

Table S1. Information on *Ganoderma* species used in phylogenetic analysis.

| No. | Species | Voucher/ID | Origin | GenBank® Accession No. | Source | Associated Host or Substrate (If Available) |
|-----|-------------------------|----------------|---------------------|---------------------------|------------|--|
| 1. | <i>G. boninense</i> | GbHap1 | Sarawak, Malaysia | MK713555 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 2. | <i>G. boninense</i> | GbHap2 | Sarawak, Malaysia | MK713556 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 3. | <i>G. boninense</i> | GbHap3 | Sarawak, Malaysia | MK713557 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 4. | <i>G. boninense</i> | GbHap4 | Sarawak, Malaysia | MK713558 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 5. | <i>G. boninense</i> | GbHap5 | Sarawak, Malaysia | MK713559 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 6. | <i>G. boninense</i> | GbHap6 | Sarawak, Malaysia | MK713560 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 7. | <i>G. boninense</i> | GbHap7 | Sarawak, Malaysia | MK713561 | This study | <i>Elaeis guineensis</i> (oil palm) |
| 8. | <i>G. boninense</i> | PER71 | Peninsular Malaysia | KM015454 | GenBank | <i>Elaeis guineensis</i> (oil palm) |
| 9. | <i>G. boninense</i> | GB001 | Peninsular Malaysia | KX092000 | GenBank | <i>Elaeis guineensis</i> (oil palm) |
| 10. | <i>G. boninense</i> | WD 2028 | Japan | KJ143905 | GenBank | Unknown |
| 11. | <i>G. boninense</i> | WD 2085 | Japan | KJ143906 | GenBank | Unknown |
| 12. | <i>G. adspersum</i> | HMAS86595 | England | AY884184 | GenBank | Unknown |
| 13. | <i>G. adspersum</i> | ITA 39 | Finland | EF060011 | GenBank | Unknown |
| 14. | <i>G. adspersum</i> | Ganoad1 | Armenia | JN588579 | GenBank | Unknown |
| 15. | <i>G. adspersum</i> | Ga-1 | Armenia | JN588580 | GenBank | Unknown |
| 16. | <i>G. adspersum</i> | Ga-2-3 | Armenia | JN588582 | GenBank | Unknown |
| 17. | <i>G. adspersum</i> | Ga-4 | Iran | JN588586 | GenBank | Unknown |
| 18. | <i>G. adspersum</i> | SFC20160115-20 | South Korea | KY364254 | GenBank | Unknown |
| 19. | <i>G. adspersum</i> | HSBU-200894 | China | MG279154 | GenBank | <i>Casuarina equisetifolia</i> (sheoak tree) |
| 20. | <i>G. adspersum</i> | ACAM A113 | Greece | MG706204 | GenBank | <i>Alnus gltinosa</i> (common alder tree) |
| 21. | <i>G. angustisporum</i> | BJFC Cui 13817 | China | NR_158431 | GenBank | Unknown |
| 22. | <i>G. angustisporum</i> | Cui 14578 | China | MG279172 | GenBank | <i>Casuarina equisetifolia</i> (sheoak tree) |
| 23. | <i>G. angustisporum</i> | Cui 16340 | China | MG279171 | GenBank | <i>Casuarina equisetifolia</i> (sheoak tree) |
| 24. | <i>G. australe</i> | HMAS86596 | England | AY884180 | GenBank | Unknown |
| 25. | <i>G. australe</i> | C50 | Brazil | JQ514105 | GenBank | Unknown |
| 26. | <i>G. australe</i> | JV 0407/14J | USA | KF605663 | GenBank | Unknown |
| 27. | <i>G. australe</i> | K-FB2(P).1 | Indonesia | KJ654550 | GenBank | Unknown |

