

Table S1. Location of samples analysed. A total 132 individuals from 5 pine species were obtained (including 30 individuals of *Pinus mugo*, 32 of *P. uliginosa*, 30 *P. uncinata*, 30 of *P. sylvestris* and 10 of outgroup *P. pinaster*)

Species	Acr.	Location	Longitude	Latitude	N
<i>P. mugo</i>	PM5	Romania, Southern Carpathians	25°27'6"	45°25'55"	7 ^a
	PM8	Montenegro, Durmitor Mts.	19°05'27"	43°09'33"	7 ^a
	PM12	Austria, Karwendel Alps	11°17'45"	47°22'42"	6 ^a
	PM14	Italy, Carnic Alps	13°08'50"	46°32'40"	4 ^a
	PM16	Italy, Abruzzi	13°58'30"	41°46'20"	6 ^a
<i>P. uliginosa</i>	PUG1	Poland, Węgliniec reserve	15°14'20"	51°17'50"	10 ^a
	PUG2	Germany, Mittelwalde	11°16'27"	47°28'50"	9 ^a
	PUG3	Poland, Batorów reserve	16°23'1"	50°27'32"	13 ^{a,c}
<i>P. uncinata</i>	PUN17	Andora, Vall de Ransol	1°38'21"	42°35'02"	6 ^a
	PUN18	Andora, San Miguel de Engolasters	1°34'12"	42°31'28"	6 ^a
	PUN23	Spain, Castiello de Jaca	-0°32'12"	42°41'19"	6 ^a
	PUN24	Spain, Sierra de Gudar	0°41'51"	40°28'49"	6 ^a
	PUN28	France, Col de la Croix de Morano	-2°50'44"	45°35'58"	6 ^a
<i>P. sylvestris</i>	PS30	Scotland, Shildaig	-5°38'24"	57° 30'35"	6 ^b
	PS31	Scotland, Glen Tanar	-2°51'36"	57° 2'60"	6 ^b
	PS37	Spain, Trevenque	-3°32'51"	37 05'47"	6 ^b
	PS39	Finland, Punkaharju	61°45'33"	29° 23'21"	6 ^b
	PS43	Poland, Jarocin	51°58'20"	17°28'40"	6 ^b
<i>P. pinaster</i>	PP1	Spain, Oria	-2°17'42"	37°29'41"	1 ^c
	PP2	Spain, San Cipriano	-7°26'21"	43°41'13"	1 ^c
	PP3	Spain, Coca	-4 31'48"	41°13'04"	1 ^c
	PP4	Spain, Olba	0 37'22"	40 08'01"	1 ^c
	PP5	France, Mimizan	-1 14'56"	44 11'56"	1 ^c
	PP6	France, Bras Nord Var	5 56'01"	43 29'11"	1 ^c
	PP7	France, Pineta	9 22'17.5"	41 40'39"	1 ^c
	PP8	Portugal, Maria de Castelo Branco	7 29'49"	39 49'31"	1 ^c
	PP9	Morocco, Ifran	5 03'00"	33 35'53"	1 ^c
	PP10	Morocco, Zaouia d Ifrane	-5 07'10"	33 33'58"	1 ^c

^a data from Wachowiak *et al.* (2018), ^b data from Wachowiak *et al.* (unpublished), ^c sequenced in this study

Table S2. Nuclear loci studied.

Locus Acronym	PCR Primers (F-upper, and R-lower)	Gene function [Category ³]	Base pairs screened ⁴ .	Gene Bank Acc. Nr.
Pr1_1	¹ AGGAAGGAAGGGGAAAC ² CAGGCTCCACTATATTG	putative beta-alanine ligase [M]	358	KC979156 - KC979177
Pr1_11	¹ GACCAGGCAAGGAAACAAAAG ² TTGGCAATCGGTTGATGGGGAG	putative glucuronidase 3 [M]	720	KC979259 - KC979288
Pr1_12	¹ TCCCCATTCTCCAAAC ² CCATCCAATCCTTCATC	NAD(P)-linked oxidoreductase-like protein [M]	434	KC979289 - KC979325
Pr1_14	¹ CTGTATGGCGTTCTTC ² ACTGGGCGTCAAGTTTC	phospholipase A1-Igama [M]	353	KC979348 - KC979373
Pr1_15	¹ CATTATTATCCAAGGGCGAG ² GAGGCTTTGAGTCACCGTTAC	mitogen-activated protein-kinase [ST]	592	KC979374 - KC979410
Pr1_17	¹ TGGGTTGTCTCTGTGG ² TGAGTTGCTGTGAGAGG	glutamate transporter [T]	319	KC979424 - KC979435
Pr1_18	¹ AAGCGACTCAAAGGGG ² TCGGCTGTATTGTCTC	alpha 1,3-glucosidase [M]	436	KC979436 - KC979460
Pr1_19	¹ CCGTATGCAAAGCATTTTC ² ACCTGATCGTGTGTG	Glycosyltransferase [M]	327	KC979461-KC979482
Pr1_21	¹ GGGTGCATGTTTCATCCACAG ² GCAGCAGCAAAAGCATTTGAAG	histone H3 K4-specific-methyltransferase [M]	363	KC979483-KC979505
Pr1_22	¹ TGAAGGGAGAGGACTAC ² ACCCAGAAACACAAAGAGGAAAC	hypothetical protein [UN]	277	KC979506-KC979528
Pr1_24	¹ ATGGATATTCTCCATGATGCAC ² ATGGTCGTCTTTTGCTTC	putative S-adenosylmethionine-dependent protein [ST]	262	KC979529-KC979537
Pr1_26	¹ CCCATTTTAGCAAACCC ² GAAGTGAAGATGAGCATAAG	putative pre-mRNA branch site-protein p14 [E]	386	KC979538 - KC979603
Pr1_29	¹ CCATTGGTGTGTCTTCTC ² AATACCCCTTTCAAGGCAAGCATATC	short-chain dehydrogenase Protein [M]	242	KC979622 - KC979653
Pr1_36	¹ GCGTTCATCATCTCAAGCC ² CTAATCTCTCTTATTGTCATCTCCACC	transcribed locus [UN]	387	KC979674 - KC979696
Pr1_43	¹ GGACATTGTACTGTTGG ² GGGTAAATGGAAAGAGTATTGG	beta-galactosidase [M]	591	KC979722 - KC979747
Pr1_45	¹ GAAATAGTCCTCTTCCTTTG ² GGCTGCTTTGGATTATATTG	O-fucosyltransferase-like protein [M]	310	KC979748 - KC979765
Pr1_47	¹ GTAAATCTTCTTGCCCTTTCATCC ² TATGCTCAACATACAGTACC	glycoprotein glucosyltransferase[M]	542	KC979786 - KC979800
Pr1_48	¹ ACCAATGCACATGCCAC ² TATTACATCACTCCACCTTC	transport protein [T]	383	KC979801- KC979827
Pr2_7	¹ CAAAACCCCTTTGAGCAC ² GAGAACTTCTTCCATTCC	transcribed locus [UN]	410	KC979875 - KC979887
Pr2_11	¹ ACAGCAGCGATTCAAC ² AACACCTCTTCCTCGTC	3-ketoacyl-CoA synthase 6-like[M]	216	KC979904 - KC979919
Pr2_16	¹ TCACTTGGCAGAAGAC ² GAGAGATTCTTTGGAGAC	glutamyl-tRNA reductase [M]	384	KC979936 - KC979946

