**Table S1:** Genbank accession numbers and sources for fungal sequences used in phylogenetic analysis and vector associations used in the cophylogenetic analysis. (t) Indicates sequences obtained from type material, asterisks (\*) indicates isolates used in symbiont switching experiments.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| fungus species | beetle isolated/  sequenced from | isolate name | ITS  accession | TEF1α  accession | RPB1  accession | Study |
| *A. batrae* (t) | *Anisandrus sayi* | C3130 | KR611322 | KT290320 | na | Mayers et al. 2015 |
| *A. beaveri* | *Cnestus murayamai* | B53K | LC175296 | LC175264 | LC174932 | Lin et al 2017 |
| *A. beaveri* | *Cnestus mutilatus* | 0414XX13 | LC175287 | LC175255 | LC174923 | Lin et al 2017 |
| *A. beaveri* | *Cnestus mutilatus* | C2749 | KF669875 | KT318380 | na | Mayers et al. 2015 |
| *A. beaveri* | *Hadrodemius comans* | W204gT | LC175303 | LC175271 | LC174939 | Lin et al 2017 |
| *A. beaveri* | *Hadrodemius globus* | 0403LY20 | LC175280 | LC175248 | na | Lin et al 2017 |
| *A. beaveri* | *Xylosandrus brevis* | B241P4 | LC175298 | LC175266 | LC174934 | Lin et al 2017 |
| *A. beaveri* | *Xylosandrus discolor* | 0320LHC5 | LC175278 | LC175246 | LC174914 | Lin et al 2017 |
| *A. beaveri* | *Xylosandrus mancus* | 1109LHC8 | LC175291 | LC175258 | LC174927 | Lin et al 2017 |
| *A. beaveri* | *Xylosndrus borealis* | 0320LHC2 | LC175277 | LC175245 | LC174913 | Lin et al 2017 |
| *A.* c.f. *beaveri* | *Xylosandrus discolor* | JH\_13142\* | MK118923 | MK121365 | MK118930 | this study |
| *A.* c.f. *beaveri* | *Cnestus murayamai* | JH\_21432 | MK118924 | MK121366 | na | this study |
| *A. catenulata* | *Eccoptopterus spinosus* | 12B1 | LC175273 | LC175241 | LC174909 | Lin et al 2017 |
| *A. catenulata* (t) | *Anisandrus hirtus* | W186g | LC175301 | LC175269 | LC174937 | Lin et al 2017 |
| *A. cleistominuta* (t) | *Anisandrus maiche* | C3843 | KX909940 | KX925309 | na | Mayers et al. 2017 |
| *A. grosmanniae* | *Xylosandrus germanus* | 1002HHS2 | LC175289 | LC175257 | na | Mayers et al. 2015 |
| *A. grosmanniae* | *Xylosandrus germanus* | JH\_13141\* | MK118925 | MK121367 | MK118931 | this study |
| *A. grosmanniae* (t) | *Xylosandrus germanus* | C3151 | KR611324 | KT318382 | na | Mayers et al. 2015 |
| *A. hartigii* | *Anisandrus dispar* | C1573 | KF669873 | KT318383 | na | Mayers et al. 2015 |
| *A. nakashimae* | *Xylosandrus amputatus* | 0414XX1 | LC175283 | LC175251 | LC174919 | Lin et al 2017 |
| *A. nakashimae* | *Xylosandrus amputatus* | W209g3 | LC175304 | LC175272 | LC174940 | Lin et al 2017 |
| *A. nakashimae* | *Xylosandrus amputatus* | JH\_13143\* | MK118926 | MK121368 | MK118932 | this study |
