

## SUPPLEMENTARY DATA

### Museomics resolve the systematics of an endangered grass lineage endemic to NW Madagascar

Silva C., Besnard G., Piot A., Razanatsoa J., Oliveira R.P. and Vorontsova M.S.

Supplementary data consist of the following:

**Table S1.** Voucher information and GenBank accession numbers for the sequences used in this study.

**Table S2.** Sequence characteristics of nuclear ribosomal DNA units and complete chloroplast genomes generated in the present study by NGS.

**Table S3.** Number of paired-end reads (Nr; excluding duplicates), size of the assembled fragments (%S; coverage in percent of the reference sequence) and mean sequencing depth (SD) for the three low-copy genes analyzed in this study.

**Figure S1.** Full maximum likelihood (ML) phylogram from the analysis of the plastid marker *ndhF* showing the phylogenetic placement of *Chasechloa*.

**Figure S2.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker ITS showing the phylogenetic placement of *Chasechloa*.

**Figure S3.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker *phyB* showing the phylogenetic placement of *Chasechloa*.

**Figure S4.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker *ppc-aL2* showing the phylogenetic placement of *Chasechloa*.

**Figure S5.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker *ppc-aR* showing the phylogenetic placement of *Chasechloa*.

**Figure S6.** Maximum clade credibility chronogram of the core Panicoideae resulting from the BEAST analysis based on the *ndhF* data set.

**Table S1.** Voucher information and GenBank accession numbers for the sequences used in this study. New sequences generated in this study are in boldface.

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Acritochaete volkensii</i> Pilg.	Carvalho 3691 (G)	HE573491	–	–	–	–
<b><i>Acroceras calcicola</i> A. Camus</b>	<b>M.S. Vorontsova et al. 1379 (K, MO, P, TAN)</b>	<b>LT593943</b>	–	–	–	–
<i>Acroceras excavatum</i> (Henrard) Zuloaga & Morrone	Morrone 5025 (SI)	EF218707	–	–	–	–
<i>Acroceras tonkinense</i> (Balansa) C.E. Hubb. ex Bor	AT & SS 630 (TCD)	AM849121	–	–	–	–
<b><i>Acroceras zizanioides</i> (Kunth) Dandy</b>	<b>O. Tostain 2616 (CAY)</b>	<b>LT593936</b>	–	–	–	–
<i>Acroceras zizanioides</i> (Kunth) Dandy	–	AY029618	–	–	–	–
<i>Alexfloydia repens</i> B.K. Simon	S.J. & T.R. Hodkinson 9391 (TCD)	HE573538	–	–	–	–
<i>Alloteropsis angusta</i> Stapf	M. Namaganda & O. Wanyana Dec09 (MHU)	–	–	FR845879	FR845890	FR845915
<i>Alloteropsis angusta</i> Stapf	Namaganda 1474	EU159715	–	–	–	–
<i>Alloteropsis cimicina</i> (L.) Stapf	SHD Ibrahim 24	EU159711	–	FR845882	FR845892	FR845917, FR845918
<b><i>Alloteropsis paniculata</i> (Benth.) Stapf</b>	<b>M.S. Vorontsova et al. 627 (K, MO, P, TAN)</b>	<b>LT593937</b>	–	–	–	–
<i>Alloteropsis paniculata</i> (Benth.) Stapf	Callens 2975	EU159712	–	–	–	–
<i>Alloteropsis papillosa</i> Clayton	Milne-Redhead 7393	EU159714	–	–	–	–
<i>Alloteropsis semialata</i> (R. Br.) Hitchc.	AT & SS 837 (TCD)	AM849123	–	–	–	–
<i>Alloteropsis semialata</i> subsp. <i>semialata</i> (R. Br.) Hitchc.	A. Teerawatananon and S. Sungkaew 630 (TCD)	–	–	FR845876	FR845889	FR845910, FR845911
<i>Altoparadisium chapadense</i> Filg., Davidse, Zuloaga & Morrone	–	–	–	–	–	EU272414
<i>Amphicarpum amphicarpon</i> (Pursh) Nash	–	JN604673	–	–	–	–
<i>Amphicarpum muhlenbergianum</i> (Schult.) Hitchc.	R. Krul 90483 (GH)	HE586631	–	–	–	–
<i>Amphipogon caricinus</i> F. Muell.	Hodkinson 9359	HE573475	–	–	–	–
<i>Ancistrachne uncinulata</i> (R. Br.) S.T. Blake	S.J. & T.R. Hodkinson 9287 (TCD)	HE573521	–	–	–	–
<i>Andropogon gerardi</i> Vitman	–	AF117391	–	–	–	–
<i>Anomochloa marantoidea</i> Brongn.	L.G. Clark 1299	–	–	–	–	AF137291
<i>Anthraenantia lanata</i> (Kunth) Benth.	–	–	–	–	–	EU272415

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Antheophora cristata</i> (Döll) De Wild. & T. Durand	P. Poilecot 4739 (G)	HE573493	–	–	–	–
<i>Antheophora elongata</i> De Wild.	S. Malcomber 3081 (MO)	HE573494	–	–	–	–
<i>Antheophora pubescens</i> Nees	–	JN604676	–	–	–	–
<i>Apluda mutica</i> L.	–	AF117392	–	–	–	–
<i>Apochloa euprepes</i> (Renvoize) Zuloaga & Morrone	C. Silva et al. 711 (HUEFS)	KP878922	KP878857	–	–	–
<i>Apochloa euprepes</i> (Renvoize) Zuloaga & Morrone	–	–	–	–	–	EU272416
<i>Arthropogon villosus</i> Nees	–	–	–	–	–	EU272417
<i>Arundinella berteroniana</i> (Schult.) Hitchc. & Chase	M. Nee 50403 (G)	HE573488	–	–	–	–
<i>Arundinella deppeana</i> Nees ex Steud.	G Sanchez-Ken 676 (ISC)	AM849214	–	–	–	–
<i>Arundinella hirta</i> (Thunb.) Tanaka	–	AF117393	–	–	–	–
<i>Arundinella nepalensis</i> Trin.	–	AF117394	–	–	–	–
<i>Arundo donax</i> L.	–	GU222718	–	–	–	–
<i>Austroanthonia setacea</i> (R. Br.) H.P. Linder	S.J. & T.R. Hodgkinson 9466 (TCD)	HE573549	–	–	–	–
<i>Axonopus fissifolius</i> (Raddi) Kuhlms.	–	–	–	–	–	EU272418
<b><i>Brachiaria comorensis</i> (Mez) A. Camus</b>	<b>Nanjarisoa O.P. 193 (K, MO, P, TAN)</b>	<b>LT593944</b>	–	–	–	–
<b><i>Brachiaria fragrans</i> A. Camus</b>	<b>J.M. Bosser 19160 (P06769493)</b>	<b>KX663837</b>	<b>LT593966</b>	<b>LT614679</b>	<b>LT614682</b>	<b>LT593971</b>
<b><i>Brachiaria tsiafajavonensis</i> A. Camus</b>	<b>M.S. Vorontsova et al. 697 (K, MO, P, TAN)</b>	<b>LT593938</b>	–	–	–	–
<i>Brachypodium distachyon</i> (L.) P. Beauv.	–	–	–	XM_0148984 20	XM_0035719 01	–
<i>Brachypodium pinnatum</i> (L.) P. Beauv.	PI-440176	–	–	–	–	AF137294
<i>Bromuniola gossweileri</i> Stapf & C.E. Hubb.	–	AY847124	–	–	–	–
<i>Buergersiochloa bambusoides</i> Pilg.	S. Dransfield 1383	–	–	–	–	AF137295
<i>Calypochloa gracillima</i> C.E. Hubb.	–	JN604677	–	–	–	–
<i>Capillipedium parviflorum</i> (R. Br.) Stapf	PI-301782	–	–	–	–	AF137296
<i>Cenchrus abyssinicus</i> (Hack.) Morrone	Friis et al. 6699 (K)	GU561512	–	–	–	–
<i>Cenchrus agrimonioides</i> Trin.	Morden 1554 (HAW)	AY623745	–	–	–	–
<i>Cenchrus americanus</i> (L.) Morrone	–	–	–	–	–	EU272452
<i>Cenchrus americanus</i> (L.) Morrone	–	KJ490012	–	–	–	–

