

Multiple, Independent Colonizations of the Hawaiian Archipelago by the Family Dolichopodidae (Diptera)

Appendix S1. Taxonomic sampling, GenBank accession numbers, partitioning and supplementary trees.

TABLE S1A. TAXON SAMPLING AND GENBANK ACCESSION NUMBERS FOR *EURYNOGASTER* COMPLEX, *CONCHOPUS*, AND NON-HAWAIIAN ENDEMIC DOLICHOPODIDAE INCLUDED IN THIS STUDY.

Genus	species	Locality	LabelName	ND2	COI	COII	12s	16s	CAD	EF1aA	EF1aB
Eurynogaster complex specimens											
<i>Adachia</i>	<i>apicenigra</i>	HAWAII, Olaa Forest, Pole 44	Ad.apicenigra107	KX781491	KX781446	KX781540	KX781592	KX781644	KX781396		KX808417
<i>Adachia</i>	<i>hispida</i>	HAWAII, Olaa Forest, Puu Unit, 4300'	Ad.hispida200978	KX781492	KX781447	KX781541	KX781593	KX781645	KX781397	KX808394	
<i>Adachia</i>	<i>n.sp.nr.hispida</i>	KAUAI, Kawaikoi Stream, 3500', 18 May 2007, sweeping over stream	Ad.sp.nr.hispida205015	KX781493	KX781448	KX781542	KX781594	KX781646	KX781398	KX808395	KX808418
<i>Arciellia</i>	<i>dolichostoma</i>	KAUAI, Puu O Kila Road, 4080'	Ar.dolichostoma205016	KX781494	KX781449	KX781568	KX781595	KX781647	KX781399	KX808396	KX808419
<i>Arciellia</i>	<i>dolichostoma</i>	KAUAI, Pihea Trail, 3600'	Ar.dolichostoma205017	KX781495	KX781450	KX781569	KX781596	KX781648	KX781400	KX808397	KX808420
<i>Arciellia</i>	<i>dolichostoma</i>	MAUI, Haleakala NP, Kaupo Trail	Ar.dolichostoma205359	KX781496	KX781451	KX781572	KX781597	KX781649			KX808421
<i>Arciellia</i>	<i>xanthopleura</i>	KAUAI, Kokee SP, Nualolo Tr.	Ar.xanthopleura147			KX781570	KX781598	KX781650	KX781401		KX808422
<i>Arciellia</i>	<i>xanthopleura</i>	KAUAI, Pihea Trail, 3600'	Ar.xanthopleura205018	KX781497	KX781452	KX781571	KX781599	KX781651	KX781402	KX808398	KX808423
<i>Eurynogaster</i>	<i>cilifemorata</i>	OAHU, Poamoho, 1.5 mi.	E.cilifemorata94	KX781512		KX781561	KX781613	KX781664	KX781416		KX808436
<i>Eurynogaster</i>	<i>clavaticauda</i>	OAHU, Poamoho, stream	E.clavaticauda95	KX781513	KX781466	KX781554	KX781614	KX781665	KX781417	KX808403	KX808437
<i>Eurynogaster</i>	<i>kauaiensis</i>	KAUAI, Pihea Trail	E.kauaiensis131	KX781514		KX781566	KX781615	KX781666	KX781418		KX808438
<i>Eurynogaster</i>	<i>maculata</i>	OAHU, Poamoho Tr.	E.maculata132	KX781515	KX781467	KX781556	KX781616	KX781667	KX781419		KX808439
<i>Eurynogaster</i>	<i>maculata</i>	MAUI, Paliku, crater wall, 6600'	E.maculata205058_205380	KX781516	KX781468	KX781557	KX781617	KX781668	KX781420	KX808404	KX808440
<i>Eurynogaster</i>	<i>n.sp.A</i>	HAWAII, Hakalau	E.n.sp.A133	KX781517		KX781549	KX781618	KX781669	KX781421		KX808441
<i>Eurynogaster</i>	<i>n.sp.B</i>	OAHU, Mt. Kaala	E.n.sp.B105			KX781562	KX781621	KX781672	KX781424		KX808444
<i>Eurynogaster</i>	<i>n.sp.C</i>	OAHU, Poamoho Tr.	E.n.sp.C128	KX781518	KX781469	KX781563	KX781619	KX781670	KX781422	KX808405	KX808442
<i>Eurynogaster</i>	<i>paludis</i>	MAUI, Pihea Trail, 3600'	E.paludis205025	KX781519	KX781470	KX781567	KX781620	KX781671	KX781423	KX808406	KX808443
<i>Eurynogaster</i>	<i>sp.nr.cilifemorata</i>	OAHU, Mt. Kaala	E.sp.nr.cilifemorata102			KX781560		KX781673			

