

Supplementary Tables and Figures

for Feller *et al.*:

Testing for a role of postzygotic incompatibilities in rapidly speciated Lake Victoria cichlids

Table S1. Overview of the number of F2 individuals and SNPs in each cross.			
Cross	Number of F2 individuals (males, females)	Number of quality-filtered SNPs (of which unmapped scaffolds)	Number of 'fixed sites' † excluding unmapped scaffolds
<i>P. sp.</i> 'nyererei-like' x <i>P. sp.</i> 'pundamilia-like'	218 (171, 47)	10,607 (216)	1,285
<i>P. pundamilia</i> x <i>P. sp.</i> 'red-head'	186 (129, 57)	9,996 (164)	1,878
<i>P. sp.</i> 'nyererei-like' x <i>N. omnicaeruleus</i>	161 (132, 29)	16,650 (361)	2,205

† Only the female was available for the P of *P. sp.* 'nyererei-like' x *P. sp.* 'pundamilia-like'; only two of the four F1s in *P. pundamilia* x *P. sp.* 'red-head'; only three of the four F1s in *P. sp.* 'nyererei-like' x *N. omnicaeruleus*. See Feller *et al.* (2021) for more information.

Table S2. List of samples used in multispecies LD analysis					
Sample	Genus	Species	Location	Sex	Ecology
103637	<i>Astatotilapia</i>	<i>nubila</i>	Luanso	m	insectivore
11536	<i>Astatotilapia</i>	<i>nubila</i> 'rocks'	Python	m	insectivore
109432	<i>Astatotilapia</i>	<i>nubila</i> 'swamp red'	Sweya	m	insectivore
104621	double-stripe group	<i>tanaos</i>	MG Transect	m	zooplanktivore
13819	double-stripe group	<i>thereuterion</i>	Makobe	m	insectivore
104013	<i>Enterochromis</i> I	<i>antleter</i> blue (St. E)	MG Transect	m	detritivore
104016	<i>Enterochromis</i> I	<i>cinctus</i> (St. E)	MG Transect	m	detritivore
108920	<i>Enterochromis</i> I	<i>coprologus</i> (St. E)	MG Transect	m	detritivore
103908	<i>Enterochromis</i> I	sp. 'new invasive'	MG Transect	m	detritivore
103720	<i>Enterochromis</i> I	<i>paropius</i>	MG Transect	m	detritivore
109795	<i>Enterochromis</i> II	<i>coprologus</i>	MG Transect	m	detritivore
11447	<i>Enterochromis</i> II	sp. 'red and blue'	Python	m	detritivore
103767	<i>Enterochromis</i> II	supramacrops 'red tail'	MG Transect	m	detritivore
158683	<i>Platytaeniodus</i>	sp. 'new degeni'	UG3	m	oral sheller/detritivore
TS04	<i>Gaurochromis</i>	<i>hiatus</i>	Sozihe	m	insectivore
TMB3	<i>Gaurochromis</i>	<i>iris</i>	Magu	m	insectivore
11946	<i>Haplochromis</i>	sp. 'purple yellow'	Makobe	m	epiphytic algae scraper
14561	<i>Harpagochromis</i>	<i>cavifrons</i>	Makobe	m	piscivore
161543	<i>Harpagochromis</i>	cf. <i>pachycephalus</i>	?	m	piscivore
109188	<i>Harpagochromis</i>	<i>howesi</i>	Makobe	m?	piscivore
78797	<i>Harpagochromis</i>	sp. 'odd dupper'	Anchor	m	piscivore
13135	<i>Harpagochromis</i>	<i>vonlinnei</i>	Makobe	m	piscivore
109219	Incertae sedis	sp. 'large red deepwater'	Makobe	m	insectivore
13269	Incertae sedis	sp. <i>Lithochrom.</i> /Pundam.	Makobe	m	insectivore
14298	Incertae sedis	sp. 'thick skin'	Makobe	m	insectivore
105005	Incertae sedis	<i>vanoijseni</i>	MG Transect	m	detritivore
80054	<i>Labrochromis</i>	cf. <i>theliodon</i>	MG Transect	m	insectivore-pharyngeal-crusher
Lishmaeli	<i>Labrochromis</i>	<i>ishmaeli</i>	captive stock	m	pharyngeal mollusk crusher
14259	<i>Labrochromis</i>	sp. 'stone'	Makobe	m	pharyngeal mollusk crusher
106641	<i>Labrochromis</i>	sp. '1'	MG Transect	m	pharyngeal mollusk crusher
14175	<i>Lipochromis</i>	<i>cryptodon</i>	Makobe	m	paedophage
130785	<i>Lipochromis</i>	sp. 'matumbi hunter'	Trawling	m	paedophage
11045	<i>Lipochromis</i>	sp. 'velvet black cryptodon'	Makobe	m	paedophage
80805	<i>Lithochromis</i>	sp. 'brown narrow snout'	Mabibi	m	insectivore
13281	<i>Lithochromis</i>	sp. 'orange'	Makobe	m	insectivore
13393	<i>Lithochromis</i>	sp. 'pseudoblue'	Makobe	m	insectivore
2801	<i>Lithochromis</i>	<i>rubripinnis</i>	Luanso	m	insecti-planktivore
11024	<i>Lithochromis</i>	sp. 'scraper'	Makobe	m	epilithic algae scraper
78773	<i>Lithochromis</i>	<i>xanthopteryx</i>	Anchor	m	insectivore
109320	<i>Lithochromis</i>	sp. 'yellow chin'	Makobe	m	zooplanktivore
11965	<i>Hoplotilapia</i>	<i>retrodens</i>	Makobe	m	oral sheller
Ig158	<i>Macropheurodus</i>	<i>bicolor</i>	Igombe	m	oral crusher
10448	<i>Ptyochromis</i>	sp. 'deepwater rock sheller'	Python	m	oral sheller
79623	<i>Ptyochromis</i>	<i>fischeri</i>	Igombe	m	oral sheller
Ig41	<i>Ptyochromis</i>	sp. 'red rock sheller'	Igombe	m?	oral sheller
14245	<i>Ptyochromis</i>	sp. 'striped rock sheller'	Makobe	m	oral sheller
79609	<i>Ptyochromis</i>	<i>xenognathus</i>	Igombe	m	oral sheller
10794	<i>Ptyochromis</i>	<i>xenognathus</i> 'rocks'	Kissenda	m	oral sheller
11347	<i>Mbipia</i>	<i>lutea</i>	Makobe	m	epilithic algae scraper
11003	<i>Mbipia</i>	<i>mbipi</i>	Makobe	m	epilithic algae scraper
10791	<i>Mbipia</i>	sp. 'red carp'	Kissenda	m	epilithic algae scraper
11338	<i>Neochromis</i>	<i>gigas</i>	Makobe	m	epilithic algae scraper
10897	<i>Neochromis</i>	<i>greenwoodi</i>	Anchor	m	epilithic algae scraper
Bi10	<i>Neochromis</i>	sp. 'long black'	Bwiru	m	epilithic algae scraper
106816	<i>Neochromis</i>	<i>omnicaeruleus</i>	Makobe	m	epilithic algae scraper
10619	<i>Neochromis</i>	<i>rufocaudalis</i>	Makobe	m	epilithic algae scraper
11070	<i>Neochromis</i>	sp. 'unicuspid scraper'	Makobe	m	generalist-algae scraper
Na15	<i>Neochromis</i>	sp. 'yellow anal scraper'	Nansio	m	epilithic algae scraper
158795	<i>Paralabidochromis</i>	<i>victoriae</i>	UG4	m?	insect picker
10618	<i>Paralabidochromis</i>	<i>chilotes</i>	Makobe	m	insectivore
11807	<i>Paralabidochromis</i>	<i>chromogynus</i>	Makobe	m	insectivore
130770	<i>Paralabidochromis</i>	<i>crassilabris</i>	Sesse	m	insectivore
104042	<i>Paralabidochromis</i>	<i>plagiodon</i>	MG Transect	m	oral sheller/detritivore
11639	<i>Paralabidochromis</i>	<i>plagiodon</i> 'rocks'	Luanso	m	oral sheller
11049	<i>Paralabidochromis</i>	<i>sauvagei</i>	Makobe	m	insectivore