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|-----|------------------------|----------------|--------------|---------------------------|---------|--|
| 28. | <i>G. australe</i> | K-FB2(P).2 | Indonesia | KJ654551 | GenBank | Unknown |
| 29. | <i>G. australe</i> | FLOR 52289 | Brazil | KU315203 | GenBank | Unknown |
| 30. | <i>G. australe</i> | CTRA11 | Brazil | KU569540 | GenBank | Unknown |
| 31. | <i>G. australe</i> | CTRA12 | Brazil | KU569541 | GenBank | Unknown |
| 32. | <i>G. australe</i> | RP57 | Brazil | KU569545 | GenBank | Unknown |
| 33. | <i>G. australe</i> | HUEFS: DHCR411 | Australia | MF436675 | GenBank | Unknown |
| 34. | <i>G. australe</i> | HUEFS: DHCR417 | Australia | MF436676 | GenBank | Unknown |
| 35. | <i>G. australe</i> | JFL 14081134 | China | MH106871 | GenBank | Unknown |
| 36. | <i>G. australe</i> | JFL 14081672 | China | MH106872 | GenBank | Unknown |
| 37. | <i>G. australe</i> | RGM207 | Chile | MK322289 | GenBank | Blueberry plant |
| 38. | <i>G. cupreum</i> | SUT H1 | Australia | AY569450 | GenBank | Unknown |
| 39. | <i>G. cupreum</i> | KR4 | India | FJ655467 | GenBank | <i>Prunus armeniaca</i> (apricot tree) |
| 40. | <i>G. cupreum</i> | KR15 | India | FJ655469 | GenBank | <i>Terminalia bellerica</i> (bedda nut tree) |
| 41. | <i>G. cupreum</i> | KR6 | India | FJ655470 | GenBank | <i>Prunus armeniaca</i> (apricot tree) |
| 42. | <i>G. cupreum</i> | GanoTK7 | Cameroon | JN105702 | GenBank | Unknown |
| 43. | <i>G. cupreum</i> | G133 | Malaysia | JN596328 | GenBank | Unknown |
| 44. | <i>G. cupreum</i> | K24 | Malaysia | JN596329 | GenBank | Unknown |
| 45. | <i>G. cupreum</i> | HMAS130804 | China | JX840345 | GenBank | Unknown |
| 46. | <i>G. cupreum</i> | HMAS99399 | China | JX840346 | GenBank | Unknown |
| 47. | <i>G. cupreum</i> | G84 | Unknown | KX055557 | GenBank | Unknown |
| 48. | <i>G. cupreum</i> | G90 | Unknown | KX055560 | GenBank | Unknown |
| 49. | <i>G. curtisii</i> | 238FL | Florida, USA | MG654171 | GenBank | Oak, hardwood |
| 50. | <i>G. destructans</i> | CMW42157 | South Africa | MG020255 | GenBank | <i>Acacia cyclops</i> (red-eyed wattle) |
| 51. | <i>G. destructans</i> | CBS139793 | South Africa | NR_132919 | GenBank | <i>Jacaranda mimosifolia</i> (fern tree) |
| 52. | <i>G. ellipsoideum</i> | GACP 14080966 | China | NR_160617 | GenBank | Decaying wood, conifer |
| 53. | <i>G. ellipsoideum</i> | GACP 14080968 | China | MH106868 | GenBank | Decaying wood, conifer |
| 54. | <i>G. gibbosum</i> | AS5.624 type 3 | China | AY593856 | GenBank | Unknown |
| 55. | <i>G. gibbosum</i> | SFC20140702-12 | South Korea | KY364260 | GenBank | Unknown |
| 56. | <i>G. lingzhi</i> | Cui 9166 | China | KJ143907 | GenBank | Unknown |