Pr2_17	¹ GCATTAGTCTGTCTGTTC ² GTGTTTCTAGGGCAATC	putative polyol transporter [T]	390	KC979947 - KC979961
Pr2_20	¹ TCGAAGACAAGCTCTG ² GACGACGATAAATGCTAC	GDP-dissociation inhibitor family-Protein [T]	380	KC979962 - KC979984
Pr2_23	¹ GCCCAAATGGTTATACATAACACTC ² CCATTCCATCGGCACAGTCATC	Transcribed locus [UN]	337	KC979985 - KC980011
Pr2_25	¹ TCCCTGAAATCAAATCCCAC ² AACCCAGCAATCTGAGCAAAGAAAAAC	hypothetical protein [UN]	403	KC980012 - KC980024
Pr2_28	¹ CCTCCCATCATTTCTTTCTTCC ² GAATTGCAGCCCTTGACACAAGAC	basic leucine zipper transcription-factor-like protein [E]	484	KC980025 - KC980041
Pr2_29	¹ GGCTTTGAACACCCTCAAAAATAC ² TAAGGACATCAATACCAGTTTGCTCAG	hypothetical protein [UN]	333	KC980042 - KC980058
Pr2_30	¹ CACTTGTCATCTGCTC ² CTTGGAAGGATAGAATCTG	U-box domain-containing [ST] protein	362	KC980059 - KC980073
Pr2_32	¹ GAATAGAAATAGAGTGCGATGG ² AAAAATGATGGCTGCGTGAGG	hypothetical protein [UN]	366	KC980074 - KC980091
Pr2_34	¹ CATTTCCAAGAGAAGACGAC ² TGCCAACTCCACTCCCTAC	ATP/ADP transporter [T]	362	KC980092 - KC980103
Pr2_35	¹ ACCCACAAATTGCCAG ² GCCGTGATTATCGAAGAG	DEAD-box ATP-dependent RNA- helicase [M]	420	KC980104 - KC980122
Pr2_38	¹ CCATCATACAACTATCCAC ² ACAGAGAATAATGGGGCAC	hypothetical protein [UN]	451	KC980123 - KC980143
Pr2_41	¹ GAAAAGGATCAAATTGTGGG ² GCTAACATTGGCTGTGG	F-box protein GID2 [ST]	372	KC980144 - KC980160
Pr2_45	¹ AACCGTCCTGATGAGCCTTG ² CAGCCTTTCTTACAGACAC	hypothetical protein [UN]	399	KC980189 - KC980218
Pr2_47	¹ TTCATAAAGCCCCCATCC ² TCTGATTTCAAAGTCGCC	hexokinase 1 [ST]	552	KC980219 - KC980234
Pr2_48	¹ GCTATGCGTTACTTGG ² TGAGTTGAGCTGCTTG	S-methyl-5-thioribose kinase [ST]	713	KC980235 - KC980278
ccoamt	GCAGCAGAAAGTGAAGGCTCAGA TCTTTCCATCATCGGGCAATG	Caffeoyl CoA O-methyltransferase ^d [M]	381	KC980357 - KC980372
rps10	CACCCAGAAATTGATGTTCCAAATC CCAGCCTTRTCACCAAATTCTCCAG	ribosomal protein S10 ^a [M]	355	KC980507 - KC980518
hp927	¹ GCAATGAGGGATTGAATTAC ² TTGGAAGAATACAAGGCAGG	hypothetical protein [UN]	360	KC980519 - KC980542
Pr4-5	¹ CATCTCCTTCAAACCTCTATTTC ² GATGCTTGAACATGATCCC	calcium dependent proteokinase ^e [ST]	357	KC980680 - KC980695
Pr4-10	¹ CATTGCCCTACGATTTC ² CTTTTGAGATGAACCAGAC	mys transcription factor ^e [E]	358	KC980696 - KC980702
Pr4-11	¹ CCTTCTATTGAATCCCTTG ² CATAGTAACAGCCTACAG	scl1 protein ^e [E]	410	KC980703 - KC980724
Pr4-12	¹ CTGCTCAAGTGAAAGG ² CTGATTGTGGATTCTGTG	proton myo-inositol transporter ^e [T]	530	KC980725 - KC980745
Pr4-18	¹ AGAGAGGGAATTGGTTGAG	myblike DNA-binding protein ^e [E]	321	KC980763 - KC980769

Pr4-21	² AAGGAAAGAAAAAGTCTGCTGATGG ¹ ACATGGTGTGTTGGCAGG ² AATGAGGAGGGTGGTAGAG	Receptor protein kinase ^e [ST]	357	KC980786 - KC980810
Pr4-27	¹ TAGCAGACGGTATTCACACAGTCC ² CCACAACCACCTTGCATCATTATTT	putative auxin induced - transcription factor ^e [E]	403	KC980811 - KC980829
Pr4-34	¹ ACCCTGTATCGATGGGTATGGAGAT ² TTTCATGTGGTTTGTGGTACAGAACCTGCAATCA	transcription factor bHLH62- like- gene ^e [E]	360	KC980830 - KC980841
Pr4-38	¹ TTATTTACATCCAACAGCGCCATTT ² GAAAGTATGGATTGCCAACTTGCAC	SET-B-like gene ^e [M]	512	KC980842 - KC980863
Pr4-41	¹ TGCAAGCTGTAAGGTAAAACCTCAT ² CAACATCAAACTGAAACCACCAGTC	ethylene responsive element- binding protein-like gene ^e [ST]	591	KC980864 - KC980906

^{1,2} - vector sequence (1=GTAAACGACGGCCAGT and 2=CAGGAAACAGCTATGACC) was present as a part of PCR primers used for amplification of the loci studied; ³ - E-gene expression regulation; M-metabolisms; ST-signal transduction; T-transport; UN-unknown; ⁴-average across all samples. DNA regions described in: ^aPalm *et al.* 2008; ^bPyhäjärvi *et al.*, 2007; ^cWachowiak *et al.* 2009; ^dEveno *et al.*, 2007; ^eErsoz *et al.* 2010, ^fDonnelly *et al.* 2016.

Table S3. Summary statistic at each locus in four pine species.