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<i>Eurynogaster</i>	<i>sp.nr.cilifemorata</i>	MAUI, Haiku Uka, Heed Trail, 4200'	E.sp.nr.cilifemorata205049	KX781520	KX781471	KX781559	KX781622	KX781674	KX781425	KX808407	KX808445
<i>Eurynogaster</i>	<i>nr. cilifemorata</i>	MAUI, East Maui Irrigation, Haiku Uka, Heed Trail	E.sp.nr.cilifemorata83	KX781521	KX781472	KX781552	KX781623	KX781675	KX781426	KX808408	KX808446
<i>Eurynogaster</i>	<i>sp.nr.clavaticauda</i>	OAHU, Poamoho, stream	E.sp.nr.clavaticauda93	KX781522	KX781473	KX781555	KX781624	KX781676	KX781427	KX808409	
<i>Eurynogaster</i>	<i>sp.nr.hawaiiensis</i>	MAUI, Haiku Uka, Carson Trail, 4200'	E.sp.nr.hawaiiensis205031	KX781523	KX781474	KX781564	KX781625	KX781677	KX781428	KX808410	KX808447
<i>Eurynogaster</i>	<i>sp.nr.hawaiiensis</i>	MAUI, East Maui Irrigation, Haiku Uka, Carson Trail	E.sp.nr.hawaiiensis80	KX781524	KX781475	KX781565	KX781626	KX781678	KX781429	KX808411	KX808448
<i>Eurynogaster</i>	<i>sp.nr.maculata</i>	HAWAII, Hakalau	E.sp.nr.maculata115			KX781547	KX781627	KX781679			
<i>Eurynogaster</i>	<i>sp.nr.maculata</i>	HAWAII, Kohalas, Puu O Uni NAR	E.sp.nr.maculata126	KX781525	KX781476	KX781550	KX781628	KX781680	KX781430		KX808449
<i>Eurynogaster</i>	<i>sp.nr.maculata</i>	MAUI, Trail to Kawiki, 1 mi. from Paliku cabin	E.sp.nr.maculata141	KX781526	KX781477	KX781558	KX781629	KX781681	KX781431		KX808450
<i>Eurynogaster</i>	<i>sp.</i>	HAWAII, Olaa Forest, Pole 44	E.sp112	KX781527	KX781478	KX781548	KX781630	KX781682	KX781432	KX808412	
<i>Eurynogaster</i>	<i>sp.</i>	MAUI, Waikamoi Forest Preserve, Heed Trail	E.sp135	KX781528	KX781479	KX781553	KX781631	KX781683	KX781433		KX808451
<i>Eurynogaster</i>	<i>variabilis</i>	HAWAII, Kau FR, Alahi Spring	E.variabilis205226	KX781529	KX781480	KX781551		KX781684	KX781434		KX808452
<i>Elmoia</i>	<i>bullata</i>	HAWAII, Kohala State Forest, trail to Waimanu Stream	El.bullata205260	KX781530		KX781543	KX781632	KX781685	KX781435	KX808413	KX808453
<i>Elmoia</i>	<i>saxatilis</i>	OAHU, Mt. Kaala	El.saxatilis106		KX781481	KX781546	KX781633	KX781686	KX781436		KX808454
<i>Major</i>	<i>minor</i>	OAHU, Mt. Kaala	M.minor205097_111	KX781531	KX781482	KX781544	KX781634	KX781687	KX781437		KX808455
<i>Sigmatineurum</i>	<i>n.sp.D</i>	HAWAII, Kohala Mountains	Si.n.sp.D205265	KX781532	KX781483	KX781545	KX781635	KX781688	KX781438		KX808456
<i>Sweziella</i>	<i>tergoprolixa</i>	MAUI, Haiku Uka, Heed Trail, 4200'	Sw.tergoprolixa205048	KX781533	KX781484	KX781578	KX781636	KX781689	KX781439	KX808414	KX808457
<i>Uropachys</i>	<i>clavastyla</i>	KAUAI, Kokee SP, Nualolo Tr.	U.clavastyla130		KX781486	KX781575	KX781639	KX781692	KX781441		KX808459
<i>Uropachys</i>	<i>fusticercus</i>	KAUAI, Na Pali-Kona FR Pihea Trail	U.fusticercus205027	KX781536	KX781487	KX781573	KX781640	KX781693	KX781442	KX808416	KX808460
<i>Uropachys</i>	<i>fusticercus</i>	KAUAI, Na Pali-Kona FR Pihea Trail	U.fusticercus61	KX781537	KX781488	KX781574	KX781641	KX781694	KX781443		KX808461
<i>Uropachys</i>	<i>palustricola</i>	KAUAI, Alakai Swamp GB27A	U.palustricola127	KX781538	KX781489	KX781576	KX781642	KX781695	KX781444		KX808462

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<i>Uropachys</i>	<i>palustricola</i>	KAUAI, Pihea Trail	U.palustricola134	KX781539	KX781490	KX781577	KX781643	KX781696	KX781445	KX808463
Other Hawaiian endemic Dolichopodidae specimens										
<i>Conchopus</i>	<i>ciliatus</i>	HAWAII, Whittington Beach Park, South Coast, Kau	Conchopus.ciliatus96	KX781504	KX781459	KX781590		KX781656	KX781408	KX808428
<i>Conchopus</i>	<i>pacificus</i>	HAWAII, Whittington Beach Park, South Coast, Kau	Conchopus.pacificus122	KX781505	KX781460	KX781591	KX781606	KX781657	KX781409	KX808429
<i>Conchopus</i>	<i>acrostichalis</i>	OAHU, Haleiwa Beach	Conchopus.acrostichalis92	KX781503	KX781458	KX781589	KX781605	KX781655	KX781407	KX808427
<i>Thinophilus</i>	<i>hardyi</i>	HAWAII, Whittington Beach Park, South Coast, Kau	Th.hardyi205118	KX781535		KX781588	KX781638	KX781691		
Non-Hawaiian endemic Dolichopodidae specimens										
<i>Chrysotus</i>	<i>longipalpis</i>	OAHU, Manoa Cliff Trail, 1800'	Ch.longipalpis205060	KX781498	KX781453	KX781579	KX781600	KX781652	KX781403	KX808424
<i>Chrysotus</i>	<i>longipalpis</i>	OAHU, Honolulu Watershed FR, Manoa Cliffs Trail	Ch.longipalpis205379	KX781499	KX781454	KX781581	KX781601	KX781653	KX781404	KX808425
<i>Chrysotus</i>	<i>sp</i>	MARQUESAS, HIVA OA MAUI, Kahanaiki Gulch, 2100'	Ch.sp173	KX781502	KX781457		KX781604			
<i>Chrysotus</i>	<i>sp nr.longipalpis</i>		Ch.sp.nr.longipalpis205030	KX781500	KX781455		KX781602		KX781405	KX808426
<i>Chrysotus</i>	<i>sp.nr.longipalpis</i>	MAUI, Puu Kukui, Kahanaiki Gulch	Ch.sp.nr.longipalpis85	KX781501	KX781456	KX781580	KX781603	KX781654	KX781406	
<i>Condyllostylus</i>	<i>sp.</i>	OAHU, Maunaloa Beach Rocks	Condyllostylus.sp164	KX781506	KX781461		KX781607	KX781658	KX781410	KX808430
<i>Dolichopus</i>	<i>exsul</i>	OAHU, Poamoho	D.exsul169	KX781507		KX781585	KX781608	KX781659	KX781411	KX808431
<i>Dolichopus</i>	<i>exsul</i>	KAUAI, Pihea Trail, 3500'	D.exsul205024	KX781509	KX781462	KX781583	KX781609	KX781660	KX781412	KX808399 KX808432
<i>Dolichopus</i>	<i>exsul</i>	MAUI, Puu Kukui Trail, 2900-3700'	D.exsul205034	KX781508	KX781463	KX781582	KX781610	KX781661	KX781413	KX808400 KX808433
<i>Dolichopus</i>	<i>exsul</i>	HAWAII, Kau FR, Alahi Spring	D.exsul205232	KX781510	KX781464	KX781584	KX781611	KX781662	KX781414	KX808401 KX808434
<i>Dolichopus</i>	<i>exsul</i>	HAWAII, Kohala Mountains	D.exsul205282	KX781511	KX781465	KX781586	KX781612	KX781663	KX781415	KX808402 KX808435
<i>Tachytrechus</i>	<i>angustipennis</i>	KAUAI, Kumuwela Trail, 3500'	T.angustipennis205026	KX781534	KX781485	KX781587	KX781637	KX781690	KX781440	KX808415 KX808458

TABLE S1B. SUMMARY OF DATA PARTITIONS AND NUCLEOTIDE MODELS DETERMINED FOR EACH PARTITION, SELECTED USING BIC IN PARTITIONFINDER (LANFEAR ET AL., 2012).

