

## Supplementary material

### **A tree money grows on: the first inclusive molecular phylogeny of the economically important pink shrimp (Decapoda : *Farfantepenaeus*) reveals cryptic diversity**

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TABLE S1. Species identifications, GenBank accession numbers, and collection localities for all individuals included in each alignment: 12S, 16S, COI, and concatenated (12S+16S+COI).

<b>Species</b>	<b>HBG</b>	<b>Collection Locale</b>	<b>12S</b>	<b>16S</b>	<b>COI</b>	<b>CONCATENATED</b>
<i>Farfantepenaeus aztecus</i>	N/A	Caribbean and/or South America	---	AF192051- AF192052	---	AF192051
<i>Farfantepenaeus aztecus</i>	N/A	Galveston Bay, TX	---	HM014401	---	---
<i>Farfantepenaeus aztecus</i>	N/A	Greece	---	KF953960- KF953963, KF983532	---	---
<i>Farfantepenaeus aztecus</i>	N/A	Gulf Breeze, FL	---	HQ214010	---	---
<i>Farfantepenaeus aztecus</i>	HBG3688	Gulf of Mexico	MG001012	MG001048	---	MG001012, MG001048
<i>Farfantepenaeus aztecus</i>	HBG3696	Gulf of Mexico	MG001014	---	---	---
<i>Farfantepenaeus aztecus</i>	N/A	Gulf of Mexico	JF899779	AF279811	---	AF279811, JF899779
<i>Farfantepenaeus aztecus</i>	HBG3694	Sabine Lake, TX	MG001013	---	MG001171	MG001013, MG001171
<i>Farfantepenaeus brasiliensis</i> N	HBG1137	Biscayne Bay	MG000983	MG001060	MG001137	MG000983, MG001060, MG001137
<i>Farfantepenaeus brasiliensis</i> N	HBG1139	Biscayne Bay	MG000995	MG001074	MG001138	MG000995, MG001074, MG001138
<i>Farfantepenaeus brasiliensis</i> N	HBG1140	Biscayne Bay	MG000984	MG001075	MG001139	MG000984, MG001075, MG001139
<i>Farfantepenaeus brasiliensis</i> N	HBG1145	Biscayne Bay	MG000985	MG001076	MG001140	MG000985, MG001076, MG001140

<i>Farfantepenaeus brasiliensis</i> N	HBG1146	Biscayne Bay	MG001002	MG001061	MG001149	MG001002, MG001061, MG001149
<i>Farfantepenaeus brasiliensis</i> N	HBG1147	Biscayne Bay	MG000997	MG001062	MG001146	MG000997, MG001062, MG001146
<i>Farfantepenaeus brasiliensis</i> N	HBG1191	Biscayne Bay	MG000986	MG001063	MG001157	MG000986, MG001063, MG001157
<i>Farfantepenaeus brasiliensis</i> N	HBG1197	Biscayne Bay	MG000998	MG001070	MG001147	MG000998, MG001063, MG001147
<i>Farfantepenaeus brasiliensis</i> N	HBG1200	Biscayne Bay	MG000992	MG001064	MG001153	MG000992, MG001064, MG001153
<i>Farfantepenaeus brasiliensis</i> N	HBG1619	Biscayne Bay	MG000987	MG001077	MG001141	MG000987, MG001077, MG001141
<i>Farfantepenaeus brasiliensis</i> N	HBG1620	Biscayne Bay	MG000988	MG001065	MG001142	MG000988, MG001065, MG001142
<i>Farfantepenaeus brasiliensis</i> N	HBG1624	Biscayne Bay	---	MG001066	MG001150	MG001066, MG001150
<i>Farfantepenaeus brasiliensis</i> N	HBG1636	Biscayne Bay	MG000999	MG001071	MG001148	MG000999, MG001071, MG001148
<i>Farfantepenaeus brasiliensis</i> N	HBG1649	Biscayne Bay	MG000993	MG001078	MG001151	MG000993, MG001078, MG001151
<i>Farfantepenaeus brasiliensis</i> N	HBG1664	Biscayne Bay	MG000990	MG001068	MG001144	MG000990, MG001068, MG001144
<i>Farfantepenaeus brasiliensis</i> N	HBG1667	Biscayne Bay	MG001001	MG001069	MG001154	MG001001, MG001069, MG001154
<i>Farfantepenaeus brasiliensis</i> N	HBG1669	Biscayne Bay	MG000996	MG001079	MG001155	MG000996, MG001079, MG001155

