

Supporting information for
Divergent karyotypes in five genera of the African endemic fish family Distichodontidae
(Cithariniformes, Osteichthyes)

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Supporting information includes:

Supplementary Text 1

Supplementary Table 1 (Table S1)

Supplementary Table 2 (Table S2)

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Supplementary References

Supplementary Text 1

Within the studied *COI* sequences of 615 bp there were 223 variable sites including 197 that were parsimonially informative. Within the studied *16S rRNA* sequences of 387 bp there were 80 variable sites including 48 that were parsimonially informative. Complete information about all sequences involved in the molecular phylogenetic analyses is given in Table S1. Genetic distances between *COI* haplotypes are given in Table S2. Genetic distances between *16S rRNA* haplotypes are given in Table S3. Phylogenetic trees constructed using maximum parsimony (MP) (Nei and Kumar 2000) and Bayesian inference (BI) methods for *COI* and *16S rRNA* are presented in Fig. S1-S4.

Table S1. Sequence data involved in the molecular phylogenetic analysis. Species names are given in accordance with the GenBank NCBI database.

Taxon	Haplotype (GenBank Accession number)		Origin	Coordinates	Voucher	References
	COI	16S				
<i>Belonophago</i>						
<i>Belonophago hutsebouti</i>	KF541759		Democratic Republic of the Congo, Salonga National Park, Nkombe-Dunda, Luilaka River, downstream of village, near confluence of Luilaka and Lila Rivers.	2°40'17.3"S 21°43'15.5"E	AMNH 241850	Arroyave et al. 2013
	KF541760		Democratic Republic of the Congo, Salonga National Park, Nkema Asondzi, Luilaka River		AMNH 241851	Arroyave et al. 2013
	HM418229		Democratic Republic of the Congo: Equateur.	2°13'27.7"S 21°11'06.4"E		Unpublished
		JX985128	Republic of the Congo: Congo River basin, Odzala			Lavoué et al. 2017
<i>Citharinus</i>						
<i>Citharinus citharus</i>	KF541750		Benin, Niger river at tunga village		AMNH 226441	Arroyave et al. 2013
	KF541749		Benin, Niger river at tunga village		AMNH 226441	Arroyave et al. 2013
	HM882704		Nigeria: Abai, South-East, Ebonyi, Afikpo			Nwani et al. 2011
	HM882705		Nigeria: Anambra, South-East, Otuocha			Nwani et al. 2011
	HM882710		Nigeria: Abai, South-East, Ebonyi, Afikpo			Nwani et al. 2011
	HM882713		Nigeria: Anambra, South-East, Otuocha			Nwani et al. 2011
	HM882715		Nigeria: Anambra, South-East, Otuocha			Nwani et al. 2011
	JF510508		Nigeria: Abai, South-East, Ebonyi, Afikpo.	5°54'36.0"N 8°03'21.6"E		Nwani et al. 2011
	JF510509		Nigeria: Abai, South-East, Ebonyi, Afikpo.	5°54'36.0"N 8°03'21.6"E		Nwani et al. 2011

		AY787989	Benin, Niger river at tunga village		AMNH 226441	Calcagnotto et al. 2005
<i>Distichodus</i>						
<i>Distichodus nefasch</i>	MT300595		Ethiopia, Southern Nations, Nationalities and Peoples, Omo River.	4°47'33.9"N 36°02'22.4"E	AMNH 264420	Arroyave et al. 2020
<i>Distichodus sexfasciatus</i>	AB070242	AB070242				Nakatani et al. 2011
<i>Nannaethiops</i>						
<i>Nannaethiops bleheri</i>	KF541848				CU 94489	Arroyave et al. 2013
	OQ891056		Ethiopia, Interfluve of the Alvero and Gilo rivers	7°45'18.4"N 34°15'38.3"E		This study
	OQ891057		Ethiopia, Interfluve of the Alvero and Gilo rivers	7°45'18.4"N 34°15'38.3"E		This study
		JX985104	Ethiopia: Nile River basin, Gambela			Lavoué et al. 2017
		OQ911366	Ethiopia, Baziél Kebele	8°18'51.2"N 34°04'24.9"E		This study
<i>Nannaethiops gracilis</i>	KF541851		Democratic Republic of the Congo, Luilaka River, Salonga National Park, Luilaka River, Boangi village		AMNH 241888	Arroyave et al. 2013
	KF541852		Democratic Republic of the Congo, Luilaka River, Salonga National Park, Luilaka River, Boangi village		AMNH 241888	Arroyave et al. 2013
<i>Nannaethiops unitaeniatus</i>	KF541849		Cameroon, South Province, Region of Kribi, stream near village of Massa'a		AMNH 249555	Arroyave et al. 2013
	KF541850		Cameroon, South Province, Region of Kribi, stream near village of Massa'a		AMNH 249555	Arroyave et al. 2013
		JX985105	Gabon: Rabi			Lavoué et al. 2017
<i>Nannaethiops sp</i>	OQ891061	OQ911367	West Africa, Fish Import			This study
	OQ891060		West Africa, Fish Import			This study
<i>Neolebias</i>						
<i>Neolebias ansorgii</i>	KF541859		Democratic Republic of the Congo, Small coast stream		AMNH 251003	Arroyave et al. 2013

