

Figure S1. Kaplan–Meier estimator for survival rate of seedlings of six *Pinus thunbergii* full-sib families inoculated with *Bursaphelenchus xylophilus* in three experimental sites. Black, dashed and gray lines indicate TBO, FTBC, and KYBO respectively.

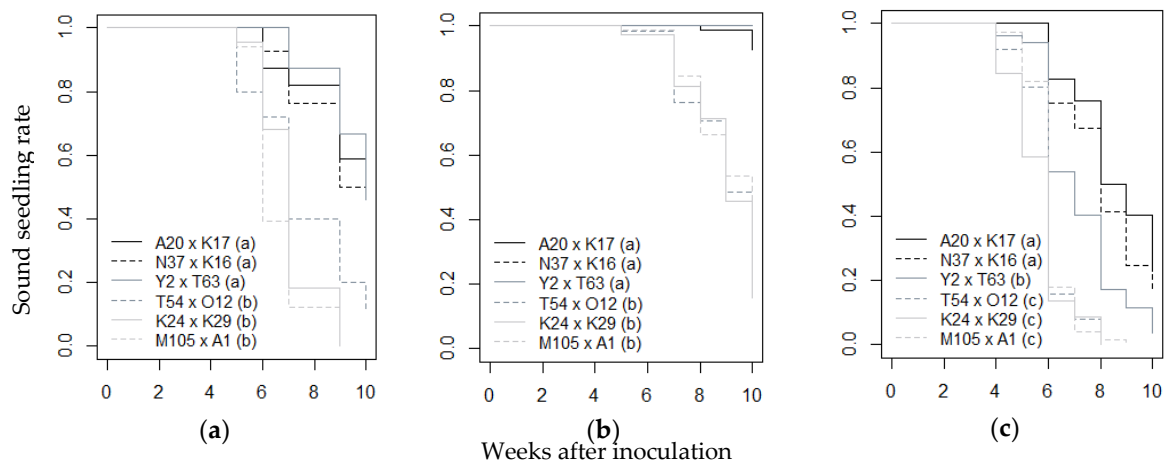


Figure S2. Kaplan–Meier estimator for survival rate of six *Pinus thunbergii* full-sib families inoculated with *Bursaphelenchus xylophilus* in each of the three experimental sites. **(a)** TBO; **(b)** FTBC; and **(c)** KYBO. See Table 1 for abbreviated names of pine families. Family names followed by a common letter are not significantly different at the 5% level of significance.

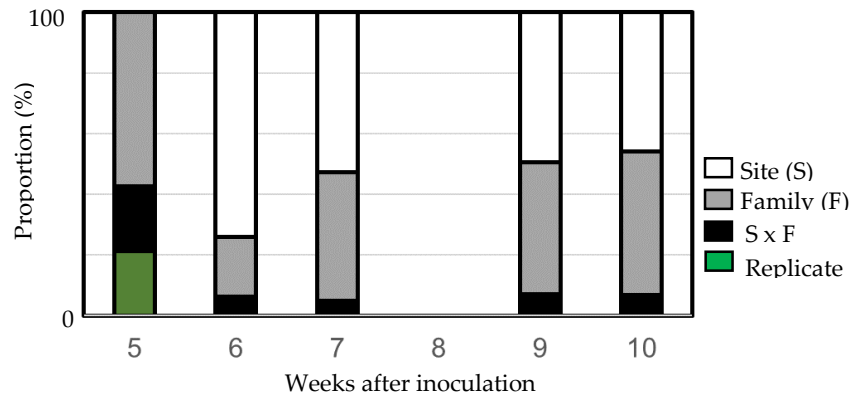


Figure S3. Proportion of variance components of site, family, their interaction, and replicate within site for survival rate of *Pinus thunbergii* seedlings inoculated with *Bursaphelenchus xylophilus*. Variance component analysis was not conducted for 4 week and 8 week after inoculation due to missing data in TBO. The analysis was performed on the data after the occurrence of dead seedlings.

Table S1. Model selection table for mean height of *Pinus thunbergii* seedlings.

Intercept	Site (S)	Family (F)	(S) x (F)	<i>d.f.</i>	Log likelihood	AIC	Δ AIC
30.14	+	+	+	20	-67.45	174.9	0.0
31.54	+	+		10	-87.05	194.1	19.2
29.56		+		8	-89.74	195.5	20.6
28.33	+			5	-105.19	220.4	45.5
26.35				3	-107.88	221.8	46.8

Table S2. Time trend in mean sound seedling rate and survival rate of six *Pinus thunbergii* families inoculated with *Bursaphelenchus xylophilus* in the three experimental sites.