<i>Farfantepenaeus brasiliensis</i> N	HBG1670	Biscayne Bay	MG000991	MG001073	MG001145	MG000991, MG001073, MG001145
<i>Farfantepenaeus brasiliensis</i> N	HBG1652	Everglades	MG000994	MG001080	MG001152	MG000994, MG001080, MG001152
<i>Farfantepenaeus brasiliensis</i> N	HBG1655	Everglades	MG000989	MG001067	MG001143	MG000989, MG001067, MG001143
<i>Farfantepenaeus brasiliensis</i> N	HBG3697	Gulf of Mexico	MG001000	MG001072	MG001156	MG001000, MG001072, MG001156
<i>Farfantepenaeus brasiliensis</i> S	HBG7603	Brazil	MG001007	MG001053	MG001163	MG001007, MG001053, MG001163
<i>Farfantepenaeus brasiliensis</i> S	HBG7604	Brazil	MG001008	MG001052	MG001161	MG001008, MG001052, MG001161
<i>Farfantepenaeus brasiliensis</i> S	N/A	Cananeia, Sao Paulo	---	---	KF783862, KF989378- KF989414	---
<i>Farfantepenaeus brasiliensis</i> S	N/A	Caribbean and/or South America	---	AF192054	---	---
<i>Farfantepenaeus brasiliensis</i> S	HBG3689	Nicaragua	MG001003	MG001054	MG001158	MG001003, MG001054, MG001158
<i>Farfantepenaeus brasiliensis</i> S	HBG3693	Nicaragua	MG001005	MG001055	MG001159	MG001005, MG001055, MG001159
<i>Farfantepenaeus brasiliensis</i> S	N/A	Santos, Sao Paulo	---	---	KF989415- KF989423	---
<i>Farfantepenaeus brasiliensis</i> S	HBG3690	Ubatuba, Sao Paulo	MG001004	MG001057	MG001160	MG001004, MG001057, MG001160
<i>Farfantepenaeus brasiliensis</i> S	HBG3698	Ubatuba, Sao Paulo	MG001006	MG001056	MG001162	MG001006, MG001056, MG001162

<i>Farfantepenaeus brasiliensis</i> S	N/A	Ubatuba, Sao Paulo	---	---	KF989360- KF989377	---
<i>Farfantepenaeus brasiliensis</i> S	N/A	US Virgin Islands	---	HM014402, HM014403, HM014405	---	---
<i>Farfantepenaeus brevirostris</i>	HBG3695	Costa Rica	MG001017	MG001109	---	MG001017, MG001109
<i>Farfantepenaeus brevirostris</i>	HBG3687	Panama	MG001015	MG001107	---	MG001015, MG001107
<i>Farfantepenaeus brevirostris</i> S	HBG3692	Panama	MG001016	MG001108	---	MG001016, MG001108
<i>Farfantepenaeus californiensis</i>	HBG3685	Baja, Mexico	MG000981	MG001058	MG001164	MG000981, MG001058, MG001164
<i>Farfantepenaeus californiensis</i>	N/A	Northwest of Mexico	EU497054, NC012738	EU497054, NC012738	---	EU497054, NC012738
<i>Farfantepenaeus californiensis</i>	HBG3703	Panama	MG000982	MG001059	MG001165	MG000982, MG001059, MG001165
<i>Farfantepenaeus duorarum</i>	HBG1621	Biscayne Bay	MG001025	MG001086	MG001130	MG001025, MG001086, MG001130
<i>Farfantepenaeus duorarum</i>	HBG1661	Biscayne Bay	MG001026	MG001087	MG001117	MG001026, MG001087, MG001117
<i>Farfantepenaeus duorarum</i>	N/A	Caribbean and/or South America	---	AF192055- AF192056	---	---
<i>Farfantepenaeus duorarum</i>	HBG1076	Everglades	MG001020	MG001081	MG001111	MG001020, MG001081, MG001111

<i>Farfantepenaeus duorarum</i>	HBG1077	Everglades	MG001040	MG001082	MG001112	MG001040, MG001082, MG001112
<i>Farfantepenaeus duorarum</i>	HBG1078	Everglades	MG001021	MG001103	MG001113	MG001021, MG001103, MG001113
<i>Farfantepenaeus duorarum</i>	HBG1102	Everglades	MG001022	MG001083	MG001114	MG001022, MG001083, MG001114
<i>Farfantepenaeus duorarum</i>	HBG1103	Everglades	MG001023	MG001084	MG001115	MG001023, MG001084, MG001115
<i>Farfantepenaeus duorarum</i>	HBG1105	Everglades	MG001024	MG001085	MG001116	MG001024, MG001085, MG001116
<i>Farfantepenaeus duorarum</i>	N/A	Gulf Breeze, FL	---	HQ214007	---	---
<i>Farfantepenaeus duorarum</i>	HBG3702	Gulf of Mexico	MG001041	MG001100	MG001129	MG001041, MG001100, MG001129
<i>Farfantepenaeus duorarum</i>	N/A	Gulf of Mexico	---	AF279812	---	---
<i>Farfantepenaeus duorarum</i>	N/A	Key Largo, FL	---	HQ214013	---	---
<i>Farfantepenaeus duorarum</i>	N/A	Mexico	---	JF899810	---	---
<i>Farfantepenaeus duorarum</i>	HBG1672	North of Everglades	MG001027	MG001091	MG001118	MG001027, MG001091, MG001118
<i>Farfantepenaeus duorarum</i>	HBG1676	North of Everglades	MG001028	MG001101	MG001119	MG001028, MG001101, MG001119
<i>Farfantepenaeus duorarum</i>	HBG1680	North of Everglades	MG001029	MG001092	MG001120	MG001029, MG001092, MG001120
<i>Farfantepenaeus duorarum</i>	HBG2437	North of Everglades	MG001030	MG001093	MG001121	MG001030, MG001093, MG001121
<i>Farfantepenaeus duorarum</i>	HBG2438	North of Everglades	MG001036	MG001094	MG001122	MG001036, MG001094, MG001122

