

# Supporting Information

Duponchelle et al. 10.1073/pnas.0802343105

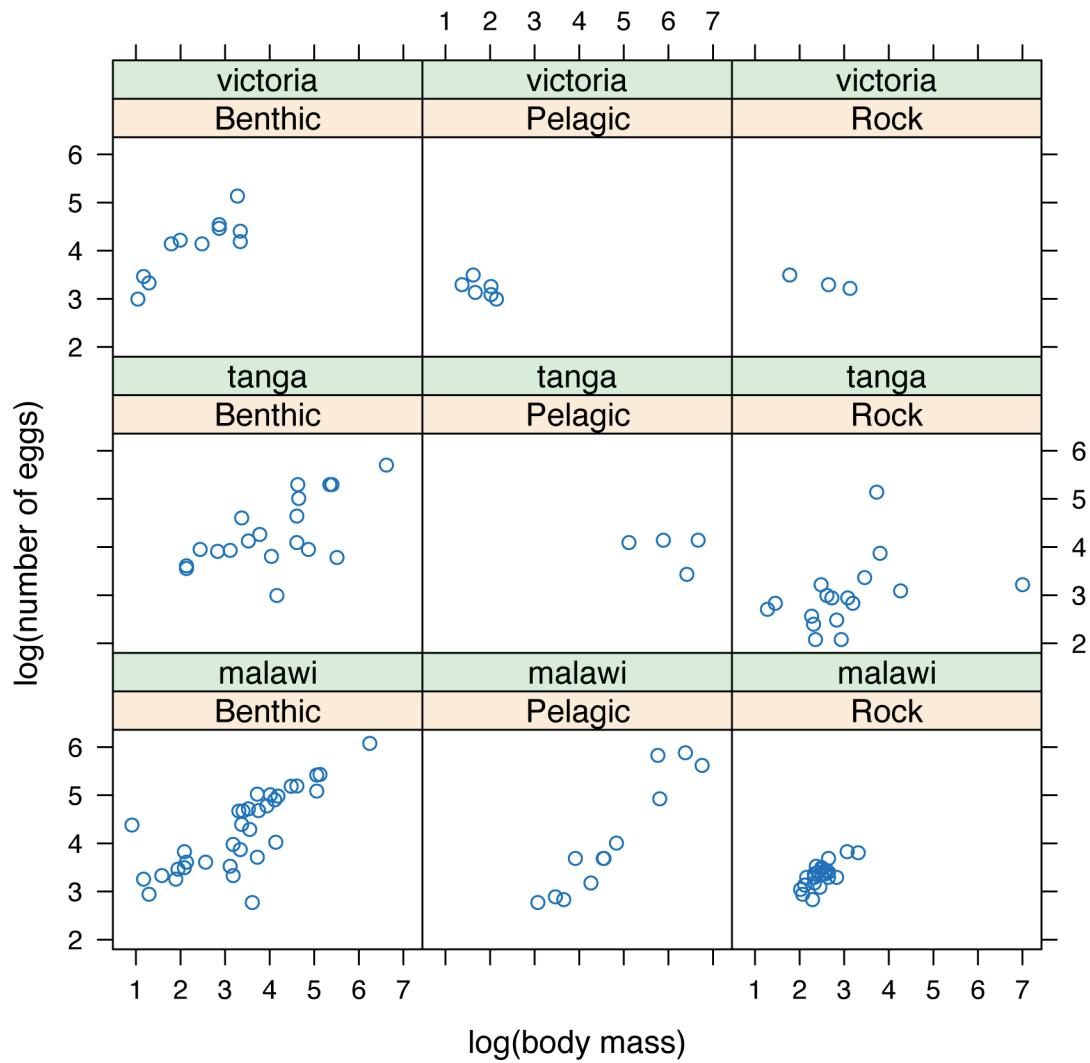
## SI Text

Accession numbers of the 581 sequences of control region (D-Loop) (\*, sequences kept for the analyses):