Program (# partitions)	Figure	Data partitions: nucleotide models selected by PartitionFinder
Dataset A Dolichopodidae Mr Bayes/ RAxML(11)	Figures 2, S1a & S1b in Appendix 1	Mr Bayes: COI_3, COII_3, ND2_3: GTR+I+G COI_1, COII_1: GTR+I+G EF1_2, COI_2, COII_2: GTR+I+G ND2_1: GTR+G ND2_2: GTR+G 12S, 16S: GTR+I+G CAD_3: HKY+I+G CAD_1, CAD_2: K80+I+G CADintron: GTR+I+G EF1_3: HKY+G EF1_1: F81+I+G RAxML: Each partition was run using the GTR+GAMMA model
Dataset B (<i>Eurynogaster</i> complex): Mr Bayes/ RAxML(11)	Figure 1 & Figure S1c-1 in Appendix 1	Mr Bayes: CAD_3: HKY+I CAD_1: GTR+G CAD_2, EF1A_2, ND_2: HKY+I+G CADintron, EF1Aintron1, EFAintron2: HKY+I EF1A_3, EF1B_3: HKY+G EF1A_1, EF1B_1: F81+I COI_2, COII_2, EF1B_2: F81+I+G EF1Bintron: F81 12S, 16S, ND2_1: GTR+I+G COI_3, COII_3, ND2_3: GTR+I+G COI_1, COII_1: GTR+G RAxML: Each partition was run using the GTR+GAMMA model
Dataset B (<i>Eurynogaster</i> complex): BEAST: Island calibrations (10)	Figures 1 & S2b in Appendix 2	CAD_3: HKY CAD_1, EF1A_1, EF1B_1: TrN+I CAD_2, EF1A_2, ND_2: HKY+I+G CADintron, EF1Aintron1, EF1Aintron2: HKY+I EF1A_3, EF1B_3: HKY+G COI_2, COII_2, EF1B_2: HKY+I+G EF1Bintron: HKY 12S, 16S, ND2_1: GTR+I+G COI_3, COII_3, ND2_3: GTR+I+G COI_1, COII_1: GTR+G
Dataset B (<i>Eurynogaster</i> complex): BEAST: Divergence rates (11)	Figures S2c & S2d in Appendix 2	COI: GTR+I+G CAD_3: HKY+I CAD_1, EF1A_2, EF1B_1: TrN+I CAD_2, EF1A_2, ND2_2: HKY+I+G CADintron, EF1Aintron1, EF1Aintron2: HKY+I EF1A_3, EF1B_3: HKY+G COII_2, EF1B_2: HKY+I EF1Bintron: HKY 12S, 16S, ND2_1: GTR+I+G COII_3, ND2_3: GTR+I+G COII_1: TrN+G

SUPPLEMENTARY TREES:

FIGURE S1A. COMBINED DOLICHOPODIDAE ANALYSIS (DATA SET A). Majority rule consensus tree summarizing Bayesian analysis, with the *Eurynogaster* complex and *Campsicnemus* collapsed. Bayesian posterior probabilities (Mr. Bayes) and bootstrap supports from the maximum likelihood analysis (RAxML) are displayed as boxes.

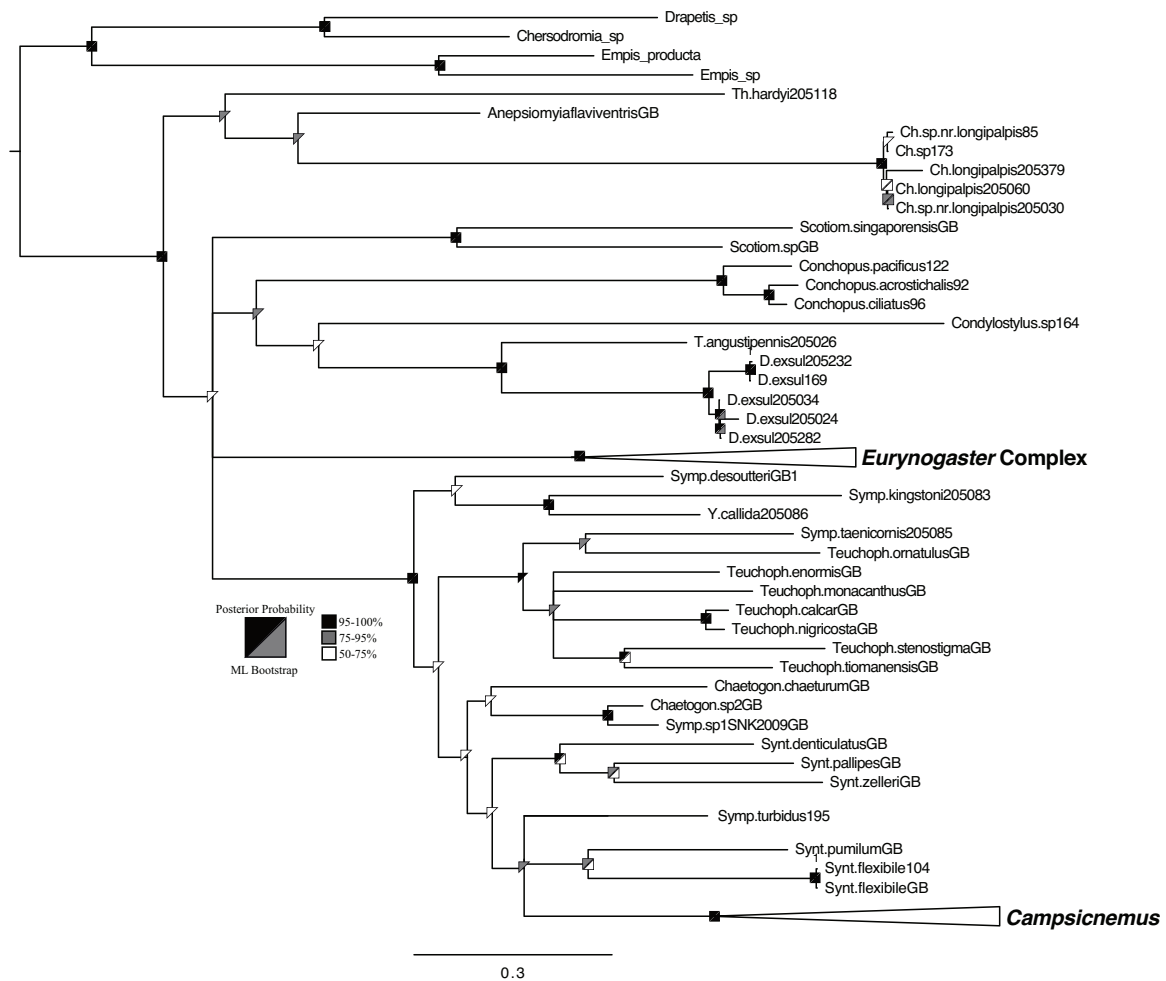


FIGURE S1B. MAXIMUM LIKELIHOOD ANALYSIS OF THE DOLICHOPODIDAE (DATA SET A).