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Cenchrus basedowii</i> (Summerh. & C.E. Hubb.) Morrone	Pullen 10417 (CANB)	GU561515	–	–	–	–
<i>Cenchrus brownii</i> Roem. & Schult.	Ramia & Marrero 9349 (SI)	GU561513	–	–	–	–
<i>Cenchrus caliculatus</i> Cav.	–	EF189886	–	–	–	–
<i>Cenchrus chilensis</i> (E. Desv.) Morrone	Zuloaga et al. 8617 (SI)	GU561516	–	–	–	–
<i>Cenchrus ciliaris</i> L.	Kellogg 1125 (MO)	EU741937	–	–	–	–
<i>Cenchrus clandestinus</i> (Hochst. ex Chiov.) Morrone	Morrone s.n. (SI)	GU561517	–	–	–	–
<i>Cenchrus echinatus</i> L.	Christin 149 (BRU)	HF558460	–	–	–	–
<i>Cenchrus flaccidus</i> (Griseb.) Morrone	Doust 1373	AF499150	–	–	–	–
<i>Cenchrus frutescens</i> L.	Deginiani 1822 (SI)	GU561519	–	–	–	–
<i>Cenchrus glaucus</i> Mudaliar & Sundaraj	Caxambu 375 (MBM)	GU561521	–	–	–	–
<i>Cenchrus incertus</i> M.A. Curtis	Morrone & Giussani 5166 (SI)	GU561514	–	–	–	–
<i>Cenchrus latifolius</i> (Spreng.) Morrone	Morrone 5231 (SI)	GU561524	–	–	–	–
<i>Cenchrus longissimus</i> (S.L. Chen & Y.X. Jin) Morrone	G. Besnard 23-2004 (G)	–	–	–	FR845905	–
<i>Cenchrus longissimus</i> (S.L. Chen & Y.X. Jin) Morrone	G Besnard 23-2004 (G)	AM849181	–	–	–	–
<i>Cenchrus macrourus</i> (Trin.) Morrone	CN 87800	GU561525	–	–	–	–
<i>Cenchrus massaicus</i> (Stapf) Morrone	Greenway & Kanuri 12834 (K)	GU561526	–	–	–	–
<i>Cenchrus mezianus</i> (Leeke) Morrone	PI 214061	GU561527	–	–	–	–
<i>Cenchrus myosuroides</i> Kunth	Doust 1376	AF499152	–	–	–	–
<i>Cenchrus nervosus</i> (Nees) Kuntze	Morrone 5329 (SI)	GU561529	–	–	–	–
<i>Cenchrus orientalis</i> (Rich.) Morrone	CN 84066	GU561530	–	–	–	–
<i>Cenchrus pedicellatus</i> (Trin.) Morrone	CN 87902	GU561531	–	–	–	–
<i>Cenchrus pilosus</i> Kunth	–	EF189887	–	–	–	–
<i>Cenchrus polystachios</i> (L.) Morrone	Morrone & Belgrano 5060 (SI)	GU561533	–	–	–	–
<i>Cenchrus purpureus</i> (Schumach.) Morrone	Morrone et al. 4473 (SI)	GU561534	–	–	–	–
<i>Cenchrus ramosus</i> (Hochst.) Morrone	CN 84079	GU561535	–	–	–	–
<i>Cenchrus setaceus</i> (Forssk.) Morrone	–	HE573510	–	–	–	–
<i>Cenchrus setigerus</i> Vahl.	Doust 1377	AF499153	–	–	–	–
<i>Cenchrus sieberianus</i> (Schltdl.) Verloove	PI 532675	GU561538	–	–	–	–

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Cenchrus squamulatus</i> (Fresen.) Morrone	PI 248534	GU561540	–	–	–	–
<i>Cenchrus thunbergii</i> (Kunth) Morrone	CN 87791	GU561541	–	–	–	–
<i>Cenchrus trachyphyllus</i> (Pilg.) Morrone	Bogdan 1151 (K)	GU561542	–	–	–	–
<i>Cenchrus tristachyus</i> (Kunth) Kuntze	Morrone & al. 4234 (SI)	GU561543	–	–	–	–
<i>Cenchrus unisetus</i> (Nees) Morrone	Friis & Vollesen 129 (K)	GU561544	–	–	–	–
<i>Cenchrus violaceus</i> (Lam.) Morrone	J.N. Labat et al. 3983 (P)	HE575799	–	–	–	–
<i>Cenotheca lappacea</i> (L.) Desv.	–	AY847122	–	–	–	–
<i>Centropodia glauca</i> (Nees) Cope	Linder, H.P. 5410 (BOL)	EU400772	–	–	–	–
<b><i>Chasechloa egregia</i> (Mez) A. Camus</b>	<b>L.H. Boivin s.n. (P00710482)</b>	<b>KX663836</b>	<b>LT593967</b>	<b>LT614681</b>	<b>LT614684</b>	<b>LT593970</b>
<b><i>Chasechloa madagascariensis</i> (Baker) A. Camus</b>	<b>H. Perrier de la Bâthie 11217 (P02351581)</b>	<b>KX663838</b>	<b>LT593968</b>	<b>LT614680</b>	<b>LT614683</b>	<b>LT593969</b>
<b><i>Chasechloa madagascariensis</i> (Baker) A. Camus</b>	<b>M. Bardot-Vaucoulon et al. 1281 (MO5966882)</b>	<b>KX364492</b>	<b>KX364491</b>	–	–	–
<i>Chasmanthium curvifolium</i> (Valdés-Reyna, Morden & S.L. Hatch) Wipff & S.D. Jones	–	AY847125	–	–	–	–
<i>Chasmanthium latifolium</i> (Michx.) H.O. Yates	Chase 19162 (K)	–	–	–	FR845901	–
<i>Chasmanthium latifolium</i> (Michx.) H.O. Yates	E.A. Kellogg V13	–	–	–	–	AF137297
<i>Chasmanthium latifolium</i> (Michx.) H.O. Yates	Peterson 17532 (US)	EF422909	–	–	–	–
<i>Chasmanthium laxum</i> (L.) H.O. Yates	–	AY847126	–	–	–	–
<i>Chasmanthium nitidum</i> (Baldwin ex Elliott) H.O. Yates	–	GU222699	–	–	–	–
<i>Chasmanthium sessiliflorum</i> (Poir.) H.O. Yates	–	AY847127	–	–	–	–
<i>Chionachne koenigii</i> (Spreng.) Thwaites	–	–	–	–	–	AF443801
<i>Chionachne koenigii</i> (Spreng.) Thwaites	–	AF117397	–	–	–	–
<i>Chionochloa antarctica</i> (Hook. f.) Zotov	Lloyd, K. 57955 (OTA)	EU400774	–	–	–	–
<i>Chrysopogon fulvus</i> (Spreng.) Chiov.	–	AF117398	–	–	–	–
<i>Cleistachne sorghoides</i> Benth.	–	AF117400	–	–	–	–
<i>Coix aquatica</i> Roxb.	–	–	–	–	–	AF443806
<i>Cortaderia archboldii</i> (Hitchc.) Connor & Edgar	J. Marsden 115 (K)	HE575788	–	–	–	–
<i>Cymbopogon flexuosus</i> (Nees ex Steud.) Will. Watson	–	AF117404	–	–	–	–
<i>Cynodon dactylon</i> (L.) Pers.	G. Besnard 70-2006 (G)	–	–	FN298419	FN298417	–