Locus	Species	N	L (bp)	P	S	Nucleotide polymorphisms					SD
						p _{total}	D	R	Ks	H _a	
ccoamt	<i>P. uliginosa</i>	31	381	11	6	0.00401	-1.423	1	1.392	0.643	0.088
	<i>P. mugo</i>	29	381	6	3	0.00244	-1.124	0	0.844	0.547	0.096
	<i>P. uncinata</i>	29	381	6	4	0.00202	-1.43	0	0.696	0.424	0.111
	<i>P. sylvestris</i>	29	381	6	2	0.00295	-0.762	0	1.018	0.254	0.100
hp927	<i>P. uliginosa</i>	31	360	7	2	0.00562	0.45	2	0.702	0.847	0.042
	<i>P. mugo</i>	30	360	5	2	0.00335	-0.124	0	0.951	0.683	0.049
	<i>P. uncinata</i>	30	360	7	3	0.00531	0.236	0	0.515	0.625	0.076
	<i>P. sylvestris</i>	28	360	11	2	0.00815	0.123	0	0.684	0.841	0.039
PR_1_1	<i>P. uliginosa</i>	26	358	4	1	0.00264	-0.264	0	0.79226	0.698	0.062
	<i>P. mugo</i>	30	358	5	3	0.00292	-0.467	0	0.89655	0.653	0.069
	<i>P. uncinata</i>	30	358	7	4	0.00396	-0.582	0	1.21576	0.706	0.064
	<i>P. sylvestris</i>	28	358	6	1	0.00263	-1.129	0	0.7991	0.619	0.098
PR_1_11	<i>P. uliginosa</i>	21	720	22	5	0.00959	0.44801	1	5.71167	0.848	0.054
	<i>P. mugo</i>	30	720	18	4	0.00298	-1.83234	0	2.34726	0.51	0.109
	<i>P. uncinata</i>	30	720	20	2	0.00932	1.10422	2	5.8256	0.8	0.056
	<i>P. sylvestris</i>	27	720	18	0	0.00964	1.6588	3	6.85705	0.821	0.038
PR_1_12	<i>P. uliginosa</i>	32	434	15	7	0.00823	-0.36001	1	2.85327	0.893	0.037
	<i>P. mugo</i>	30	434	16	7	0.00805	-0.6537	0	2.78294	0.92	0.024
	<i>P. uncinata</i>	30	434	7	2	0.00601	0.85965	0	2.08267	0.763	0.039
	<i>P. sylvestris</i>	29	434	12	8	0.00293	-1.93035	0	1.29887	0.377	0.115
PR_1_14	<i>P. uliginosa</i>	28	353	9	2	0.00461	-0.34752	0	2.04938	0.69	0.068
	<i>P. mugo</i>	29	353	8	3	0.00661	0.44777	0	2.28571	0.722	0.07
	<i>P. uncinata</i>	27	353	10	3	0.00712	-0.10203	0	2.43269	0.627	0.094
	<i>P. sylvestris</i>	29	353	7	2	0.00581	0.4459	1	2.04202	0.786	0.05
PR_1_15	<i>P. uliginosa</i>	24	592	18	6	0.00538	-1.2321	0	2.92977	0.442	0.124
	<i>P. mugo</i>	28	592	26	17	0.00699	-1.4823	0	3.93333	0.635	0.104
	<i>P. uncinata</i>	30	592	16	13	0.00212	-2.34263	0	1.17457	0.469	0.114
	<i>P. sylvestris</i>	27	592	13	1	0.00565	0.03948	0	3.10345	0.55	0.108
PR_1_17	<i>P. uliginosa</i>	32	319	13	2	0.01066	-0.29051	3	2.72214	0.861	0.050
	<i>P. mugo</i>	30	319	6	0	0.00581	0.63752	0	1.52854	0.825	0.041
	<i>P. uncinata</i>	29	319	6	3	0.00527	0.28628	0	1.39153	0.751	0.049
	<i>P. sylvestris</i>	29	319	2	0	0.0012	-0.50812	0	0.42816	0.192	0.09
PR_1_18	<i>P. uliginosa</i>	32	436	8	2	0.00489	0.18747	1	2.10138	0.835	0.045
	<i>P. mugo</i>	30	436	8	5	0.00368	-0.64815	0	1.62591	0.761	0.043
	<i>P. uncinata</i>	30	436	10	1	0.00536	-0.26255	0	2.28631	0.885	0.022
	<i>P. sylvestris</i>	29	436	9	2	0.00498	-0.18324	0	2.14286	0.732	0.072
PR_1_19	<i>P. uliginosa</i>	28	327	9	1	0.01018	1.38607	0	2.84662	0.786	0.046
	<i>P. mugo</i>	30	327	11	3	0.00993	0.54669	0	2.84995	0.809	0.043
	<i>P. uncinata</i>	30	327	8	1	0.00837	1.07752	0	2.37969	0.54	0.099
	<i>P. sylvestris</i>	29	327	7	1	0.00908	1.9854	1	2.56408	0.739	0.045
PR_1_21	<i>P. uliginosa</i>	31	363	10	4	0.00554	-1.14317	2	1.91978	0.871	0.039
	<i>P. mugo</i>	29	363	10	7	0.00405	-1.3638	0	1.55718	0.714	0.068
	<i>P. uncinata</i>	30	363	5	2	0.00358	-0.01497	0	1.40249	0.63	0.058
	<i>P. sylvestris</i>	27	363	7	4	0.00426	-0.47302	0	1.617	0.632	0.096
PR_1_22	<i>P. uliginosa</i>	22	277	14	8	0.01034	-0.91956	1	2.34603	0.732	0.072
	<i>P. mugo</i>	29	277	4	0	0.00628	1.8327	1	1.47104	0.697	0.04
	<i>P. uncinata</i>	30	277	8	1	0.00794	0.27175	0	1.84211	0.766	0.049
	<i>P. sylvestris</i>	28	277	10	1	0.01501	1.96915	0	3.33333	0.5	0.07
PR_1_24	<i>P. uliginosa</i>	26	262	5	2	0.00497	-0.01892	0	1.02546	0.535	0.096
	<i>P. mugo</i>	28	262	6	2	0.00421	-0.82607	0	0.88254	0.524	0.103
	<i>P. uncinata</i>	30	262	5	0	0.00372	-0.62122	0	0.79031	0.451	0.103
	<i>P. sylvestris</i>	28	262	4	1	0.00473	0.53505	0	0.99048	0.442	0.087
PR_1_26	<i>P. uliginosa</i>	25	386	18	5	0.01411	0.2655	4	4.32552	0.827	0.067
	<i>P. mugo</i>	28	386	28	15	0.01743	-0.24467	5	5.36931	0.923	0.035
	<i>P. uncinata</i>	23	386	23	8	0.01639	0.02691	3	4.81212	0.905	0.041
	<i>P. sylvestris</i>	29	386	29	8	0.0175	-0.34362	5	5.38492	0.889	0.033