<i>Farfantepenaeus duorarum</i>	HBG2439	North of Everglades	MG001039	MG001095	MG001123	MG001039, MG001095, MG001123
<i>Farfantepenaeus duorarum</i>	HBG2471	North of Everglades	MG001033	MG001097	MG001126	MG001033, MG001097, MG001126
<i>Farfantepenaeus duorarum</i>	HBG2472	North of Everglades	MG001034	MG001098	MG001127	MG001034, MG001098, MG001127
<i>Farfantepenaeus duorarum</i>	HBG2474	North of Everglades	MG001037	MG001106	MG001131	MG001037, MG001106, MG001131
<i>Farfantepenaeus duorarum</i>	HBG2478	North of Everglades	MG001035	---	---	---
<i>Farfantepenaeus duorarum</i>	N/A	Panacea, FL	---	HQ214006	---	---
<i>Farfantepenaeus duorarum</i>	HBG3701	Perdido Key	MG001038	MG001099	MG001128	MG001038, MG001099, MG001128
<i>Farfantepenaeus duorarum</i>	N/A	Saint Joseph Bay, FL	---	HQ214011	---	---
<i>Farfantepenaeus duorarum</i>	HBG2460	South of Biscayne Bay	MG001031	MG001096	MG001124	MG001031, MG001096, MG001124
<i>Farfantepenaeus duorarum</i>	HBG2464	South of Biscayne Bay	MG001032	MG001102	MG001125	MG001032, MG001102, MG001125
<i>Farfantepenaeus duorarum</i>	N/A	Unknown	---	AY601732	---	---
<i>Farfantepenaeus isabelae</i>	HBG7601	Brazil	MG001010	---	MG001167	MG001010, MG001167
<i>Farfantepenaeus isabelae</i>	HBG7602	Brazil	MG001011	MG001049	MG001168	MG001011, MG001049, MG001168
<i>Farfantepenaeus notialis</i>	HBG1138	Biscayne Bay	MG001042	MG001104	MG001132	MG001042, MG001104, MG001132
<i>Farfantepenaeus notialis</i>	HBG1188	Biscayne Bay	MG001043	MG001088	MG001133	MG001043, MG001088, MG001133

<i>Farfantepenaeus notialis</i>	HBG1617	Biscayne Bay	MG001046	MG001089	MG001134	MG001046, MG001089, MG001134
<i>Farfantepenaeus notialis</i>	HBG1654	Biscayne Bay	MG001044	MG001090	MG001135	MG001044, MG001090, MG001135
<i>Farfantepenaeus notialis</i>	N/A	Cuba	X84350	AJ133054	X84350	AJ133054, X84350
<i>Farfantepenaeus notialis</i>	HBG2455	South of Biscayne Bay	MG001045	MG001105	MG001136	MG001045, MG001105, MG001136
<i>Farfantepenaeus paulensis</i>	N/A	Cananeia, Sao Paulo	---	---	KF783861, KF989432- KF989448	KF783861, KF989432
<i>Farfantepenaeus paulensis</i>	N/A	Rio de Janeiro	---	---	KM065406, KM065409, KM065413	---
<i>Farfantepenaeus paulensis</i>	N/A	Rio Grande do Sul	---	---	KM065407, KM065410- KM065412	---
<i>Farfantepenaeus paulensis</i>	N/A	RS, Brazil	---	---	KF989458- KF989461	KF989458
<i>Farfantepenaeus paulensis</i>	N/A	Santos, Sao Paulo	---	---	KF989449- KF989457	KF989449
<i>Farfantepenaeus paulensis</i>	N/A	Ubatuba, Sao Paulo	---	---	KF989424- KF989431	KF989424
<i>Farfantepenaeus subtilisMI</i>	HBG1662	Biscayne Bay	MG001009	MG001050	MG001166	MG001009, MG001050, MG001166
<i>Farfantepenaeus subtilisMI</i>	N/A	Caribbean and/or South America	---	AF192061- AF192068	---	AF192061- AF192068
<i>Farfantepenaeus subtilisMI</i>	N/A	Unknown	---	AY344193	---	---



<i>Farfantepenaeus subtilisMII</i>	HBG7599	Brazil	MG001018	---	MG001169	MG001018, MG001169
<i>Farfantepenaeus subtilisMII</i>	HBG7600	Brazil	MG001019	MG001051	MG001170	MG001019, MG001051, MG001170
<i>Farfantepenaeus subtilisMII</i>	N/A	Caribbean and/or South America	---	AF192069- AF192076	---	AF192069- AF192076
<i>Litopenaeus vannamei</i>	HBG1607	Washington, DC	MG001047	MG001110	MG001172	MG001047, MG001110, MG001172
<i>Litopenaeus setiferous</i>	N/A	Gulf of Mexico	AF279841	AF279819	---	AF279841, AF279819
<i>Litopenaeus stylirostris</i>	N/A	Western Atlantic	---	AF255057	---	AF255057

TABLE S2. The primer pairs and annealing temperatures associated with PCR amplification of three mitochondrial genes used in this study.