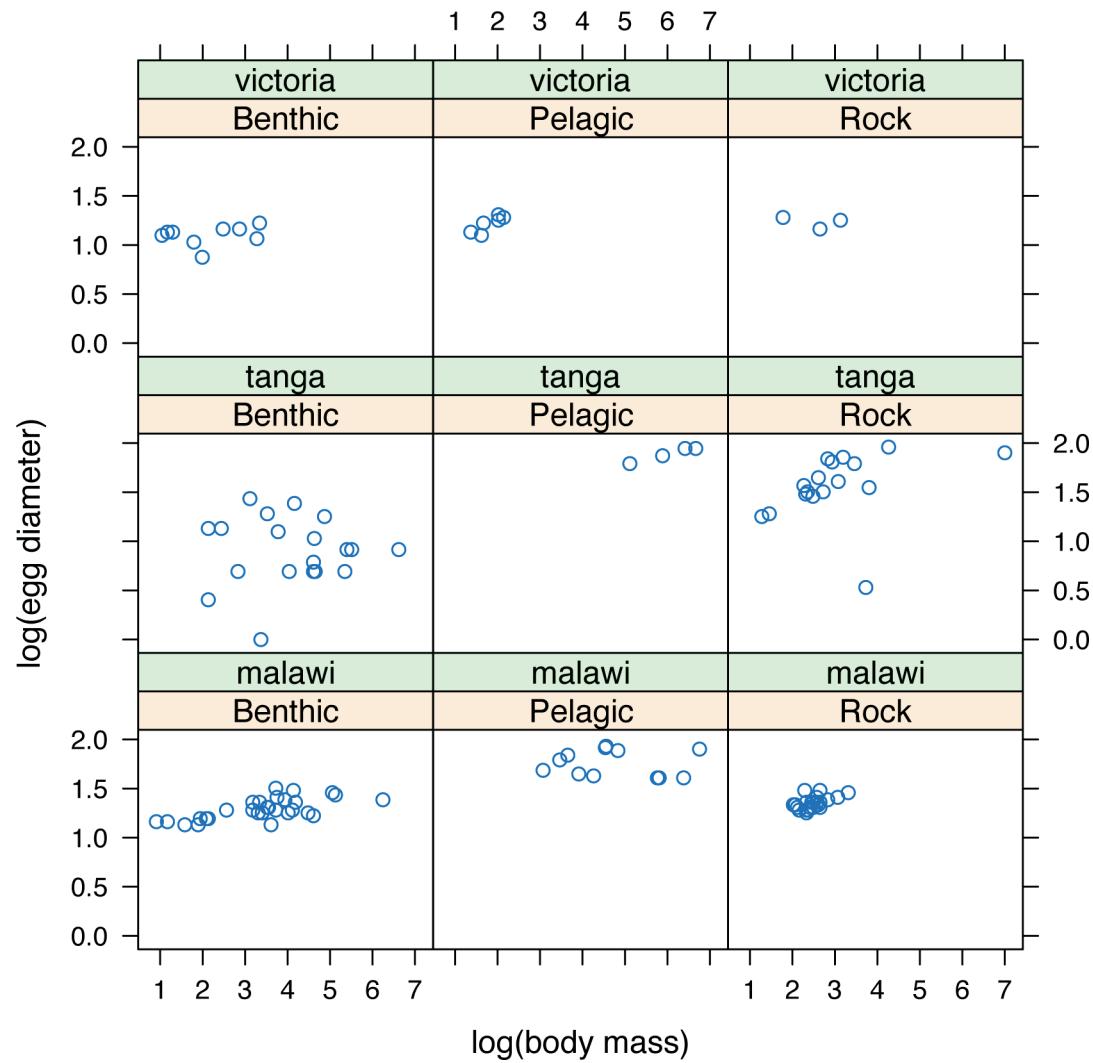
F213520\*-AF213522\*, AF213526\*, AF213541\*, AF213542\*, AF213554\*, AF213619\*-AF213621\*, AF213623\*, AF213624\*, AF213626\*, AF298907\*-AF298928\*, AF298930\*-AF298937\*, AF298942\*-AF298957\*, AF298959\*-AF298961\*, AF298964\*-AF298967\*, AF298969\*-AF298975\*, AF298977\*-AF298979\*, AF298982\*, AF298984\*, AF298985\*, AF400702\*, AF400706\*, AF400707\*, AF400710\*, AF400726\*, AF400727\*, AF400729\*-AF400732\*, AF400734\*, AF400735\*, AF400737\*, AJ291404\*, AJ291409\*, AJ291410\*, AJ291412\*, AJ295929\*, AJ407078-AJ407143, AJ489716, AJ492025-AJ492142, AJ492143\*-AJ492145\*, AJ506160\*, AY226786\*, AY301960\*-AY301963\*, AY301964-AY301966, AY301973, AY301974, AY338979\*-AY338981\*, AY338982-AY338986, AY339003-AY339009, AY339027\*-AY339029\*, AY339033\*-AY339035\*, AY339037\*-AY339039\*, AY339042\*-AY339045\*, AY339050\*-AY339053\*, AY574581\*-AY574583\*, AY574585, AY574587\*, AY574589, AY574591, AY574604-AY574608, AY574610\*, AY574611, AY574612, AY574614, AY574615, AY574618, AY574619, AY574628, AY574633, AY615431-AY615445, AY615462-AY615475, AY615476\*-AY615478\*, AY615479-AY615496, AY615497\*-AY615499\*, AY629408\*, AY629411\*, AY663759\*, AY663761\*-AY663767\*, AY663781\*-AY663783\*, AY682486\*, AY682487\*, AY682501\*-AY682506\*, AY682508\*, AY740289\*, AY740320\*, AY740328\*-AY740331\*, AY913939\*, AY913940\*, AY929939\*, AY929940\*, AY929956\*, AY929961, AY929962, AY929964\*, AY929972, AY929974, AY929975\*, AY929978, AY929980, AY930020, AY930021, AY930023, AY930024\*, AY930025\*, AY930039\*, AY930040\*, DQ054907\*, U01107\*, U01109\*, U01111, U01113\*-U01116\*, U01927\*-U01931\*, U01933\*-U01935\*, U01938\*-U01944\*, U01951\*-U01954\*, U12547\*-U12549, U12551\*, U13597\*, U13600\*-U13607\*, U38808, U38984, U38985\*, U38986-U38995, U50347\*-U50349\*, U90760\*-U90766\*, U90768\*-U90781\*, X58151\*, X58152\*, X90593\*-X90595\*, X90596-X90603, X90604\*-X90609\*, X90610, X90626\*, Z21750\*, Z97410-Z97418, Z97420-Z97438, Z97461-Z97463, Z97465