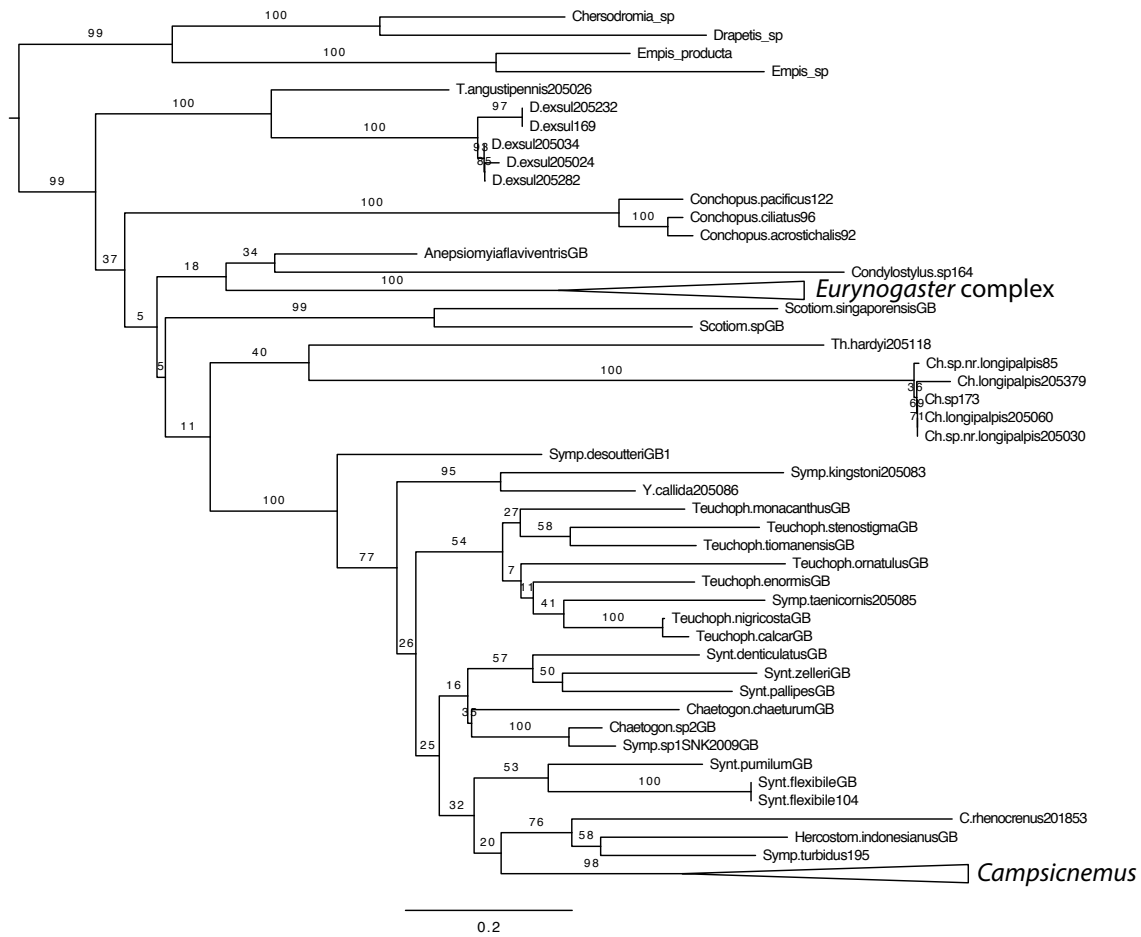


FIGURE S1C. Majority rule consensus tree summarizing Bayesian analysis of the *Eurynogaster* complex. Bayesian posterior probabilities (Mr. Bayes) and bootstrap supports from the maximum likelihood analysis (RAxML) are displayed as boxes. Islands that each specimen was collected from are shown next to each tip.

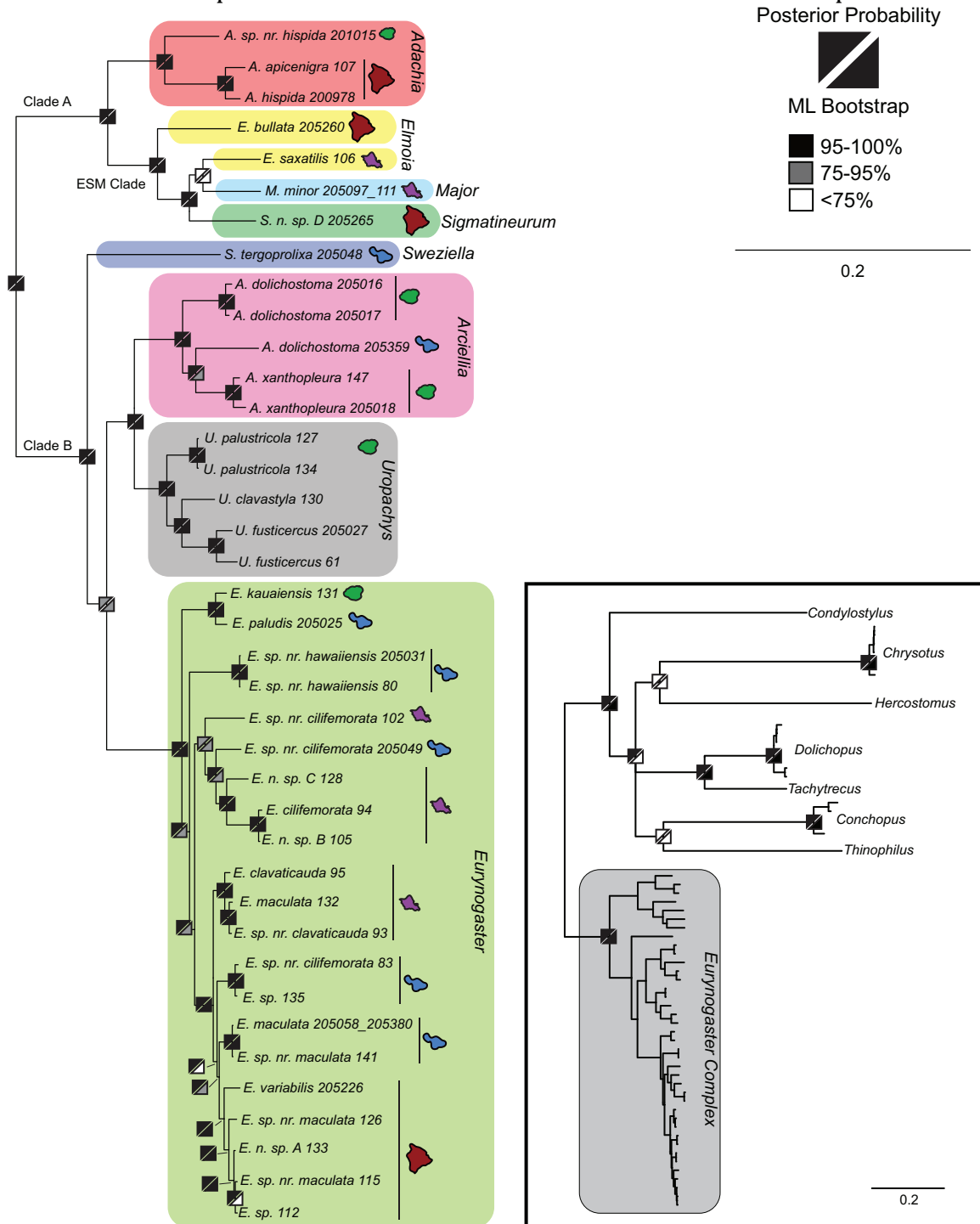
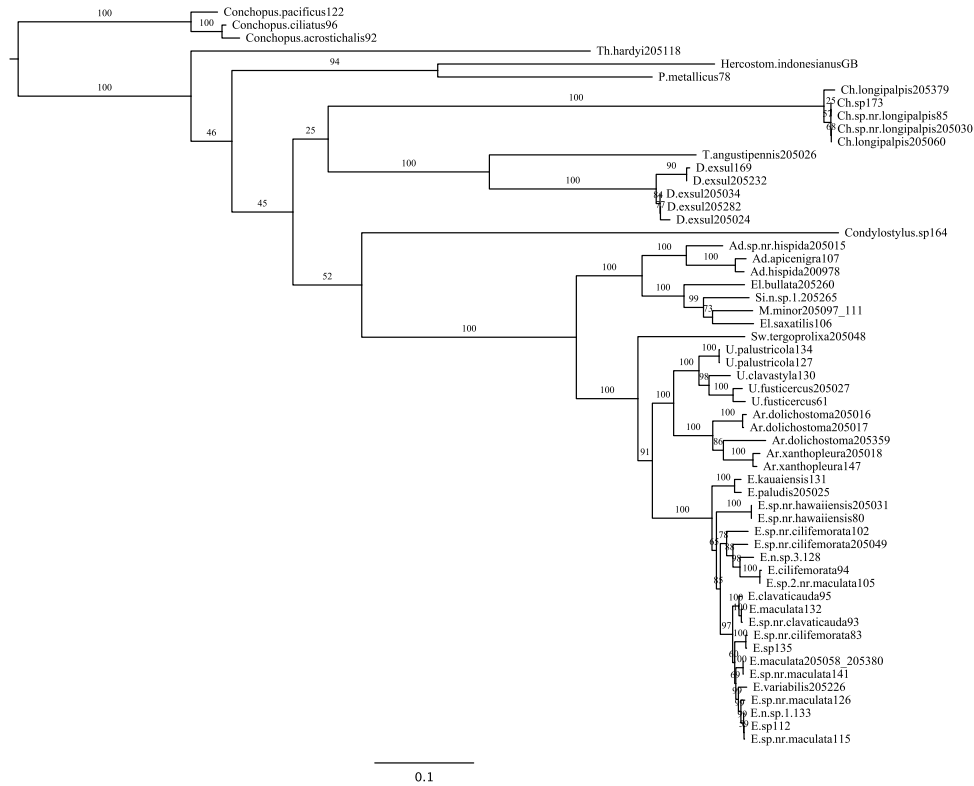


