Table S1. Specimens used in the study with their reference numbers, species, voucher information and GenBank accessions of their sequences

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Taxon | DNA number | Voucher | ITS | ß-tubulin | RPB1 | EFT2.1 | LSU | IGS1 | IGS3 | IGS16 |
| *P. dolichorhiza* | N1942 | Panama; B. Goffinet 753; CONN |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | N789 | Madagascar; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | N999 | Reunion Island; N. Magain & E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | P1551 | Galapagos Islands; F. Bungartz 8368; CDS 41014 |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | P1596 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS 34453 |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | P28 | Costa Rica; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | P348 | Mexico; M. A. Herrera-Campos 13382; MEXU |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | P879 | Rwanda; E. Sérusiaux PA7; LG |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* | P893 | Bolivia; M. Kukwa 9740; UGDA 17730 |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* 2 | P1567 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS 34530 |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* 2 | P1575 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS 34456 |  |  |  |  |  |  |  |  |
| *P. dolichorhiza* b | P1202 | Mexico; ; MEXU |  |  |  |  |  |  |  |  |
| *P. hawaiensis* | P1236 | USA, Hawaii; B. McCune 22196; McCune Private. Coll. |  |  |  |  |  |  |  |  |
| *P. hymenina* | N357 | Spain, Tenerife; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P. hymenina* | P1229 | USA, Oregon; B. McCune 30448; McCune Private. Coll. |  |  |  |  |  |  |  |  |
| *P. hymenina* | P1799 | Portugal, Azores; P. Divakar 6915a; MAF |  |  |  |  |  |  |  |  |
| *P. hymenina* | P1903 | Portugal, Azores; P. Divakar 6916s; MAF |  |  |  |  |  |  |  |  |
| *P. hymenina* | P430 | Canada, Newfoundland; J. Lendemer 10397; H |  |  |  |  |  |  |  |  |
| *P. hymenina* | P516 | Portugal, Azores; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P. hymenina* | P539 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. hymenina* | P80 | Iceland; T. Ahti 69347; H |  |  |  |  |  |  |  |  |
| *P. melanorrhiza* | P1798 | Portugal, Azores; P. Divakar 6918b; MAF |  |  |  |  |  |  |  |  |
| *P. melanorrhiza* | P515 | Portugal, Azores; E. Sérusiaux SN ; LG |  |  |  |  |  |  |  |  |
| *P. nana* 1 | P1281 | China, Yunnan; J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. nana* 1 | P1290 | China, Yunnan; J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. nana* 1 | P1665 | China, Sichuan; N. Gustavsson 10; UPS 509502 |  |  |  |  |  |  |  |  |
| *P. nana* 1 | P1666 | Japan, Kochi; G. Thor 21255; UPS 383534 |  |  |  |  |  |  |  |  |
| *P. nana* 2 | P609 | New Zealand; S. Stenroos 6037; H |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | P3060 | Canada, BC; C. Bjork 16545; UBC |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | N1939 | USA, Alabama; B. Goffinet 5209; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | N1944 | USA, Alaska; B. Goffinet 9424; CONN |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | P1252 | USA, AZ; J. Hollinger 1781; UBC |  |  |  |  |  |  |  |  |
| *P. neopolydactyla 1* | P309 | Canada, Québec J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | P411 | Russia, Yakutia; T. Ahti 65064; H |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | P640 | USA, NC; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | P645 | USA, NC; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1 | P845 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 1b | P325 | Peru; E. Gaya 07.14.10-19; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2b | N1929 | China, Yunnan; B. Goffinet 10120; CONN |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2b | P1291 | China, Yunnan; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2c | P1659 | Japan, Hokkaido; G. Thor 25720; UPS 519479 |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2a | P1662 | Japan, Hokkaido; A. Frisch 10/Jp410; UPS 522008 |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2b | P1667 | Japan, Kochi; G. Thor 2127x; UPS 164500 |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2a | P384 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2a | P390 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2a | P3069 | T. Goward 06-329c; UBC |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2b | P3032 | Russia (East Russia); J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2c | P3001 | Russia (East Russia); J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 2c | P3009 | Russia, Sakhalin; S. Tchabanenko 3082; SAKH |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 3 | P859 | Vietnam; Vo Thi Phi Giao G06-NL86B; B 600144665 |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P1212 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P1537 | Russia, Siberia; J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P1668 | Japan, Hokkaido; G. Thor 24306; UPS 519471 |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P302 | Canada, Québec F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P3024 | Canada, Québec R. Darnajoux s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P3027 | Canada, Québec R. Darnajoux s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P321 | Canada, Québec F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P506 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P669 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 4 | P811 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 5 | P1228 | USA, Oregon; B. McCune 30018; McCune Private. Coll. |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 5 | P1232 | USA, Oregon; B. McCune 26873; McCune Private. Coll. |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 5 | P1257 | USA, Oregon; J. Hollinger 1385; UBC |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 6 | P1231 | USA, Oregon; B. McCune 24160; McCune Private. Coll. |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 6 | P3051 | USA, OR; J. Hollinger 1386; UBC |  |  |  |  |  |  |  |  |
| *P. neopolydactyla* 7 | P3010 | Russia, Sakhalin; S. Tchabanenko 3072; SAKH |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P1638 | USA, NC; Richard C. Harris 52559; NY |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P299 | Canada, Québec F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P3034 | Russia (East Russia); ; DUKE |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P510 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P521 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P543 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. occidentalis* | P866 | USA, Alaska; T. Ahti 63231; H |  |  |  |  |  |  |  |  |
| *P. pacifica* | P1243 | Canada, BC; T. Goward 06-1522; UBC |  |  |  |  |  |  |  |  |
| *P. pacifica* | P443 | Canada, British Columbia; O. Vitikainen 13080; H |  |  |  |  |  |  |  |  |
| *P. polydactylon* | N2069 | Norway; J. Holtan-Hartwig 528; O |  |  |  |  |  |  |  |  |
| *P. polydactylon* | P3021 | Turkey; K. Yazici s.n.; H |  |  |  |  |  |  |  |  |
| *P. polydactylon* | P385 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. polydactylon* | P388 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. polydactylon* | P71 | USA, NM; J. Hollinger 2462; DUKE |  |  |  |  |  |  |  |  |
| *P. polydactylon* | P856 | Iran; A. A. Maassoumi 573; B 600114374 |  |  |  |  |  |  |  |  |
| *P. polydactylon* 2 | P1234 | USA, Montana; B. McCune 29108; McCune Private. Coll. |  |  |  |  |  |  |  |  |
| *P. polydactylon* 2 | P3015 | USA, MI; J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. polydactylon* 2 | P3052 | Canada, BC; J. Hollinger 1505; UBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 1 | P890 | Bolivia; M. Kukwa 8536; UGDA 17702 |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 1 | P897 | Mexico; M. A. Herrera-Campos 122; MEXU |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 1 | P901 | Colombia; R.Lücking 33383; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 1 | P938 | Colombia; R.Lücking 33321; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 1 | P945 | Colombia; R.Lücking 33691; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 1 | P953 | Colombia; R.Lücking 33333; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 2 | P1521 | Colombia; R.Lücking 34028; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 2 | P900 | Colombia; R.Lücking 33367; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 3 | P1522 | Colombia; R.Lücking 34033; UDBC |  |  |  |  |  |  |  |  |
| *P. pulverulenta* 3 | P1525 | Colombia; R.Lücking 199; UDBC 199 |  |  |  |  |  |  |  |  |
| *P. scabrosa* 1 | P1210 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosa* 1 | P1250 | Canada, Alberta; J. Hollinger 1066; UBC |  |  |  |  |  |  |  |  |
| *P. scabrosa* 1 | P1539 | Russia, Siberia; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 1 | P550 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosa* 1 | P97 | Canada, Québec; F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 2 | P107 | Canada, Québec; F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 2 | P113 | Canada, Québec; F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 2 | P1209 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosa* 2 | P1255 | Canada, BC; C. Bjork 16230; UBC |  |  |  |  |  |  |  |  |
| *P. scabrosa* 2 | P1540 | Russia, Siberia; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 2 | P830 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosa* 3 | N1236 | Greenland; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosa* 3 | P1538 | Russia, Siberia; J. Miadlikowska et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 3 | P865 | Russia, Yakutia; T. Ahti 65068; H |  |  |  |  |  |  |  |  |