PR_1_29	<i>P. uliginosa</i>	30	242	6	2	0.00686	0.27368	1	1.6907	0.611	0.088
	<i>P. mugo</i>	29	242	7	2	0.00491	-0.99482	0	1.26339	0.473	0.11
	<i>P. uncinata</i>	30	242	5	1	0.00575	0.27821	0	1.44619	0.343	0.097
	<i>P. sylvestris</i>	28	242	7	2	0.00903	0.64537	0	2.16726	0.638	0.061
PR_1_36	<i>P. uliginosa</i>	30	387	13	8	0.00493	-1.47236	1	2.12302	0.825	0.052
	<i>P. mugo</i>	29	387	7	2	0.00421	-0.3856	0	1.91667	0.759	0.047
	<i>P. uncinata</i>	30	387	12	7	0.00537	-1.30811	0	2.25536	0.839	0.038
	<i>P. sylvestris</i>	28	387	10	3	0.00525	-0.77939	0	2.24339	0.804	0.041
PR_1_43	<i>P. uliginosa</i>	28	591	11	2	0.00402	-0.52141	2	2.64915	0.87	0.036
	<i>P. mugo</i>	30	591	12	8	0.00328	-1.17787	0	2.29664	0.814	0.044
	<i>P. uncinata</i>	30	591	10	2	0.00421	-0.04623	0	2.72104	0.844	0.037
	<i>P. sylvestris</i>	29	591	10	5	0.00381	-0.36986	0	2.54699	0.685	0.065
PR_1_45	<i>P. uliginosa</i>	30	310	10	2	0.00995	0.02815	2	2.60153	0.818	0.060
	<i>P. mugo</i>	27	310	10	2	0.00726	-0.72263	0	1.93473	0.781	0.071
	<i>P. uncinata</i>	30	310	10	3	0.01038	0.47475	0	2.71073	0.809	0.043
	<i>P. sylvestris</i>	29	310	9	2	0.01049	0.84323	0	2.72449	0.786	0.04
PR_1_47	<i>P. uliginosa</i>	22	542	3	0	0.00165	0.14824	0	0.82653	0.506	0.106
	<i>P. mugo</i>	30	542	0	0	0	0	0	0.11111	0	0
	<i>P. uncinata</i>	30	542	4	1	0.00143	-0.60921	0	0.75287	0.522	0.091
	<i>P. sylvestris</i>	29	542	7	2	0.00375	0.41296	0	1.79592	0.709	0.059
PR_1_48	<i>P. uliginosa</i>	32	383	9	3	0.00628	-0.1055	1	2.4265	0.875	0.042
	<i>P. mugo</i>	28	383	8	3	0.00479	-0.33014	0	1.99148	0.772	0.057
	<i>P. uncinata</i>	30	383	6	2	0.00397	0.00946	0	1.73347	0.621	0.091
	<i>P. sylvestris</i>	29	383	20	13	0.00602	-1.92302	0	2.35135	0.569	0.106
PR_2_7	<i>P. uliginosa</i>	31	410	31	26	0.00677	-2.52116	0	3.23333	0.624	0.099
	<i>P. mugo</i>	30	410	1	0	0.00045	-0.40885	0	0.15747	0.186	0.088
	<i>P. uncinata</i>	30	410	1	0	0.00031	-0.76373	0	0.88177	0.129	0.079
	<i>P. sylvestris</i>	25	410	4	1	0.00262	0.03571	0	1.79444	0.457	0.105
PR_2_11	<i>P. uliginosa</i>	31	213	3	2	0.00143	-1.37016	0	0.32222	0.243	0.099
	<i>P. mugo</i>	28	213	3	2	0.00184	-1.16485	0	0.39731	0.323	0.108
	<i>P. uncinata</i>	30	213	2	1	0.00117	-1.02235	0	0.27389	0.246	0.098
	<i>P. sylvestris</i>	28	213	2	1	0.00229	-0.07831	0	0.48036	0.474	0.079
PR_2_16	<i>P. uliginosa</i>	31	384	9	0	0.00627	0.21331	1	1.96491	0.733	0.058
	<i>P. mugo</i>	30	384	11	3	0.00834	0.4934	0	2.59646	0.669	0.076
	<i>P. uncinata</i>	30	384	10	2	0.00526	-0.63174	0	1.6384	0.639	0.069
	<i>P. sylvestris</i>	27	384	2	0	0.00248	1.76461	0	0.75566	0.655	0.049
PR_2_17	<i>P. uliginosa</i>	32	390	3	1	0.00274	1.00411	0	0.92804	0.569	0.048
	<i>P. mugo</i>	30	390	4	1	0.00314	0.54829	0	1.04753	0.605	0.052
	<i>P. uncinata</i>	30	390	5	1	0.00344	0.17386	0	1.14259	0.667	0.063
	<i>P. sylvestris</i>	27	390	5	2	0.0018	-1.28947	0	0.61538	0.447	0.113
PR_2_20	<i>P. uliginosa</i>	30	380	4	2	0.00199	-0.65598	0	0.98719	0.395	0.100
	<i>P. mugo</i>	29	380	7	4	0.00363	-0.68198	1	1.52521	0.773	0.057
	<i>P. uncinata</i>	30	380	14	2	0.00621	-1.11634	0	2.35862	0.701	0.062
	<i>P. sylvestris</i>	29	380	7	3	0.00374	-0.60788	1	1.56303	0.635	0.077
PR_2_23	<i>P. uliginosa</i>	30	337	9	5	0.00504	-0.78372	0	1.71571	0.779	0.063
	<i>P. mugo</i>	28	337	6	1	0.00404	-0.33785	0	1.43965	0.733	0.066
	<i>P. uncinata</i>	30	337	8	0	0.00489	-0.56861	0	1.66782	0.733	0.079
	<i>P. sylvestris</i>	27	337	10	7	0.00454	-1.33449	1	1.57669	0.755	0.059
PR_2_25	<i>P. uliginosa</i>	31	403	7	2	0.00432	-0.02436	0	1.46911	0.804	0.044
	<i>P. mugo</i>	30	403	4	1	0.00276	0.25599	0	0.96681	0.563	0.072
	<i>P. uncinata</i>	30	403	5	2	0.00348	0.30306	1	1.1973	0.687	0.055
	<i>P. sylvestris</i>	27	403	5	2	0.00341	0.16435	1	1.1573	0.675	0.056
PR_2_28	<i>P. uliginosa</i>	31	403	7	2	0.00432	-0.02436	0	1.46911	0.804	0.044
	<i>P. mugo</i>	30	403	4	1	0.00276	0.25599	0	0.96681	0.563	0.072
	<i>P. uncinata</i>	30	403	5	2	0.00348	0.30306	1	1.1973	0.687	0.055
	<i>P. sylvestris</i>	27	403	5	2	0.00341	0.16435	1	1.1573	0.675	0.056
PR_2_29	<i>P. uliginosa</i>	30	333	7	3	0.00428	-0.5713	0	1.18774	0.57	0.092
	<i>P. mugo</i>	30	333	6	2	0.00242	-1.33328	0	0.67241	0.492	0.1
	<i>P. uncinata</i>	29	333	4	1	0.00402	0.81756	0	1.1102	0.463	0.080
	<i>P. sylvestris</i>	24	333	5	0	0.00408	0.02707	0	1.08116	0.576	0.097
PR_2_30	<i>P. uliginosa</i>	31	362	5	0	0.00493	1.15297	0	1.60928	0.753	0.032
	<i>P. mugo</i>	27	362	5	0	0.00351	-0.05742	0	1.19247	0.604	0.085