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Cyperochloa hirsuta</i> Lazarides & L. Watson	–	AY847139	–	–	–	–
<b><i>Cyphochlaena madagascariensis</i> Hack.</b>	<b>M.S. Vorontsova et al. 954 (K, MO, P, TAN)</b>	<b>LT593940</b>	–	–	–	–
<i>Cyrtococcum multinode</i> (Lam.) Clayton	M.S. Vorontsova et al. 302 (K, MO, P, TAN)	HF558465	–	–	–	–
<i>Cyrtococcum patens</i> (L.) A. Camus	G. Besnard 10-2004 (G)	–	–	FN298422	FN298423	FR845919
<i>Cyrtococcum patens</i> (L.) A. Camus	G. Besnard 10-2004 (G)	–	–	–	–	FR845920
<i>Dactyloctenium aegyptium</i> (L.) Willd.	T. Renaud 05-2005 (G)	–	–	FN298425	FR845902	–
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roem. & Schult.	–	FR839624	–	–	–	–
<i>Danthoniopsis dinteri</i> (Pilg.) C.E. Hubb.	PI-207548	–	–	–	–	AF137300
<i>Dichantherium clandestinum</i> (L.) Gould	GD:37887	–	–	–	–	FR845922, FR845923
<i>Dichantherium sabulorum</i> (Lam.) Gould & C.A. Clark	–	–	–	–	–	EU272425
<i>Digitaria ciliaris</i> (Retz.) Koeler	–	–	–	–	–	EU272426
<i>Digitaria didactyla</i> Willd.	G. Besnard 28-2006	–	–	FR845884	FR845893	–
<i>Digitaria sanguinalis</i> (L.) Scop.	G. Besnard 01-2005	–	–	FR845883	–	–
<i>Distichlis spicata</i> (L.) Greene	Columbus 3432 (RSA )	EF561670	–	–	–	–
<i>Echinochloa colona</i> (L.) Link	C. Silva 850 (HUEFS)	KP878923	KP878858	–	–	–
<i>Echinochloa colona</i> (L.) Link	–	–	–	–	–	EU272429
<i>Echinochloa crus-galli</i> (L.) P. Beauv.	G. Besnard 04-2001	–	–	FR845885	–	–
<i>Echinochloa crus-galli</i> (L.) P. Beauv.	–	–	–	–	AY251482	–
<i>Echinochloa frumentacea</i> Link	–	–	–	–	–	EU272430
<i>Echinolaena gracilis</i> Swallen	S.N. Moreira 1530 (BHCB)	KP878924	KP878859	–	–	–
<i>Echinolaena inflexa</i> (Poir.) Chase	C. Silva et al. 271 (HUEFS)	KP878925	KP878860	–	–	–
<i>Echinolaena inflexa</i> (Poir.) Chase	–	–	–	–	–	EU272431
<i>Ehrharta erecta</i> Lam.	E.A. Kellogg V44	–	–	–	–	AF137302
<i>Elionurus muticus</i> (Spreng.) Kuntze	–	AF117410	–	–	–	–
<i>Eragrostis curvula</i> (Schrad.) Nees	M. Chase 9268.B (K)	HE577867	–	–	–	–
<i>Eriachne pulchella</i> Domin	–	GU222715	–	–	–	–
<i>Garnotia fergusonii</i> Trimen	E. Barnes, s.n (K)	HE575794	–	–	–	–

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Glyceria grandis</i> S. Watson	J.I. Davis & R.J. Soreng s.n.	–	–	–	–	AF137305
<i>Guadua</i> sp.	T.R. Hodkinson s.n. (TCD)	–	–	–	FR845894	–
<i>Gynerium sagittatum</i> (Aubl.) P. Beauv.	C. Snak et al. 914 (HUEFS)	KP878926	KP878861	–	–	–
<i>Gynerium sagittatum</i> (Aubl.) P. Beauv.		GU222701	–	–	–	–
<i>Hakonechloa macra</i> (Munro) Honda	E.A. Kellogg V21	–	–	–	–	AF137306
<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	–	–	–	–	–	AF443810
<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	–	AF117411	–	–	–	–
<i>Hildaea breviscrops</i> (Döll) C. Silva & R.P. Oliveira	R.P. Oliveira et al. 1885 (HUEFS)	KP878927	KP878862	–	–	–
<i>Hildaea pallens</i> (Sw.) C. Silva & R.P. Oliveira	C. Silva & N.M. Corrêa 327 (HUEFS)	KP878928	KP878863	–	–	–
<i>Hildaea pallens</i> (Sw.) C. Silva & R.P. Oliveira	–	–	–	–	–	EU272437
<i>Hildaea pallens</i> var. <i>major</i> (Nees) C. Silva & R.P. Oliveira	R.J. Jago & B. Wannan 5716 (CANB)	–	KP878864	–	–	–
<i>Hildaea ruprechtii</i> (Döll) C. Silva & R.P. Oliveira	(GO) C. Silva et al. 636 (HUEFS)	KP878929	KP878865	–	–	–
<i>Hildaea ruprechtii</i> (Döll) C. Silva & R.P. Oliveira	(RJ) C. Silva 745 (HUEFS)	KP878930	KP878866	–	–	–
<i>Hildaea</i> sp.	(PA) Costa et al. 903 (BHCB)	KP878931	KP878867	–	–	–
<i>Hildaea tenuis</i> (J. Presl & C. Presl) C. Silva & R.P. Oliveira	A.C. Mota & C. Silva 431 (HUEFS)	KP878932	KP878868	–	–	–
<i>Holcus lanatus</i> L.	G. Besnard 05-2002 (G)	–	–	FN298428	FR845903	–
<i>Homolepis glutinosa</i> (Sw.) Zuloaga & Soderstr.	–	–	–	–	–	EU272434
<i>Homolepis isocalycia</i> (G. Mey.) Chase	–	–	–	–	–	EU272435
<i>Hordeum vulgare</i> L.	NIASHv2033B15	–	–	–	–	AK365283
<i>Hyparrhenia hirta</i> (L.) Stapf	P.A. Christin 03-2005 (G)	–	–	–	FR845895	–
<i>Hyparrhenia hirta</i> (L.) Stapf	–	–	–	–	–	AF443811
<i>Hyparrhenia hirta</i> (L.) Stapf	–	AF117412	–	–	–	–
<i>Ichnanthus</i> aff. <i>bambusiflorus</i> (Trin.) Döll	(BA) C. Silva et al. 722 (HUEFS)	KP878934	KP878870	–	–	–
<i>Ichnanthus</i> aff. <i>bambusiflorus</i> (Trin.) Döll	(MG) C. Silva et al. 751-A (HUEFS)	KP878935	KP878871	–	–	–
<i>Ichnanthus</i> aff. <i>hoffmannseggii</i> (Roem. & Schult.) Döll	C. Silva et al. 815 (HUEFS)	KP878936	KP878872	–	–	–
<i>Ichnanthus</i> aff. <i>leiocarpus</i> (Spreng.) Kunth	C. Silva & N.M. Corrêa 332 (HUEFS)	KP878937	KP878873	–	–	–
<i>Ichnanthus bambusiflorus</i> (Trin.) Döll	(BA) C. Silva et al. 255 (HUEFS)	–	–	–	–	–
<i>Ichnanthus bambusiflorus</i> (Trin.) Döll	(MG) C. Silva et al. 746 (HUEFS)	KP878938	KP878874	–	–	–