| *P. scabrosa* 4 | P312 | Canada, Québec F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 4 | P315 | Canada, Québec F. Lutzoni et al. s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P. scabrosa* 4 | P549 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosella* | P536 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P. scabrosella* | P619 | Norway; N. Magain s.n.; LG |  |  |  |  |  |  |  |  |
| *P*. sp. 1 | P885 | Bolivia; M. Kukwa 9276; UGDA 17710 |  |  |  |  |  |  |  |  |
| *P*. sp. 1 | P886 | Bolivia; M. Kukwa 9327; UGDA 17713 |  |  |  |  |  |  |  |  |
| *P*. sp. 1 | P909 | Colombia; R. Lücking 33339; UDBC |  |  |  |  |  |  |  |  |
| *P*. sp. 2a | P1555 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS |  |  |  |  |  |  |  |  |
| *P*. sp. 2a | P1570 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS 34526 |  |  |  |  |  |  |  |  |
| *P*. sp. 2a | P907 | Colombia; R. Lücking 33361; UDBC |  |  |  |  |  |  |  |  |
| *P*. sp. 2b | P1557 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS 34562 |  |  |  |  |  |  |  |  |
| *P*. sp. 2b | P1561 | Brazil, Minas Gerais; J. Miadlikowska et al. ; CGMS |  |  |  |  |  |  |  |  |
| *P*. sp. 3 | P1530 | New Zealand; D. Blanchon s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P*. sp. 3 | P604 | New Zealand; F. Högnabba 1538; H |  |  |  |  |  |  |  |  |
| *P*. sp. 3 | P605 | New Zealand; S. Stenroos 5815; H |  |  |  |  |  |  |  |  |
| *P*. sp. 3 | P607 | New Zealand; S. Stenroos 5820; H |  |  |  |  |  |  |  |  |
| *P*. sp. 4 | N1534 | Papua New Guinea; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P*. sp. 5 | N1545 | Papua New Guinea; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P*. sp. 6 | P1650 | Honduras; B. Allen 17790; NY |  |  |  |  |  |  |  |  |
| *P*. sp. 6 | P1734 | Peru; N. Magain s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P*. sp. 6 | P936 | Colombia; R. Lücking 33659; UDBC |  |  |  |  |  |  |  |  |
| *P*. sp. 7a | N1666 | Canada, BC; T. Tonsberg 20741; BG 34876 |  |  |  |  |  |  |  |  |
| *P*. sp. 7a | N1674 | Canada, British Columbia; T. Tonsberg 20742; BG 34877 |  |  |  |  |  |  |  |  |
| *P*. sp. 7a | P3055 | Canada, BC; T. Goward 06-1371; UBC |  |  |  |  |  |  |  |  |
| *P*. sp. 7b | P1660 | Japan, Hokkaido; G. Thor 25408; UPS 519475 |  |  |  |  |  |  |  |  |
| *P*. sp. 7b | P1672 | Japan, Hokkaido; G. Thor ; UPS |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1748 | J. Santosh 080042; J. Santosh Private Coll. |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1898 | China, Yunnan; B. Goffinet 10063; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1900 | China, Yunnan; B. Goffinet 10102; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1922 | China, Yunnan; B. Goffinet 10072; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1924 | China, Yunnan; B. Goffinet 10095; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1928 | China, Yunnan; B. Goffinet 10107; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | N1947 | China, Yunnan; B. Goffinet 9978; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | P1237 | Taiwan; A. Mikulin T71; Mikulin Private Coll. |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | P1272 | China, Jilin province; M. Sohrabi 16572; M. Sohrabi Private Coll. |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | P1278 | China, Yunnan; J. Miadlikowska s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | P1610 | USA, VT; W. Buck 53756; NY 01024735 |  |  |  |  |  |  |  |  |
| *P*. sp. 8 | P3013 | Russia, Khabarosk; J. Miadlikoswka s.n.; DUKE |  |  |  |  |  |  |  |  |
| *P*. sp. 9 | N1899 | China, Yunnan; B. Goffinet 10014; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 9 | N1908 | China, Yunnan; B. Goffinet 10040; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 9 | N1921 | China, Yunnan; B. Goffinet 10064; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 9 | N1923 | China, Yunnan; B. Goffinet 10073; CONN |  |  |  |  |  |  |  |  |
| *P*. sp. 10 | P1652 | Canada, Nova Scotia ; NY |  |  |  |  |  |  |  |  |
| *P*. sp. 10 | P3050 | USA, NC; J. Hollinger ; UBC |  |  |  |  |  |  |  |  |
| *P*. sp. 10 | P450 | USA, Pennsylvania; J. Lendemer 16792; NY |  |  |  |  |  |  |  |  |
| *P*. sp. 11 | N1532 | Papua New Guinea; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P*. sp. 11 | N1533 | Papua New Guinea; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P*. sp. 12 | P3304 | Japan; E. Sérusiaux s.n.; LG |  |  |  |  |  |  |  |  |
| *P. truculenta* | P1251 | Chile; J. Hollinger 1925; UBC |  |  |  |  |  |  |  |  |
| *P. truculenta* | P1750 | Kerguelen Islands; R.L. Poulsen 767; H |  |  |  |  |  |  |  |  |
| *P. truculenta* | P3016 | Gough Island; M. Gremmen 99-348; H |  |  |  |  |  |  |  |  |
| *P. truculenta* | P329 | Chile; P. Nelson 4362; Tim Wheeler |  |  |  |  |  |  |  |  |
| *P. truculenta* | P330 | Chile; T. Wheeler 3826; Tim Wheeler |  |  |  |  |  |  |  |  |
| *P. truculenta* | P332 | Chile; T. Wheeler 89; Tim Wheeler |  |  |  |  |  |  |  |  |
| *P. truculenta* | P335 | Chile; T. Wheeler 1093; Tim Wheeler |  |  |  |  |  |  |  |  |