Accession numbers of the 134 sequences of the NADH-2:

AF305246, AF305249, AF305250, AF305252, AF305255- AF305261, AF305266-AF305268, AF305276, AF305281- AF305283, AF305287-AF305291, AF305297, AF305298, AF305304, AF305310-AF305314, AF305316, AF305318, AF305321, AF305323, AF317240, AF317265, AF317266, AF317268, AF317272, AF398214-AF398216, AF398218, AF398220-AF398225, AF398227, AF398229, AF398230, AF398232, AY337767, AY337769, AY337770, AY337774, AY337778, AY337779, AY337781-AY337783, AY337785-AY337787, AY337790, AY337795, AY663716, AY663717-AY663722, AY663736, AY663737, AY682518-AY682524, AY682538-AY682542, AY682544, AY682546, AY740343, AY740370, AY740379-AY740381, AY930048, AY930061, AY930066-AY930071, AY930085, AY930087, AY930088, AY930091, AY930093, AY930100, AY930107, DQ055006, DQ055010, DQ055018, DQ055041, DQ093109, DQ093110, DQ093113-DQ093115, U07239-U07242, U07247, U07248, U07254, U07257, U07260-U07263, U07267, U07270.



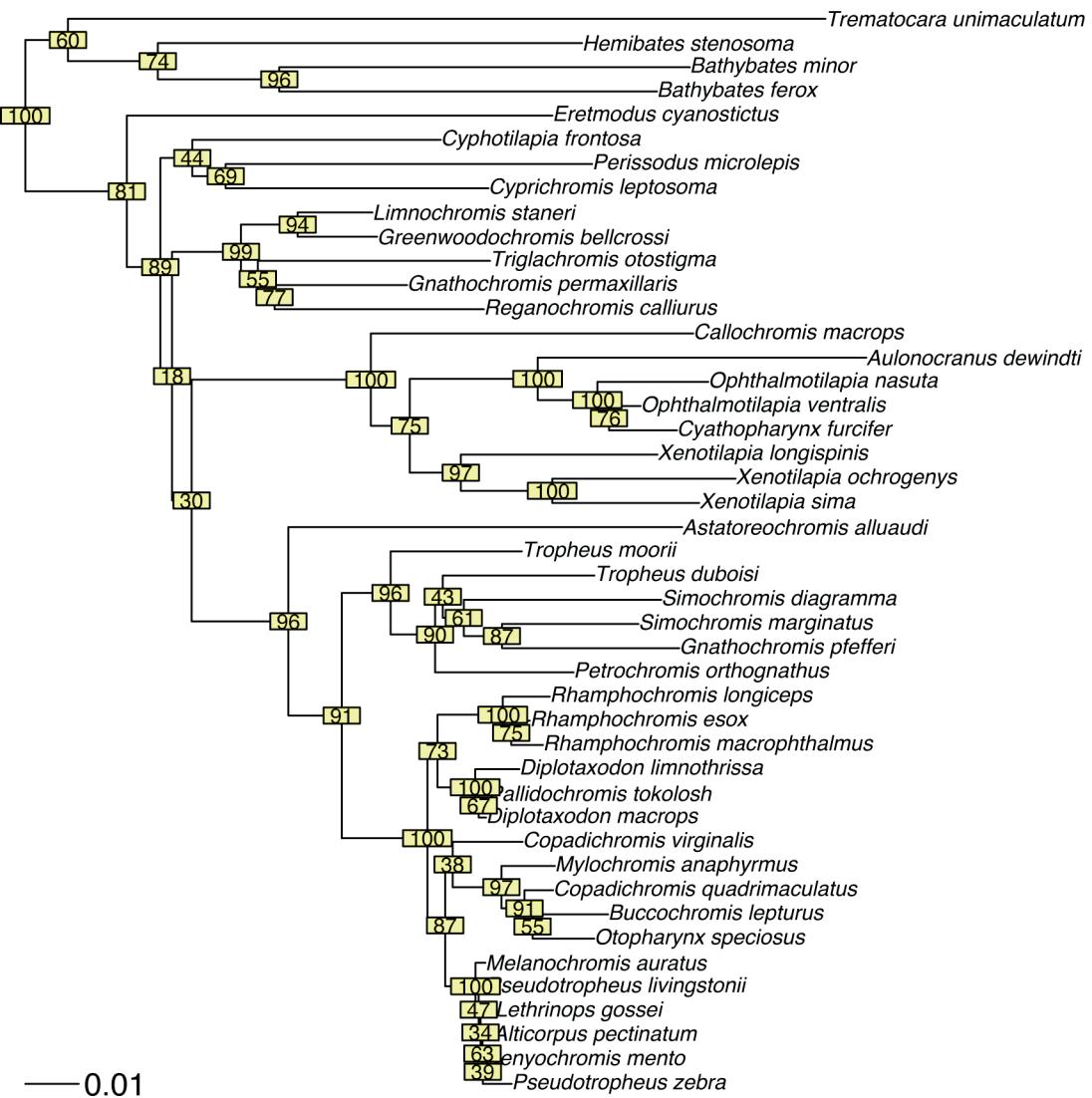
**Fig. S1.** Log-transformed relationships between batch fecundity (number of eggs) and body mass for all combinations of habitat and lake.



**Fig. S2.** Log-transformed relationships between egg diameter and body mass for all combinations of habitat and lake.



**Fig. S3.** Phylogenetic relationships among 55 species of African cichlids estimated by NJ from control region sequences. Values at node are bootstrap percentages (100 repetitions).



**Fig. S4.** Phylogenetic relationships among 45 species of African cichlids estimated by NJ from NADH-2 sequences. Values at node are bootstrap percentages (100 repetitions).

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**Table S1.** Some reproductive characteristics of Lake Malawi mouthbrooding haplochromine cichlids