| *A. nakashimae* (t) | *Xylosandrus amputatus* | C3445 | KR611323 | KT318381 | na | Mayers et al. 2015 |
| *A. roeperi* | *Xylosandrus crassiusculus* | B242U4 | LC175300 | LC175268 | LC174936 | Lin et al 2017 |
| *A. roeperi* | *Xylosandrus crassiusculus* | JH\_13140\* | MK118927 | MK121369 | na | this study |
| *A. roeperi* (t) | *Xylosandrus crassiusculus* | C2448 | KF669871 | KT318384 | na | Harrington et al. 2014 |
| *A.* sp. | *Eccoptopterus gracilipes* | JH\_2836 | na | MK121370 | na | this study |
| *A.* sp. | *Xylosandrus morigerus* | JH\_27755 | MK118928 | MK121371 | MK118933 | this study |
| *A. xylebori* | *Xylosandrus compactus* | JH\_13139\* | MK118929 | MK121372 | MK118934 | this study |
| *A. xylebori* (t) | *Xylosandrus compactus* | C3051 | KF669874 | KT318385 | na | Mayers et al. 2015 |
| *Ceratocystis fimbriata* | *na* | C1099 | AY157957 | HM569615 | na | Mayers et al. 2015 |
| *Meredithiella\_norrisii* (t) | *Corthylus punctatissimus* | C3151 | KR611326 | KT318386 | na | Mayers et al. 2015 |
| *Phialophoropsis ferruginea* | *Trypodendron lineatum* | M243 | KR611328 | KT318387 | na | Mayers et al. 2015 |
| *Phialophoropsis* sp. | *Trypodendron domesticum* | C2230 | KC305146 | KT318388 | na | Mayers et al. 2015 |

**Table S2:** Genbank accession numbers for beetle sequences used in the phylogenetic analysis.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Leaf name** | | **CO1** | | **EF-1a** | | **28S** | **CAD** | **ArgK** |
| *Amasa bicostatus* | | Amasa\_bicostatus\_ | GU808689.1 | GU808731.1 | | GU808574.1 | | GU808615.1 | GU808653.1 |
| *Amasa knizeki* | Amasa\_knizeki\_ | | GU808688.1 | | GU808730.1 | | GU808572.1 | GU808614.1 | GU808652.1 |
| *Amasa versicolor* | | Amasa\_versicolor\_ | GU808693.1 | GU808733.1 | | GU808578.1 | | GU808618.1 | GU808656.1 |
| *Ambrosiodmus asperatus* | Ambrosiodmus\_asperatus\_ | | HM064047.1 | | HM064153.1 | | HM099666.1 | HM064226.1 | HM064330.1 |
| *Ambrosiodmus obliquus* | | Ambrosiodmus\_obliquus\_ | HM064048.1 | HM064154.1 | | HM099667.1 | | HM064227.1 | HM064331.1 |
| *Ambrosiodmus rubricollis* | Ambrosiodmus\_rubricollis\_ | | HM064049.1 | | HM064155.1 | | HM099668.1 | HM064228.1 | HM064332.1 |
| *Ambrosiodmus tachygraphus* | | Ambrosiodmus\_tachygraphus\_ | HM064053.1 | HM064159.1 | | HM099671.1 | | HM064232.1 | HM064336.1 |
| *Ambrosiophilus atratus* | Ambrosiophilus\_atratus\_ | | HM064120.1 | | HM064206.1 | | HM099735.1 | HM064298.1 | HM064386.1 |
| *Ambrosiophilus mogia* | | Ambrosiophilus\_mogia\_ | HM064131.1 | HM064213.1 | | HM099746.1 | | HM064310.1 | HM064394.1 |
