

Table S3: Common pathogens causing leaf damage on pines in European forest stands

Pathogen name	Country of detection	Host species	References
<b><i>Acremonium</i> Link</b>	France	<i>P. nigra</i>	1
<b><i>Alternaria alternata</i> (Fr.) Keissl.</b>	Germany, Spain, Ukraine	<i>P. sylvestris</i> , <i>P. halepensis</i>	2, 3, 4
<b><i>Alternaria</i> Nees</b>	Spain	<i>P. pinaster</i>	5
<b><i>Asterosporium asterospermum</i> (Pers.) S. Hughes</b>	Slovakia	<i>P. nigra</i>	6
<b><i>Botryotinia fuckeliana</i> (de Bary) Whetzel</b>	Spain	<i>Pinus</i> spp.	7
<b><i>Botrytis cinerea</i> Pers.</b>	Germany, Romania, Russia	<i>P. sylvestris</i> , <i>Pinus</i> spp., <i>Pseudotsuga menziesii</i>	2, 8, 9
<b><i>Botrytis</i> P. Micheli ex Haller</b>	France, Spain	<i>P. nigra</i> , <i>P. radiata</i> , <i>P. pinaster</i>	1, 3, 10
<b><i>Camarosporium pini</i> (Westend.) Sacc.</b>	Slovakia	<i>P. nigra</i> , <i>P. ponderosa</i>	11, 12
<b><i>Coleosporium cacaliae</i> G.H. Otth</b>	Germany	<i>P. sylvestris</i> , <i>P. mugo</i>	13
<b><i>Coleosporium campanulae</i> (Pers.) Tul.</b>	Germany, Lithuania	<i>P. sylvestris</i>	14, 15
<b><i>Coleosporium euphrasiae</i> (Schumach.)</b>	Germany, Lithuania	<i>P. sylvestris</i>	14, 15

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<i>Coleosporium inulae</i> Rabenh.	Germany	<i>P. sylvestris</i>	14
<i>Coleosporium</i> Lév.	Bulgaria, Slovakia	<i>P. mugo</i> , <i>P. sylvestris</i> , <i>P. halepensis</i> , <i>P. nigra</i> , <i>P. radiata</i>	6, 16, 17, 18
<i>Coleosporium melampyri</i> (Rebent.) Kleb.	Germany, Lithuania	<i>P. sylvestris</i>	14, 15
<i>Coleosporium sonchi</i> (F. Strauss) Lév.	Germany	<i>P. sylvestris</i>	14
<i>Coleosporium tussilaginis</i> (Pers.) Lév.	Germany, Lithuania, Romania, Spain, United Kingdom	<i>P. nigra</i> , <i>P. sylvestris</i> , <i>Pinus</i> spp.	7, 14, 19, 9
<i>Coniothyrium</i> Corda	France	<i>P. nigra</i>	1
<i>Coniothyrium dispersellum</i> P. Karst.	Lithuania	<i>P. mugo</i>	20
<i>Cronartium flaccidum</i> (Alb. & Schwein.) G. Winter	Germany, Lithuania	<i>P. sylvestris</i>	14, 15
<i>Cronartium ribicola</i> J.C. Fisch.	Lithuania, United Kingdom	<i>P. strobus</i> , <i>P. sibirica</i> , <i>P. flexilis</i> , <i>P. lambertiana</i> , <i>P. monticola</i>	15, 21
<i>Cyclaneusma niveum</i> (Persoon) DiCosmo, Peredo & Minter (1983)	Germany, Spain	<i>P. halepensis</i> , <i>P. nigra</i> , <i>P. pinaster</i> , <i>P. pinea</i>	4, 14