10628	<i>Paralabidochromis</i>	sp. 'short snout scraper'	Makobe	m	epilithic algae scraper
10577	<i>Paralabidochromis</i>	<i>cyaneus</i>	Makobe	m	insectivore
80344	<i>Paralabidochromis</i>	<i>flavus</i>	Makobe	m	insectivore
Ga2	<i>Paralabidochromis</i>	sp. 'orange anal rockpicker'	Gana	m	insectivore
Ki30	<i>Paralabidochromis</i>	sp. 'pseudorockpicker'	Kissenda	m	insectivore
Ga33	<i>Paralabidochromis</i>	sp. 'sky blue picker'	Gana	m	insectivore
161476	<i>Prognathochromis</i>	<i>dichrourus</i> complex	?	m	piscivore
130786	<i>Prognathochromis</i>	<i>perrieri</i>	lab stock	m	piscivore
10715	<i>Pundamilia</i>	<i>azurea</i>	Ruti	m	zooplanktivore
78887	<i>Pundamilia</i>	sp. 'orange anal nyererei'	Bihiru	m	insectivore
11034	<i>Pundamilia</i>	sp. 'pink anal fin'	Makobe	m	zooplanktivore
84391	<i>Pundamilia</i>	sp. 'red head'	?	m?	insecti-planktivore?
E3c	<i>Pundamilia</i>	sp. 'yellow azurea'	UG/Nsimba	m	insecti-planktivore
Ju22	<i>Pundamilia</i>	sp. 'big blue red'	Juma	m	insectivore
14125	<i>Pundamilia</i>	sp. 'deepwater giant'	Makobe	m	insectivore
IG291	<i>Pundamilia</i>	<i>igneopinnis</i>	Igombe	m	zooplanktivore
11053	<i>Pundamilia</i>	<i>nyererei</i>	Makobe	m	insecti-planktivore
12170	<i>Pundamilia</i>	sp. 'nyererei-like'	Python	m	insecti-planktivore
10554	<i>Pundamilia</i>	<i>pundamilia</i>	Makobe	m	insectivore
11545	<i>Pundamilia</i>	sp. 'pundamilia-like'	Python	m	insectivore
12849	<i>Pundamilia</i>	sp. 'Luanso red'	Luanso	m	insectivore
11154	<i>Pundamilia</i>	sp. 'blue deepwater'	Luanso	m	insectivore
13653	<i>Pundamilia</i>	<i>macrocephala</i>	Makobe	m	insecti-planktivore
12372	<i>Pundamilia</i>	sp. 'yellow deepwater'	Luanso	m	zooplanktivore
103778	<i>Yssichromis</i>	cf. <i>supramacrops</i>	MG Transect	m	zooplanktivore
IG104	<i>Yssichromis</i>	<i>laparogramma</i>	Igombe	m	zooplanktivore
79560	<i>Yssichromis</i>	<i>plumbus</i>	Igombe	m	zooplanktivore
103754	<i>Yssichromis</i>	<i>pyrrhocephalus</i>	MG Transect	m	zooplanktivore
Ypiceatus	<i>Yssichromis</i>	<i>piceatus</i>	lab stock	m?	zooplanktivore