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| 57. | <i>G. lingzhi</i> | SFC20150812-48 | South Korea | KY364247 | GenBank | Unknown |
| 58. | <i>G. lingzhi</i> | Dai12479 | China | JQ781864 | GenBank | Unknown |
| 59. | <i>G. lobatum</i> | JV 1008/32 | USA | KF605670 | GenBank | Unknown |
| 60. | <i>G. lobatum</i> | JV 1008/31 | USA | KF605671 | GenBank | Unknown |
| 61. | <i>G. martinicense</i> | LIP SW-Mart08-55 | France | KF963256 | GenBank | Unknown |
| 62. | <i>G. martinicense</i> | LIP SW-Mart08-44 | France | KF963257 | GenBank | Unknown |
| 63. | <i>G. mastoporum</i> | FRIM 98 | Malaysia | AJ627585 | GenBank | <i>Acacia mangium</i> (brown salwood) |
| 64. | <i>G. mbrekobenum</i> | SSP:10 | India | KY865253 | GenBank | Unknown citrus tree |
| 65. | <i>G. mbrekobenum</i> | NGM | India | MH221092 | GenBank | Unknown citrus tree |
| 66. | <i>G. mbrekobenum</i> | MIN 850481 | Ghana | NR_147647 | GenBank | Unknown |
| 67. | <i>G. multipileum</i> | Dai 9447 | China | KJ143914 | GenBank | Unknown |
| 68. | <i>G. multipileum</i> | CWN 04670 | Taiwan | KJ143913 | GenBank | Unknown |
| 69. | <i>G. orbiforme</i> | Cui 13918 | China | MG279186 | GenBank | <i>Casuarina equisetifolia</i> (sheoak tree) |
| 70. | <i>G. perzonatum</i> | SP445985 | Brazil | KJ792745 | GenBank | Unknown |
| 71. | <i>G. perzonatum</i> | SP445987 | Brazil | KJ792747 | GenBank | Unknown |
| 72. | <i>G. perzonatum</i> | SP445990 | Brazil | KJ792750 | GenBank | Unknown |
| 73. | <i>G. pfeifferi</i> | K(M)120818 | UK | AY884185 | GenBank | Unknown |
| 74. | <i>G. pfeifferi</i> | 874 | Czech Republic | AM906059 | GenBank | <i>Fagus sylvatica</i> (common beech) |
| 75. | <i>G. pfeifferi</i> | GPF2 | Poland | JN008874 | GenBank | Unknown |
| 76. | <i>G. philippii</i> | E7098 | Indonesia | AJ536662 | GenBank | <i>Acacia mangium</i> (brown salwood) |
| 77. | <i>G. philippii</i> | E7425 | Malaysia | AJ608713 | GenBank | <i>Acacia mangium</i> (brown salwood) |
| 78. | <i>G. pseudoferreum</i> | CATAS-RRI-Gp-01 | China | KX454334 | GenBank | <i>Hevea brasiliensis</i> (rubber tree) |
| 79. | <i>G. pseudoferreum</i> | CATAS-RRI-Gp-02 | China | KX454335 | GenBank | <i>Hevea brasiliensis</i> (rubber tree) |
| 80. | <i>G. rywardenii</i> | HKAS58053 | Cameroon | HM138671 | GenBank | <i>Elaeis guineensis</i> (oil palm) |
| 81. | <i>G. rywardenii</i> | HKAS58054 | Cameroon | HM138672 | GenBank | <i>Elaeis guineensis</i> (oil palm) |
| 82. | <i>G. rywardenii</i> | TK31 18S | Cameroon | JN105693 | GenBank | <i>Elaeis guineensis</i> (oil palm) |
| 83. | <i>G. rywardenii</i> | GanoTK32 | Cameroon | JN105698 | GenBank | <i>Elaeis guineensis</i> (oil palm) |
| 84. | <i>G. sinense</i> | XZ-G-C2 | Unknown | HQ235634 | GenBank | Unknown |
| 85. | <i>G. sinense</i> | GDGM25829 | China | KC415760 | GenBank | Unknown |