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<b><i>Cyclaneusma minor</i> (Butin) DiCosmo, Peredo &amp; Minter (1983)</b>	Bulgaria, Romania	<i>P. sylvestris</i>	22, 26, 56
<b><i>Diplodia sapinea</i> (Fr.) Fuckel</b>	Romania, Portugal	<i>P. nigra</i> , <i>P. sylvestris</i> , <i>P. pinaster</i> , <i>P. pinea</i>	23, 24
<b><i>Dothistroma pini</i> Hulbary</b>	Bulgaria, France, Russia, Slovakia, Spain	<i>Pinus</i> spp., <i>P. nigra</i> subsp. <i>laricio</i> , <i>P. nigra</i> subsp. <i>austriaca</i> , <i>P. mugo</i> , <i>P. aristata</i> , <i>P. coulteri</i> , <i>P. densiflora</i> , <i>P. flexilis</i> , <i>P. jeffreyi</i> , <i>P. schwerinii</i> , <i>P. sylvestris</i> , <i>P. ponderosa</i> , <i>Pinus nigra</i> subsp. <i>pallasiana</i>	25, 26, 17, 27, 28, 29, 30, 31, 32, 33
<b><i>Dothistroma septosporum</i> (Dorog.) M. Morelet</b>	Finland, France, Germany, Greece, Lithuania, Romania, Russia, Slovakia, Spain, United Kingdom	<i>Pinus</i> sp., <i>Pinus brutia</i> , <i>Pinus nigra</i> subsp. <i>laricio</i> , <i>P. nigra</i> subsp. <i>austriaca</i> , <i>P. pinaster</i> , <i>P. sylvestris</i> , <i>P. heldreichii</i> , <i>P. mugo</i> , <i>P. nigra</i> , <i>P. peuce</i> , <i>P. ponderosa</i> , <i>P. radiata</i> , <i>P. sibirica</i> , <i>P. strobus</i> , <i>P. sylvestris</i> , <i>P. cembra</i> , <i>P. banksiana</i> , <i>P. contorta</i> , <i>P. densiflora</i> , <i>P. flexilis</i> , <i>P. jeffreyi</i> , <i>P. koraiensis</i> , <i>P. monticola</i> , <i>P. resinosa</i> , <i>P. rigida</i> , <i>P. strobus</i> , <i>P. sylvestris</i> , <i>P. thunbergii</i> , <i>P. wallichiana</i>	16, 34, 28, 29, 30, 31, 32, 35, 36, 37, 38, 39, 40, 41, 42
<b><i>Endomelanconium pini</i> (Corda) Petr.</b>	Romania	<i>P. mugo</i> , <i>P. sylvestris</i>	43
<b><i>Epicoccum nigrum</i> Link</b>	France	<i>P. nigra</i>	1
<b><i>Fusarium avenaceum</i> (Fr.) Sacc.</b>	France	<i>Pseudotsuga menziesii</i>	1

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<i>Fusarium bulbigenum</i> var. <i>blasticola</i> (Rostr.) Wollenw.	Germany	<i>P. sylvestris</i>	14
<i>Fusarium</i> Link	Slovakia	<i>P. nigra</i>	11
<i>Fusarium oxysporum</i> var. <i>aurantiacum</i> (Link) Wollenw.	Germany	<i>P. sylvestris</i> , <i>P. ponderosa</i>	14
<i>Fusarium sporotrichioides</i> Sherb.	Slovakia	<i>P. ponderosa</i>	44
<i>Fusarium stilboides</i> Wollenw.	Germany	<i>P. sylvestris</i>	2
<i>Gliocladium</i> Corda	France	<i>P. nigra</i>	1
<i>Hendersonia acicola</i> Münch & Tubeuf	Lithuania, Romania, Spain	<i>P. sylvestris</i> , <i>P. mugo</i> , <i>P. halepensis</i>	45, 4, 46
<i>Herpotrichia juniperi</i> (Duby) Petr.	France, Germany, Russia, Spain	<i>Pinus spp.</i> , <i>P. mugo</i>	13, 18, 7, 46, 47
<i>Hormonema</i> Lagerb. & Melin	France	<i>Pseudotsuga menziesii</i>	1
<i>Hypodermella sulcigena</i> (Link) Tubeuf	Russia	<i>P. sylvestris</i> , <i>P. montana</i>	8
<i>Lecanosticta acicola</i> (Thüm.) Syd.	France, Italy, Slovakia, Lithuania, Portugal,	<i>Pinus spp.</i> , <i>P. mugo</i> , <i>P. nigra</i> , <i>P. sylvestris</i> , <i>P. radiata</i>	1, 48, 45, 32, 49, 11, 50