	<i>P. uncinata</i>	29	362	5	2	0.0031	-0.32432	0	1.08108	0.692	0.063
	<i>P. sylvestris</i>	27	362	4	1	0.00233	-0.49529	0	0.86279	0.55	0.085
PR_2_32	<i>P. uliginosa</i>	32	366	10	3	0.00608	-0.32609	1	1.9377	0.869	0.036
	<i>P. mugo</i>	29	366	5	2	0.00373	0.19747	0	1.27676	0.539	0.093
	<i>P. uncinata</i>	30	366	8	3	0.00541	-0.05679	0	1.74176	0.766	0.061
	<i>P. sylvestris</i>	25	366	6	1	0.00677	1.03887	0	2.06111	0.803	0.04
PR_2_34	<i>P. uliginosa</i>	29	362	3	2	0.00036	-1.44456	0	0.53151	0.129	0.079
	<i>P. mugo</i>	30	362	1	0	0.00036	-0.76373	0	0.2532	0.129	0.079
	<i>P. uncinata</i>	27	362	2	0	0.00192	0.71889	0	0.74279	0.604	0.066
	<i>P. sylvestris</i>	28	362	2	1	0.0013	-0.21831	0	0.54209	0.442	0.087
PR_2_35	<i>P. uliginosa</i>	32	420	9	2	0.00594	-0.00916	1	2.42459	0.756	0.070
	<i>P. mugo</i>	30	420	3	1	0.00165	-0.21724	0	0.97173	0.487	0.097
	<i>P. uncinata</i>	30	420	2	0	0.0009	-1.18883	0	0.71824	0.356	0.106
	<i>P. sylvestris</i>	29	420	5	2	0.00261	-0.39886	0	1.30291	0.606	0.081
PR_2_38	<i>P. uliginosa</i>	32	441	10	4	0.00552	0.00859	2	1.73005	0.724	0.074
	<i>P. mugo</i>	29	441	6	2	0.00402	0.52754	0	1.5551	0.643	0.054
	<i>P. uncinata</i>	29	441	5	0	0.00488	2.00776	0	1.45306	0.576	0.048
	<i>P. sylvestris</i>	28	441	8	1	0.00388	-0.46127	0	1.0915	0.601	0.061
PR_2_41	<i>P. uliginosa</i>	31	372	8	3	0.00413	-0.70313	0	1.28649	0.727	0.070
	<i>P. mugo</i>	30	372	7	4	0.00275	-1.24401	0	0.85249	0.586	0.098
	<i>P. uncinata</i>	30	372	8	3	0.0058	0.20604	0	1.79694	0.752	0.058
	<i>P. sylvestris</i>	29	372	4	0	0.00364	0.74237	0	1.87755	0.655	0.057
PR_2_45	<i>P. uliginosa</i>	23	399	5	1	0.00393	0.02788	0	1.2346	0.644	0.092
	<i>P. mugo</i>	30	399	7	4	0.00389	-0.67509	0	1.09074	0.586	0.098
	<i>P. uncinata</i>	30	399	5	1	0.00366	-0.44101	0	1.01089	0.736	0.056
	<i>P. sylvestris</i>	29	399	6	4	0.00328	-1.06068	0	0.89961	0.8	0.038
PR_2_47	<i>P. uliginosa</i>	26	552	4	0	0.00233	0.58288	0	1.47143	0.64	0.091
	<i>P. mugo</i>	29	552	3	0	0.00268	2.20539	0	1.63595	0.675	0.034
	<i>P. uncinata</i>	29	552	6	2	0.00389	1.13995	0	2.25346	0.663	0.054
	<i>P. sylvestris</i>	28	552	9	3	0.0045	0.20506	0	2.96543	0.685	0.083
PR_2_48	<i>P. uliginosa</i>	29	713	16	7	0.00409	-1.04631	1	2.22772	0.756	0.079
	<i>P. mugo</i>	29	713	23	11	0.00529	-1.3217	0	2.85592	0.906	0.03
	<i>P. uncinata</i>	29	713	21	6	0.00682	-0.40107	0	3.69475	0.899	0.033
	<i>P. sylvestris</i>	27	713	23	11	0.00766	-0.38989	0	4.0097	0.883	0.033
PR_4_5	<i>P. uliginosa</i>	32	357	6	2	0.00346	-0.47883	1	1.17191	0.637	0.076
	<i>P. mugo</i>	30	357	4	3	0.0016	-1.11781	0	0.6565	0.515	0.089
	<i>P. uncinata</i>	30	357	6	2	0.00359	-0.48865	0	1.18347	0.453	0.105
	<i>P. sylvestris</i>	29	357	4	1	0.00374	0.74237	0	1.22368	0.463	0.08
PR_4_10	<i>P. uliginosa</i>	31	358	2	0	0.00253	1.61377	1	0.7935	0.695	0.036
	<i>P. mugo</i>	30	358	2	1	0.00101	-1.22455	0	0.38908	0.352	0.103
	<i>P. uncinata</i>	30	358	2	1	0.00164	0.32082	0	0.5546	0.549	0.038
	<i>P. sylvestris</i>	27	358	1	1	0.00021	-1.15354	0	0.18018	0.074	0.067
PR_4_11	<i>P. uliginosa</i>	29	410	9	2	0.00494	-0.48618	0	1.61315	0.781	0.048
	<i>P. mugo</i>	30	410	9	1	0.00524	-0.2963	0	1.68027	0.653	0.085
	<i>P. uncinata</i>	30	410	9	2	0.00469	-0.59504	0	1.51648	0.766	0.053
	<i>P. sylvestris</i>	29	410	9	5	0.004	-0.99106	0	1.30729	0.685	0.09
PR_4_12	<i>P. uliginosa</i>	32	530	8	2	0.00463	0.7039	0	2.42695	0.704	0.050
	<i>P. mugo</i>	30	530	9	3	0.00501	0.5276	0	2.61638	0.763	0.052
	<i>P. uncinata</i>	30	530	6	0	0.00457	1.70738	0	2.3944	0.715	0.040
	<i>P. sylvestris</i>	29	530	6	6	0.00091	-2.1762	0	0.57834	0.261	0.106
PR_4_18	<i>P. uliginosa</i>	31	321	4	3	0.00147	-1.34255	0	0.54167	0.385	0.099
	<i>P. mugo</i>	30	321	1	1	0.00021	-1.147	0	0.23077	0.067	0.061
	<i>P. uncinata</i>	30	321	1	1	0.00021	-1.147	0	0.23077	0.067	0.061
	<i>P. sylvestris</i>	27	321	2	0	0.00156	-0.07121	0	0.57051	0.467	0.094
PR_4_21	<i>P. uliginosa</i>	31	357	22	6	0.01397	-0.59885	6	4.1664	0.92	0.031
	<i>P. mugo</i>	28	357	6	2	0.00435	0.02085	0	1.57115	0.765	0.054
	<i>P. uncinata</i>	30	357	7	1	0.00422	-0.43676	0	1.53487	0.805	0.041
	<i>P. sylvestris</i>	27	357	6	2	0.00377	-0.39901	0	1.41973	0.744	0.054
PR_4_34	<i>P. uliginosa</i>	29	360	3	0	0.00156	-0.62937	0	0.49421	0.502	0.099
	<i>P. mugo</i>	27	360	5	5	0.00103	-2.00406	0	0.34286	0.279	0.112
	<i>P. uncinata</i>	30	360	3	3	0.00056	-1.73178	0	0.21053	0.131	0.082
	<i>P. sylvestris</i>	29	360	2	0	0.00074	-0.98857	0	0.26255	0.256	0.102

