0	2	0	0	0	[01]	0	–	2	[01]	0	–	–	3	1	0	1	1	0	1
<i>Pennisetum flaccidum</i>	0	0	0	0	1	2	1	0	0	2	2	0	0	3	2	1	1	1	1	1
<i>Pennisetum foermeranum</i>	0	0	1	1	1	2	[12]	0	0	2	3	1	1	3	1	1	1	1	1	1
<i>Pennisetum frutescens</i>	0	0	0	0	1	2	1	1	0	2	3	1	1	3	1	1	1	1	1	1
<i>Pennisetum glaucocladum</i>	0	0	0	0	0	[01]	0	–	–	2	1	0	1	3	1	1	1	0	0	1
<i>Pennisetum glaucum</i>	0	2	[01]	0	[01]	[01]	0	–	2	[01]	0	–	–	[01]	[01]	2	0	1	2	0
<i>Pennisetum hordeoides</i>	0	0	0	0	1	[01]	0	–	2	2	4	1	3	3	1	4	0	2	2	0
<i>Pennisetum lanatum</i>	0	2	0	0	1	2	2	0	2	2	2	0	[02]	3	1	1	1	0	1	1
<i>Pennisetum latifolium</i>	0	0	0	0	0	1	0	–	2	2	[12]	1	[03]	3	2	[01]	1	2	[01]	1
<i>Pennisetum macrourum</i>	0	0	0	0	[01]	1	0	–	2	2	2	1	0	3	1	0	1	1	1	1
<i>Pennisetum massaicum</i>	0	1	0	0	[01]	2	2	1	0	2	3	1	1	3	1	1	1	2	1	1
<i>Pennisetum mezianum</i>	0	2	0	0	1	2	2	0	0	2	4	1	1	3	1	1	1	0	1	1

<i>Pennisetum montanum</i>	0	2	0	0	[01]	2	0	0	[02]	2	[23]	0	[13]	3	2	[14]	1	2	[14]	1
<i>Pennisetum natalense</i>	0	0	0	0	[01]	[01]	0	–	2	2	1	0	1	3	1	1	1	0	1	1
<i>Pennisetum nervosum</i>	0	1	0	0	0	2	2	0	0	2	4	1	1	3	1	1	1	1	1	1
<i>Pennisetum orientale</i>	0	1	0	0	1	2	[12]	0	0	2	3	1	1	3	1	1	1	1	1	1
<i>Pennisetum pedicellatum</i>	0	1	1	0	[01]	2	[12]	1	[02]	0	3	2	1	3	1	4	1	2	0	0
<i>Pennisetum polystachion subsp. atrichum</i>	0	0	0	0	1	0	–	–	–	2	4	1	1	3	1	4	0	2	0	0
<i>Pennisetum polystachion subsp. polystachyon</i>	0	0	0	0	[01]	[01]	0	–	2	2	4	1	0	3	1	4	0	2	0	0
<i>Pennisetum purpureum</i>	0	0	[01]	1	1	1	0	–	2	2	2	0	0	3	[01]	0	1	2	1	1
<i>Pennisetum ramosum</i>	0	0	0	0	[01]	2	1	0	2	2	[34]	1	0	[23]	1	0	?	1	0	?
<i>Pennisetum schweinfurthii</i>	0	1	1	1	0	0	–	–	–	2	1	1	2	0	1	[02]	1	2	1	1
<i>Pennisetum setaceum</i>	0	1	[01]	1	[01]	0	–	–	–	2	[12]	0	0	3	1	1	1	1	1	1
<i>Pennisetum sieberianum</i>	0	[02]	[01]	0	[01]	1	–	–	2	1	0	–	–	3	1	2	0	2	4	0
<i>Pennisetum sphacelatum</i>	0	2	0	0	0	1	0	–	2	2	1	1	0	3	1	1	1	2	1	1
<i>Pennisetum squamulatum</i>	0	2	1	1	0	0	–	–	–	1	0	–	–	1	0	0	0	1	0	0
<i>Pennisetum thunbergii</i>	0	1	0	0	0	0	–	–	–	2	1	0	0	2	1	1	2	1	0	1
<i>Pennisetum trachyphyllum</i>	0	0	0	0	[01]	2	1	0	1	2	3	0	1	3	1	1	1	2	1	1
<i>Pennisetum tristachyum</i>	0	3	0	0	0	0	–	–	–	2	1	0	0	3	1	1	1	1	1	1
<i>Pennisetum unisetum</i>	0	3	0	0	0	1	0	–	2	1	0	–	–	1	2	0	0	1	2	1
<i>Pennisetum villosum</i>	0	3	[01]	0	[01]	[01]	0	–	2	2	1	0	0	3	1	1	1	1	1	1
<i>Pennisetum violaceum</i>	0	2	[12]	0	[01]	[01]	0	–	2	2	2	0	2	[012]	2	2	0	2	[02]	0