Species	Habitat	N	Mean body mass, g	Mean batch fecundity	Relative fecundity ( $\text{kg}^{-1}$ )	n	Oocyte diameter, mm	Ref
<i>Copadichromis quadrimaculatus</i>	Pelagic	19	60.3	40	663	8	5.2	6
<i>Diplotaxodon apogon</i>	Pelagic	64	25.2	16	635	22	5.4	6
<i>D. argenteus</i>	Pelagic	10	112.5	40	356	3	6.9	6
<i>D. "big eye"</i>	Pelagic	17	69.0	42	452	17	5.1	10,4
<i>D. limnothrissa</i>	Pelagic	144	37.6	17	495	21	6.3	6
<i>D. macrops</i>	Pelagic	212	36.4	18	493	46	6.0	6
<i>Pallidochromis tokolosh</i>	Pelagic	28	81.2	40	602	3	6.8	6
<i>Rhamphochromis longiceps*</i>	Pelagic	70	173.0	50	288	70	6.6	10,4
<i>R. woodi*</i>	Pelagic	28	522.0	241	461	18	6.7	10,4
<i>R. macropthalmus</i>	Pelagic	1	934.0	522	559		5.0	10,B
<i>R. "grey"</i>	Pelagic	5	323.0	134	416		5.0	11,B
<i>R. esox</i>	Pelagic	8	573.0	348	608		5.0	11,B
<b>Means</b>					<b>502 ± 33</b>		<b>5.8 ± 0.23</b>	
<i>Alticorpus "geoffreyi"</i>	Benthic	60	67.0	146	2179	26	3.9	6
<i>A. macroleithrum</i>	Benthic	66	41.5	152	3663	24	3.6	6
<i>A. mentale</i>	Benthic	99	177.2	229	1292	31	4.2	6
<i>A. pectinatum</i>	Benthic	22	33.1	112	3384	3	3.7	6
<i>Aulonocara "blue orange"</i>	Benthic	27	5	28	5600	16	3.1	6
<i>Au. "minutus"</i>	Benthic	33	2.2	16	7273	29	3.1	6
<i>Au. "cf. macrochir"</i>	Benthic	4	36.8	80	2174	8	3.2	6
<i>Au. "rostratum deep"</i>	Benthic	8	33.5	81	2418	—	6	
<i>Buccochromis lepturus</i>	Benthic	7	452.1	436	964	4	4.0	6
<i>B. nototaenia</i>	Benthic	7	89.5	179	2000	3	3.5	6
<i>Copadichromis virginalis</i>	Benthic	353	21.7	28	1290	76	3.9	6
<i>Lethrinops argenteus</i>	Benthic	196	56.1	119	2121	28	4.0	6
<i>L. "deep water albus"</i>	Benthic	15	29.6	107	3615	3	3.5	6
<i>L. "dw altus"</i>	Benthic	71	9.6	37	3854	34	3.3	6
<i>L. gossei</i>	Benthic	421	52.6	108	2053	190	4.1	6
<i>L. longimanus</i>	Benthic	6	40.3	73	1811	4	3.7	6
<i>L. macrochir</i>	Benthic	4	34.7	107	3084	2	3.5	6
<i>L. "minutus"</i>	Benthic	11	3.8	19	5000	—	6	
<i>L. "oliveri"</i>	Benthic	98	9.3	46	4946	45	3.3	6
<i>L. polli</i>	Benthic	37	13.2	37	2803	18	3.6	6
<i>Mylochromis anaphyrus</i>	Benthic	89	62.7	150	2392	21	3.5	6
<i>Nyassachromis "argyrosoma"</i>	Benthic	83	4.0	33	4925	16	3.3	6