Table S3. List of species used in VCF file used for FST analyses

Genus	Species
<i>Enterochromis</i> I	<i>paropius</i>
<i>Enterochromis</i> I	<i>antleter</i>
<i>Enterochromis</i> I	<i>cinctus</i> (St. E)
<i>Enterochromis</i> I	<i>coprologus</i> I
<i>Enterochromis</i> I	sp. 'new invasive'
<i>Enterochromis</i> II	<i>coprologus</i> F blue morph
<i>Gaurochromis</i>	<i>hiatus</i>
<i>Harpagochromis</i>	<i>cavifrons</i>
<i>Harpagochromis</i>	<i>vonlinnei</i>
<i>Lithochromis</i>	sp. 'scraper'
<i>Lithochromis</i>	'sp. yellow chin'
<i>Mbipia</i>	<i>mbipi</i>
<i>Neochromis</i>	<i>gigas</i>
<i>Neochromis</i>	<i>greenwoodi</i>
<i>Neochromis</i>	<i>omnicaeruleus</i>
<i>Neochromis</i>	sp. 'unicuspid scraper'
<i>Paralabidochromis</i>	<i>sauvagei</i>
<i>Paralabidochromis</i>	sp. 'short snout scraper'
<i>Paralabidochromis</i>	<i>cyaneus</i>
<i>Platytaeniodus</i>	sp. 'new degeni'
<i>Pundamilia</i>	<i>nyererei</i>
<i>Pundamilia</i>	<i>pundamilia</i>
<i>Pundamilia</i>	sp. 'nyererei-like'
<i>Pundamilia</i>	sp. 'pundamilia-like'
<i>Pundamilia</i>	<i>azurea</i>
<i>Pundamilia</i>	sp. 'red head'
<i>Yssichromis</i>	<i>pyrrhocephalus</i>
<i>Yssichromis</i>	<i>plumbus</i>

Table S4. List of species pairs and number of individuals used in FST analyses - sympatric sister species and cross pairs.					
Number of individuals	Genus	Species	Location	Lake	Ecology
Pair 1					
5	<i>Pundamilia</i>	<i>nyererei</i>	Makobe	Victoria	insecti-planktivore
5	<i>Pundamilia</i>	<i>pundamilia</i>	Makobe	Victoria	insectivore
Pair 2 ('PNP' and 'PPP') †					
5	<i>Pundamilia</i>	sp. 'nyererei-like'	Python	Victoria	insecti-planktivore
5	<i>Pundamilia</i>	sp. 'pundamilia-like'	Python	Victoria	insectivore
Pair 3					
3	<i>Neochromis</i>	<i>omnicaeruleus</i>	Makobe	Victoria	epilithic algae scraper
3	<i>Neochromis</i>	sp. 'unicuspid scraper'	Makobe	Victoria	generalist-algae scraper
Pair 4					
3	<i>Yssichromis</i>	<i>pyrrhocephalus</i>	MG Transect?	Victoria	zooplanktivore
3	<i>Yssichromis</i>	<i>plumbus</i>	?	Victoria	zooplanktivore
Pair 5					
5	<i>Mbipia</i>	<i>mbipi</i>	Makobe	Victoria	epilithic algae scraper
5	<i>Pundamilia</i>	sp. 'pink anal fin'	Makobe	Victoria	zooplanktivore
Pair 6					
3	<i>Neochromis</i>	<i>gigas</i>	Makobe	Victoria	epilithic algae scraper
3	<i>Paralabidochromis</i>	<i>cyaneus</i>	Makobe	Victoria	insectivore
Pair 7					
3	<i>Lithochromis</i>	sp. 'scraper'	Makobe	Victoria	epilithic algae scraper
3	<i>Lithochromis</i>	sp. 'yellow chin'	Makobe	Victoria	zooplanktivore
Pair 8					
5	<i>Enterochromis</i> I	<i>cinctus</i> (St. E)	MG Transect	Victoria	detritivore
5	<i>Enterochromis</i> II	<i>coproloaus</i> F blue morph	MG Transect	Victoria	detritivore
Pair 9					
3	<i>Enterochromis</i> I	sp. 'new invasive'	MG Transect	Victoria	detritivore
3	<i>Yssichromis</i>	<i>pyrrhocephalus</i>	MG Transect	Victoria	zooplanktivore
Pair 10					
4	<i>Enterochromis</i> I	<i>paropius</i>	MG Transect	Victoria	detritivore
4	<i>Enterochromis</i> I	<i>coprologus</i> I	MG Transect	Victoria	detritivore
Pair 11					
3	<i>Enterochromis</i> I	<i>antleter</i>	MG Transect	Victoria	detritivore
3	<i>Platytaeniodus</i>	sp. 'new degeni'	MG Transect	Victoria	oral sheller/detritivore
Pair ('PNP' and 'NOM') †					
3	<i>Pundamilia</i>	sp. 'nyererei-like'	Python	Victoria	insecti-planktivore
3	<i>Neochromis</i>	<i>omnicaeruleus</i>	Makobe	Victoria	epilithic algae scraper
Pair ('PPM' and 'PRHZ') †					
3	<i>Pundamilia</i>	<i>pundamilia</i>	Makobe	Victoria	insectivore
3	<i>Pundamilia</i>	sp. 'red head'	Zue?	Victoria	?