Targeted Gene	Forward Primer	Reverse Primer	Anneal Temp
12S	12Sf 5'-GAAACCAGGATTAGATACCC-3' (Mokady, Rozenblatt, Graur, & Loya, 1994)	12S1r 5'-AGCGACGGGCGATATGTAC-3' (Buhay, Moni, Mann, & Crandall, 2007)	50°C
16S	16SH 5'-CCGGTCTGAACTCAGATCACGT-3' (Palumbi et al., 2002)	16SL 5'-CGCCTGTTTAAACAAAAACAT-3' (Palumbi et al., 2002)	46°C
16S	16S-fcray 5'-GACCGTGCKAAGGTAGCATAATC-3' (Crandall & Fitzpatrick, 1996)	16S-rcray 5'-CCGGTYTGAAC TCAAATCATGTAAA-3' Developed in Crandall Lab	52°C- 58°C
16S	16S-L2/L9 5'-TGCCTGTTTATCAAAAAACAT-3' 5'-CGCCTGTTTATCAAAAAACAT-3' (Palumbi et al., 2002)	16S-1472 5'-AGATAGAAACCAACCTGG-3' (Crandall & Fitzpatrick, 1996)	40°C
COI	LCOI-1472 5'-GGTCAACAAATCATAAAGATATTG-3' (Folmer, Hoeh, Black, & Vrijenhoek, 1994)	HCOI-2198 5'-TAAACTTCAGGGTGACCAAAAAATCA-3' (Folmer et al., 1994)	40°C

Table S3. Results of jModelTest for the MAFFT-aligned 12S data set, including negative log likelihood (-lnL), number of estimated parameters (K), Corrected Akaike Information Criterion (AICc), AICc difference (delta), weight and cumulative weight (cumWeight).

<b>Model</b>	<b>-lnL</b>	<b>K</b>	<b>AICc</b>	<b>delta</b>	<b>weight</b>	<b>cumWeight</b>
JC	1112.60249	330	8634.152348	0.000000	1.000000	1.000000
K80	1078.02716	331	8758.162428	124.010080	1.18e-027	1.000000
JC+G	1094.14272	331	8790.393548	156.241200	1.18e-034	1.000000
JC+I	1099.73704	331	8801.582188	167.429840	4.40e-037	1.000000
K80+G	1057.37187	332	8920.743740	286.591392	5.85e-063	1.000000
K80+I	1058.54125	332	8923.082500	288.930152	1.82e-063	1.000000
TrNef	1076.73760	332	8959.475200	325.322852	2.28e-071	1.000000
TPM2	1077.72341	332	8961.446820	327.294472	8.49e-072	1.000000
TPM3	1077.79242	332	8961.584840	327.432492	7.92e-072	1.000000
TPM1	1078.01026	332	8962.020520	327.868172	6.37e-072	1.000000
JC+I+G	1094.03607	332	8994.072140	359.919792	6.99e-079	1.000000
TrNef+G	1056.70205	333	9134.946957	500.794609	1.79e-109	1.000000
TrNef+I	1056.86215	333	9135.267157	501.114809	1.53e-109	1.000000
TPM2+G	1057.13388	333	9135.810617	501.658269	1.16e-109	1.000000
TPM3+G	1057.21461	333	9135.972077	501.819729	1.07e-109	1.000000
TPM1+G	1057.28713	333	9136.117117	501.964769	9.99e-110	1.000000
K80+I+G	1057.33377	333	9136.210397	502.058049	9.54e-110	1.000000
TPM2+I	1058.31452	333	9138.171897	504.019549	3.58e-110	1.000000

TPM3+I	1058.39676	333	9138.336377	504.184029	3.29e-110	1.000000
TPM1+I	1058.45937	333	9138.461597	504.309249	3.09e-110	1.000000
TIM3ef	1076.50600	333	9174.554857	540.402509	4.50e-118	1.000000
TIM1ef	1076.72229	333	9174.987437	540.835089	3.62e-118	1.000000
TIM2ef	1077.46283	333	9176.468517	542.316169	1.73e-118	1.000000
F81	1087.19498	333	9195.932817	561.780469	1.03e-122	1.000000
HKY	1045.13818	334	9340.041066	705.888717	5.23e-154	1.000000
TIM2ef+G	1056.49915	334	9362.763006	728.610657	6.08e-159	1.000000
TIM3ef+G	1056.53649	334	9362.837686	728.685337	5.86e-159	1.000000
TIM1ef+G	1056.61866	334	9363.002026	728.849677	5.40e-159	1.000000
TIM3ef+I	1056.69912	334	9363.162946	729.010597	4.98e-159	1.000000
TPM2+I+G	1057.09832	334	9363.961346	729.808997	3.34e-159	1.000000
TPM3+I+G	1057.17503	334	9364.114766	729.962417	3.10e-159	1.000000
TPM1+I+G	1057.24702	334	9364.258746	730.106397	2.88e-159	1.000000
TrNef+I+G	1057.73049	334	9365.225686	731.073337	1.78e-159	1.000000
TIM2ef+I	1057.75323	334	9365.271166	731.118817	1.74e-159	1.000000
TIM1ef+I	1057.86857	334	9365.501846	731.349497	1.55e-159	1.000000
F81+G	1066.76824	334	9383.301186	749.148837	2.11e-163	1.000000
F81+I	1073.55722	334	9396.879146	762.726797	2.38e-166	1.000000
TVMef	1076.10523	334	9401.975166	767.822817	1.86e-167	1.000000
HKY+I	1020.65605	335	9533.130282	898.977933	6.16e-196	1.000000
HKY+G	1022.63640	335	9537.090982	902.938633	8.50e-197	1.000000