<i>Otopharynx "productus"</i>	Benthic	5	14.8	34	2297	—	6	
<i>O. speciosus</i>	Benthic	4	179.5	162	903	—	6	
<i>Placidochromis "long"</i>	Benthic	11	5.7	26	4561	10	3.1	6
<i>Pl. "platyrhynchos"</i>	Benthic	65	20.5	53.5	2610	24	3.6	6
<i>Pseudotropheus livingstonii</i>	Benthic	9	3.9	26	6667	7	3.2	6
<i>Sciaenochromis alhi</i>	Benthic	11	23.5	48	2043	3	3.9	6
<i>Sc. benthicola</i>	Benthic	19	43.7	56	1281	13	4.4	6
<i>Stigmatochromis "guttatus"</i>	Benthic	9	33.3	41	1231	4	4.5	6
<i>Taeniolethrinops furcicauda</i>	Benthic	6	100.1	180	1798	3	3.4	6
<i>T. praeorbitalis</i>	Benthic	5	156.8	226	1441	3	4.3	6
<i>Trematocranus brevirostris</i>	Benthic	37	7.1	32	4507	12	3.3	6
<i>Tr. placodon</i>	Benthic	10	67.0	135	2015	5	3.6	6
<b>Means</b>					<b>2947 ± 282</b>		<b>3.6 ± 0.07</b>	
<i>Cynotilapia afra</i>	Rocky	117	7.4	21	2838	49	3.8	A
<i>Genyochromis mento</i>	Rocky	10	13.1	30	2290	9	3.7	A
<i>Labeotropheus fuelleborni</i>	Rocky	37	16.5	27	1636	9	4.4	A
<i>L. trewavasae</i>	Rocky	6	15.0	27	1800	3	4.0	A
<i>Melanochromis auratus</i>	Rocky	7	8.4	24	2857	2	3.5	A
<i>M. vermiculus</i>	Rocky	22	7.3	19	2603	7	3.8	A
<i>Petrotilapia "fuscous"</i>	Rocky	12	24.5	46	1878	3	4.1	A
<i>P. nigra</i>	Rocky	4	31.5	45	1429	2	4.3	A
<i>Pseudotropheus "aggressive blue"</i>	Rocky	10	13.1	29	2214	4	4.1	A
<i>Ps. "ag. grey head"</i>	Rocky	7	8.0	23	2875	6	3.7	A
<i>Ps. aurora</i>	Rocky	37	10.8	30	2778	18	3.7	A
<i>Ps. barlowi</i>	Rocky	22	11.0	34	3091	10	3.6	A
<i>Ps. callainos</i>	Rocky	31	10.0	17	1700	17	4.4	A
<i>Ps. heteropterus</i>	Rocky	7	9.7	29	2990	4	3.6	A
<i>Ps. tropheops "blue"</i>	Rocky	6	13.6	32	2353	4	3.7	A
<i>Ps. tr. "lilac"</i>	Rocky	9	14.9	31	2081	5	3.8	A
<i>Ps. tr. "orange chest"</i>	Rocky	45	14.0	31	2214	16	3.9	A
<i>Ps. tr. "red cheek"</i>	Rocky	14	13.2	22	1667	10	3.9	A
<i>Ps. williamsi</i>	Rocky	17	15.3	40	2614	10	3.9	A
<i>Ps. zebra "black dorsal"</i>	Rocky	18	13.5	33	2444	6	3.9	A
<i>Ps. zebra "red dorsal"</i>	Rocky	388	9.3	27	2903	143	3.6	A
<i>Ps. zebra "yellow throat"</i>	Rocky	18	12.9	29	2248	6	3.9	A
<i>Ps. zebra</i>	Rocky	148	10.7	27	2523	54	3.9	A
<b>Means</b>					<b>2349 ± 102</b>		<b>3.9 ± 0.05</b>	