† cross species pairs

Table S5. List of species pairs and number of individuals used in FST analyses - non-sister species.					
	Genus	Species	Location	Lake	Ecology
Pair 1					
3	<i>Pundamilia</i>	<i>nyererei</i>	Makobe	Victoria	insecti-planktivore
3	<i>Neochromis</i>	<i>omnicaeruleus</i>	Makobe	Victoria	epilithic algae scraper
Pair 2					
3	<i>Pundamilia</i>	<i>pundamilia</i>	Makobe	Victoria	insectivore
3	<i>Yssichromis</i>	<i>pyrrhocephalus</i>	MG Transect	Victoria	zooplanktivore
Pair 3					
3	<i>Yssichromis</i>	<i>plumbus</i>	Igombe	Victoria	zooplanktivore
3	<i>Neochromis</i>	<i>gigas</i>	Makobe	Victoria	epilithic algae scraper
Pair 4					
3	<i>Pundamilia</i>	sp. 'nyererei-like'	Python	Victoria	insecti-planktivore
3	<i>Lithochromis</i>	sp. 'scraper'	Makobe	Victoria	epilithic algae scraper
Pair 5					
3	<i>Lithochromis</i>	sp. 'yellow chin'	Makobe	Victoria	zooplanktivore
3	<i>Enterochromis</i> I	<i>cinctus</i> (St. E)	MG Transect	Victoria	detritivore
Pair 6					
5	<i>Pundamilia</i>	sp. 'pundamilia-like'	Python	Victoria	insectivore
5	<i>Enterochromis</i> II	<i>coprologus</i> F blue morph	MG Transect	Victoria	detritivore
Pair 7					
5	<i>Mbipia</i>	<i>mbipi</i>	Makobe	Victoria	epilithic algae scraper
5	<i>Enterochromis</i> I	<i>paropius</i>	MG Transect	Victoria	detritivore
Pair 8					
3	<i>Enterochromis</i> I	<i>antleter</i>	MG Transect	Victoria	detritivore
3	<i>Neochromis</i>	sp. 'unicuspid scraper'	Makobe	Victoria	generalist-algae scraper
Pair 9					
3	<i>Paralabidochromis</i>	<i>cyaneus</i>	Makobe	Victoria	insectivore
3	<i>Pundamilia</i>	sp. 'pink anal fin'	Makobe	Victoria	zooplanktivore
Pair 10					
3	<i>Enterochromis</i> I	sp. 'new invasive'	MG Transect	Victoria	detritivore
3	<i>Pundamilia</i>	sp. 'pundamilia-like'	Python	Victoria	insectivore
Pair 11					
3	<i>Platytaeniodus</i>	sp. 'new degeni'	MG Transect	Victoria	oral sheller/detritivore
3	<i>Pundamilia</i>	sp. 'red head'	Zue	Victoria	?

Table S6. Windows containing both a SNP with segregation distortion in either of the three crosses and a SNP in high multispecies LD with an r^2 of >0.5 . Bold windows are also overlapping in the $r^2 > 0.6$ subset and the italic window only appears in the latter subset, which is due to the thinning method where only one of two SNPs within 50 kb of each other were kept (randomly).

chromosome	start	end	found in cross
chr1	12350000	12399999	PPMxPRHZ
chr4	20650000	20699999	PNPxPPP
chr4	22400000	22449999	PNPxPPP
chr6	850000	899999	PPMxPRHZ
chr6	20700000	20749999	PNPxPPP
chr6	21550000	21599999	PNPxPPP
chr6	26000000	26049999	PNPxPPP
chr6	27300000	27349999	PNPxPPP
chr6	27900000	27949999	PNPxPPP
chr6	30900000	30949999	PNPxPPP
chr7	29500000	29549999	PPMxPRHZ
chr9	4500000	4549999	PPMxPRHZ
chr10	29700000	29749999	PNPxNOM
chr10	34050000	34099999	PNPxNOM
chr10	37200000	37249999	PNPxNOM
chr13	11500000	11549999	PNPxPPP
chr14	350000	399999	PNPxPPP
chr14	6050000	6099999	PNPxPPP
chr14	12150000	12199999	PPMxPRHZ
chr14	12300000	12349999	PPMxPRHZ
chr14	12450000	12499999	PNPxPPP
chr14	15600000	15649999	PPMxPRHZ
chr14	19350000	19399999	PNPxPPP
chr14	20550000	20599999	PNPxPPP
chr14	20800000	20849999	PPMxPRHZ
chr14	22900000	22949999	PNPxPPP
chr15	6900000	6949999	PPMxPRHZ
chr15	10550000	10599999	PPMxPRHZ
chr16	1700000	1749999	PNPxNOM
chr16	1900000	1949999	PNPxPPP
chr16	7550000	7599999	PNPxPPP
chr16	8800000	8849999	PNPxPPP
chr18	10750000	10799999	PPMxPRHZ
<i>chr18</i>	<i>16650000</i>	<i>16700000</i>	<i>PNPxNOM</i>
chr20	650000	699999	PNPxNOM
chr22	4300000	4349999	PPMxPRHZ
chr22	17700000	17749999	PPMxPRHZ
chr22	24950000	24999999	PNPxNOM

Table S7. Results of Pearson's correlation tests of weighted FST scores between sympatric sister species pairs.