FIGURE S1D. COMBINED MAXIMUM LIKELIHOOD ANALYSIS OF ALL GENES (DATA SET B).



SUPPLEMENTARY TREES: INDIVIDUAL MAXIMUM LIKELIHOOD GENE TREES:

FIGURE S1E. COI

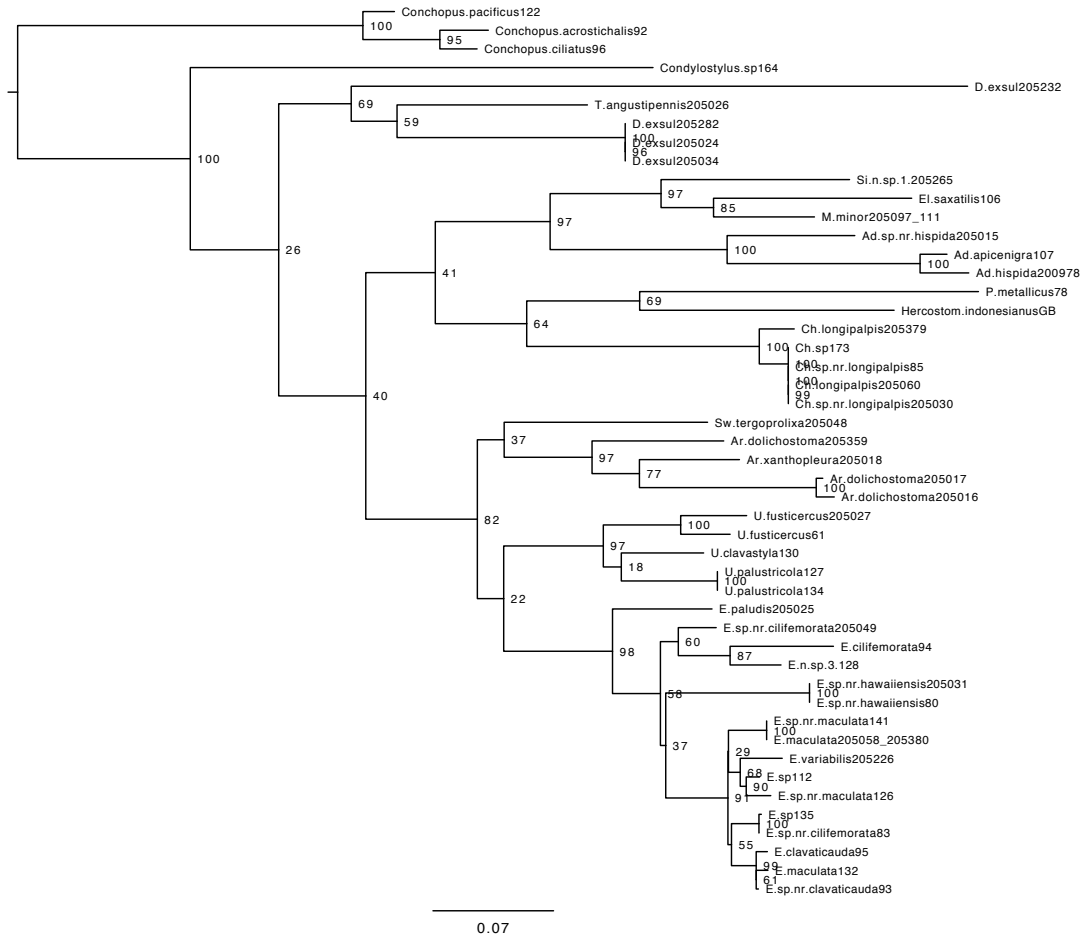


FIGURE S1F. COII

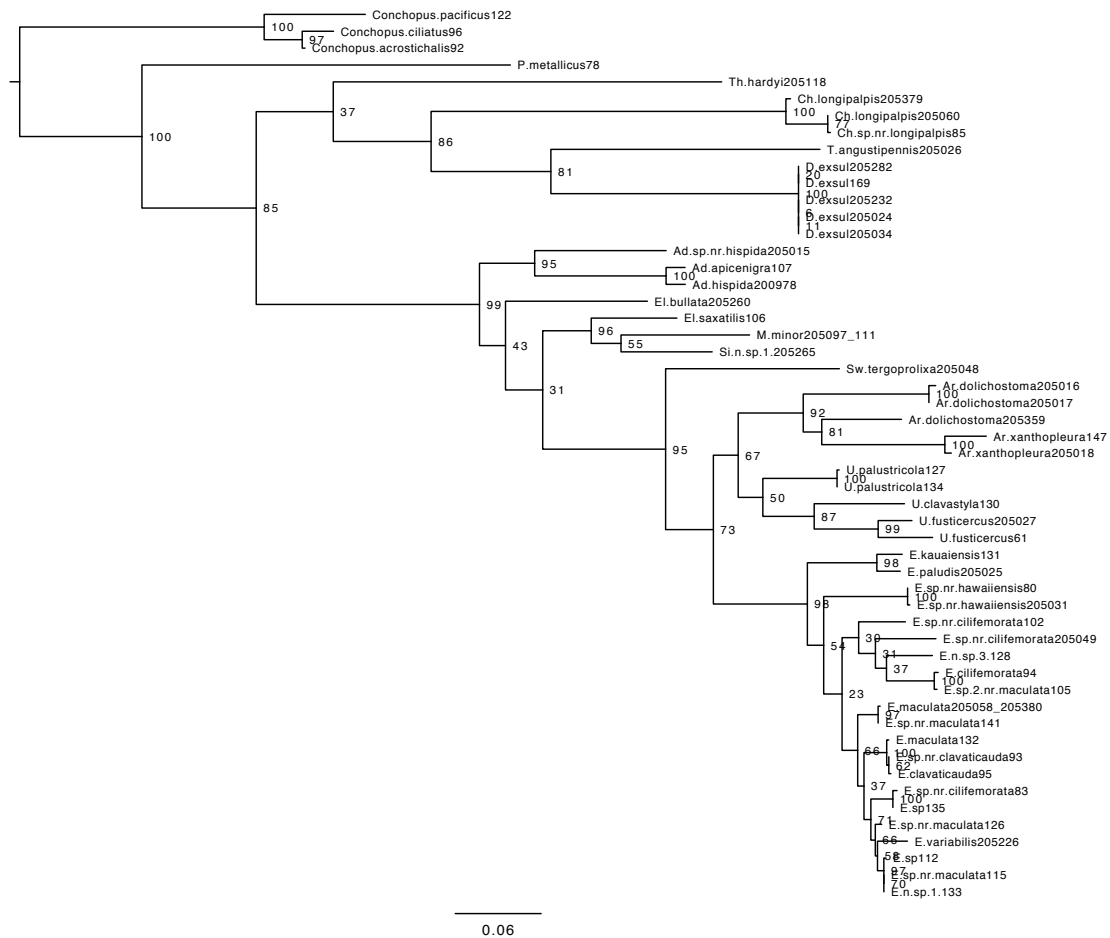


FIGURE S1G. ND2