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|-----|--|------------|--------------|---------------------------|---------|--|
| 86. | <i>G. sinense</i> | Wei 5327 | China | KF494998 | GenBank | Unknown |
| 87. | <i>G. sinense</i> | zizhi | China | KT906369 | GenBank | Unknown |
| 88. | <i>G. sinense</i> | Cui 13835 | China | MG279193 | GenBank | <i>Casuarina equisetifolia</i> (sheoak tree) |
| 89. | <i>G. tornatum</i> | NPG1 | Malaysia | KJ767488 | GenBank | Unknown |
| 90. | <i>G. williamsianum</i> | Wei 5032 | China | KU219994 | GenBank | Unknown |
| 91. | <i>G. williamsianum</i> | Dai 16809 | China | MG279183 | GenBank | <i>Casuarina equisetifolia</i> (sheoak tree) |
| 92. | <i>G. zonatum</i> | FL-02 | Florida, USA | KJ143921 | GenBank | Palm tree |
| 93. | <i>G. zonatum</i> | 221FL | Florida, USA | MG654421 | GenBank | Unknown |
| 94. | <i>G. zonatum</i> | 254FL | Florida, USA | MG654426 | GenBank | Unknown |
| 95. | <i>Tomophagus colossus</i> (Outgroup) | TC-02 | Vietnam | KJ143923 | GenBank | Unknown |
| 96. | <i>Tomophagus colossus</i> (Outgroup) | UMNFL110 | Florida, USA | MG654429 | GenBank | Unknown |

Table S2. Pairwise genetic distance among seven haplotypes of *G. boninense* isolated from oil palm plantation in Sarawak with *Tomophagus colossus* (KJ143923) as the outgroup. Haplotypes genetic difference of sampled *G. boninense* isolates are low, indicating that they are closely related.

| Haplotypes | GbHap 1 | GbHap 2 | GbHap 3 | GbHap 4 | GbHap 5 | GbHap 6 | GbHap 7 | Outgroup |
|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| GbHap 1 | - | | | | | | | |
| GbHap 2 | 0.004 | - | | | | | | |
| GbHap 3 | 0.004 | 0.007 | - | | | | | |
| GbHap 4 | 0.002 | 0.006 | 0.006 | - | | | | |
| GbHap 5 | 0.002 | 0.002 | 0.006 | 0.004 | - | | | |
| GbHap 6 | 0.004 | 0.007 | 0.004 | 0.006 | 0.006 | - | | |
| GbHap 7 | 0.002 | 0.002 | 0.006 | 0.004 | 0.004 | 0.006 | - | |
| Outgroup | 0.117 | 0.119 | 0.122 | 0.120 | 0.120 | 0.120 | 0.117 | - |

Table S3. Sampling sites for *G. boninense* basidiomata collection throughout Sarawak. For comparison, Kuala Igan samples (n= 6) are included as part of Matu-Daro's population with distance between both location within 40 km. Sampling locations for Miri's population collected from Lambir, Sungai Balim and Sungai Taniku are also situated within 40 to 80 km between plantation location. Sungai Meris and Sungai Liuk representing Balingian's population is located within 5 km from each other.

| No. | Population (District/ Sub-District) | Location | No. of Sample (n) | Decimal Degrees (mean) | | Sampling Date |
|-----|---|---------------|-------------------------|---------------------------|-----------|---------------------------|
| | | | | Latitude | Longitude | |
| 1 | Miri | Lambir | 5 | 4.135 | 113.980 | 7 th Jul 2015 |
| | | Sungai Balim | 5 | 3.924 | 113.712 | 7 th Jul 2015 |
| | | Sungai Taniku | 2 | 4.424 | 114.105 | 7 th Jul 2015 |
| 2 | Asajaya | Sungai Mata | 12 | 1.478 | 110.663 | 10 th Jul 2015 |
| 3 | Matu-Daro | Tanjung Alan | 56 | 2.489 | 111.545 | 21 st Oct 2015 |
| | | Kuala Igan | 6 | 2.772 | 111.726 | 1 st Oct 2018 |
| 4 | Balingian | Sungai Meris | 11 | 2.964 | 112.509 | 29 th Mac 2017 |
| | | Sungai Liuk | 20 | 2.988 | 112.548 | 29 th Mac 2017 |