pair1	pair2	t	df	CI low.	CI up.	corr.	p-value
Pundamilia nyererei vs Pundamilia pundamilia	Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	16.86	12672	0.131	0.165	0.148	4.2E-63
Pundamilia nyererei vs Pundamilia pundamilia	Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	11.98	12536	0.089	0.124	0.106	6.5E-33
Pundamilia nyererei vs Pundamilia pundamilia	Yssichromis pyrrhocephalus vs Yssichromis plumbus	16.71	12525	0.131	0.165	0.148	4.8E-62
Pundamilia nyererei vs Pundamilia pundamilia	Neochromis gigas vs Paralabidochromis cyaneus	28.13	12735	0.225	0.258	0.242	5.6E-169
Pundamilia nyererei vs Pundamilia pundamilia	Neochromis gigas vs Paralabidochromis cyaneus	12.34	12549	0.092	0.127	0.109	8.8E-35
Pundamilia nyererei vs Pundamilia pundamilia	Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	14.72	12650	0.113	0.147	0.130	1.1E-48
Pundamilia nyererei vs Pundamilia pundamilia	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	25.83	12721	0.207	0.240	0.223	2.2E-143
Pundamilia nyererei vs Pundamilia pundamilia	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	23.38	12620	0.187	0.220	0.204	2.2E-118
Pundamilia nyererei vs Pundamilia pundamilia	Enterochromis I paropius vs Enterochromis I coprologus	26.02	12711	0.208	0.241	0.225	1.7E-145
Pundamilia nyererei vs Pundamilia pundamilia	Enterochromis I antleter vs Platytaeniodus 'new degeni'	22.91	12622	0.183	0.216	0.200	8.3E-114
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	6.52	12525	0.041	0.076	0.058	7.4E-11
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Yssichromis pyrrhocephalus vs Yssichromis plumbus	8.51	12501	0.058	0.093	0.076	2.0E-17
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	10.18	12718	0.073	0.107	0.090	2.9E-24
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Neochromis gigas vs Paralabidochromis cyaneus	8.13	12537	0.055	0.090	0.072	4.7E-16
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	6.92	12625	0.044	0.079	0.061	4.7E-12
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	15.84	12701	0.122	0.156	0.139	5.5E-56
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	12.10	12589	0.090	0.124	0.107	1.6E-33
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Enterochromis I paropius vs Enterochromis I coprologus	15.45	12696	0.119	0.153	0.136	2.2E-53
Pundamilia sp. 'nyererei-like vs Pundamilia sp. 'pundamilia-like'	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	11.77	12604	0.087	0.121	0.104	8.3E-32
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Yssichromis pyrrhocephalus vs Yssichromis plumbus	10.61	12412	0.077	0.112	0.095	3.5E-26
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	7.19	12571	0.047	0.081	0.064	7.1E-13
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Neochromis gigas vs Paralabidochromis cyaneus	2.18	12453	0.002	0.037	0.020	2.9E-02
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	1.31	12498	-0.006	0.029	0.012	1.9E-01
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	10.02	12558	0.072	0.106	0.089	1.6E-23
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	6.17	12481	0.038	0.073	0.055	6.9E-10
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Enterochromis I paropius vs Enterochromis I coprologus	5.87	12552	0.035	0.070	0.052	4.4E-09
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	5.16	12504	0.029	0.064	0.046	2.5E-07
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	13.85	12574	0.105	0.140	0.123	2.8E-43
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Neochromis gigas vs Paralabidochromis cyaneus	3.94	12429	0.018	0.053	0.035	8.2E-05
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	4.62	12488	0.024	0.059	0.041	3.8E-06
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	8.78	12563	0.061	0.095	0.078	1.9E-18
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	30.51	12547	0.246	0.279	0.263	3.0E-197
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Enterochromis I paropius vs Enterochromis I coprologus	13.13	12566	0.099	0.134	0.116	3.9E-39
Yssichromis pyrrhocephalus vs Yssichromis plumbus	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	12.07	12505	0.090	0.125	0.107	2.3E-33
Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	Neochromis gigas vs Paralabidochromis cyaneus	5.78	12588	0.034	0.069	0.051	7.8E-09
Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	4.87	12701	0.026	0.060	0.043	1.2E-06
Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	11.44	12794	0.083	0.118	0.101	3.8E-30
Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	14.20	12669	0.108	0.142	0.125	2.0E-45
Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	Enterochromis I paropius vs Enterochromis I coprologus	21.34	12777	0.169	0.202	0.185	2.8E-99

Mbipia mbipi vs Pundamilia sp. 'pink anal fin'	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	20.22	12670	0.160	0.194	0.177	1.7E-89
Neochromis gigas vs Paralabidochromis cyaneus	Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	6.45	12524	0.040	0.075	0.058	1.1E-10
Neochromis gigas vs Paralabidochromis cyaneus	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	7.06	12578	0.045	0.080	0.063	1.7E-12
Neochromis gigas vs Paralabidochromis cyaneus	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	8.47	12493	0.058	0.093	0.076	2.6E-17
Neochromis gigas vs Paralabidochromis cyaneus	Enterochromis I paropius vs Enterochromis I coprologus	7.57	12583	0.050	0.085	0.067	4.0E-14
Neochromis gigas vs Paralabidochromis cyaneus	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	10.62	12520	0.077	0.112	0.095	3.0E-26
Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	12.06	12701	0.089	0.124	0.106	2.7E-33
Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	11.80	12578	0.087	0.122	0.105	5.6E-32
Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	Enterochromis I paropius vs Enterochromis I coprologus	12.76	12676	0.095	0.130	0.113	4.5E-37
Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	12.02	12601	0.089	0.124	0.106	4.4E-33
Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	12.40	12658	0.092	0.127	0.110	4.3E-35
Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	Enterochromis I paropius vs Enterochromis I coprologus	11.51	12772	0.084	0.118	0.101	1.7E-30
Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	11.78	12668	0.087	0.121	0.104	6.9E-32
Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	Enterochromis I paropius vs Enterochromis I coprologus	16.85	12668	0.131	0.165	0.148	4.8E-63
Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	13.47	12583	0.102	0.136	0.119	4.7E-41
Enterochromis I paropius vs Enterochromis I coprologus	Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'	14.94	12659	0.114	0.149	0.132	5.1E-50
Results of Pearson's correlation tests of weighted FST scores with recombination rate							
Pundamilia nyererei vs Pundamilia pundamilia		-6.37	1542	-0.208	-0.111	-0.160	2.5E-10
Pundamilia sp. 'nyererei-like' vs Pundamilia sp. 'pundamilia-like'		-5.97	1538	-0.199	-0.101	-0.151	2.9E-09
Neochromis omnicaeruleus vs Neochromis sp. 'unicuspid scraper'		-2.94	1526	-0.125	-0.025	-0.075	3.4E-03
Yssichromis pyrrhocephalus vs Yssichromis plumbus		-4.50	1525	-0.164	-0.065	-0.114	7.5E-06
Mbipia mbipi vs Pundamilia sp. 'pink anal fin'		-6.06	1545	-0.201	-0.103	-0.152	1.7E-09
Neochromis gigas vs Paralabidochromis cyaneus		-2.86	1523	-0.123	-0.023	-0.073	4.2E-03
Lithochromis sp. 'scraper' vs Lithochromis sp. 'yellow chin'		-2.66	1549	-0.117	-0.018	-0.067	8.0E-03
Enterochromis I cinctus (E) vs Enterochromis II coprologus (F blue)		-5.69	1548	-0.191	-0.094	-0.143	1.6E-08
Enterochromis I sp. 'new invasive' vs Yssichromis pyrrhocephalus		-3.26	1536	-0.132	-0.033	-0.083	1.1E-03
Enterochromis I paropius vs Enterochromis I coprologus		-4.44	1547	-0.161	-0.063	-0.112	9.4E-06
Enterochromis I antleter vs Platytaeniodus sp. 'new degeni'		-4.29	1537	-0.158	-0.059	-0.109	1.9E-05