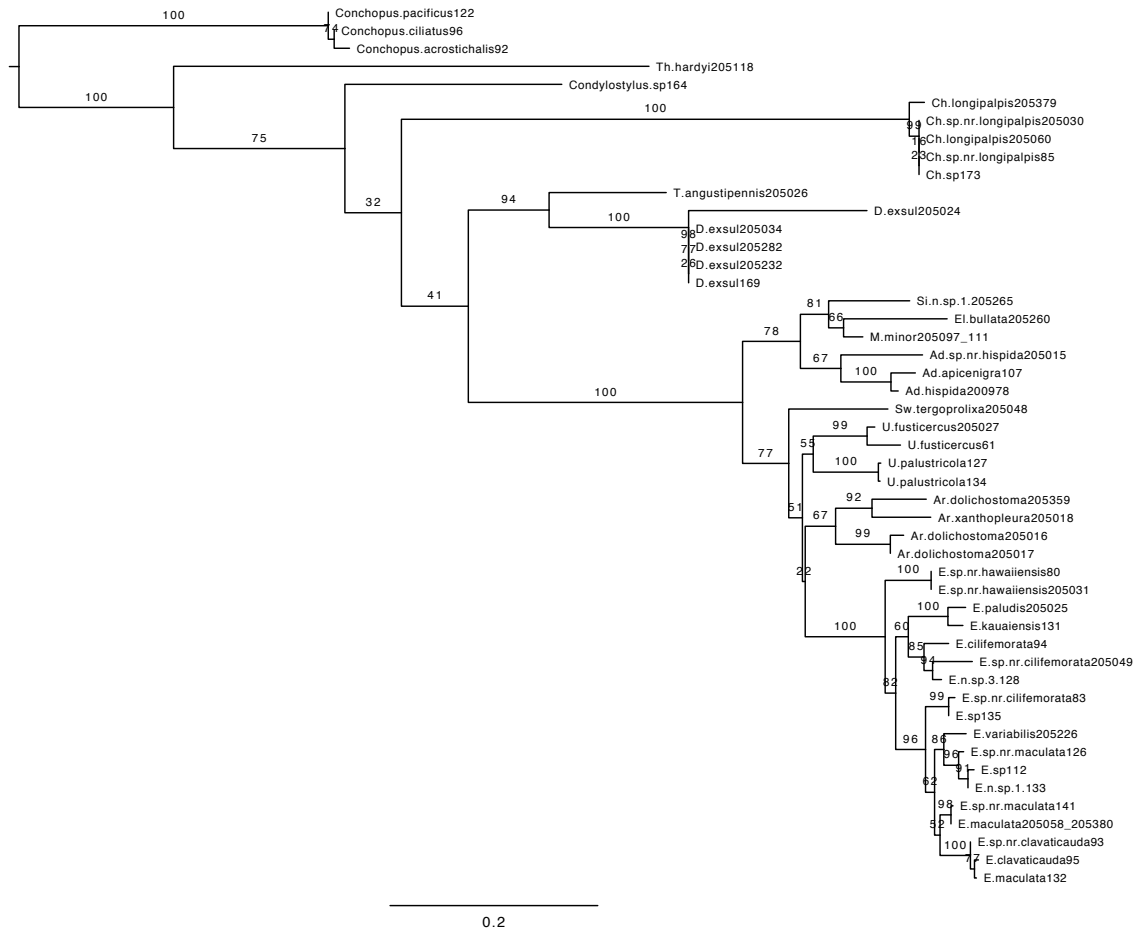


FIGURE S1H. 12S

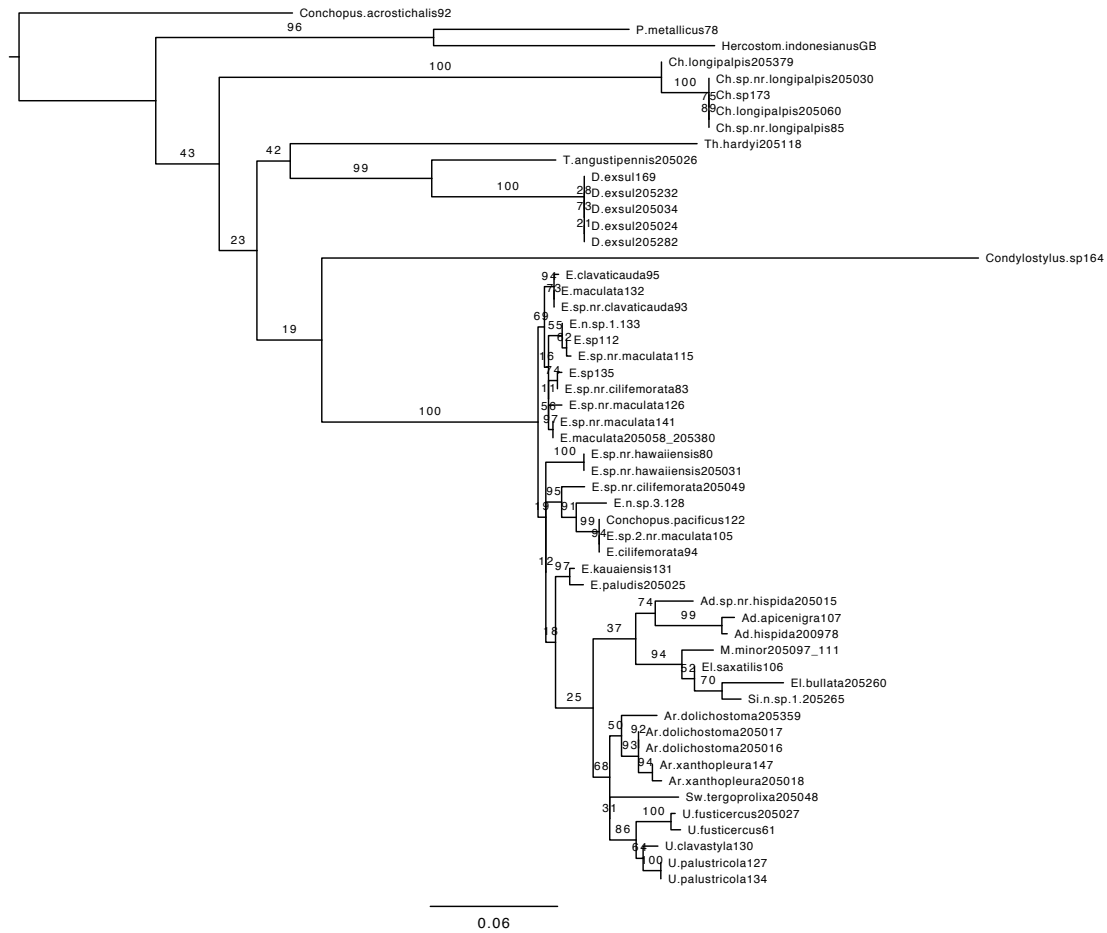


FIGURE S1i. 16S

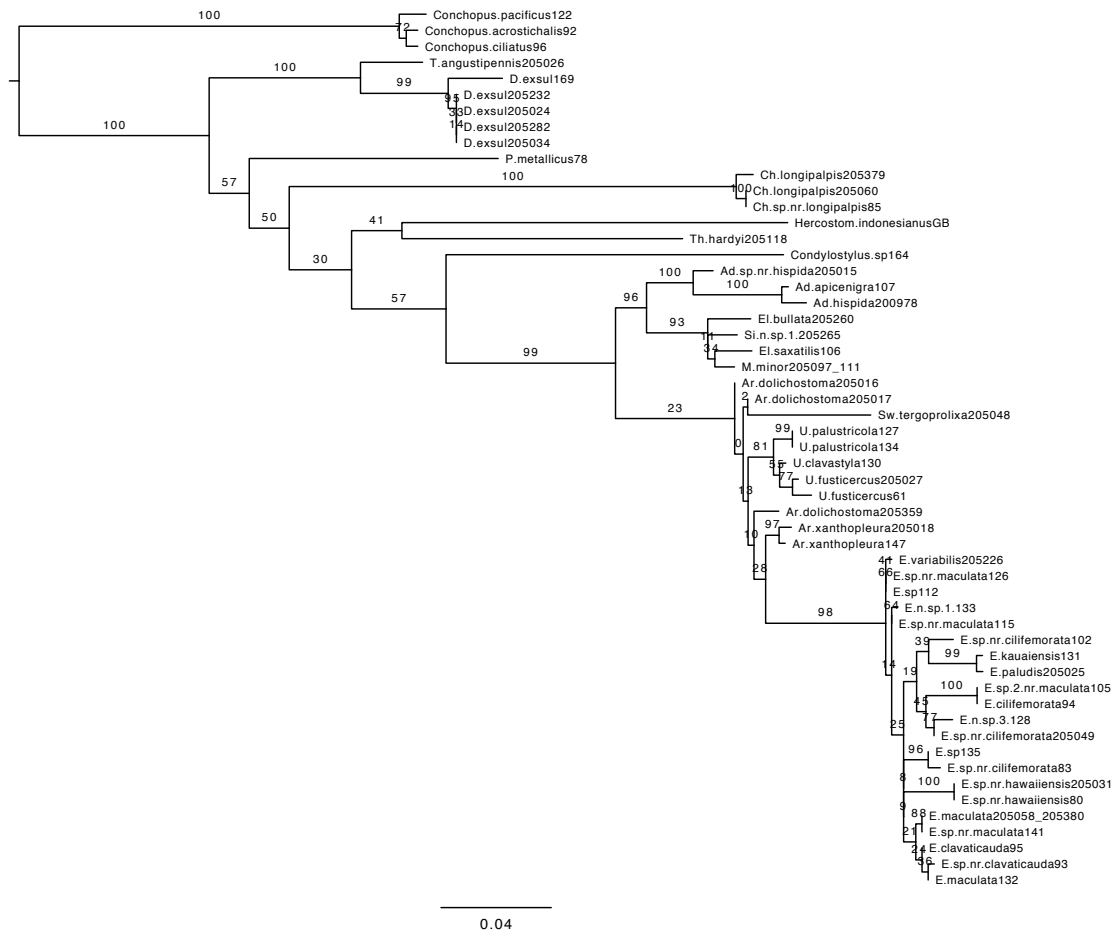