PR_4_38	<i>P. uliginosa</i>	28	512	5	3	0.00097	-1.71968	0	0.41326	0.328	0.112
	<i>P. mugo</i>	30	512	6	4	0.00164	-1.30296	0	0.66724	0.543	0.1
	<i>P. uncinata</i>	30	512	6	5	0.00123	-1.68413	0	0.51552	0.446	0.101
	<i>P. sylvestris</i>	27	512	3	0	0.0011	-0.70335	0	0.45738	0.33	0.108
PR_4_41	<i>P. uliginosa</i>	28	591	13	2	0.00555	-0.06307	1	2.75573	0.862	0.047
	<i>P. mugo</i>	29	591	13	6	0.00493	-0.40084	0	2.48263	0.776	0.06
	<i>P. uncinata</i>	30	591	18	7	0.00742	-0.11928	0	3.65828	0.876	0.041
	<i>P. sylvestris</i>	28	591	16	11	0.00394	-1.4919	0	2.01911	0.907	0.034
rps10	<i>P. uliginosa</i>	31	355	4	0	0.00376	0.84416	1	1.34464	0.742	0.046
	<i>P. mugo</i>	29	355	3	1	0.0024	0.27469	1	1.10854	0.547	0.096
	<i>P. uncinata</i>	30	355	4	0	0.00382	0.88151	1	1.26188	0.761	0.044
	<i>P. sylvestris</i>	22	355	2	0	0.00246	1.34546	0	0.84127	0.593	0.085
Species average											
	<i>P. uliginosa</i>	29.3	19414	441	155	0.00525	-0.28	39	1.86431	0.68933	0.06642
	<i>P. mugo</i>	29.3	19414	365	154	0.00404	-0.37	8	1.50080	0.60092	0.07071
	<i>P. uncinata</i>	29.6	19414	363	113	0.00455	-0.14	8	1.65601	0.62260	0.06590
	<i>P. sylvestris</i>	27.8	19414	367	128	0.00458	-0.16	14	1.68221	0.59831	0.07269

N - average number of sequences analyzed per locus; L - total length of sequence in base pairs excluding indels; P - total number of polymorphic sites; S - total number of singleton mutations); π - average nucleotide diversity; D - Tajima's D statistic; R - average number of recombination events Ks - average pairwise divergence per site to the outgroup *P. pinaster* at all loci; Hd - haplotype diversity; SD - standard deviation of haplotype diversity. Tajimas's D values significant at $p < 0.05$ are bolded.

Table S4. Maximum likelihoods and Akaike statistics for all 16 evolutionary models tested in fastsimcoal2.
(see Figure 5 for details of scenario)

Model	Δ likelihood	AIC	Δ AIC
S12	349.645	4239	0
S14	353.749	4252	13
S15	355.781	4267	28
S11	355.375	4269	30
S13	356.333	4270	31
S16	366.586	4319	80
S6	384.285	4376	138
S1	385.150	4378	140
S10	384.380	4385	146
S7	384.519	4391	153
S4	390.027	4395	156
S3	390.547	4403	164
S8	387.833	4405	166
S2	393.085	4415	176
S9	390.620	4418	179
S5	395.510	4428	189

Best model is indicated in grey (lowest value of AIC). See Figure for details of each scenario.

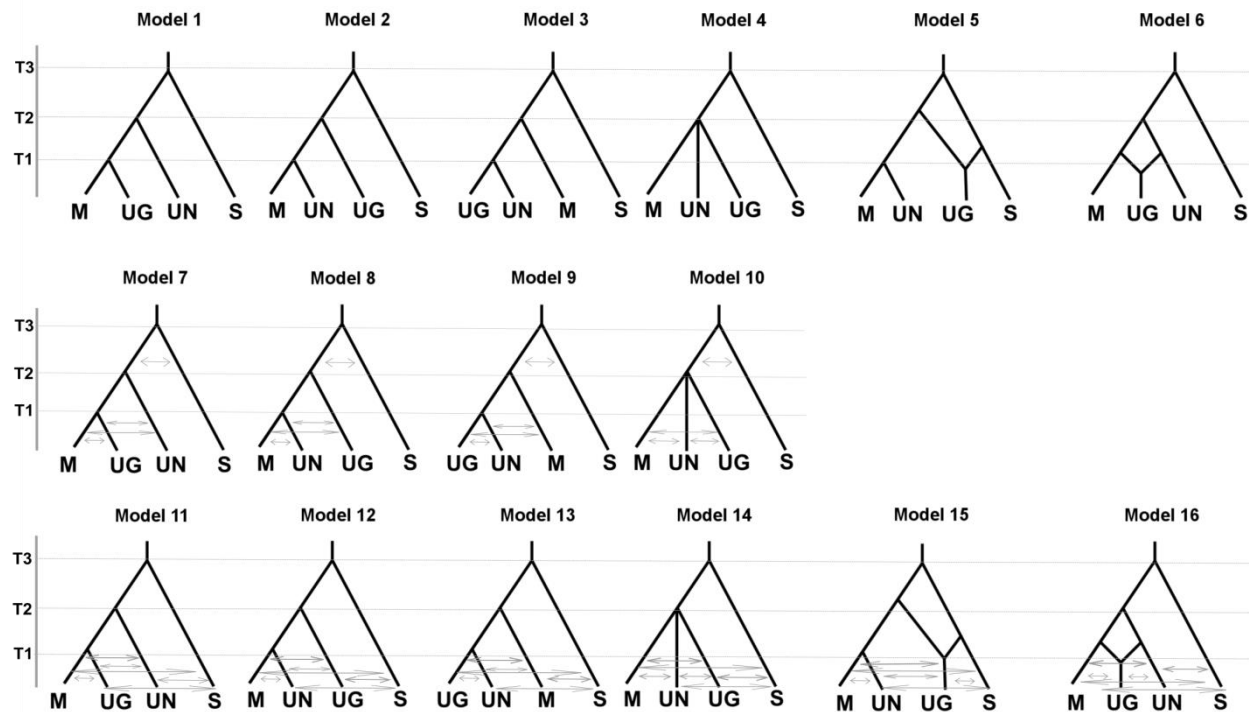


Figure S1 Schematic representation of the 16 demographic models tested in fastsimcoal2. Four models represent possible dichotomous and polytomous divergence between taxa from *P. mugo* complex after their split from *P. sylvestris* (models 1-4), two represent possible hybrid origin of *P. uliginosa* with different putative parental taxa (model 5-6), and the rest is variation of models 1-6 with different asymmetric migration matrix between species. Population divergence/hybridization times are indicated by T1-T3 parameters, and migration is indicated by arrows.