Table S8. List of genes in which high multispecies LD ($r^2 > 0.5$ and/or > 0.6) SNPs are located that are fixed between the extant relatives of the radiation ancestors and are also situated in windows with top 5% FST outliers (between any of the tested species pairs).

chr	start	end	gene name	Makobe island cichlid gene (<i>P. nyererei</i> v.1) on Ensembl	GO annotations (UniProt) cellular component	GO annotations (UniProt) molecular function	GO annotations (UniProt) biological process	sister pairs	non-sister pairs
1	11402815	11405602	mrpl48	Mitochondrial ribosomal protein L48	mitochondrial ribosome	n/a	n/a	3	1
2	24101268	24236959	mgat4c	Alpha-1,3 -mannosyl-glycoprotein 4-beta-N-acetyl glucosaminyl transferase C-like	n/a	n/a	n/a	1,2,4,7,8,9	3,4,5,10,11
2	26199951	26207444	dusp11	Dual specificity phosphatase 11	n/a	protein tyrosine/ serine/ threonine phosphatase activity	protein dephosphorylation	4,5	7
2	28005791	28180551	cadps2	Ca ⁺⁺ -dependent secretion activator 2	cytoplasmic vesicle, presynapse	n/a	dense core granule exocytosis, synaptic vesicle exocytosis	4,5	4,5,7,9
4	3663902	3801979	man1a2	mannosidase alpha class 1A member 2	membrane	calcium ion binding, mannosyl-oligosaccharide 1,2-alpha-mannosidase activity	carbohydrate metabolic process, determination of heart/ liver/ pancreatic left/right asymmetry, intrahepatic bile duct development, regulation of cilium assembly	n/a	10
5	316469	328106	si:ch211-112g6.4	uncharacterized LOC102211607	n/a	n/a	n/a	9	3
6	1526352	1853564	GRIK2	glutamate receptor ionotropic, kainate 2-like	postsynaptic membrane	ionotropic glutamate receptor activity	n/a	3,5,10	1,3,6,7
6	5415106	5603199	ptpru	Protein tyrosine phosphatase receptor type Ub	membrane	protein tyrosine phosphatase activity	protein dephosphorylation	2,8,11	n/a
6	9549914	9574871	zhx2	zinc fingers and homeoboxes 2	nucleus	DNA binding	n/a	n/a	6
7	798190	887629	adgrl2	Adhesion G protein-coupled receptor L2a	membrane	carbohydrate binding, G protein-coupled receptor activity	cell surface receptor signaling pathway	8,11	2,9
7	4721822	4747907	armc9	Armadillo repeat containing 9	centriole, ciliary basal body, cytoplasm	n/a	cilium assembly	1,8	n/a
9	24590258	24614358	n/a	n/a	n/a	n/a	n/a	6,7	5,9
12	33166145	33239783	tmem178b	Transmembrane protein 178B	membrane	n/a	n/a	8	n/a
13	13170434	13279908	ptprg	Protein tyrosine phosphatase receptor type G	membrane	carbonate dehydratase activity, zinc ion binding	n/a	7,11	n/a
13	23851482	23861896	fam219aa	protein FAM219A	n/a	n/a	n/a	8	n/a
13	24060216	24085468	lox12a	lysyl oxidase homolog 2A-like	extracellular space, membrane	copper ion binding, protein-lysine 6-oxidase activity, scavenger receptor activity	peptidyl-lysine oxidation, sprouting angiogenesis	8	n/a