	KF541860				CU 93512	Arroyave et al. 2013
	KF541858		Democratic Republic of the Congo, small stream flowing into Atlantic Ocean near Moanda		AMNH 250442	Arroyave et al. 2013
	HM418212		Democratic Republic of the Congo: Bas-Congo, Aquarium Trade			Sonet et al. 2019
	HM418213		Democratic Republic of the Congo: Bas-Congo, Aquarium Trade			Sonet et al. 2019
		AY788058				Calcagnotto et al. 2005
		JX985107	Gabon: Doumvou			Lavoué et al. 2017
<i>Neolebias powelli</i>		AY788061	Nigeria, Niger delta		AMNH 233408	Calcagnotto et al. 2005
<i>Neolebias trewavasae</i>	KF541857				AMNH uncataloged	Arroyave et al. 2013
	KF541853		Cameroon, South Province, Stream near Metondo Village, Kribia-Ebolowa Road		AMNH 249536	Arroyave et al. 2013
		JX985132	Gabon: Ivindo River, Loa Loa			Lavoué et al. 2017
<i>Neolebias trilineatus</i>	KF541856				CU 91513	Arroyave et al. 2013
	KF541854		Democratic Republic of the Congo, Salonga National Park, Nkombe-Dunda, Luilaka River, downstream of village, near confluence of Luilaka and Lila Rivers.	2°40'17.3"S 21°43'15.5"E	AMNH 247928	Arroyave et al. 2013
	KF541855		Democratic Republic of the Congo, Salonga National Park, Nkombe-Dunda, Luilaka River, downstream of village, near confluence of Luilaka and Lila Rivers.	2°40'17.3"S 21°43'15.5"E	AMNH 247928	Arroyave et al. 2013
	MK074510		Republic of the Congo: Congo, Lefini, Marigotns tout pres du confluent.	2°59'24.0"S 15°30'00.0"E		Sonet et al. 2019
	MK074511		Republic of the Congo: Congo, Lefini, Marigotns tout pres du confluent.	2°59'24.0"S 15°30'00.0"E		Sonet et al. 2019
	KT193336		Democratic Republic of the Congo, Itimbiri River			Decru et al. 2016
	HM418214		Democratic Republic of the Congo: Equateur.	2°40'17.3"S 21°43'15.6"E		Sonet et al. 2019