N and n, number of fishes used for fecundity and oocyte size calculation, respectively. References: (A) F.D. et al. (unpublished data); (B) R. L. Robinson (unpublished data).

\*, value corresponds to the arithmetic mean of the longest and smallest lengths of the oocytes. Means ± SEM per fish category are shown in bold type.

**Table S2.** Some reproductive characteristics of Lake Tanganyika mouthbrooding cichlids

Species	Habitat	Body mass, g	Batch fecundity	Relative fecundity ( $\text{kg}^{-1}$ )	Oocyte diameter, mm	Ref
<i>Bathybates ferox</i>	Pelagic	785.9	63	80	7	12, 18, 19
<i>Bathybates horni</i>	Pelagic	360.1	63	175	6.5	12, 18, 19
<i>Bathybates minor</i>	Pelagic	166.4	60	361	6	12, 18, 19
<i>Hemibates stenosoma</i>	Pelagic	610.4	31	51	7	12, 18, 19
Means				<b><math>167 \pm 70</math></b>	<b><math>6.6 \pm 0.24</math></b>	
<i>Callochromis macrops</i>	Benthic	22.5	51	2269	4.2	15
<i>Gnathochromis permaxillaris</i>	Benthic	104.6	150	1434	2	12, 18, 19
<i>Gnathochromis pfefferi</i>	Benthic	11.5	52	4537	3.1	15
<i>Greenwoodochromis bellcrossi</i>	Benthic	220.9	200	906	2.5	12
<i>Limnochromis staneri</i>	Benthic	210.3	200	951	2	12
<i>Plecodus multidentatus</i>	Benthic	246.9	44	178	2.5	12
<i>Reganochromis calliurus</i>	Benthic	100.3	104	1036	2.2	12
<i>Reganochromis centropomoides</i>	Benthic	102.5	200	1952	2.8	12
<i>Tangachromis dhanisi</i>	Benthic	17.0	50	2948	2	12, 18, 19
<i>Trematocara kufferathi</i>	Benthic	8.4	37	4386	1.5	12, 18, 19
<i>Trematocara nigrifrons</i>	Benthic	43.7	71	1625	3	12
<i>Trematocara unimaculatum</i>	Benthic	100.3	60	598	2	12
<i>Triglachromis otostigma</i>	Benthic	29.1	100	3437	1	12
<i>Xenochromis hecqui</i>	Benthic	748.2	300	401	2.5	12
<i>Xenotilapia longispinis</i>	Benthic	130.2	52	400	3.5	12
<i>Xenotilapia nigrolabiata</i>	Benthic	64.1	20	312	4	12
<i>Xenotilapia ornatipinnis</i>	Benthic	56.7	45	794	2	12
<i>Xenotilapia sima</i>	Benthic	33.8	62	1832	3.6	15
<i>Xenotilapia ochrogenys</i>	Benthic	8.4	35	4149	3.1	15
Means				<b><math>1797 \pm 331</math></b>	<b><math>2.6 \pm 0.19</math></b>	
<i>Aulonocranus dewindti</i>	Rocky	11.9	25	2092	4.3	15
<i>Cyathopharynx furcifer</i>	Rocky	44.9	48	1069	4.7	15
<i>Cyphotilapia frontosa</i>	Rocky	<b>1096.9</b>	25	23	6.7	13, 14
<i>Cyprichromis leptosoma</i>	Rocky	10.1	11	1090	4.4	15, 18, 19
<i>Eretmodus cyanostictus</i>	Rocky	4.3	17	3970	3.6	15