13	25639751	25781707	cpne5b	copine-8-like	n/a	calcium-dependent phospholipid binding Source	n/a	1,10	1
13	26328980	26331331	opn1lw1	red-sensitive opsin	membrane	G protein-coupled receptor activity, photoreceptor activity	phototransduction, visual perception	1,2,4,10,11	2,6,7
15	2410998	2418594	n/a	n/a	n/a	n/a	n/a	7,8	n/a
15	22766186	22824294	n/a	transcription factor COE3-like	nucleus	DNA binding, DNA-binding transcription factor activity, metal ion binding	n/a	n/a	3
16	17940301	17944614	bcap29	B cell receptor associated protein 29	endoplasmic reticulum membrane	endoplasmic reticulum to Golgi vesicle-mediated transport, intracellular protein transport, protein localization to endoplasmic reticulum exit site	n/a	n/a	10
17	10115782	10123352	n/a	cytosolic sulfotransferase 3-like	n/a	sulfotransferase activity	n/a	1	n/a
17	12572258	12606006	b4galt5	UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide 5	Golgi cisterna membrane, Golgi membrane	glycosyltransferase activity, metal ion binding	carbohydrate metabolic process, dorsal/ventral axis specification, otolith development, positive regulation of BMP signaling pathway, protein glycosylation, proteoglycan biosynthetic process	5,10,11	11
20	602637	626056	CASKIN2	casin-2-like	n/a	n/a	n/a	1,5,8,10	1,6,7,8
20	21206539	21254556	n/a	n/a	n/a	n/a	n/a	4	9
22	3170729	3184972	zbtb34	zinc finger and BTB domain-containing protein 34-like	n/a	n/a	n/a	4	n/a
22	3578170	3614889	glt1d1	Glycosyltransferase 1 domain containing 1	n/a	glycosyltransferase activity	n/a	3	7,8,10
22	5992293	6522529	grid2	Glutamate receptor, ionotropic, delta 2	postsynaptic membrane	ionotropic glutamate receptor activity	n/a	2	n/a
22	10654447	10673831	serinc5	Serine incorporator 5	plasma membrane	n/a	n/a	7	5

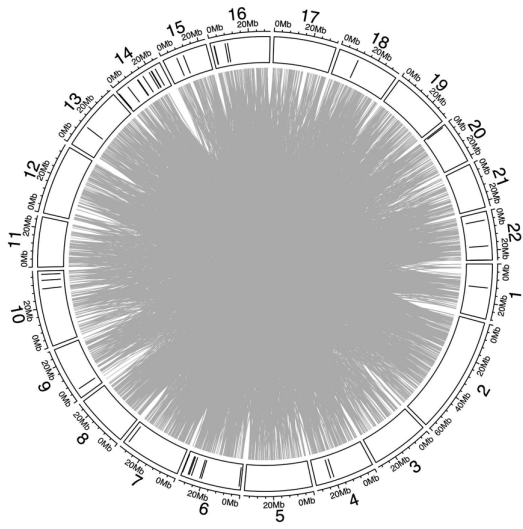


Fig. S1 Multispecies inter-chromosomal LD versus segregation distortion in the three crosses. The outer tract shows the locations of the 50 kb windows that contained both a segregation distortion SNPs from either of the three crosses and a SNP in high multispecies inter-chromosomal LD ($r^2 > 0.5$). The gray lines in the middle indicate the connections between the SNPs in multispecies inter-chromosomal LD pairs with an $r^2 > 0.5$.