| *Ambrosiophilus semicarinatus* | Ambrosiophilus\_semicarinatus\_ | | HM064050.1 | | HM064156.1 | | HM099669.1 | HM064229.1 | HM064333.1 |
| *Anisandrus dispar* | | Anisandrus\_dispar\_Xyldis | GU808699.1 | GU808738.1 | | GU808584.1 | | GU808622.1 | GU808661.1 |
| *Anisandrus dispar* | Anisandrus\_dispar\_ | | HQ883695.1 | | HQ883763.1 | | HQ883606.1 | HQ883840.1 | HQ883926.1 |
| *Anisandrus hirtus* | | Anisandrus\_hirtus\_ | GU808700.1 | na | | GU808585.1 | | GU808623.1 | GU808662.1 |
| *Anisandrus maiche* | Anisandrus\_maiche\_28176 | | na | | na | | **MK098863** | **MK098871** | **MK098874** |
| *Anisandrus obesus* | | Anisandrus\_obesus\_ | GU808701.1 | na | | GU808586.1 | | na | GU808663.1 |
| *Anisandrus sayi* | Anisandrus\_sayi\_ | | GU808704.1 | | GU808741.1 | | GU808589.1 | GU808626.1 | GU808666.1 |
| *Anisandrus ursa* | | Anisandrus\_ursa\_ | GU808722.1 | GU808758.1 | | GU808606.1 | | GU808644.1 | GU808681.1 |
| *Anisandrus ursulus* | Anisandrus\_ursulus\_ | | GU808723.1 | | GU808759.1 | | GU808607.1 | GU808645.1 | GU808682.1 |
| *Arixyleborus canaliculatus* | | Arixyleborus\_canaliculatus\_ | HM064054.1 | na | | HM099672.1 | | HM064233.1 | HM064337.1 |
| *Arixyleborus morio* | Arixyleborus\_morio\_ | | HM064056.1 | | HM064162.1 | | HM099675.1 | HM064236.1 | HM064340.1 |
| *Arixyleborus puberulus* | | Arixyleborus\_puberulus\_ | HM064055.1 | HM064160.1 | | HM099673.1 | | HM064234.1 | HM064338.1 |
| *Beaverium insulindicus* | Beaverium\_insulindicus\_ | | HM064129.1 | | na | | HM099744.1 | HM064308.1 | HM064392.1 |
| *Beaverium latus* | | Beaverium\_latus\_ | HM064059.1 | HM064165.1 | | HM099678.1 | | HM064239.1 | na |
| *Beaverium perplexus* | Beaverium\_perplexus\_ | | HM064060.1 | | HM064166.1 | | HM099679.1 | HM064240.1 | HM064343.1 |
| *Cnestus ater* | | Cnestus\_ater\_ | GU808705.1 | GU808742.1 | | GU808590.1 | | GU808627.1 | GU808667.1 |
| *Cnestus aterrimus* | Cnestus\_aterrimus\_28177 | | ns | | na | | **MK098864** | na | **MK098875** |
| *Cnestus bimaculatus* | | Cnestus\_bimaculatus\_ | GU808694.1 | na | | GU808579.1 | | GU808619.1 | GU808657.1 |
| *Cnestus improcerus* | Cnestus\_improcerus\_ | | GU808715.1 | | GU808752.1 | | GU808599.1 | GU808636.1 | GU808675.1 |
| *Cnestus murayamai* | | Cnestus\_murayamai\_28178 | na | na | | **MK098865** | | na | **MK098876** |
| *Cnestus mutilatus* | Cnestus\_mutilatus\_xyomul | | GU808719.1 | | GU808755.1 | | GU808603.1 | GU808641.1 | GU808678.1 |
| *Cnestus pseudosuturalis* | | Cnestus\_pseudosuturalis\_ | GU808695.1 | GU808734.1 | | GU808580.1 | | GU808620.1 | GU808658.1 |
| *Coccotrypes dactyliperda* | Coccotrypes\_dactyliperda\_ | | GU808727.1 | | GU808763.1 | | GU808611.1 | GU808649.1 | GU808686.1 |