Taxon	Character										
	41	42	43	44	45	46	47	48	49	50	51
<i>Rupichloa acuminata</i>	2	0	1	0	1	1	1	1	0	1	0
<i>Ixophorus unisetus</i>	2	0	1	2	1	1	1	1	0	0	1
<i>Paspalidium geminatum</i>	2	2	1	0	1	1	1	1	0	0	0
<i>Setaria palmifolia</i>	1	–	–	0	1	1	1	1	0	1	0
<i>Setaria parviflora</i>	2	0	1	0	1	1	1	1	0	1	0
<i>Setaria sphacelata</i>	2	0	1	0	1	1	1	1	0	0	0
<i>Stenotaphrum secundatum</i>	2	0	1	0	1	1	1	1	0	0	1
<i>Odontelytrum abyssinicum</i>	2	[13]	1	4	1	0	1	0	0	0	1
<i>Cenchrus brownii</i>	2	1	1	1	1	0	0	1	0	0	1
<i>Cenchrus ciliaris</i>	[02]	0	0	0	1	0	0	1	0	0	1
<i>Cenchrus echinatus</i>	2	0	1	1	1	0	0	1	0	0	1
<i>Cenchrus incertus</i>	2	0	1	1	1	0	0	1	0	0	1
<i>Cenchrus myosuroides</i>	[02]	3	1	0	1	0	0	2	0	0	1
<i>Cenchrus pilosus</i>	[12]	0	1	1	1	0	0	1	0	0	1
<i>Cenchrus setigerus</i>	2	3	1	4	1	0	0	1	0	0	1
<i>Pennisetum alopecuroides</i>	0	–	–	0	1	0	1	1	0	0	1
<i>Pennisetum basedowii</i>	0	–	–	1	1	0	0	1	0	0	1
<i>Pennisetum chilense</i>	2	3	1	0	0	0	1	0	0	0	1
<i>Pennisetum clandestinum</i>	0	–	–	1	0	0	1	–	0	0	1
<i>Pennisetum flaccidum</i>	2	?	1	0	1	0	1	1	0	0	1
<i>Pennisetum foermeranum</i>	2	3	1	3	1	0	0	1	0	0	1
<i>Pennisetum frutescens</i>	[01]	–	–	1	1	0	0	1	0	0	1
<i>Pennisetum glaucocladum</i>	0	–	–	1	1	0	1	0	0	0	1
<i>Pennisetum glaucum</i>	[02]	4	0	4	0	0	0	1	1	0	1
<i>Pennisetum hordeoides</i>	2	2	0	2	0	0	0	1	0	0	1
<i>Pennisetum lanatum</i>	2	4	1	1	1	0	1	1	0	0	1
<i>Pennisetum latifolium</i>	0	–	–	0	1	0	1	1	0	0	1
<i>Pennisetum macrourum</i>	[02]	0	1	1	1	0	1	1	0	0	1
<i>Pennisetum massaicum</i>	[12]	2	1	1	1	0	0	1	0	0	1
<i>Pennisetum megianum</i>	2	0	1	0	1	0	0	1	0	0	1
<i>Pennisetum montanum</i>	[02]	1	1	1	1	0	1	1	0	0	1

<i>Pennisetum natalense</i>	[01]	0	1	[02]	1	0	1	0	0	0	1
<i>Pennisetum nervosum</i>	[01]	–	–	1	1	0	1	1	0	0	1
<i>Pennisetum orientale</i>	2	0	1	1	1	0	1	1	0	0	1
<i>Pennisetum pedicellatum</i>	[02]	4	1	0	0	0	0	1	0	0	1
<i>Pennisetum polystachion subsp. atrichum</i>	2	0	0	0	0	0	0	?	0	0	1
<i>Pennisetum polystachion subsp. polystachyon</i>	[02]	0	0	0	0	0	0	1	0	0	1
<i>Pennisetum purpureum</i>	2	0	1	1	1	0	[01]	0	1	0	1
<i>Pennisetum ramosum</i>	2	?	?	?	?	?	0	1	0	0	?
<i>Pennisetum schweinfurthii</i>	0	–	–	1	1	0	1	0	0	0	1
<i>Pennisetum setaceum</i>	[02]	0	1	1	1	0	0	0	0	0	1
<i>Pennisetum sieberianum</i>	2	4	0	4	0	0	0	0	1	0	1
<i>Pennisetum sphacelatum</i>	0	–	–	1	1	0	1	1	0	0	1
<i>Pennisetum squamulatum</i>	0	–	–	0	0	0	0	0	0	0	1
<i>Pennisetum thunbergii</i>	0	–	–	0	1	0	1	1	[01]	0	1
<i>Pennisetum trachyphyllum</i>	2	0	0	0	0	0	1	1	0	0	1
<i>Pennisetum tristachyum</i>	0	–	–	0	1	0	1	1	0	0	1
<i>Pennisetum unisetum</i>	0	–	–	4	1	0	1	1	0	0	1
<i>Pennisetum villosum</i>	[02]	3	1	1	1	0	0	–	0	0	1
<i>Pennisetum violaceum</i>	[12]	?	?	?	?	0	0	0	1	0	1