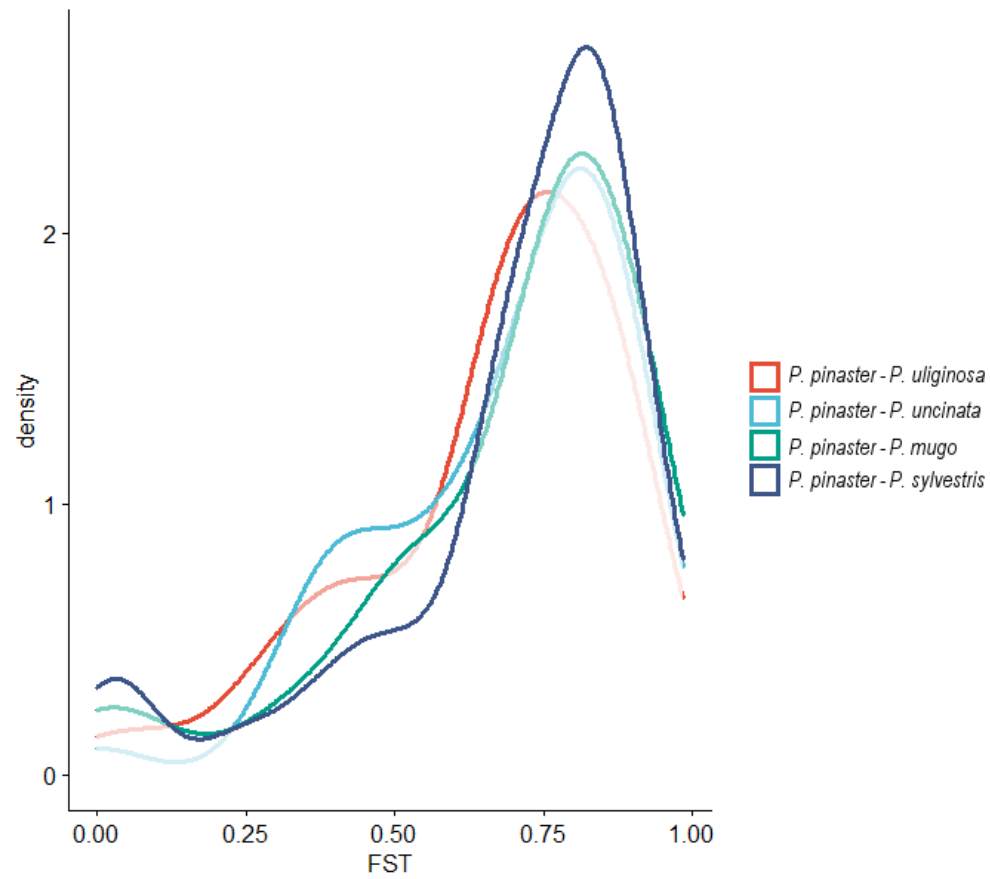


Figure S2. Distribution of genetic differentiation (F_{ST}) in pairwise comparisons between four studied pines and an outgroup *P. pinaster* based on all variable sites in a set of 48 nuclear loci.

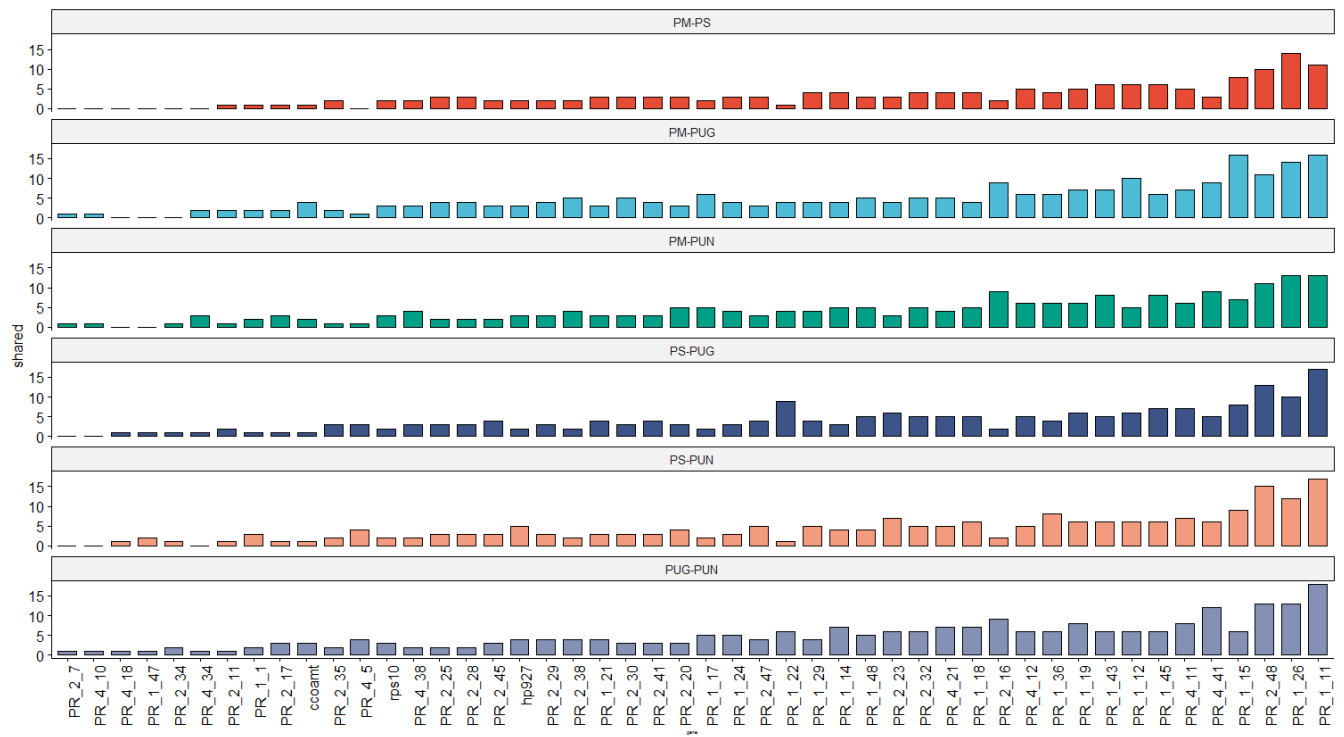


Figure S3. Numbers of shared polymorphism between studied species in pairwise comparisons across all of the 48 nuclear loci studied.

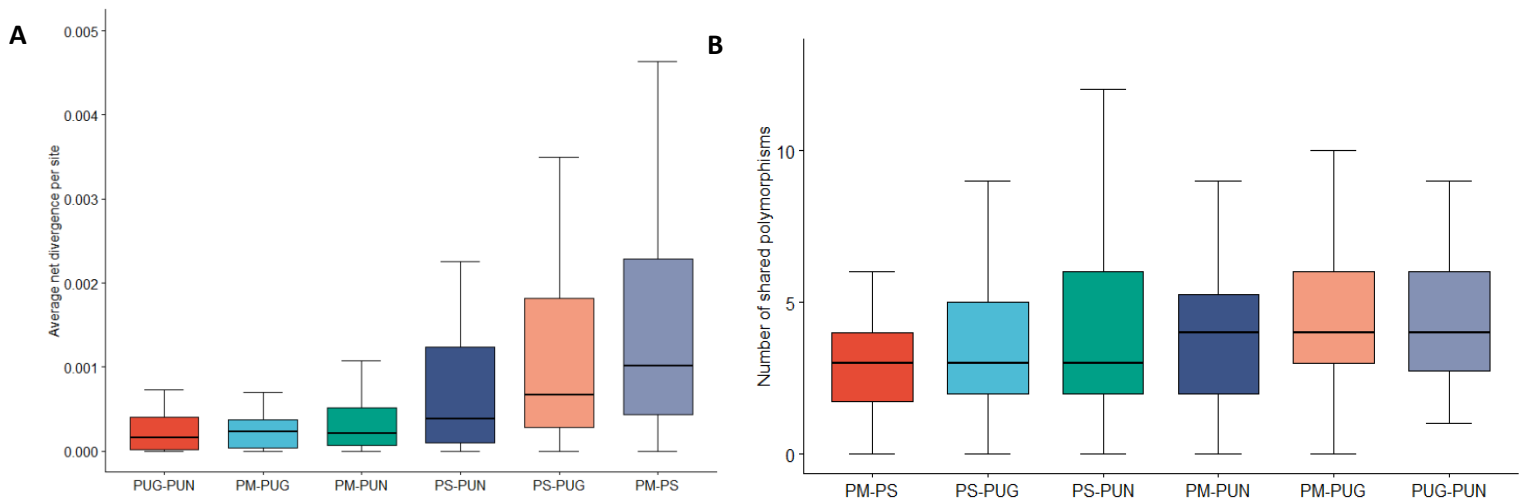


Figure S4. Net between-species divergence per site (A), and number of shared polymorphisms (B) in pairwise comparisons averaged across 48 nuclear loci.