| *Coccotrypes longior* | | Coccotrypes\_longior\_ | GU808728.1 | GU808764.1 | | GU808612.1 | | GU808650.1 | na |
| *Coptoborus pseudotenuis* | Coptoborus\_pseudotenuis\_ | | HM064071.1 | | AF508880.1 | | HM099689.1 | HM064249.1 | HM064347.1 |
| *Coptoborus sp558* | | Coptoborus\_sp558\_ | HM064072.1 | HM064172.1 | | HM099690.1 | | HM064250.1 | na |
| *Coptodryas confusa* | Coptodryas\_confusa\_ | | HM064065.1 | | HM064169.1 | | HM099683.1 | HM064243.1 | na |
| *Cyclorhipidion foersteri* | | Cyclorhipidion\_foersteri\_ | HM064075.1 | HM064175.1 | | HM099693.1 | | HM064254.1 | HM064349.1 |
| *Cyclorhipidion multipunctatus* | Cyclorhipidion\_multipunctatus\_ | | HM064076.1 | | HM064176.1 | | HM099694.1 | HM064255.1 | HM064350.1 |
| *Cyclorhipidion perpiloselum* | | Cyclorhipidion\_perpiloselum\_ | HM064077.1 | HM064177.1 | | HM099695.1 | | HM064256.1 | HM064351.1 |
| *Cyclorhipidion revocabile* | Cyclorhipidion\_revocabile\_ | | HM064078.1 | | HM064178.1 | | HM099696.1 | HM064257.1 | HM064352.1 |
| *Cyclorhipidion sus* | | Cyclorhipidion\_sus\_ | HM064057.1 | HM064163.1 | | HM099676.1 | | HM064237.1 | HM064341.1 |
| *Debus pseudocylindricus* | Debus\_pseudocylindricus\_ | | HM064135.1 | | HM064214.1 | | HM099750.1 | HM064314.1 | HM064397.1 |
| *Debus pumilus* | | Debus\_pumilus\_ | HM064136.1 | HM064215.1 | | HM099751.1 | | HM064315.1 | HM064398.1 |
| *Diuncus duodecimspinatus* | Diuncus\_duodecimspinatus\_ | | HM064063.1 | | HM064168.1 | | HM099681.1 | na | na |
| *Diuncus haberkorni* | | Diuncus\_haberkorni\_isolate\_027 | HM064064.1 | na | | HM099682.1 | | HM064242.1 | HM064345.1 |
| *Diuncus papatrae* | Diuncus\_papatrae\_ | | HM064061.1 | | HM064167.1 | | HM099680.1 | HM064241.1 | HM064344.1 |
| *Dryocoetiops coffea* | | Dryocoetiops\_coffea\_ | AF187122.1 | AF186670.2 | | KY805976.1 | | KY805926.1 |  |
| *Eccoptopterus sp* | Eccoptopterus\_sp\_coloured\_AIC\_2011 | | na | | na | | HM099698.1 | HM064259.1 | HM064354.1 |
| *Eccoptopterus gracilipes* | | Eccoptopterus\_gracilipes\_28179 | na | na | | **MK098866** | | **MK098872** | **MK098877** |
| *Eccoptopterus gracilipes* | Eccoptopterus\_gracilipes\_ | | HM064080.1 | | na | | HM099699.1 | HM064260.1 | HM064355.1 |
| *Eccoptopterus limbus* | | Eccoptopterus\_limbus\_ | HM064081.1 | HM064180.1 | | HM099700.1 | | HM064261.1 | HM064356.1 |
| *Eccoptopterus spinosus* | Eccoptopterus\_spinosus\_ | | HM064082.1 | | HM064179.1 | | HM099701.1 | HM064262.1 | HM064357.1 |
| *Euwallacea andamanensis* | | Euwallacea\_andamanensis\_ | HM064083.1 | HM064181.1 | | HM099702.1 | | HM064263.1 | KP313809.1 |
| *Euwallacea destruens* | Euwallacea\_destruens\_ | | KP313800.1 | | HM064183.1 | | HM099704.1 | HM064265.1 | HM064359.1 |
