

Table S1. Information of all oomycete isolates used in the phylogenetic analyses, including local, international and alternative isolate identifications. GenBank accession numbers for sequences obtained in the present study are printed in bold.

(Sub) Clade	Species	Isolate identification	GenBank accession No.			
			ITS	<i>Btub</i>	<i>cox1</i>	<i>nadh1</i>
-	<i>Nothophytophthora valdiviana</i> (T)	CBS 142357; CL331	MZ753910	MZ736449	MZ736421	KY788628
1	<i>Phytophthora nicotianae</i> (ASI2)	WPC P6303; CPHST BL 162	(GS) JAAKBE010001860	(GS) JAAKBE010003943	(GS) JAAKBE010002284	(GS) JAAKBE010003823
1a	<i>P. cactorum</i>	P295	(GS) RCMO01001417	(GS) RCMO01000030	(GS) RCMO01000985	(GS) RCMO01000778
1c	<i>P. infestans</i>	CBS 147289, T30-4; TJ1504	MZ753914	MZ736454	MZ736428	MZ736507
2a	<i>P. meadii</i>	CBS 219.88; 61J9; IMI 129185; WPC P3950 - P3433; ATCC 58103	MH620109	KX250594	Contig HQ708324 MT583652	MT583705
2b	<i>P. tropicalis</i> (T)	CBS 434.91; WPC P10329; 35C8; ATCC 76651, MYA-4218; CPHST BL 58	MH620112	KX250699	Contig MH620025 MH136987	-
2b	<i>P. tropicalis</i>	AN97/86; PD97/11132	-	-	-	AY563988
2c	<i>P. multivora</i> (T)	CBS 124094; 55C5; WPC P16837, P19594; WAC13201; ICMP 19454	MG865546	KX250776	Contig MH136939 FJ237508	MZ736508
2e	<i>P. multivesiculata</i> (T)	CBS 545.96; 29E3; WPC P10410; CPHST BL 50G; MG 33-6; AR 239; PD 95/8679	MH620118	EU080066	Contig MH136937 MH620032	KX011295
3	<i>P. nemorosa</i> (T)	CBS 114870; WPC P19600; 41C4; CPHST BL 27; ATCC MYA-2948	KF317082	KX250965	Contig KF317104 MH136941	DQ361211
3	<i>P. pseudosyringae</i> (T)	CBS 111772; WPC P10437; 30A8; CPHST BL 51G; ATCC MYA-4222; p284; PSEU 6	KF317083	KX250979	MZ736504	MZ736509
4	<i>P. alticola</i>	CBS 121939; WPC P16948 - P16052; CMW 34279 - 19425; 47G5	KF317084	KX251007	Contig HQ261245 KF317106	-
4	<i>P. arenaria</i> (T)	CBS 127950; WPC P19599; PD 825; 55C2; CPHST BL 78	HQ013219	KJ372289	Contig MH136848 MH620034	-

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			ITS	<i>Btub</i>	<i>cox1</i>	<i>nadh1</i>
4	<i>P. boodjera</i> (T)	CBS 138637; VHS 26806; CPHST BL 181; WPC 13637	KJ372244	KJ372283	Contig KJ396688 MH477743	-
4	<i>P. cathayensis</i> (T)	CP30; CGMCC 19655	MN385741	MT063102	MN692211	-
4	<i>Phytophthora heterospora</i>	317-A12; CBS 148036	MT232395	MZ782810	MZ782831	MZ782852
4	<i>P. heterospora</i>	A1A	MT232399	MZ782813	MZ782834	MZ782855
4	<i>P. heterospora</i>	A1B1	MZ927098	MZ782814	MZ782835	MZ782856
4	<i>P. heterospora</i>	C2B1	MZ927099	MZ782815	MZ782836	MZ782857
4	<i>P. heterospora</i>	DB2	MZ927100	MZ782816	MZ782837	MZ782858
4	<i>P. heterospora</i>	FK1	KM979514	KU870332	KU870322	KP050547
4	<i>P. heterospora</i>	FK2	KP050543	KU870333	KU870323	KP050548
4	<i>P. heterospora</i>	FK3	KP050544	KU870334	KU870324	KP050549
4	<i>P. heterospora</i>	FK4	KP050545	KU870335	KU870325	KP050550
4	<i>P. heterospora</i>	FK5	KP050546	KU870336	KU870326	KP050551
4	<i>P. heterospora</i>	Campobello2b	MT232397	MZ782812	MZ782833	MZ782854
4	<i>P. heterospora</i>	Palm2	MT232396	MZ782811	MZ782832	MZ782853
4	<i>P. heterospora</i>	PH047	MZ927095	MZ782804	MZ782825	MZ782846
4	<i>P. heterospora</i>	PH051; TJ0237; CBS 148035	MT232392	MZ782805	MZ782826	MZ782847
4	<i>P. heterospora</i>	PH052	MZ927096	MZ782806	MZ782827	MZ782848
4	<i>P. heterospora</i> (T)	PH054; TJ0238; CBS 148034	MT232393	MZ782807	MZ782828	MZ782849
4	<i>P. heterospora</i>	PH057	MZ927097	MZ782808	MZ782829	MZ782850
4	<i>P. heterospora</i>	PH211	MT232394	MZ782809	MZ782830	MZ782851
4	<i>P. litchii</i> (AS11)	CBS 100.81; WPC P15218; CPHST BL 48G; ATCC 34595; MG 33-3	MG865525	MH493966	MH136920	DQ361208
4	<i>P. litchii</i>	SHS3	-	(GS) PCFV01000014	(GS) PCFV01000263	(GS) PCFV01000263
4	<i>P. megakarya</i> (T)(A1)	IMI 182590; WPC 1664; CPHST BL 22	MG865533	-	Contig MH136928 AY564193	-
4	<i>P. megakarya</i>	IMI 337098	-	AY564078	-	AY564020
4	<i>P. megakarya</i> (T)(A2)	CBS 238.83; 61J5; WPC P1672; CPHST BL 73; ATCC 42100; IMI 202077	MG865534	KX251035	Contig MH136929 MH620035	-