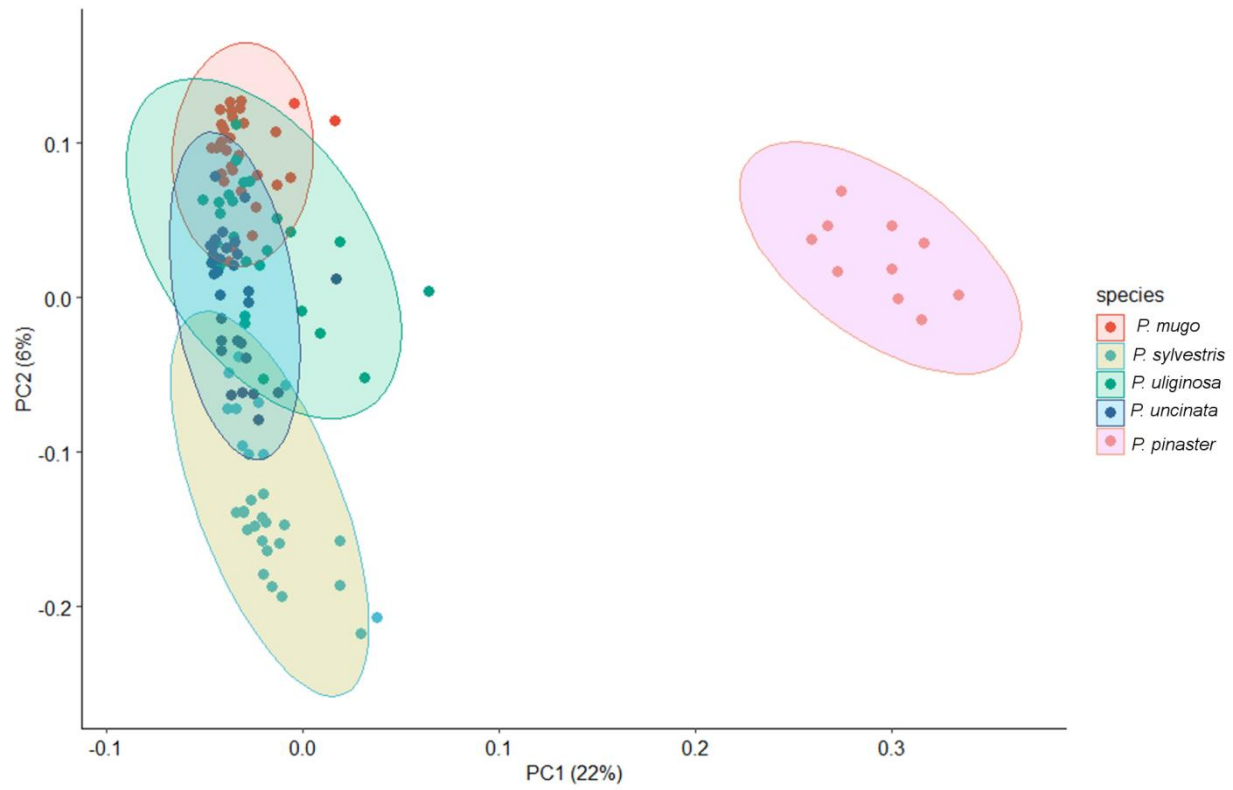


Figure S5. The results of the principal components analysis (PCA) showing differentiation of species (*P. pinaster* included as an outgroup) by the first two principal axes.

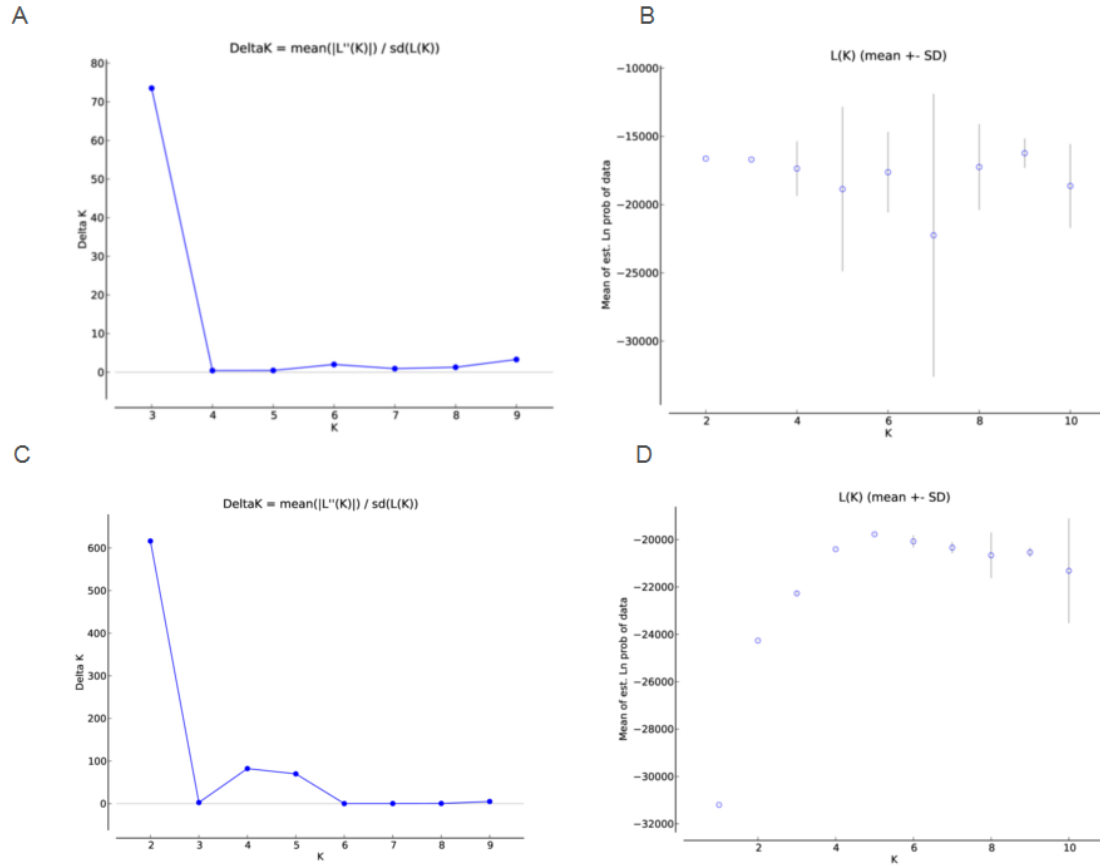


Figure S6. The results of likelihood estimate and Evanno method for STRUCTURE runs. results of likelihood estimate ΔK and the log probability Evanno method for STRUCTURE runs with *P. pinaster* (A, B); and without *P. pinaster* as an outgroup (C, D). For STRUCTURE results, see Figure 3.



Figure S7 Phylogenetic relationships (ML tree) of 132 samples of *P. uliginosa*, *P. mugo*, *P. uncinata* and *P. sylvestris* rooted with *P. pinaster* based on the concatenated sequence of 48 nuclear loci. Due to the overall excess of low bootstrap values (< 50) bootstrap values were not shown to improve figure readability. Species color coded as in Figure 3 and Figure 5.