| *Hadrodemius comans* | | Hadrodemius\_comans\_ | HM064089.1 | na | | HM099708.1 | | HM064270.1 | na |
| *Hadrodemius globus* | Hadrodemius\_globus\_ | | HM064088.1 | | HM064186.1 | | HM099707.1 | HM064269.1 | HM064361.1 |
| *Leptoxyleborus depressus* | | Leptoxyleborus\_depressus\_ | HM064091.1 | HM064187.1 | | HM099709.1 | | HM064272.1 | HM064363.1 |
| *Leptoxyleborus sordicauda* | Leptoxyleborus\_sordicauda\_ | | HM064092.1 | | na | | HM099710.1 | HM064273.1 | HM064364.1 |
| *Microperus elegans* | | Microperus\_elegans\_ | HM064067.1 | HM064170.1 | | HM099685.1 | | HM064245.1 | HM064346.1 |
| *Microperus intermedius* | Microperus\_intermedius\_ | | HM064093.1 | | HM064188.1 | | HM099711.1 | HM064274.1 | HM064365.1 |
| *Sampsonius dampfi* | | Sampsonius\_dampfi\_ | HM064095.1 | AF259885.1 | | HM099713.1 | | HM064276.1 | HM064366.1 |
| *Streptocranus fragilis* | Streptocranus\_fragilis\_ | | HM064096.1 | | HM064191.1 | | HM099714.1 | HM064277.1 | na |
| *Streptocranus longispinis* | | Streptocranus\_longispinis\_ | HM064097.1 | HM064192.1 | | HM099715.1 | | HM064278.1 | HM064367.1 |
| *Webbia dipterocarpi* | Webbia\_dipterocarpi\_ | | HM064104.1 | | HM064197.1 | | HM099722.1 | HM064285.1 | HM064373.1 |
| *Xyleborinus quadrispinosus* | | Xyleborinus\_quadrispinosus\_ | HM064111.1 | HM064201.1 | | HM099726.1 | | HM064289.1 | HM064379.1 |
| *Xyleborinus saxeseni* | Xyleborinus\_saxeseni\_ | | KC845519.1 | | HM064202.1 | | HM099727.1 | HM064290.1 | HM064380.1 |
| *Xyleborus adusticollis* | | Xyleborus\_adusticollis\_ | HM064117.1 | HM064204.1 | | HM099732.1 | | HM064295.1 | HM064384.1 |
| *Xyleborus aff\_impexus* | Xyleborus\_aff\_impexus\_ | | HM064102.1 | | HM064195.1 | | HM099720.1 | HM064283.1 | HM064371.1 |
| *Xyleborus affinis* | | Xyleborus\_affinis\_Xylaff | GU808696.1 | GU808735.1 | | GU808581.1 | | GU808621.1 | GU808659.1 |
| *Xyleborus aplanatideclivis* | Xyleborus\_aplanatideclivis\_ | | HM064058.1 | | HM064164.1 | | HM099677.1 | HM064238.1 | HM064342.1 |
| *Xyleborus decumans* | | Xyleborus\_decumans\_ | HM064122.1 | HM064209.1 | | HM099737.1 | | HM064300.1 | HM064389.1 |
| *Xyleborus fallax* | Xyleborus\_fallax\_ | | HM064125.1 | | AF508873.1 | | HM099740.1 | HM064304.1 | HM064390.1 |
| *Xyleborus longior* | | Xyleborus\_longior\_ | HM064130.1 | HM064212.1 | | HM099745.1 | | HM064309.1 | HM064393.1 |
| *Xyleborus volvulus* | Xyleborus\_volvulus\_ | | HM064149.1 | | HM064222.1 | | HM099763.1 | HM064327.1 | HM064406.1 |
| *Xylosandrus amputatus* | | Xylosandrus\_amputatus\_28166 | na | na | | **MK098867** | | na | **MK098878** |
| *Xylosandrus brevis* | Xylosandrus\_brevis\_28170 | | na | | na | | **MK098868** | na | **MK098879** |