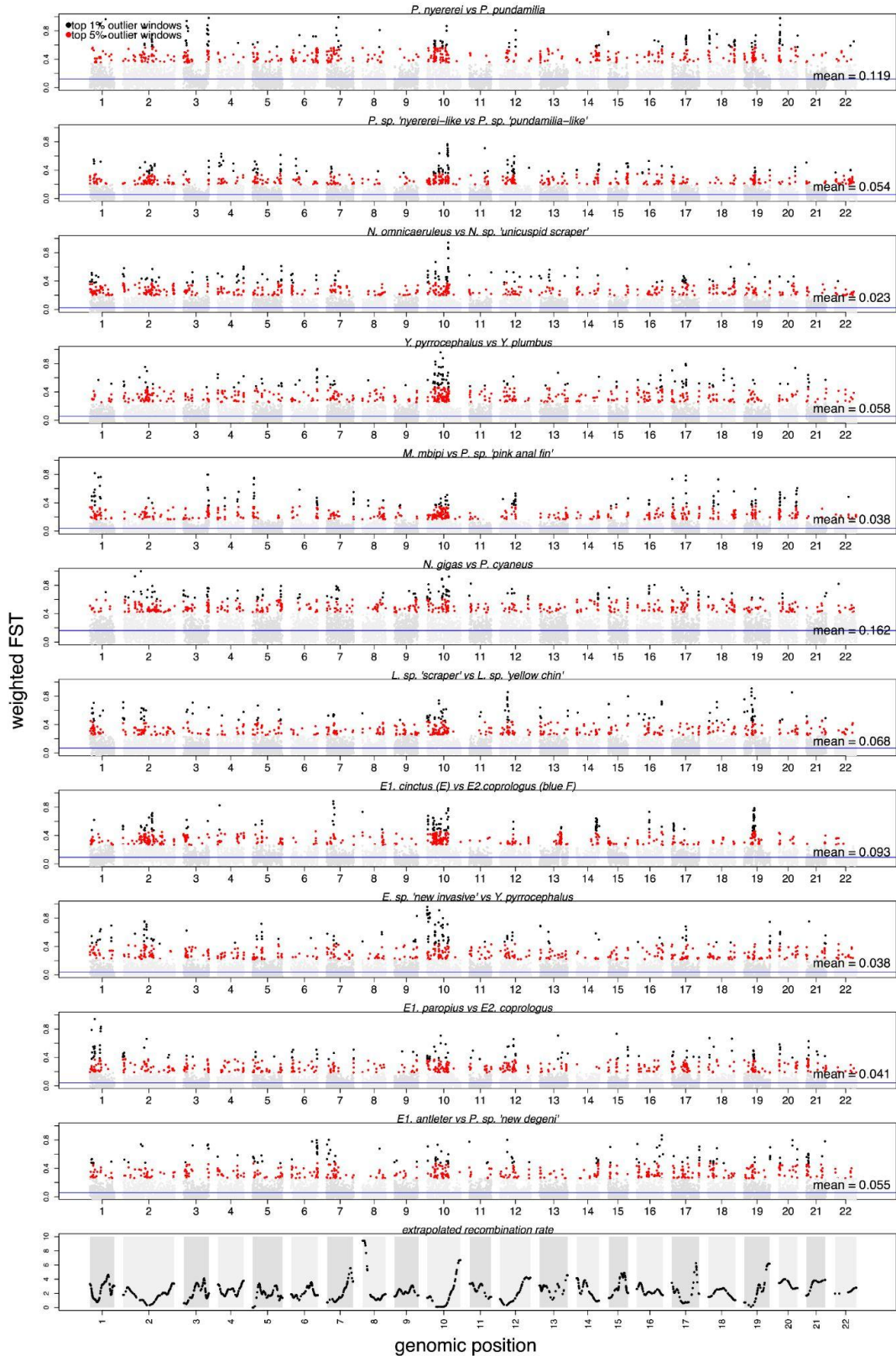


Fig. S2. FST landscapes between 11 sympatric sister species pairs (see also Table S4) and recombination landscape inferred from the *P. pundamilia* x *P. sp. 'red-head'* cross by Feulner *et al.* (2018). The FST landscapes are highly correlated with each other as well as with the recombination landscape (Table S7).

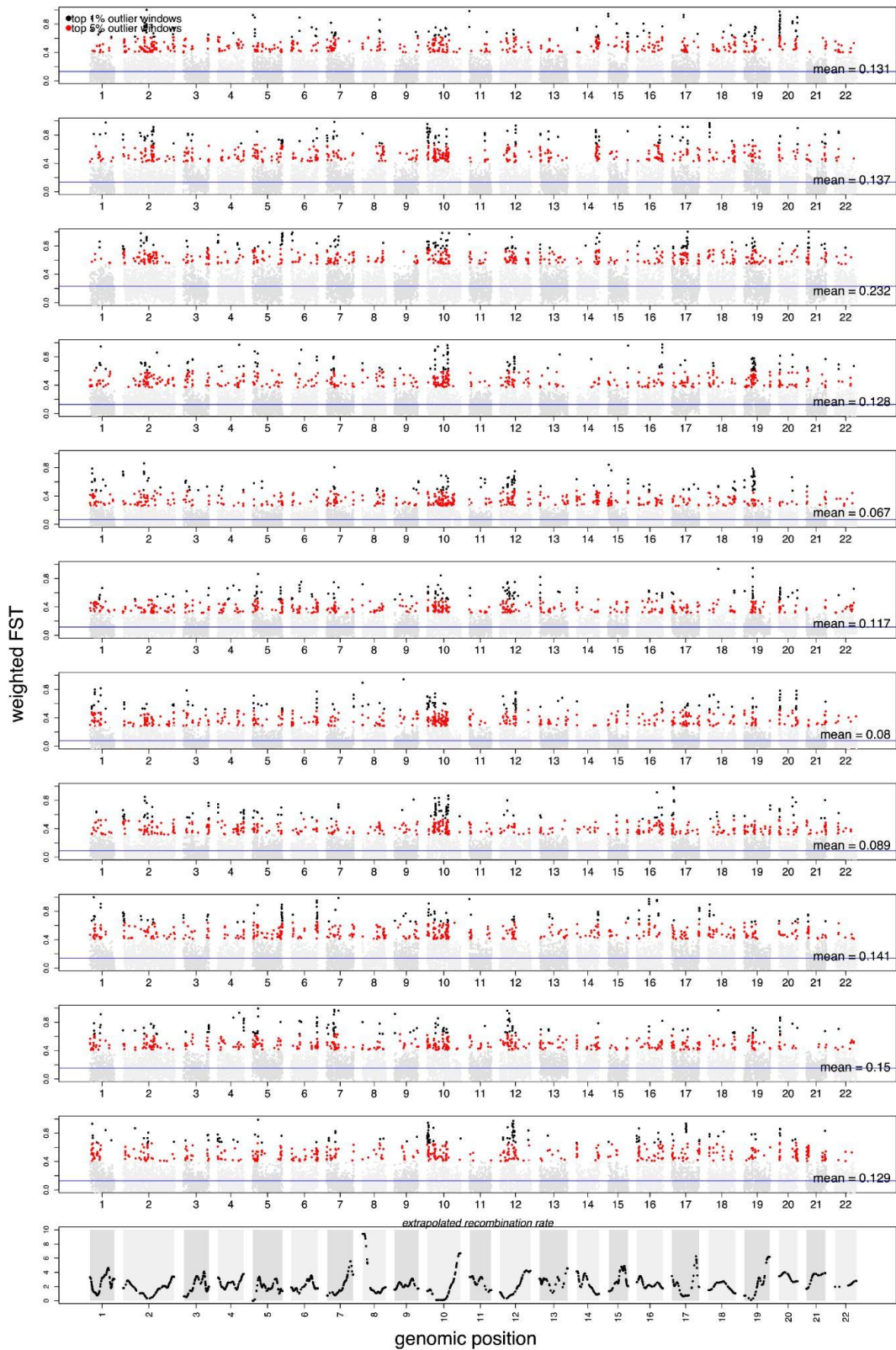


Fig. S3. FST landscapes between 11 non-sister species pairs. See Table S5 for information on species pairs (in the same order).

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- Feller, A.F., Ogi, V., Seehausen, O. & Meier, J.I. (2021) Identification of a novel sex determining chromosome in cichlid fishes that acts as XY or ZW in different lineages. *Hydrobiologia*, **848**, 3727–3745.
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