FIGURE S1J. CAD

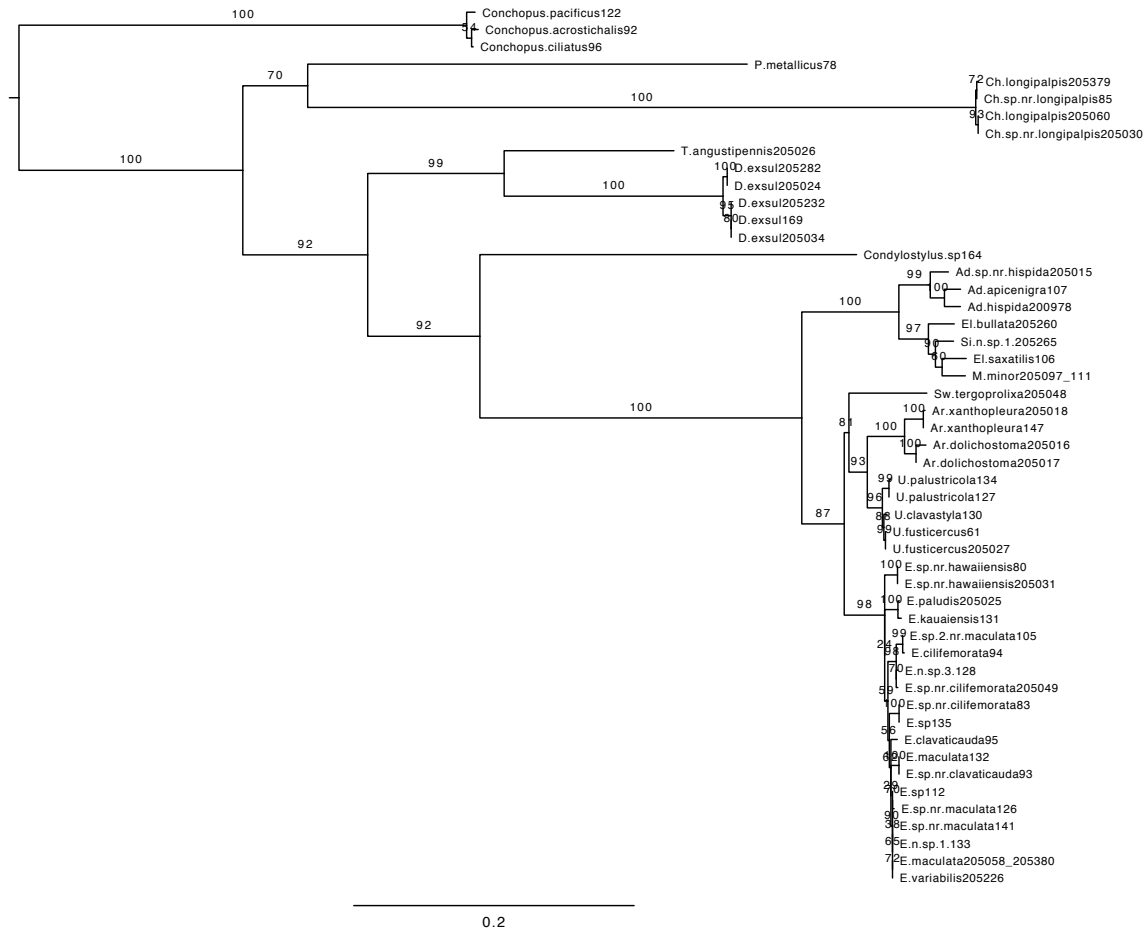


FIGURE S1k. EF1AA

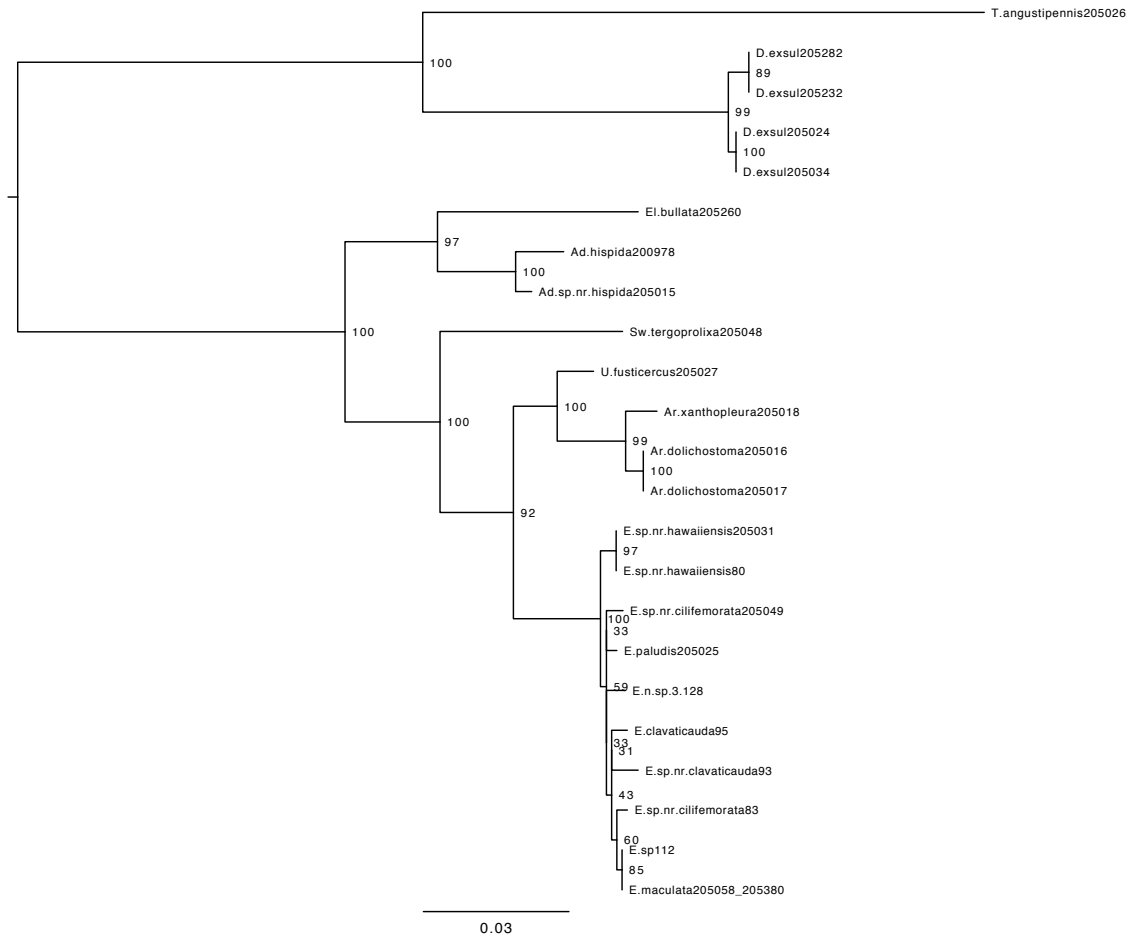


FIGURE S1L. EF1AB