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			ITS	<i>Btub</i>	<i>cox1</i>	<i>nadh1</i>
4	<i>P. megakarya</i>	zdho	-	-	-	(GS) NBNE01000504
4	<i>P. palmivora</i>	CBS 179.26; IMI 198927; WPC P3548	MT232400	MZ782817	MZ782838	MZ782859
4	<i>P. palmivora</i>	Phoenix4	MT232403	MZ782819	MZ782840	MZ782861
4	<i>P. palmivora</i>	PhoenixF	MT232402	MZ782818	MZ782839	MZ782860
4	<i>P. palmivora</i>	IMI 390579; GRE1	MT232404	MZ782820	MZ782841	MZ782862
4	<i>P. palmivora</i>	IMI 503890; MD5	MT232406	MZ782821	MZ782842	MZ782863
4	<i>P. palmivora</i>	IMI 503891; MD6	MT232407	MZ782822	MZ782843	MZ782864
4	<i>P. taxon palmivora</i> -like	PH083	MZ927101	MZ782823	MZ782844	MZ782865
4	<i>P. taxon palmivora</i> -like	PH090	MT232401	MZ782824	MZ782845	MZ782866
4	<i>P. palmivora</i> (ASI1)	CBS 305.62; WPC P0633; CPHST BL 105; IMI 062655; IMI 348384	MG865559	MH493992	MH136949	-
4	<i>P. palmivora</i> (ASI2)	WPC P0255; CPHST BL 46; ATCC 26200	MG865560	MH493994	MH136950	-
4	<i>P. palmivora</i>	ZC01	(GS) VOQZ01000473	(GS) VOQZ0100	(GS) VOQZ01000950	(GS) VOQZ01000945
4	<i>P. quercetorum</i> (T)	CBS 121119; WPC P15555; ATCC MYA-4086; CPHST-BL 52G; MD 9/2	MG865577	EU080901	Contig MH136969 KX759520	-
5	<i>P. castaneae</i>	CBS 587.85; WPC 15598; 61J7; IMI 325914; ATCC 36818; ICMP 19450	MH620122	KX251098	(MGS) MN883602	(MGS) MN883602
5	<i>P. heveae</i> (T)	CBS 296.29; WPC P3428; 22J1; ATCC 58815; ICMP 19451; KACC 44943; IMI 180616; CPHST BL 67	MH620123	KX251112	(MGS) MN883604	(MGS) MN883604
6a	<i>P. humicola</i> (T)	CBS 200.81; WPC P3826; 32F8; ATCC 52179, MYA-4080; IMI 302303; p198; CPHST BL 42G;	KF112855	KX251140	Contig KF112862 HQ708305	MZ736506
6b	<i>P. chlamydospora</i>	P17-99	(GS) JAABLK010000522	(GS) JAABLK010000021	(MGS) CM022726	(MGS) CM022726
7a1	<i>P. tyrrhenica</i> (T)	CBS 142301; PH154; TJ1153	KU899188	KU899265	MZ736441	KU899507
7a2	<i>P. europaea</i> (T)	CBS 109049; 62A2; WPC P10324; EUR 2; CPHST BL 37G	MH620138	KX251523	Contig KU681022 HQ261303	KU899469
7b	<i>P. sojae</i>	28F9; P6497	KC733444	KX251770	(MGS) DQ832717	(MGS) DQ832717