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Pathogen name	Country of detection	Host species	References
	Spain		
<i>Lecanosticta</i> Syd.	Spain	<i>Pinus spp.</i>	40
<i>Leptomelanconium asperulum</i> (Moesz) Petr.	Romania	<i>P. mugo</i>	46
<i>Leptostroma</i> Fr.	France	<i>P. nigra</i>	1
<i>Leptostroma pinastri</i> Desm.	Spain	<i>P. halepensis</i>	4
<i>Libertella</i> Desm.	France	<i>P. nigra</i>	1
<i>Lophodermella conjuncta</i> (Darker) Darker	Romania, Spain	<i>Pinus spp., P. nigra</i>	7, 46
<i>Lophodermella sulcigena</i> (Rostr.) Höhn.	Bulgaria, Romania, Slovakia, United Kingdom	<i>P. contorta, P. halepensis, P. nigra, P. radiata, P. sylvestris, P. mugo</i>	17, 51, 52, 46, 21, 53
<i>Lophodermium</i> Chevall.	Bulgaria, Spain, United Kingdom	<i>P. contorta, P. nigra, P. sylvestris, P. radiata</i>	25, 54, 55, 21, 56, 57
<i>Lophodermium conigenum</i> (Link) Tubeuf	Lithuania, Romania, United Kingdom	<i>P. mugo, P. sylvestris</i>	58, 20, 59, 21, 56, 57

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<b><i>Lophodermium nitens</i> Darker</b>	Germany, Russia	<i>Pinus</i> spp., <i>P. albicaulis</i> , <i>P. mugo</i> , <i>P. strobus</i>	14, 60
<b><i>Lophodermium pinastri</i> (Schr.) Chev.</b>	Bulgaria, France, Germany, Lithuania, Romania, Russia, Slovakia, Spain, United Kingdom	<i>Pinus</i> spp., <i>P. sylvestris</i> , <i>P. halepensis</i> , <i>P. nigra</i> , <i>P. radiata</i> , <i>P. mugo</i> , <i>P. cembra</i> , <i>P. strobus</i> , <i>P. armandii</i> , <i>P. bungeana</i> , <i>P. contorta</i> , <i>P. flexilis</i> , <i>P. ponderosa</i> , <i>P. taeda</i>	7,16, 17, 18, 13, 20, 61, 59, 46, 58,22, 62, 21, 56, 57, 63
<b><i>Lophodermium pinicola</i> Tehon</b>	Germany	<i>P. sylvestris</i>	64
<b><i>Lophodermium pini-mugonis</i> C.L. Hou &amp; M. Piepenbr.</b>	Germany	<i>P. mugo</i>	65
<b><i>Lophodermium seditiosum</i> Minter, Staley &amp; Millar</b>	Bulgaria, Finland, Germany, Italy, Lithuania, Portugal, Slovakia, Romania, Russia, Spain, United Kingdom	<i>Pinus</i> spp., <i>P. sylvestris</i> , <i>P. halepensis</i> , <i>P. nigra</i> , <i>P. radiata</i> , <i>P. contorta</i> , <i>P. mugo</i> , <i>P. pinaster</i> , <i>P. pinea</i> ,	7, 61, 17, 18, 61, 58, 66, 67, 23, 68, 21,56, 57

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<i>Melampsora larici-tremulae</i> Kleb.	Italy	<i>P. pinea</i>	69
<i>Melampsora pinitorqua</i> Rostr.	France, Italy, Finland, Germany, Spain, United Kingdom	<i>Pinus</i> spp., <i>P. pinea</i> , <i>P. sylvestris</i>	7, 14, 70, 71, 72, 73, 74, 75
<i>Melampsora populnea</i> (Pers.) P. Karst.	Germany, Lithuania, Romania	<i>P. contorta</i> , <i>P. mugo</i> , <i>P. sylvestris</i> , <i>P. nigra</i> , <i>P. strobus</i> , <i>P. ponderosa</i> , <i>P. banksiana</i>	15, 76, 77
<i>Meloderma desmazieri</i> (Duby) Darker	Romania	<i>P. strobus</i> , <i>P. wallichiana</i>	41
<i>Neocatenulostroma germanicum</i> (Crous & U. Braun) Quaedvl. & Crous	Lithuania	<i>P. mugo</i> , <i>P. sylvestris</i>	45
<i>Pestalotia</i> De Not.	Slovakia	<i>P. nigra</i>	78
<i>Pestalotia funerea</i> Desm.	Spain	<i>P. radiata</i>	55
<i>Pestalotia hartigii</i> Tubeuf	Spain	<i>P. radiata</i>	55
<i>Pestalotiopsis funerea</i> (Desm.) Steyaert	Lithuania, Spain	<i>P. mugo</i> , <i>P. sylvestris</i>	3, 7, 79
<i>Pestalotiopsis stevensonii</i> (Peck) Nag Raj	Spain	<i>P. halepensis</i>	4