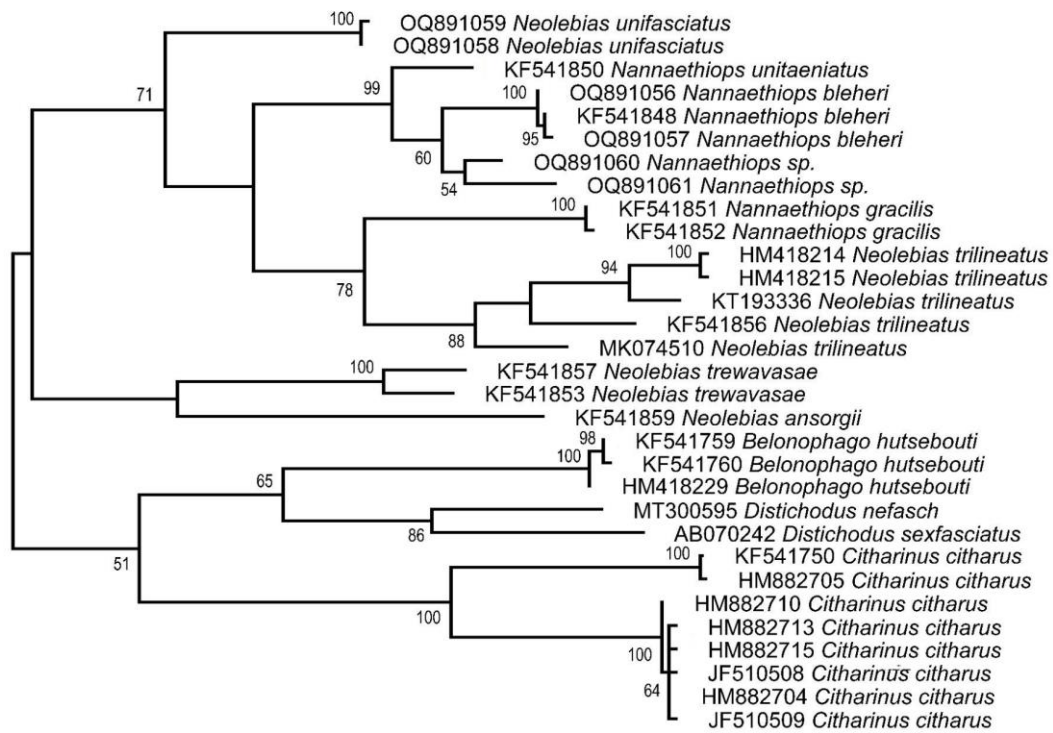
	HM418215		Democratic Republic of the Congo: Equateur.	2°40'17.3"S 21°43'15.6"E		Sonet et al. 2019
		AY788063	Africa Fish Import		AMNH233439	Calcagnotto et al. 2005
<i>Neolebias unifasciatus</i>		JX985103	Benin: Oueme River			Lavoué et al. 2017
	OQ891059	JX985103	West Africa, Fish Import			This study
	OQ891058	JX985103	West Africa, Fish Import			This study

Table S2. Estimates of genetic distances (p-distance) between haplotypes *COI* (615 bp).

Species	GenBank NCBI		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
<i>Neolebias unifasciatus</i>	OQ891058	1																							
	OQ891059	2	0,002																						
<i>Nannaethiops bleheri</i>	KF541848	3	0,112	0,111																					
	OQ891056	4	0,111	0,109	0,002																				
	OQ891057	5	0,114	0,112	0,002	0,003																			
<i>Nannaethiops sp.</i>	OQ891060	6	0,117	0,115	0,037	0,036	0,039																		
	OQ891061	7	0,114	0,112	0,052	0,050	0,054	0,031																	
<i>Nannaethiops unitaeniatus</i>	KF541850	8	0,107	0,106	0,055	0,054	0,057	0,037	0,046																
<i>Neolebias trilineatus</i>	KF541856	9	0,104	0,106	0,117	0,115	0,119	0,119	0,111	0,115															
	MK074510	10	0,114	0,115	0,114	0,112	0,112	0,107	0,102	0,109	0,054														
	KT193336	11	0,102	0,104	0,111	0,109	0,112	0,111	0,102	0,102	0,059	0,062													
	HM418214	12	0,104	0,106	0,115	0,114	0,117	0,111	0,107	0,111	0,063	0,067	0,031												
	HM418215	13	0,107	0,109	0,115	0,114	0,117	0,111	0,107	0,109	0,063	0,067	0,031	0,003											
<i>Nannaethiops gracilis</i>	KF541851	14	0,120	0,119	0,130	0,128	0,132	0,128	0,120	0,125	0,102	0,101	0,099	0,111	0,111										
	KF541852	15	0,119	0,117	0,132	0,130	0,133	0,130	0,122	0,127	0,104	0,102	0,101	0,112	0,112	0,002									
<i>Neolebias trewavasae</i>	KF541857	16	0,151	0,150	0,145	0,143	0,146	0,141	0,138	0,138	0,143	0,137	0,137	0,128	0,130	0,148	0,146								
	KF541853	17	0,141	0,140	0,145	0,143	0,146	0,146	0,135	0,140	0,137	0,137	0,133	0,132	0,133	0,143	0,141	0,036							
<i>Neolebias ansorgii</i>	KF541859	18	0,164	0,163	0,187	0,185	0,187	0,182	0,187	0,179	0,176	0,180	0,182	0,167	0,169	0,179	0,179	0,148	0,150						
<i>Belonophago hutsebouti</i>	HM418229	19	0,174	0,172	0,190	0,189	0,189	0,192	0,189	0,189	0,180	0,177	0,171	0,163	0,163	0,190	0,192	0,174	0,177	0,195					
<i>Distichodus nefasch</i>	MT300595	20	0,148	0,146	0,163	0,161	0,161	0,164	0,164	0,161	0,159	0,163	0,167	0,156	0,158	0,171	0,172	0,150	0,148	0,161	0,137				
<i>Distichodus sexfasciatus</i>	AB070242	21	0,146	0,145	0,169	0,167	0,171	0,166	0,166	0,161	0,154	0,169	0,154	0,159	0,158	0,161	0,163	0,169	0,171	0,169	0,143	0,089			
<i>Citharinus citharus</i>	HM882704	22	0,195	0,193	0,179	0,177	0,177	0,190	0,189	0,184	0,195	0,193	0,195	0,198	0,200	0,193	0,195	0,205	0,200	0,195	0,193	0,195	0,180		
	HM882705	23	0,203	0,202	0,177	0,176	0,179	0,187	0,185	0,184	0,179	0,190	0,184	0,184	0,187	0,202	0,203	0,193	0,192	0,207	0,198	0,189	0,192	0,109	