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Ichnanthus calvescens</i> (Nees ex Trin.) Döll	(BA) C. Silva et al. 416 (HUEFS)	KP878939	KP878875	–	–	–
<i>Ichnanthus calvescens</i> (Nees ex Trin.) Döll	(CE) A.C. Mota & C. Silva 452 (HUEFS)	KP878940	KP878876	–	–	–
<i>Ichnanthus calvescens</i> (Nees ex Trin.) Döll	(GO) C. Silva et al. 648 (HUEFS)	KP878941	KP878877	–	–	–
<i>Ichnanthus dasycoleus</i> Tutin	C. Silva 769 (HUEFS)	KP878942	KP878878	–	–	–
<i>Ichnanthus glaber</i> (Raddi) Hitchc.	C. Silva & J.G. Freitas 315 (HUEFS)	KP878943	KP878879	–	–	–
<i>Ichnanthus hirtus</i> (Raddi) Chase	C. Silva & N.M. Corrêa 357 (HUEFS)	KP878944	KP878880	–	–	–
<i>Ichnanthus inconstans</i> (Trin. ex Nees) Döll	C. Silva et al. 475 (HUEFS)	KP878945	KP878881	–	–	–
<i>Ichnanthus leiocarpus</i> (Spreng.) Kunth	C. Silva & N.M. Corrêa 339 (HUEFS)	KP878947	KP878883	–	–	–
<i>Ichnanthus longiglumis</i> Mez	C. Silva et al. 522 (HUEFS)	KP878949	KP878885	–	–	–
<i>Ichnanthus mollis</i> Ekman	C. Silva 990 (HUEFS)	KP878950	KP878886	–	–	–
<i>Ichnanthus nemoralis</i> (Schrad.) Hitchc. & Chase	C. Silva et al. 260 (HUEFS)	KP878951	KP878887	–	–	–
<i>Ichnanthus oplismenoides</i> Munro ex Döll	C. Silva et al. 891 (HUEFS)	KP878952	KP878888	–	–	–
<i>Ichnanthus panicoides</i> P. Beauv.	R.P. Oliveira et al. 1857 (HUEFS)	KP878953	KP878889	–	–	–
<i>Ichnanthus riedelii</i> (Trin.) Döll	C. Silva et al. 422 (HUEFS)	KP878954	KP878890	–	–	–
<i>Ichnanthus</i> sp.	(BA) R.P. Oliveira et al. 1216 (HUEFS)	KP878955	KP878891	–	–	–
<i>Ichnanthus</i> sp.	(MG) C. Silva et al. 550 (HUEFS)	KP878956	KP878892	–	–	–
<i>Ichnanthus zehntneri</i> Mez	C. Silva 771 (HUEFS)	KP878957	KP878893	–	–	–
<i>Isachne mauritiana</i> Kunth	G. Besnard 09-2006 (G)	–	–	–	FR845904	–
<i>Isachne mauritiana</i> Kunth	G Besnard 09-2006 (G)	AM849162	–	–	–	–
<b><i>Lasiacis ligulata</i> Hitchc. &amp; Chase</b>	<b>J. Olivier 02 (CAY)</b>	<b>LT593942</b>	–	–	–	–
<i>Lasiacis sorghoidea</i> (Desv. ex Ham.) Hitchc. & Chase	–	–	–	–	–	EU272438
<i>Lecomtella madagascariensis</i> A. Camus	M.S. Vorontsova et al. 603 (K, MO, P, TAN)	HF543599	HG315108	HG315106	HG315107	HG315105
<i>Lolium perenne</i> L.	S. Mathews 402	–	–	–	–	AF137308
<i>Lygeum spartum</i> L.	R.J. Soreng 3698	–	–	–	–	AF137309
<i>Megastachya mucronata</i> (Poir.) P. Beauv.	M. Chase 36798 (K)	HE577872	–	–	–	–
<i>Megathyrsus maximus</i> (Jacq.) B.K. Simon & S.W.L. Jacobs	P. Rondeau 05-2005 (G)	–	–	–	FR845900	–
<i>Melica cupani</i> Guss.	PI-383702	–	–	–	–	AF137310



Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Melinis repens</i> (Willd.) Zizka	C. Silva et al. 626 (HUEFS)	KP878958	KP878894	–	–	–
<i>Melinis repens</i> (Willd.) Zizka	P. Rondeau 06-2005 (G)	–	–	–	FR845896	–
<i>Melinis repens</i> (Willd.) Zizka	–	–	–	–	–	EU272439
<i>Mesosetum chaseae</i> Luces	–	–	–	–	–	EU272440
<i>Micraira adamsii</i> Lazarides	M. Lazarides 7768 (K)	HE575789	–	–	–	–
<i>Microstegium nudum</i> (Trin.) A. Camus	–	AF117415	–	–	–	–
<i>Mnesithea selloana</i> (Hack.) de Koning & Sosef	–	AF117401	–	–	–	–
<i>Molinia caerulea</i> (L.) Moench	R.J. Soreng 3305	–	–	–	–	AF137312
<i>Molinia caerulea</i> (L.) Moench	–	GU222716	–	–	–	–
<i>Ocellochloa stolonifera</i> (Poir.) Zuloaga & Morrone	C. Silva & T.A. Amorim 368 (HUEFS)	KP878959	KP878895	–	–	–
<i>Oedochloa camporum</i> (Swallen) C. Silva & R.P. Oliveira	C. Silva et al. 676 (HUEFS)	KP878960	KP878896	–	–	–
<i>Oedochloa cordata</i> (Ekman) C. Silva & R.P. Oliveira	C. Silva et al. 872 (HUEFS)	KP878961	KP878897	–	–	–
<i>Oedochloa grandifolia</i> (Döll) C. Silva & R.P. Oliveira	K.M. Pimenta & R.P. Oliveira 50 (HUEFS)	KP878962	KP878898	–	–	–
<i>Oedochloa minarum</i> (Nees) C. Silva & R.P. Oliveira	Z.L. Wagner & P.L. Viana 9613 (BHCB)	KP878963	KP878899	–	–	–
<i>Oedochloa procurrens</i> (Nees ex Trin.) C. Silva & R.P. Oliveira	C. Silva et al. 270-A	KP878964	KP878900	–	–	–
<i>Oplismenus hirtellus</i> (L.) P. Beauv.	C. Silva & N.M. Corrêa 351 (HUEFS)	KP878965	KP878901	–	–	–
<i>Oplismenus hirtellus</i> (L.) P. Beauv.	G. Besnard 15-2006 (G)	–	–	–	FN298431	–
<i>Orthoclada laxa</i> (Rich.) P. Beauv.	C. Silva et al. 939 (HUEFS)	–	KP878856	–	–	–
<i>Oryza sativa</i> L.	–	–	–	NM191306	AF271995	–
<i>Ottochloa nodosa</i> (Kunth) Dandy	(1) E.J. Thompson et al. 102 (CANB)	–	KP878902	–	–	–
<i>Ottochloa nodosa</i> (Kunth) Dandy	(2) R.J. Cumming 15324 (CANB)	KP878966	KP878903	–	–	–
<i>Ottochloa nodosa</i> (Kunth) Dandy	(3) F.R. Willis et al. 87 (CANB)	–	KP878904	–	–	–
<i>Panicum aquaticum</i> Poir.	C. Silva 853 (HUEFS)	KP878967	KP878905	–	–	–
<i>Panicum capillare</i> L.	M. Lavin s.n.	–	–	–	–	AF137316
<i>Panicum cervicatum</i> Chase	C. Silva 591 (HUEFS)	KP878968	KP878906	–	–	–
<i>Panicum laetum</i> Kunth	T. Renaud 06-2005 (G)	–	–	–	FR845897	FR845924
<i>Panicum laetum</i> Kunth	T. Renaud 06-2005 (G)	–	–	–	–	FR845925