<i>Ophthalmotilapia nasutus</i>	Rocky	21.7	19	875	5	15
<i>Ophthalmotilapia ventralis</i>	Rocky	9.7	13	1346	4.8	15
<i>Perissodus microlepis</i>	Rocky	41.6	171	4114	1.7	12
<i>Petrochromis famula</i>	Rocky	24.3	17	698	6.4	15
<i>Petrochromis orthognathus</i>	Rocky	31.8	29	913	6	15
<i>Petrochromis polyodon</i>	Rocky	71.1	22	309	7.1	15
<i>Pseudosimochromis curvifrons</i>	Rocky	10.5	8	760	4.5	15
<i>Simochromis diagramma</i>	Rocky	13.6	20	1471	5.2	15
<i>Simochromis marginatus</i>	Rocky	15.2	19	1249	4.5	15
<i>Spathodus marlieri</i>	Rocky	3.6	15	4179	3.5	14, 17
<i>Tropheus duboisi</i>	Rocky	18.8	8	426	6.1	16
<i>Tropheus moorii</i>	Rocky	16.9	12	709	6.3	16
Means				<b><math>1488 \pm 322</math></b>	<b><math>5.0 \pm 0.33</math></b>	

Means  $\pm$  SEM per fish category appear in bold type.

**Table S3.** Some reproductive characteristics of Lake Victoria mouthbrooding haplochromine cichlids

Species	Habitat	Body mass, g	Batch fecundity	Relative fecundity ( $\text{kg}^{-1}$ )	Oocyte diameter, mm	Ref
<i>Haplochromis "kribensis"</i>	Pelagic	7.5	22	2917	3.5	20, 21, 23
<i>H. "argens"</i>	Pelagic	5.3	23	4340	3.4	22, 23
<i>H. laparogramma</i>	Pelagic	8.5	20	2349	3.6	22, 23
<i>H. heusinkveldi</i>	Pelagic	7.5	26	3448	3.7	22, 23
<i>H. pyrrhocephalus</i>	Pelagic	3.9	27	6864	3.1	22, 23
<i>H. piceatus</i>	Pelagic	5.1	33	6530	3	22, 23
<b>Means</b>				<b><math>4408 \pm 473</math></b>	<b><math>3.4 \pm 0.11</math></b>	
<i>H. "nigrofasciatus"</i>	Benthic	2.8	20	7054	3	21
<i>H. "reginus"</i>	Benthic	3.6	28	7687	3.1	21, 22, 23
<i>H. nanoserranus</i>	Benthic	28.2	66	2340	3.4	20
<i>H. "dusky wine-red fin"</i>	Benthic	3.2	32	9932	3.1	21
<i>H. crocopeplus</i>	Benthic	28.2	82	2907	3.4	20
<i>H. "red tail incurved head"</i>	Benthic	11.9	63	5273	3.2	21
<i>H. teegelaari</i>	Benthic	17.6	87	4945	3.2	21
<i>H. "cinctus-like"</i>	Benthic	6.0	63	10494	2.8	21
<i>H. "red tridens"</i>	Benthic	7.3	68	9284	2.4	21
<i>H. "profundus"</i>	Benthic	17.6	94	5343	3.2	21
<b>Means</b>				<b><math>6526 \pm 899</math></b>	<b><math>3.1 \pm 0.09</math></b>	
<i>Pundamilia nyererei</i>	Rocky	5.9	33	5580	3.6	24
<i>Neochromis rufocaudalis</i>	Rocky	22.9	25	1093	3.5	20, 21
<i>Neochromis greenwoodi</i>	Rocky	14.1	27	1912	3.2	21
<b>Means</b>				<b><math>2862 \pm 1379</math></b>	<b><math>3.4 \pm 0.12</math></b>	