Table S3. Estimates of genetic distances (p-distance) between *I6S r RNA* haplotypes (387 bp)

Species	GenBank NCBI		1	2	3	4	5	6	7	8	9	10	11	12
<i>Neolebias unifasciatus</i>	JX985103	1												
<i>Nannaethiops bleheri</i>	JX985104	2	0,039											
	OQ911366	3	0,039	0,003										
<i>Nannaethiops sp.</i>	OQ911367	4	0,034	0,016	0,018									
<i>Nannaethiops unitaeniatus</i>	JX985105	5	0,039	0,023	0,023	0,018								
<i>Neolebias trilineatus</i>	AY788063	6	0,036	0,029	0,029	0,029	0,034							
<i>Neolebias trewavasae</i>	JX985132	7	0,076	0,070	0,068	0,070	0,073	0,055						
<i>Neolebias ansorgii</i>	JX985107	8	0,084	0,076	0,073	0,079	0,076	0,073	0,084					
<i>Neolebias powelli</i>	AY788061	9	0,103	0,105	0,103	0,097	0,100	0,105	0,111	0,079				
<i>Belonophago hutsebouti</i>	JX985128	10	0,096	0,094	0,091	0,086	0,089	0,096	0,117	0,100	0,105			
<i>Distichodus sexfasciatus</i>	AB070242	11	0,076	0,086	0,086	0,076	0,078	0,068	0,073	0,073	0,092	0,089		
<i>Citharinus citharus</i>	AY787989	12	0,110	0,118	0,118	0,110	0,115	0,107	0,102	0,113	0,122	0,131	0,097	



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Fig. S1. Maximum Parsimony (MP) trees with compressed subtrees based on 615-bp *COI* fragment. Length of branches is proportional to the genetic distances between haplotypes; bootstrap support (Felsenstein, 1985) is indicated next to the branching nodes and calculated from 1000 replicas (not specified - bootstrap support is less than 50%).

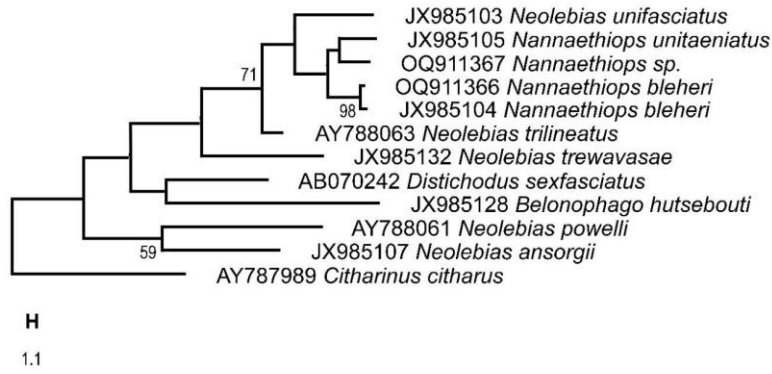


Fig. S2. Maximum Parsimony (MP) trees with compressed subtrees based on 387-bp *16S rRNA* fragment. Length of branches is proportional to the genetic distances between haplotypes; bootstrap support (Felsenstein 1985) is indicated next to the branching nodes and calculated from 1000 replicas (not specified - bootstrap support is less than 50%).