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Panicum millegrana</i> Poir.	–	–	–	–	–	EU272446
<b><i>Panicum mitopus</i> K. Schum.</b>	<b>M.S. Vorontsova et al. 488 (K, MO, P, TAN)</b>	<b>LT593941</b>	–	–	–	–
<i>Panicum pleianthum</i> Peter	R.C. Hall 53 (K, MO, P, TAN)	HF558466	–	–	–	–
<i>Panicum racemosum</i> (P. Beauv.) Spreng.	C. Silva 852 (HUEFS)	KP878969	KP878907	–	–	–
<i>Pariana radiceflora</i> Sagot ex Döll	L.G. Clark & W. Zhang 1344	–	–	–	–	AF137317
<i>Phacelurus digitatus</i> (Sibth. & Sm.) Griseb.	–	AF117418	–	–	–	–
<i>Pharus latifolius</i> L.	TCD T.R. Hodkinson 514	–	–	FR845886	FR845898	–
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	G. Besnard 71-2006 (G)	–	–	FN298433	–	–
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	–	–	–	–	–	AF137322
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	–	U21997	–	–	–	–
<i>Poecilostachys bakeri</i> (Schinz) C.E. Hubb.	M.S. Vorontsova et al. 301 (K, MO, P, TAN)	HF558486 + update	–	–	–	–
<i>Poecilostachys bromoides</i> Stapf	G. Besnard 43-2006 (G)	–	–	–	–	FR845921
<i>Pseudechinolaena polystachya</i> (Kunth) Stapf	C. Silva & T.A. Amorim 365 (HUEFS)	KP878970	KP878908	–	–	–
<i>Pseudechinolaena polystachya</i> (Kunth) Stapf	–	–	–	–	–	EU272453
<b><i>Pseudolasiacis leptolomoides</i> (A. Camus) A. Camus</b>	<b>M.S. Vorontsova et al. 983 (K, MO, P, TAN)</b>	<b>LT593939</b>	–	–	–	–
<i>Pseudosasa japonica</i> (Siebold & Zucc. ex Steud.) Makino ex Nakai	W. Zhang 8400708	–	–	–	–	AF137323
<i>Renvoizea</i> sp.	R.P. Oliveira et al. 2081 (HUEFS)	KP878971	–	–	–	–
<i>Renvoizea trinii</i> (Kunth) Zuloaga & Morrone	C. Silva et al. 718 (HUEFS)	KP878972	KP878909	–	–	–
<i>Rugoloa pilosa</i> (Sw.) Zuloaga	C. Silva & N.M. Corrêa 335 (HUEFS)	KP878973	KP878910	–	–	–
<i>Saccharum</i> sp.	Sugarcane cultivar: H32-8560	–	–	M86661	–	–
<i>Sacciolepis indica</i> (L.) Chase	TCD A.T. & S.S. 654	–	–	FR845887	FR845899	–
<i>Schismus barbatus</i> (L.) Thell.	S.J. & T.R. Hodkinson 9467 (TCD)	HE573550	–	–	–	–
<i>Schizachyrium condensatum</i> (Kunth) Nees	C. Silva 843 (HUEFS)	KP878974	KP878911	–	–	–
<i>Schizachyrium scoparium</i> (Michx.) Nash	–	AF117420	–	–	–	–
<i>Setaria italica</i> (L.) P. Beauv.	–	–	–	–	AY491400	–
<i>Setaria palmifolia</i> (J. Koenig) Stapf	–	–	–	–	–	EU272455
<i>Setaria plicata</i> (Lam.) T. Cooke	G. Besnard 22-2004 (G)	–	–	–	FN298435	–

Taxon	Voucher	GenBank accession numbers				
		<i>ndhF</i>	ITS	<i>ppc-aL2</i>	<i>ppc-aR</i>	<i>phyB</i>
<i>Sorghastrum nutans</i> (L.) Nash	–	AF117421	–	–	–	–
<i>Sorghum bicolor</i> (L.) Moench	–	–	–	Sb03g035090	X55664	–
<i>Spartochloa scirpoidea</i> (Steud.) C.E. Hubb.	–	AY847140	–	–	–	–
<i>Spinifex littoreus</i> (Burm. f.) Merr.	TCD A.T. & S.S. 657	–	–	FR845888	–	–
<i>Sporobolus indicus</i> (L.) R. Br.	M. Chase 9275 (K)	HE575785	–	–	–	–
<i>Steinchisma hians</i> (Elliott) Nash	–	–	–	–	–	EU272458
<i>Stipagrostis pennata</i> (Trin.) De Winter	–	–	–	FN298438	FN298442	–
<i>Stipagrostis plumosa</i> (L.) Munro ex T. Anderson	F. Anthelme 03-2006 (G)	–	–	FN298436	–	–
<i>Streptostachys asperifolia</i> Desv.	C. Silva et al. 775 (HUEFS)	KP878975	KP878912	–	–	–
<i>Streptostachys asperifolia</i> Desv.	–	–	–	–	–	EU272461
<i>Tatianyx arnaces</i> (Trin.) Zuloaga & Soderstr.	–	–	–	–	–	EU272463
<i>Tripsacum dactyloides</i> (L.) L.	–	AF117433	–	–	–	–
<i>Tristachya leucothrix</i> Trin. ex Nees	H. Beck 5018	–	–	–	FR845906	–
<i>Triticum aestivum</i> L.	R. Mason-Gamer s.n.	–	–	–	–	AF137331
<i>Uniola paniculata</i> L.	–	GU222707	–	–	–	–
<i>Yakirra australiensis</i> var. <i>australiensis</i> (Domin) Lazarides & R.D. Webster	S. Legge & S. Murphy 22 (CANB)	KP878976	KP878913	–	–	–
<i>Yakirra australiensis</i> var. <i>intermedia</i> R.D. Webster	K.F. Keneally 10619 (CANB)	–	KP878914	–	–	–
<i>Yakirra majuscula</i> (F. Muell. ex Benth.) Lazarides & R.D. Webster	S. Legge & S. Murphy 856 (CANB)	KP878977	KP878915	–	–	–
<i>Yakirra muelleri</i> (Hughes) Lazarides & R.D. Webster	R.J. Cumming 15771 (CANB)	KP878978	KP878916	–	–	–
<i>Yakirra nulla</i> Lazarides & R.D. Webster	L.A. Craven & G. Whitbread 8135 (CANB)	–	KP878917	–	–	–
<i>Yakirra pauciflora</i> (R.Br.) Lazarides & R.D. Webster	(1) I. Cowie 2698 (CANB)	KP878979	KP878918	–	–	–
<i>Yakirra pauciflora</i> (R.Br.) Lazarides & R.D. Webster	(2) K. Pajimans 2355 (CANB)	KP878980	KP878919	–	–	–
<i>Yakirra pauciflora</i> (R.Br.) Lazarides & R.D. Webster	(3) A.A. Mitchell 3820 (CANB)	KP878981	KP878920	–	–	–
<i>Yakirra pauciflora</i> (R.Br.) Lazarides & R.D. Webster	(4) I. Cowie & G. Leach 3891 (CANB)	KP878982	KP878921	–	–	–
<i>Zea mays</i> L.	–	–	–	–	AB012228	–
<i>Zea mays</i> L.	M. Lavin s.n.	–	–	–	–	AF137332
<i>Zoysia japonica</i> Steud.	M. Chase 9278 (K)	AM849197	–	–	–	–