Means  $\pm$  SEM per fish category appear in bold type.

**Table S4. Some reproductive characteristics of the noncichlid pelagic fish species of the East African Great Lakes and of the most common marine pelagic teleost species**

Species	Relative fecundity (kg <sup>-1</sup> )	Oocyte diameter, mm	Ref
<b>Marine pelagic species</b>	<b>419,183 ± 74215</b>	<b>0.99 ± 0.05</b>	
<b>Scombridae</b>	<b>295,951 ± 112,394</b>	<b>0.98 ± 0.03</b>	
<i>Thunnus albacares</i>	12,700	0.96	25
<i>Thunnus alalunga</i>	161,300		25
<i>Thunnus obesus</i>	188,311	1.05	25
<i>Thunnus maccoyii</i>	571,428	0.71	25
<i>Thunnus thynnus</i>	123,762	1.0	25
<i>Acanthocybium solandri</i>	560,747		25
<i>Euthynnus affinis</i>	95,455		25
<i>Euthynnus alletteratus</i>	17,750		25
<i>Scomber scombrus</i>	1,709,401	1.15	25
<i>Scomberomorus cavalla</i>	28,110		25
<i>Scomberomorus commerson</i>	99,043		25
<i>Scomberomorus maculatus</i>	192,678	1.0	25
<i>Auxis thazard thazard</i>	501,253		25
<i>Auxis rochei rochei</i>	124,000	0.97	25
<i>Katsuwonus pelamis</i>	53,333	1.0	25
<b>Engraulidae</b>	<b>512,880 ± 112,679</b>	<b>1.08 ± 0.10</b>	
<i>Engraulis mordax</i>	191,667	1.01	25
<i>Engraulis encrasicolus</i>	100,000	1.5	25
<i>Anchoa hepsetus</i>	356,250	1.08	25
<i>Encrassicholina heterolobus</i>	775,000	0.74	26
<i>Encrassicholina devisi</i>	1,039,000		27
<i>Encrassicholina punctifer</i>	875,000		28
<i>Encrassicholina indicus</i>	694,000		25, 27
<i>Thrissina baelama</i>	361,000		29
<i>Stolephorus waitei</i>	224,000		28
<b>Clupeidae</b>	<b>306,311 ± 65,433</b>	<b>1.16 ± 0.13</b>	
<i>Clupea harengus</i>	327,869	1.16	25
<i>Clupea pallasii</i>	86,301	1.4	25
<i>Sardinops sagax</i>	227,273	1.1	25
<i>Sardinella pilchardus</i>	576,923	1.5	25
<i>Herklotischthys quadrimaculatus</i>	319,500	0.65	30,31
<i>Amblygaster sirm</i>	300,000		29
<b>Dussumieriidae</b>	<b>1,228,000 ± 461,000</b>	<b>0.59 ± 0.005</b>	
<i>Spratelloides delicatulus</i>	767,000	0.59	26,31
<i>Spratelloides gracilis</i>	1,689,000	0.58	26,28
<b>Leiognathidae</b>			
<i>Leiognathus bindus</i>	484,000	0.6	29, 32
<b>African Great Lakes noncichlid pelagic species</b>			
<i>Engraulicypris sardella</i>		0.5	38
<i>Stolothrissa tanganicae</i>		<1.0	34
<i>Limnothrissa miodon</i>	1,532,000	<1.0	37
<i>Lates stappersii</i>	550,000	0.5	33
<i>Rastrineobola argentea</i>	583,000	0.5	35, 36

Means ± SEM per fish category in bold.