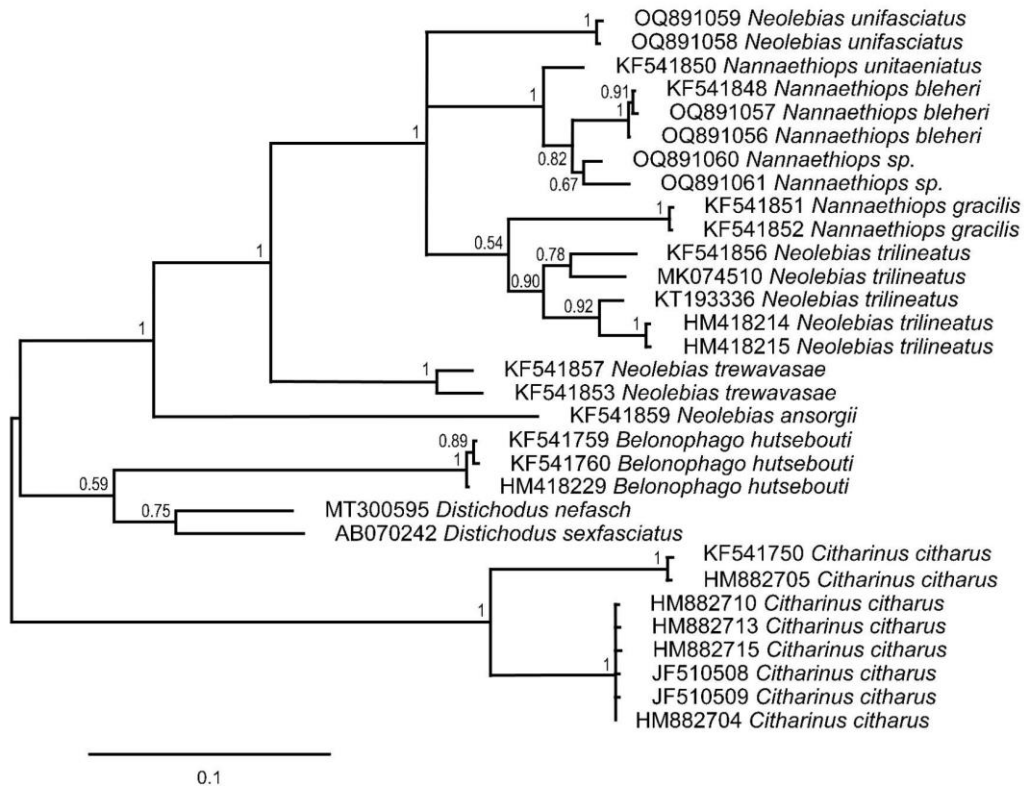


Fig. S3. Bayesian Inference (BI) trees with compressed subtrees based on 615-bp *COI* fragment. Length of branches is proportional to the genetic distances between haplotypes; support is indicated next to the branching nodes and calculated from 10000 replicas (not specified - bootstrap support is less than 0.5).

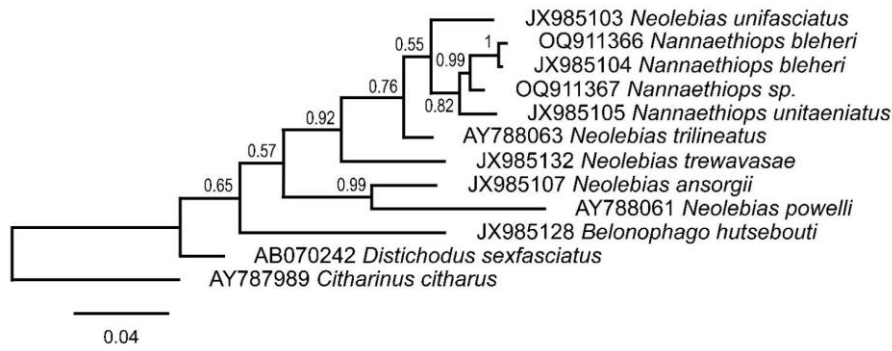


Fig. S4. Bayesian Inference (BI) trees with compressed subtrees based on 387-bp *16S rRNA* fragment. Length of branches is proportional to the genetic distances between haplotypes; support is indicated next to the branching nodes and calculated from 10000 replicas (not specified - bootstrap support is less than 0.5).

Supplementary References

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