TrN	1041.42847	335	9574.675122	940.522773	5.86e-205	1.000000
TPM1uf	1042.78648	335	9577.391142	943.238793	1.51e-205	1.000000
TPM3uf	1044.96109	335	9581.740362	947.588013	1.71e-206	1.000000
TPM2uf	1045.07114	335	9581.960462	947.808113	1.53e-206	1.000000
TIM2ef+I+G	1056.39437	335	9604.606922	970.454573	1.86e-211	1.000000
TVMef+G	1056.44000	335	9604.698182	970.545833	1.77e-211	1.000000
TIM1ef+I+G	1056.50053	335	9604.819242	970.666893	1.67e-211	1.000000
TVMef+I	1056.53149	335	9604.881162	970.728813	1.62e-211	1.000000
TIM3ef+I+G	1057.56860	335	9606.955382	972.803033	5.73e-212	1.000000
F81+I+G	1068.29308	335	9628.404342	994.251993	1.26e-216	1.000000
SYM	1076.88117	335	9645.580522	1011.428173	0.00e+000	1.000000
TrN+G	1017.07904	336	9783.158080	1149.005732	0.00e+000	1.000000
TrN+I	1017.43298	336	9783.865960	1149.713612	0.00e+000	1.000000
TPM1uf+G	1019.31983	336	9787.639660	1153.487312	0.00e+000	1.000000
TPM1uf+I	1019.39888	336	9787.797760	1153.645412	0.00e+000	1.000000
TPM3uf+G	1019.85536	336	9788.710720	1154.558372	0.00e+000	1.000000
TPM3uf+I	1019.95610	336	9788.912200	1154.759852	0.00e+000	1.000000
TPM2uf+I	1020.63992	336	9790.279840	1156.127492	0.00e+000	1.000000
TPM2uf+G	1022.59664	336	9794.193280	1160.040932	0.00e+000	1.000000
HKY+I+G	1022.66041	336	9794.320820	1160.168472	0.00e+000	1.000000
TIM3	1041.19990	336	9831.399800	1197.247452	0.00e+000	1.000000
TIM2	1041.41077	336	9831.821540	1197.669192	0.00e+000	1.000000

TIM1	1042.86746	336	9834.734920	1200.582572	0.00e+000	1.000000
SYM+G	1055.78543	336	9860.570860	1226.418512	0.00e+000	1.000000
SYM+I	1057.06128	336	9863.122560	1228.970212	0.00e+000	1.000000
TVMef+I+G	1057.53657	336	9864.073140	1229.920792	0.00e+000	1.000000
TIM1+G	1015.71422	337	10054.202634	1420.050285	0.00e+000	1.000000
TIM3+G	1015.74380	337	10054.261794	1420.109445	0.00e+000	1.000000
TIM1+I	1016.08073	337	10054.935654	1420.783305	0.00e+000	1.000000
TIM3+I	1016.39722	337	10055.568634	1421.416285	0.00e+000	1.000000
TIM2+G	1017.06698	337	10056.908154	1422.755805	0.00e+000	1.000000
TrN+I+G	1019.95382	337	10062.681834	1428.529485	0.00e+000	1.000000
TIM2+I	1020.09661	337	10062.967414	1428.815065	0.00e+000	1.000000
TPM1uf+I+G	1021.35445	337	10065.483094	1431.330745	0.00e+000	1.000000
TPM3uf+I+G	1021.91830	337	10066.610794	1432.458445	0.00e+000	1.000000
TPM2uf+I+G	1022.62730	337	10068.028794	1433.876445	0.00e+000	1.000000
TVM	1042.54419	337	10107.862574	1473.710225	0.00e+000	1.000000
SYM+I+G	1055.68250	337	10134.139194	1499.986845	0.00e+000	1.000000
TIM3+I+G	1015.59331	338	10345.986620	1711.834272	0.00e+000	1.000000
TIM1+I+G	1018.29241	338	10351.384820	1717.232472	0.00e+000	1.000000
TVM+G	1018.99731	338	10352.794620	1718.642272	0.00e+000	1.000000
TVM+I	1019.05087	338	10352.901740	1718.749392	0.00e+000	1.000000
TIM2+I+G	1019.66157	338	10354.123140	1719.970792	0.00e+000	1.000000
GTR	1040.69136	338	10396.182720	1762.030372	0.00e+000	1.000000

GTR+G	1014.99880	339	10656.963117	2022.810769	0.00e+000	1.000000
GTR+I	1015.47751	339	10657.920537	2023.768189	0.00e+000	1.000000
TVM+I+G	1021.08828	339	10669.142077	2034.989729	0.00e+000	1.000000
GTR+I+G	1017.63655	340	10996.701671	2362.549323	0.00e+000	1.000000

Table S4. Results of jModelTest for the MAFFT-aligned 16S data set, including negative log likelihood (-lnL), number of estimated parameters (K), Bayesian Information Criterion (BIC), BIC difference (delta), weight and cumulative weight (cumWeight).