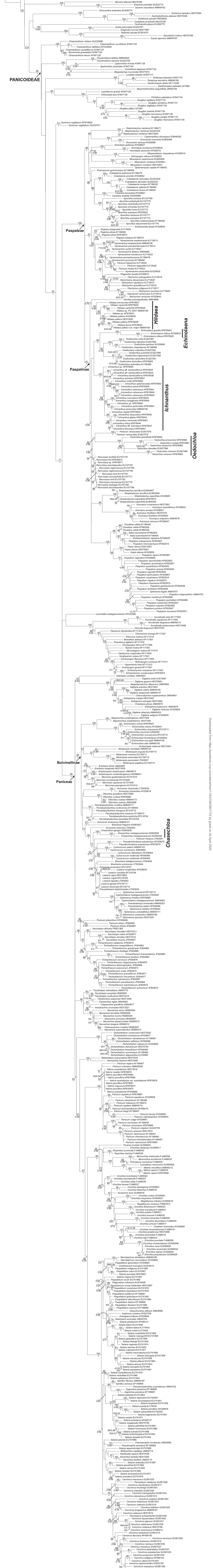
**Table S2.** Sequence characteristics of nuclear ribosomal DNA units and complete chloroplast genomes generated in the present study by NGS: GenBank accession number, average sequencing depth, and DNA fragment size of the genomic regions.

Species	nrDNA			Plastid DNA		
	Accession number	Mean sequencing depth	Recovered fragment size	Accession number	Mean sequencing depth	Plastome size
<i>Chasechloa madagascariensis</i>	LT593968	1175× ± 521	6,726 bp	KX663838	149× ± 63	137,989 bp
<i>Chasechloa egregia</i>	LT593967	857× ± 516	6,742 bp	KX663836	198× ± 120	140,371 bp
<i>Brachiaria fragrans</i>	LT593966	1356× ± 209	6,775 bp	KX663837	148× ± 31	139,754 bp

**Table S3.** Number of paired-end reads ( $N_r$ ; excluding duplicates), size of the assembled fragments ( $\%S$ ; coverage in percent of the reference sequence) and mean sequencing depth ( $SD$ ) for the three low-copy genes analyzed in this study. The minimum and maximum values for the sequencing depth are given in brackets. The mean sequencing depth on the three DNA regions is also given. Partial gene sequences are deposited to GenBank [accessions numbers LT614682 to LT614684 (*ppc-aR*), LT614679 to LT614681 (*ppc-aL2*), and LT593969 to LT593971 (*phyB*)].

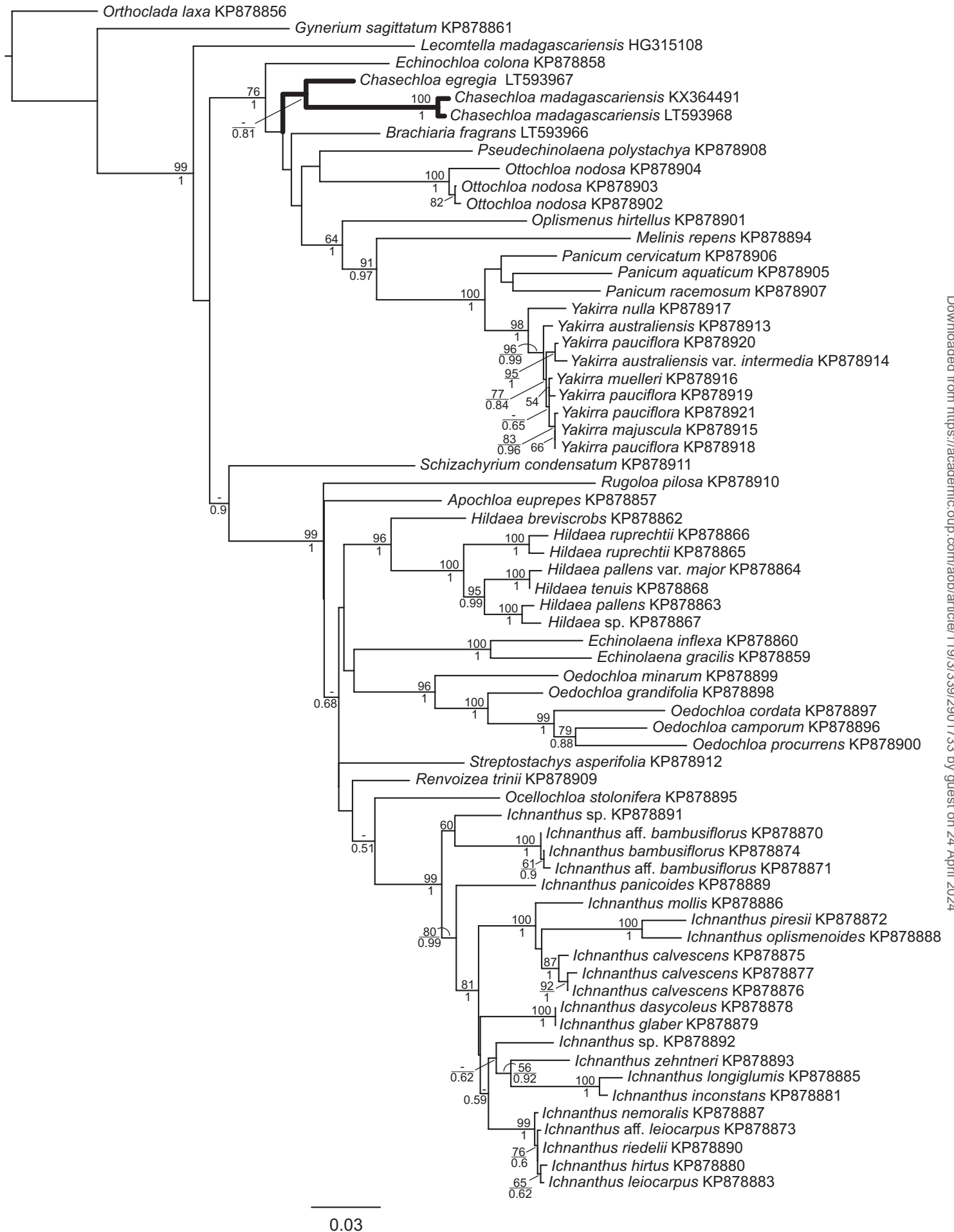
Species		<i>ppc-aR</i> (exons 8-10)	<i>ppc-aL2</i> (exons 8-10)	<i>phyB</i>	Mean
<i>Chasechloa madagascariensis</i>	$N_r$	30	21	5	
	$\%S$	88.9% (1873/2108 bp)	88.3% (1766/1983 bp)	44.7% (423/946 bp)	
	$SD$	3.7× [0-9]	2.6× [0-9]	1.1× [0-4]	2.8×
<i>Chasechloa egregia</i>	$N_r$	29	17	8	
	$\%S$	79.4% (1731/2181 bp)	63.7% (1263/1983 bp)	70.1% (663/946 bp)	
	$SD$	3.3× [0-10]	2.1× [0-9]	1.9× [0-8]	2.6×
<i>Brachiaria fragrans</i>	$N_r$	41	29	8	
	$\%S$	95.3% (2094/2197 bp)	88.1% (1757/1995 bp)	87.3% (826/946 bp)	
	$SD$	4.3× [0-12]	3.2× [0-10]	1.8× [0-6]	3.4×

**Fig. S1.** Full maximum likelihood (ML) phylogram from the analysis of the plastid marker *ndhF* showing the phylogenetic placement of *Chasechloa*. ML bootstrap support values are indicated above branches and Bayesian support values below the branches.