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			ITS	<i>Btub</i>	<i>cox1</i>	<i>nadh1</i>
7c	<i>P. cinnamomi</i> (T)	CBS 144.22; IMI 022938; 61J1; WPC P2110; ATCC 1407	KU899160	KX251812	Contig HQ708257 MH620070	KU899475
8a	<i>P. sansomeana</i>	WPC P8051; 47H3; ATCC MYA-4455; CPHST BL 55	MH620155	KX251931	(MGS) MH936679	(MGS) MH936679
8b	<i>P. lactucae</i> (T)	61F4; BPIC 1985; P19872; CPHST BL 113	MH620161	KX252043	Contig MH620085 KC478738	KF882714
8c	<i>P. ramorum</i> (T)	CBS 101553; P1577; BBA9/95; Pr-164; CSL2266; WPC P10103; PR-05-012; CPHST BL 55G	MG865581	(GS) RYEP01000230	(MGS) EU427470	(MGS) EU427470
9a2	<i>P. quininea</i> (T)	CBS 407.48; 46C4; ATCC 46733; WPC P1089-P8488; CPHST BL 54G	MG865580	AY564085	Contig AY564200 HQ708386	AY564027
9b1	<i>P. captiosa</i> (T)	CBS 119107; 46H7; CPHST BL 11; NZFS 310C; WPC P10719; ICMP 15576	DQ297402	-	-	-
9b2	<i>P. captiosa</i>	46H8; NZFS 430; ICMP 17567	-	KX252555	(MGS) MN883606	(MGS) MN883606
10	<i>P. boehmeriae</i> (T)	CBS 291.29; WPC P6950; IMI 180614; MG 42-6; 45F9; CPHST BL 32G; ATCC 60238	HQ643149	EU080162	Contig HQ261251 KT183047	DQ361200
10	<i>P. kernoviae</i> (T)	WPC P19827; IMI 393170; CPHST BL 91; PCPCC P1571	(GS) VKKV01000063	(GS) VKKV01000263	(GS) VKKV01000418	(GS) VKKV01000418
11	<i>P. lilii</i> (T)	CBS 135746; NBRC 32174; MAFF 237500; EL 8701; CPHST BL 123	MG865523	Contig MG493965 AB856782	MH136918	-
12	<i>P. castanetorum</i> (T)	CBS 142299; BD292	MF036182	MZ736453	MZ736427	MF036292
12	<i>P. quercina</i>	TJ292; PL7; P731	MF036194	MZ736504	MZ736505	MF036301
12	<i>P. tubulina</i> (T)	CBS 141212; TJ271; TUB1; Hohenegg II/1; P736	MF036196	MZ736467	MZ736440	MF036303
14	<i>P. cyperi</i>	11048	MK045313	-	-	-
14	<i>P. cyperi</i>	MVAP06098582	-	KY608800	MH445454	.
DMPH	<i>Bremia lactucae</i>	SF5	(GS) SHOA01000013	(GS) SHOA01000026	(MGS) MH271689	(MGS) MH271689

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			ITS	<i>Btub</i>	<i>cox1</i>	<i>nadh1</i>
DMPH	<i>Plasmopara halstedii</i>	Plhal710	(GS) PDFJ01000023	(GS) PDFJ01000039	(GS) PDFJ01000150	(GS) PDFJ01000150
DMPH	<i>Plasmopara viticola</i>	INRA-PV221	(GS) MBPM02000295	(GS) MBPM02000031	(MGS) MN105125	(MGS) MN105125
DMCC	<i>Peronospora effusa</i>	SPp3	MG793197	-	-	-
DMCC	<i>Peronospora effusa</i>	R14	-	(GS) QLLG01000479	(MGS) MH325167	(MGS) MH325167
DMCC	<i>Peronospora tabacina</i>	968-S26	(GS) NBSG01000065	(GS) NBSG01000797	(MGS) KT893456	(MGS) KT893456
DMCC	<i>Pseudoperonospora cubensis</i>	MSU-1	(GS) AHJF01002487	(GS) AHJF01000065	(GS) AHJF01005719 AHJF01021320	(GS) AHJF01000547
GDM	<i>Sclerospora graminicola</i>	UoM-SG	(GS) MIQA02020524	(GS) MIQA02005411	(GS) MIQA02016028	(GS) MIQA02022157
BDM	<i>Hyaloperonospora arabidopsidis</i>	Cala2	(GS) LKIA01008204	(GS) LKIA01000455	(GS) LKIA01003057	(GS) LKIA01001610
BDM	<i>Hyaloperonospora brassicae</i>	HV2163	EU049248	(GS) SZZJ01000824	(GS) SZZJ01002632	-

(T) Type;

(DMPH) Downy Mildews with Pyriform Haustoria;

(GDM) grass-infecting Graminicolous Downy Mildews;

(GS) Genome Sequence;

(DMCC) Downy Mildews with Colored Conidia;

(BDM) Brassicolous Downy Mildews;

(MGS) Mitochondrial Genome Sequence;

(ASI) Abad Selected isolate (from IDphy: molecular and morphological identification of *Phytophthora* based on the types, <https://idtools.org>).