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<i>Pestalotiopsis</i> Steyaert	France	<i>P. nigra</i>	1
<i>Phacidium infestans</i> P. Karst.	Finland, Germany, Lithuania, RussiaF	<i>Pinus</i> spp., <i>P. cembra</i> , <i>P. sylvestris</i>	18, 58, 66, 80
<i>Phacidium lacerum</i> Fr.	Germany	<i>P. sylvestris</i>	81
<i>Phoma</i> Sacc.	France	<i>P. nigra</i>	1
<i>Phomopsis</i> (Sacc.) Sacc.	France, Slovakia, Spain	<i>Pseudotsuga menziesii</i> , <i>P. halepensis</i> , <i>P. nigra</i>	1, 4, 6
<i>Rhizosphaera</i> <i>kalkhoffii</i> Bubák	Spain	<i>Pinus</i> spp.	7
<i>Rhizosphaera pini</i> (Corda) Maubl.	Lithuania	<i>P. mugo</i>	20
<i>Sclerophoma</i> <i>magnusiana</i> M. Wilson & G.G. Hahn	Germany	<i>P. sylvestris</i>	82
<i>Sclerophoma</i> <i>pithyophila</i> (Corda) Höhn.	Bulgaria, France, Germany, Spain, United Kingdom	<i>P. contorta</i> , <i>P. halepensis</i> , <i>P. nigra</i> , <i>P. pinaster</i> , <i>P. radiata</i> , <i>P. sylvestris</i> , <i>P. uncinata</i>	4, 7, 13, 22, 22, 83, 84, 79, 85, 86
<i>Sclerotinia</i> <i>graminearum</i> Elenev ex Solkina	Russia	<i>P. sylvestris</i>	8



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<b><i>Sirococcus conigenus</i> (Pers.) P.F. Cannon &amp; Minter</b>	Spain	<i>Pinus</i> spp.	7
<b><i>Sirococcus strobilinus</i> Preuss</b>	France, Spain, United Kingdom	<i>P. nigra</i> , <i>P. pinaster</i> , <i>P. sylvestris</i> , <i>P. uncinata</i> , <i>P. contorta</i>	1, 39, 77, 73
<b><i>Sordaria macrospora</i> Auersw.</b>	Slovakia	<i>P. nigra</i>	87
<b><i>Sydowia polyspora</i> (Bref. &amp; Tavel) E. Müll.</b>	Lithuania	<i>P. mugo</i>	88
<b><i>Thyriopsis halepensis</i> (Cooke) Theiss. &amp; Syd.</b>	Spain, Portugal	<i>P. halepensis</i> , <i>P. pinaster</i> , <i>P. pinea</i>	4, 89
<b><i>Thyriopsis halepensis</i> (Cooke) Theiss. &amp; Syd.</b>	France, Spain, Portugal	<i>Pinus</i> spp., <i>P. halepensis</i> , <i>P. pinea</i> , <i>P. pinaster</i> , <i>P. canariensis</i>	4, 7, 89, 90
<b><i>Trichothecium roseum</i> (Pers.) Link</b>	Slovakia	<i>Pinus</i> spp.	6
<b><i>Truncatella hartigii</i> (Tubef) Steyaert</b>	Spain	<i>Pinus</i> spp.	7
<b><i>Typhula Ishikariensis</i> S. Imai</b>	Russia	<i>P. sylvestris</i>	91

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