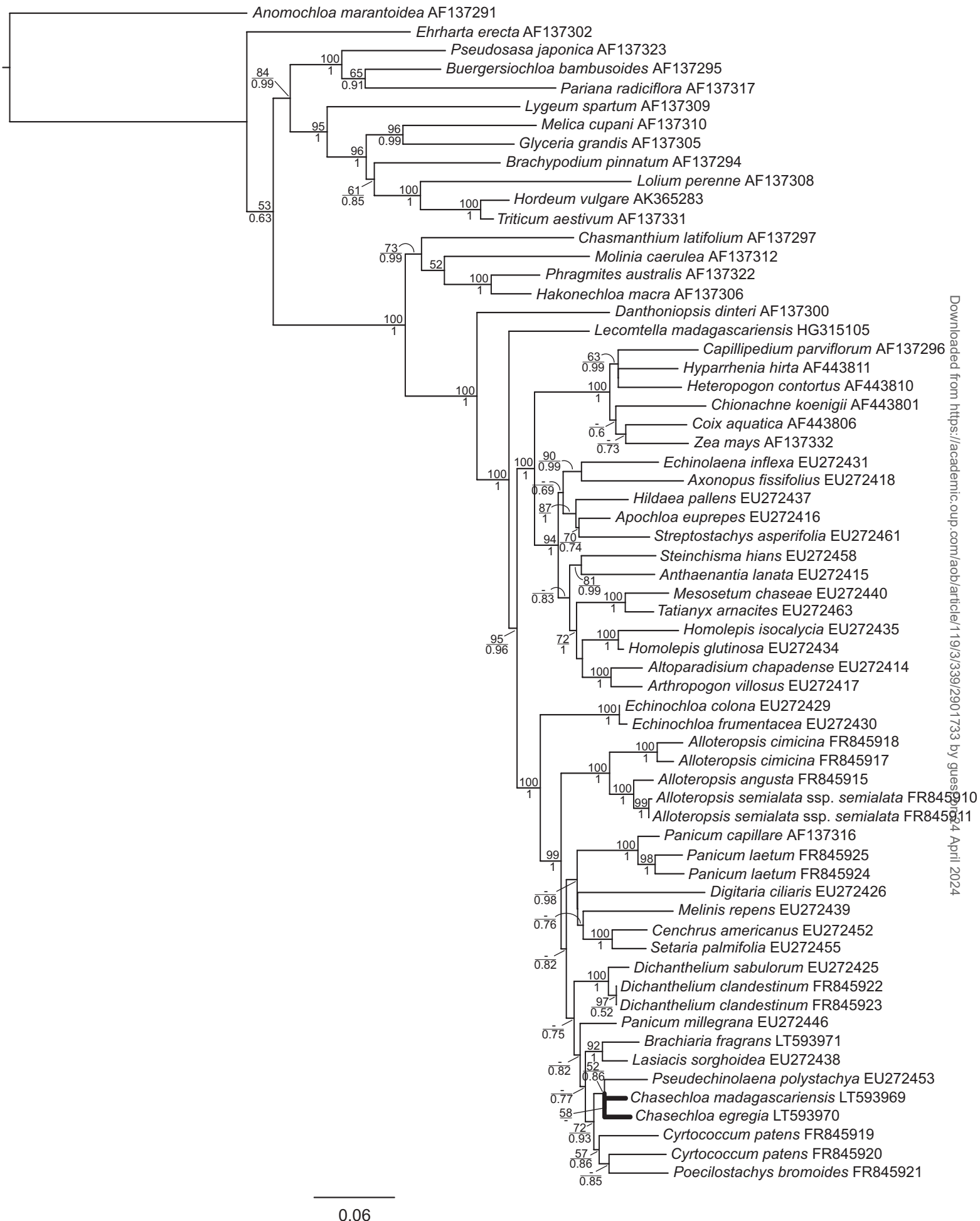


Downloaded from https://academic.oup.com/iad/advance-article-abstract/doi/10.1093/iad/iaab013/6311733 by guest on 24 April 2024

**Fig. S2.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker ITS showing the phylogenetic placement of *Chasechloa*. ML bootstrap support values are indicated above branches and Bayesian support values below the branches.