<b>Model</b>	<b>-lnL</b>	<b>K</b>	<b>BIC</b>	<b>delta</b>	<b>weight</b>	<b>cumWeight</b>
HKY+G	1558.31876	335	5229.850498	0.000000	0.552140	0.552140
HKY+I	1559.17720	335	5231.567378	1.716880	0.234010	0.786150
TrN+G	1557.59042	336	5234.701916	4.851418	0.048818	0.834968
TrN+I	1558.07743	336	5235.675936	5.825438	0.029997	0.864964
TPM2uf+G	1558.16671	336	5235.854496	6.003998	0.027435	0.892399
TPM1uf+G	1558.18963	336	5235.900336	6.049838	0.026813	0.919212
TPM3uf+G	1558.47550	336	5236.472076	6.621578	0.020146	0.939358
TPM2uf+I	1558.90186	336	5237.324796	7.474298	0.013153	0.952511
TPM3uf+I	1558.94301	336	5237.407096	7.556598	0.012623	0.965134
TPM1uf+I	1558.94519	336	5237.411456	7.560958	0.012595	0.977729
HKY+I+G	1559.17285	336	5237.866776	8.016278	0.010031	0.987760
TIM1+G	1557.46850	337	5240.766175	10.915677	0.002354	0.990114
TIM3+I	1557.76894	337	5241.367055	11.516557	0.001743	0.991856
TIM3+G	1557.83055	337	5241.490275	11.639777	0.001639	0.993495
TIM1+I	1557.86376	337	5241.556695	11.706197	0.001585	0.995080
TIM2+G	1558.20128	337	5242.231735	12.381237	0.001131	0.996211
TIM2+I	1558.31506	337	5242.459295	12.608797	0.001009	0.997221
TrN+I+G	1558.65786	337	5243.144895	13.294397	0.000716	0.997937



TPM3uf+I+G	1558.79350	337	5243.416175	13.565677	0.000626	0.998563
TPM2uf+I+G	1558.95643	337	5243.742035	13.891537	0.000532	0.999094
TPM1uf+I+G	1558.96649	337	5243.762155	13.911657	0.000526	0.999621
TIM3+I+G	1556.69063	338	5245.518533	15.668035	0.000219	0.999839
TVM+G	1558.29866	338	5248.734593	18.884095	4.38e-005	0.999883
TIM2+I+G	1558.42125	338	5248.979773	19.129275	3.87e-005	0.999922
TIM1+I+G	1558.45155	338	5249.040373	19.189875	3.76e-005	0.999959
TVM+I	1558.82699	338	5249.791253	19.940755	2.58e-005	0.999985
TVM+I+G	1556.93122	339	5252.307812	22.457314	7.34e-006	0.999993
GTR+G	1557.63438	339	5253.714132	23.863634	3.63e-006	0.999996
GTR+I	1557.63824	339	5253.721852	23.871354	3.62e-006	1.000000
GTR+I+G	1558.08733	340	5260.928130	31.077632	9.85e-008	1.000000
K80+G	1592.85571	332	5280.000103	50.149605	7.12e-012	1.000000
TPM3+G	1589.82193	333	5280.240641	50.390143	6.31e-012	1.000000
K80+I	1593.55009	332	5281.388863	51.538365	3.55e-012	1.000000
TPM3+I	1590.69066	333	5281.978101	52.127603	2.65e-012	1.000000
K80+I+G	1591.69232	333	5283.981421	54.130923	9.72e-013	1.000000
TPM2+G	1592.03027	333	5284.657321	54.806823	6.93e-013	1.000000
TPM1+G	1592.13490	333	5284.866581	55.016083	6.24e-013	1.000000
TrNef+G	1592.70510	333	5286.006981	56.156483	3.53e-013	1.000000
TPM2+I	1592.71178	333	5286.020341	56.169843	3.51e-013	1.000000
TPM1+I	1592.82255	333	5286.241881	56.391383	3.14e-013	1.000000