| *Xylosandrus compactus* | | Xylosandrus\_compactus\_Xyocom04 | GU808707.1 | GU808744.1 | | GU808592.1 | | GU808629.1 | GU808668.1 |
| *Xylosandrus compactus* | Xylosandrus\_compactus\_ | | GU808706.1 | | GU808743.1 | | GU808591.1 | GU808628.1 |  |
| *Xylosandrus crassiusculus* | | Xylosandrus\_crassiusculus\_xyocra01 | GU808708.1 | GU808745.1 | | GU808593.1 | | GU808630.1 | GU808669.1 |
| *Xylosandrus crassiusculus* | Xylosandrus\_crassiusculus\_xyocra02 | | GU808709.1 | | GU808746.1 | | GU808594.1 | GU808631.1 | GU808670.1 |
| *Xylosandrus crassiusculus* | | Xylosandrus\_crassiusculus\_xyocra07 | GU808710.1 | GU808747.1 | | GU808595.1 | | GU808632.1 | GU808671.1 |
| *Xylosandrus crassiusculus* | Xylosandrus\_crassiusculus\_xyocra08 | | GU808711.1 | | GU808748.1 | | GU808596.1 | GU808633.1 | GU808672.1 |
| *Xylosandrus derupteterminatus* | | Xylosandrus\_derupteterminatus\_28169 | na | na | | MK098869 | | na | MK098880 |
| *Xylosandrus discolor* | Xylosandrus\_discolor\_Xyosp02 | | GU808721.1 | | GU808757.1 | | GU808605.1 | GU808643.1 | GU808680.1 |
| *Xylosandrus germamus* | | Xylosandrus\_germamus\_xyoger01 | GU808713.1 | GU808750.1 | | GU808597.1 | | GU808634.1 | GU808673.1 |
| *Xylosandrus germamus* | Xylosandrus\_germamus\_xyoger02 | | GU808714.1 | | GU808751.1 | |  | GU808635.1 | GU808674.1 |
| *Xylosandrus hulcri* | | Xylosandrus\_hulcri\_ | GU808725.1 | GU808761.1 | | GU808609.1 | | GU808647.1 | GU808684.1 |
| *Xylosandrus mancus* | Xylosandrus\_mancus\_21439 | | na | | na | | **MK098870** | **MK098873** | **MK098881** |
| *Xylosandrus mancus* | | Xylosandrus\_mancus\_ | GU808716.1 | GU808753.1 | | na | | GU808637.1 | GU808676.1 |
| *Xylosandrus monteithi* | Xylosandrus\_monteithi\_ | | GU808724.1 | | GU808760.1 | | GU808608.1 | GU808646.1 | GU808683.1 |
| *Xylosandrus morigerus* | | Xylosandrus\_morigerus\_Xyomor01 | GU808717.1 | GU808754.1 | | GU808600.1 | | GU808638.1 | GU808677.1 |
| *Xylosandrus morigerus* | Xylosandrus\_morigerus\_Xyomor02 | | GU808718.1 | | na | | GU808601.1 | GU808639.1 | na |
| *Xylosandrus morigerus* | | Xylosandrus\_morigerus\_Xyomor03 | na | na | | GU808602.1 | | GU808640.1 | na |
| *Xylosandrus queenslandi* | Xylosandrus\_queenslandi\_ | | GU808720.1 | | GU808756.1 | | GU808604.1 | GU808642.1 | GU808679.1 |
| *Xylosandrus rotundicollis* | | Xylosandrus\_rotundicollis\_Xylrot | GU808703.1 | GU808740.1 | | GU808588.1 | | GU808625.1 | GU808665.1 |
| *Xylosandrus russulus* | Xylosandrus\_russulus\_ | | GU808698.1 | | GU808737.1 | | GU808583.1 | na | na |
| *Xylosandrus borneensis* | | Xylosandrus\_borneensis\_466 | GU808726.1 | GU808762.1 | | GU808610.1 | | GU808648.1 | GU808685.1 |