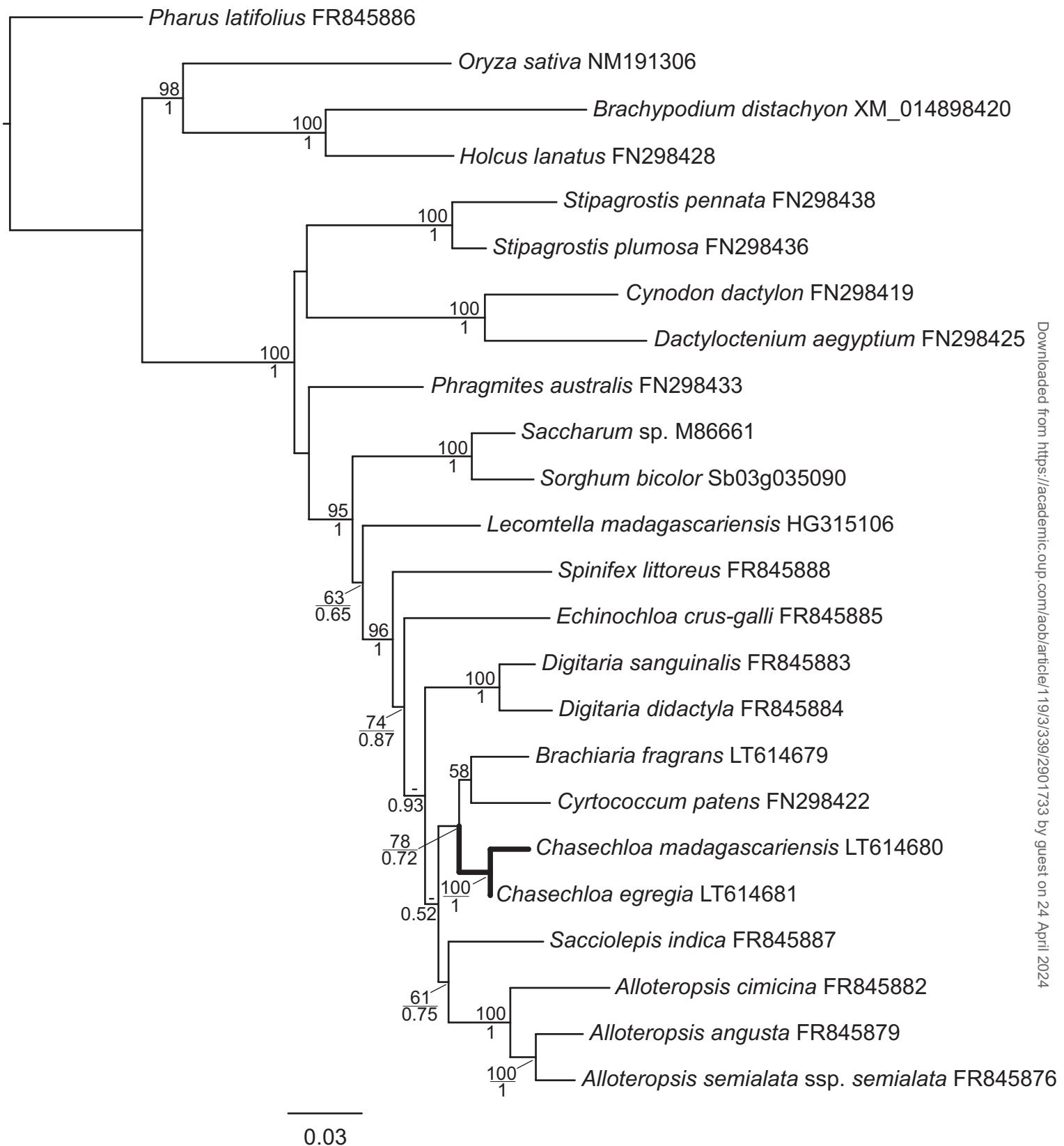


**Fig. S3.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker *phyB* showing the phylogenetic placement of *Chasechloa*. ML bootstrap support values are indicated above branches and Bayesian support values below the branches.

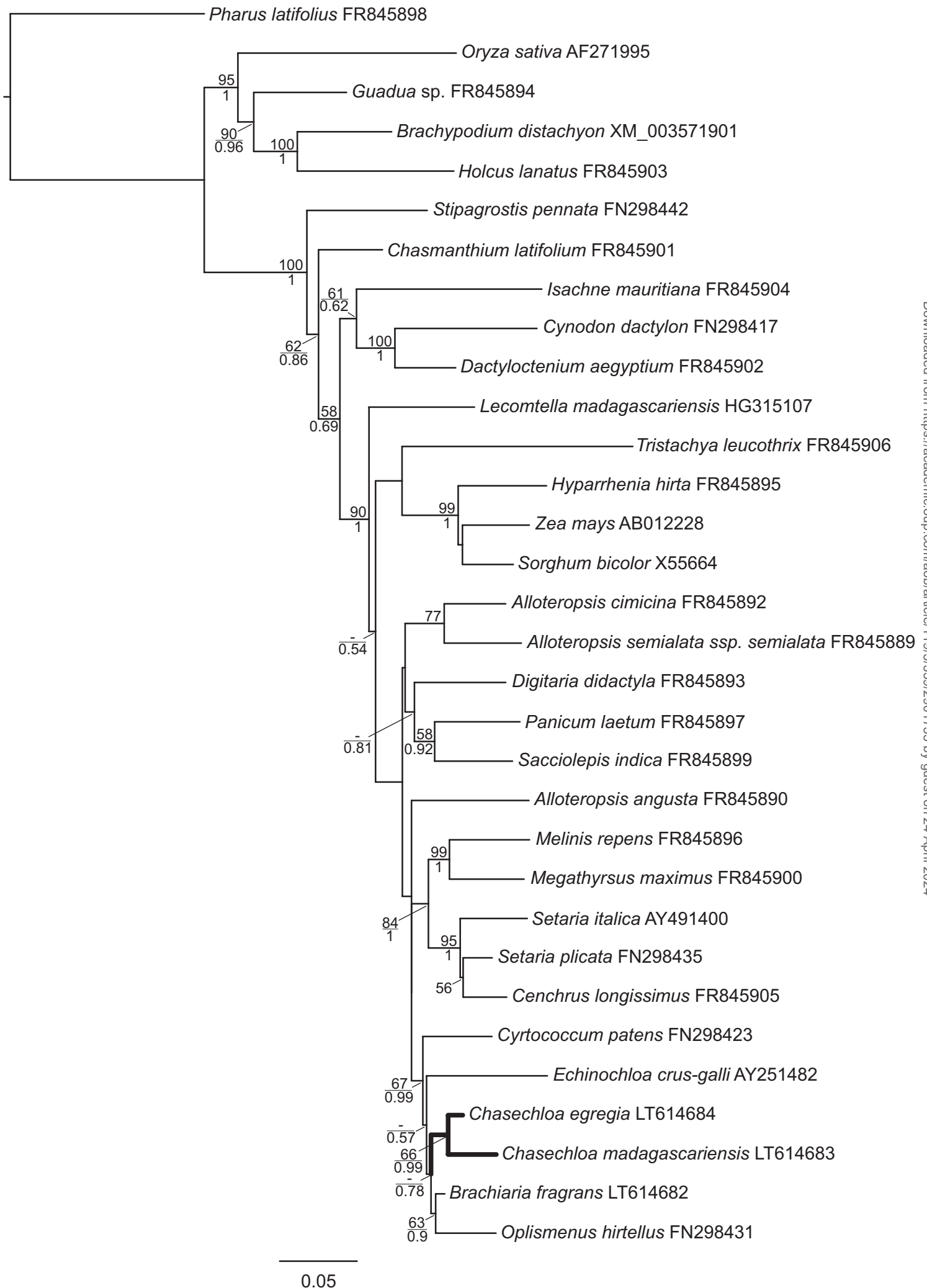




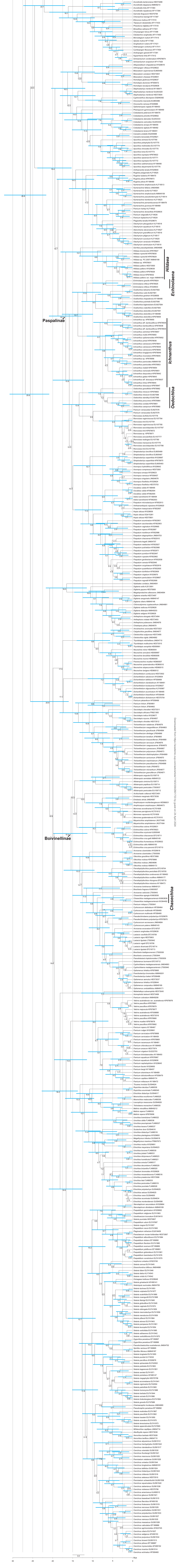
**Fig. S4.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker *ppc-aL2* showing the phylogenetic placement of *Chasechloa*. ML bootstrap support values are indicated above branches and Bayesian support values below the branches.



**Fig. S5.** Maximum likelihood (ML) phylogram from the analysis of the nuclear marker *ppc-aR* showing the phylogenetic placement of *Chasechloa*. ML bootstrap support values are indicated above branches and Bayesian support values below the branches.



**Fig. S6.** Maximum clade credibility chronogram of the core Panicoideae resulting from the BEAST analysis based on the *ndhF* data set. Numbers on the nodes refer to mean ages. Blue bars represent 95% confidence intervals of ages. (Mya = millions years ago)



Downloaded from <https://academic.oup.com/iob/advance-article-abstract/doi/10.1093/iob/obz017/5431393> by guest on 24 April 2024