TIM3ef+G	1589.68992	334	5286.284719	56.434222	3.07e-013	1.000000
TPM3+I+G	1589.98904	334	5286.882959	57.032462	2.28e-013	1.000000
TrNef+I	1593.42081	333	5287.438401	57.587903	1.73e-013	1.000000
HKY	1590.42388	334	5287.752639	57.902142	1.47e-013	1.000000
TIM3ef+I	1590.57123	334	5288.047339	58.196842	1.27e-013	1.000000
TIM2ef+G	1591.87291	334	5290.650699	60.800202	3.46e-014	1.000000
TIM1ef+G	1591.98161	334	5290.868099	61.017602	3.11e-014	1.000000
TVMef+G	1588.88703	335	5290.987038	61.136540	2.93e-014	1.000000
TPM2+I+G	1592.38361	334	5291.672099	61.821602	2.08e-014	1.000000
TPM1+I+G	1592.48773	334	5291.880339	62.029842	1.87e-014	1.000000
TIM2ef+I	1592.58011	334	5292.065099	62.214602	1.71e-014	1.000000
TIM1ef+I	1592.78246	334	5292.469799	62.619302	1.39e-014	1.000000
TPM3uf	1589.64000	335	5292.492978	62.642480	1.38e-014	1.000000
TVMef+I	1589.73112	335	5292.675218	62.824720	1.26e-014	1.000000
TPM1uf	1590.03204	335	5293.277058	63.426560	9.31e-015	1.000000
TIM3ef+I+G	1590.03219	335	5293.277358	63.426860	9.31e-015	1.000000
TPM2uf	1590.08839	335	5293.389758	63.539260	8.80e-015	1.000000
TrNef+I+G	1593.26215	334	5293.429179	63.578682	8.63e-015	1.000000
TrN	1590.80360	335	5294.820178	64.969680	4.31e-015	1.000000
SYM+G	1588.74408	336	5297.009236	67.158738	1.44e-015	1.000000
TIM2ef+I+G	1592.24719	335	5297.707358	67.856860	1.02e-015	1.000000
TVMef+I+G	1589.18725	336	5297.895576	68.045078	9.25e-016	1.000000

TIM1ef+I+G	1592.37528	335	5297.963538	68.113040	8.94e-016	1.000000
TIM3	1589.36771	336	5298.256496	68.405998	7.72e-016	1.000000
SYM+I	1589.59948	336	5298.720036	68.869538	6.13e-016	1.000000
TIM1	1589.72966	336	5298.980396	69.129898	5.38e-016	1.000000
TIM2	1590.36607	336	5300.253216	70.402718	2.85e-016	1.000000
SYM+I+G	1589.15268	337	5304.134535	74.284037	4.09e-017	1.000000
TVM	1589.26971	337	5304.368595	74.518097	3.64e-017	1.000000
GTR	1588.99048	338	5310.118233	80.267735	2.05e-018	1.000000
F81+G	1604.89774	334	5316.700359	86.849862	7.64e-020	1.000000
F81+I+G	1604.77789	335	5322.768758	92.918260	3.67e-021	1.000000
TPM3	1617.54336	332	5329.375403	99.524905	1.35e-022	1.000000
K80	1621.40949	331	5330.799564	100.949066	6.63e-023	1.000000
TPM1	1620.48170	332	5335.252083	105.401585	7.15e-024	1.000000
TIM3ef	1617.37618	333	5335.349141	105.498643	6.81e-024	1.000000
TPM2	1620.53231	332	5335.353303	105.502805	6.80e-024	1.000000
F81+I	1614.69369	334	5336.292259	106.441762	4.25e-024	1.000000
TrNef	1621.25367	332	5336.796023	106.945525	3.30e-024	1.000000
TVMef	1616.53269	334	5339.970259	110.119762	6.76e-025	1.000000
TIM1ef	1620.34099	333	5341.278761	111.428263	3.51e-025	1.000000
TIM2ef	1620.37803	333	5341.352841	111.502343	3.39e-025	1.000000
SYM	1616.36827	335	5345.949518	116.099020	3.40e-026	1.000000
JC+G	1633.04887	331	5354.078324	124.227826	5.84e-028	1.000000

JC+I+G	1632.19411	332	5358.676903	128.826405	5.86e-029	1.000000
F81	1632.81508	333	5366.226941	136.376443	1.34e-030	1.000000
JC+I	1642.05436	331	5372.089304	142.238806	7.17e-032	1.000000
JC	1659.64348	330	5400.959446	171.108948	3.86e-038	1.000000

TABLE S5. Results of PartitionFinder for the MAFFT-aligned COI data set.

Settings used

alignment : ./FphlyoCOI\_MAFFT.phy

branchlengths : linked

models : JC, K80, TRNEF, K81, TVMEF, TIMEF, SYM, F81, HKY, TRN, K81UF, TVM, TIM, GTR, JC+G, K80+G, TRNEF+G, K81+G, TVMEF+G, TIMEF+G, SYM+G, F81+G, HKY+G, TRN+G, K81UF+G, TVM+G, TIM+G, GTR+G, JC+I, K80+I, TRNEF+I, K81+I, TVMEF+I, TIMEF+I, SYM+I, F81+I, HKY+I, TRN+I, K81UF+I, TVM+I, TIM+I, GTR+I, JC+I+G, K80+I+G, TRNEF+I+G, K81+I+G, TVMEF+I+G, TIMEF+I+G, SYM+I+G, F81+I+G, HKY+I+G, TRN+I+G, K81UF+I+G, TVM+I+G, TIM+I+G, GTR+I+G

model\_selection : aic

search : greedy

Best partitioning scheme

Scheme Name : start\_scheme

Scheme lnL : -2420.64355469

Scheme AIC : 5559.28710938

Number of params : 359

Number of sites : 659

Number of subsets : 3

Subset	Best Model	# sites	subset id	Partition names
1	TIM+G	220	787c222c3fd320008b879c06120a62c3	Gene1_pos1
2	TRN+I	220	57f416b26686ec7ac3bc4ede701ad7d0	Gene1_pos2
3	GTR+I	219	221348b558ce91aa7bdc154b4945821e	Gene1_pos3

MrBayes block for partition definitions

```
begin mrbayes;
```

```
    charset Subset1 = 1-659\3;
```

```
    charset Subset2 = 2-659\3;
```

```
    charset Subset3 = 3-659\3;
```

```
    partition PartitionFinder = 3:Subset1, Subset2, Subset3;
```

```
    set partition=PartitionFinder;
```

```
    lset applyto=(1) nst=6 rates=gamma;
```

```
    lset applyto=(2) nst=6 rates=propinv;
```

```
    lset applyto=(3) nst=6 rates=propinv;
```

```
    prset applyto=(all) ratepr=variable;
```

```
    unlink statefreq=(all) revmat=(all) shape=(all) pinvar=(all) tratio=(all);
```

```
end;
```

TABLE S6. Results of PartitionFinder for the MAFFT-aligned concatenated data set.

Settings used

alignment : ./FphyloCONCAT\_MAFFT.phy

branchlengths : linked

models : JC, K80, TRNEF, K81, TVMEF, TIMEF, SYM, F81, HKY, TRN, K81UF, TVM, TIM, GTR, JC+G, K80+G, TRNEF+G, K81+G, TVMEF+G, TIMEF+G, SYM+G, F81+G, HKY+G, TRN+G, K81UF+G, TVM+G, TIM+G, GTR+G, JC+I, K80+I, TRNEF+I, K81+I, TVMEF+I, TIMEF+I, SYM+I, F81+I, HKY+I, TRN+I, K81UF+I, TVM+I, TIM+I, GTR+I, JC+I+G, K80+I+G, TRNEF+I+G, K81+I+G, TVMEF+I+G, TIMEF+I+G, SYM+I+G, F81+I+G, HKY+I+G, TRN+I+G, K81UF+I+G, TVM+I+G, TIM+I+G, GTR+I+G

model\_selection : aic

search : greedy

Best partitioning scheme

Scheme Name : step\_4

Scheme lnL : -4859.28137207

Scheme AIC : 10064.5627441

Number of params : 173

Number of sites : 1529

Number of subsets : 5

Subset	Best Model	# sites	subset id	Partition names
1	TRN+I	246	462b384ce69208debf3f41b6cb30edbf	Gene1_pos3, Gene1_pos1
2	TRN+I+G	624	a3b82be7956f4281c2c2e07ada4dc9cc	Gene1_pos2, Gene2_pos1, Gene2_pos2, Gene2_pos3
3	F81	220	3d72dfe9e3e25c203fe7067daa43108a	Gene3_pos1
4	TRN+I	220	c49f7142f6ec4b2da2e70bd95117e53a	Gene3_pos2
5	TRN+I	219	edf16fbfa929a68fb529855d01c7503b	Gene3_pos3

MrBayes block for partition definitions

begin mrbayes;

charset Subset1 = 3-369\3 1-369\3;

charset Subset2 = 2-369\3 370-870\3 371-870\3 372-870\3;

charset Subset3 = 871-1529\3;

charset Subset4 = 872-1529\3;

charset Subset5 = 873-1529\3;

partition PartitionFinder = 5:Subset1, Subset2, Subset3, Subset4, Subset5;

set partition=PartitionFinder;

lset applyto=(1) nst=6 rates=propinv;

lset applyto=(2) nst=6 rates=invgamma;



```
lset applyto=(3) nst=1;
```

```
lset applyto=(4) nst=6 rates=propinv;
```

```
lset applyto=(5) nst=6 rates=propinv;
```

```
prset applyto=(all) ratepr=variable;
```

```
unlink statefreq=(all) revmat=(all) shape=(all) pinvar=(all) tratio=(all);
```

```
end;
```

TABLE S7. A summary of the evidence for and against the separation of *F. notialis* from *F. duorarum*, as well as for splitting *F. brasiliensis* into N and S. Evidence includes results of this study, as well as evidence from the literature.

	<b>Evidence for...</b>	<b>Evidence against...</b>
<b>Separation of <i>F. notialis</i> and <i>F. durarum</i></b>	Topology of the <i>F. duorarum</i> - <i>F. notialis</i> clade allows for the potential resolution of reciprocal monophyly between species	Topology of intermixed terminal nodes
	Different adrostral sulcus condition	Similar thelycum and petasma condition
	Previous molecular studies support sister species relationship (Lavery et al., 2004; R. Maggioni et al., 2001; Voloch et al., 2005)	Genetic distance between <i>F. notialis</i> and <i>F. duorarum</i> measured to be 1.2% (much lower than the threshold value of 6.1% determined through the 10X method and too low to confidently separate species through ABGD analysis)
<b>Separation of <i>F. brasiliensis</i> N and <i>F. brasiliensis</i> S</b>	Topology of the <i>F. brasiliensis</i> clades strongly support a division between a northern and southern subclade	Genetic distance between <i>F. brasiliensis</i> N and <i>F. brasiliensis</i> S measured to be 2.3% (lower than the threshold value of 6.1% determined through the 10X method and too low to confidently separate species through ABGD analysis)
		Lack of accompanying morphological differences