Site	Family			Sound seedling rate										Survival rate									
				1W	2W	3W	4W	5W	6W	7W	8W	9W	10W	1W	2W	3W	4W	5W	6W	7W	8W	9W	10W
TBO	A20	x	K17	1.00	1.00	1.00		0.67	0.56	0.54		0.46	0.38	1.00	1.00	1.00		1.00	0.87	0.82		0.59	0.49
	N37	x	K16	1.00	1.00	0.93		0.83	0.50	0.50		0.45	0.40	1.00	1.00	1.00		1.00	0.93	0.76		0.50	0.48
	Y2	x	T63	1.00	1.00	1.00		0.72	0.64	0.51		0.44	0.36	1.00	1.00	1.00		1.00	1.00	0.87		0.67	0.46
	T54	x	O12	1.00	0.92	0.60		0.40	0.12	0.08		0.08	0.08	1.00	1.00	1.00		0.80	0.72	0.40		0.20	0.12
	K24	x	K29	1.00	0.95	0.73		0.09	0.00	0.00		0.00	0.00	1.00	1.00	1.00		0.95	0.68	0.18		0.00	0.00
	M105	x	A1	1.00	0.97	0.82		0.15	0.00	0.00		0.00	0.00	1.00	1.00	1.00		0.94	0.39	0.12		0.00	0.00
FTBC	A20	x	K17	1.00	1.00	1.00	1.00	0.97	0.89	0.86	0.80	0.80	0.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.93
	N37	x	K16	1.00	1.00	1.00	1.00	0.99	0.97	0.97	0.96	0.94	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
	Y2	x	T63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	T54	x	O12	1.00	1.00	0.99	0.84	0.44	0.31	0.28	0.26	0.22	0.21	1.00	1.00	1.00	1.00	0.99	0.99	0.76	0.71	0.49	0.32
	K24	x	K29	1.00	1.00	0.94	0.64	0.13	0.07	0.06	0.06	0.04	0.04	1.00	1.00	1.00	1.00	0.97	0.97	0.81	0.71	0.46	0.16
	M105	x	A1	1.00	1.00	1.00	0.94	0.30	0.28	0.20	0.14	0.13	0.10	1.00	1.00	1.00	1.00	0.99	0.99	0.85	0.66	0.54	0.27
KYBO	A20	x	K17	1.00	1.00	0.99	0.48	0.37	0.24	0.23	0.21	0.21	0.21	1.00	1.00	1.00	1.00	1.00	0.83	0.76	0.50	0.40	0.23
	N37	x	K16	1.00	1.00	1.00	0.36	0.23	0.13	0.10	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	0.75	0.68	0.31	0.25	0.17
	Y2	x	T63	1.00	0.94	0.87	0.25	0.12	0.04	0.04	0.04	0.04	0.04	1.00	1.00	1.00	0.96	0.94	0.54	0.40	0.12	0.12	0.04
	T54	x	O12	1.00	0.97	0.36	0.03	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.92	0.80	0.16	0.08	0.00	0.00	0.00
	K24	x	K29	1.00	0.91	0.28	0.02	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.84	0.59	0.14	0.09	0.00	0.00	0.00
	M105	x	A1	1.00	0.96	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.97	0.82	0.18	0.04	0.00	0.00	0.00
Total	TBO			1.00	0.98	0.88		0.53	0.36	0.32		0.28	0.24	1.00	1.00	1.00		0.96	0.79	0.58		0.38	0.30
	FTBC			1.00	1.00	0.99	0.90	0.64	0.59	0.56	0.53	0.52	0.50	1.00	1.00	1.00	1.00	0.99	0.99	0.90	0.84	0.74	0.61
	KYBO			1.00	0.97	0.72	0.21	0.14	0.08	0.07	0.07	0.07	0.07	1.00	1.00	1.00	0.96	0.87	0.46	0.37	0.18	0.15	0.08
	Total			1.00	0.98	0.86	0.55	0.41	0.34	0.32	0.30	0.29	0.27	1.00	1.00	1.00	0.98	0.94	0.73	0.62	0.51	0.43	0.34

Light gray values indicate all of the seedlings were sound or survived. Dark gray values indicate all of the seedlings showed external symptom of disease or dead.

Table S3. Estimated variance components for sound seedling rate of *Pinus thunbergii* after inoculation of with *Bursaphelenchus xylophilus*.

Factor	Estimated variance component \pm SD (proportion, %)									
	5		6		7		9		10	
Site (S)	4.29 \pm 2.07	(45)	4.96 \pm 2.23	(41)	5.05 \pm 2.25	(40)	3.80 \pm 1.95	(39)	3.69 \pm 1.92	(38)
Family (F)	4.50 \pm 2.12	(47)	6.04 \pm 2.46	(50)	6.49 \pm 2.55	(52)	5.50 \pm 2.34	(56)	5.44 \pm 2.33	(56)
(S) x (F)	0.75 \pm 0.87	(8)	0.87 \pm 0.93	(7)	0.87 \pm 0.93	(7)	0.47 \pm 0.69	(5)	0.57 \pm 0.75	(6)
Replication	0.03 \pm 0.17	(0)	0.11 \pm 0.33	(1)	0.08 \pm 0.29	(1)	0.02 \pm 0.15	(0)	0.01 \pm 0.09	(0)

Table S4. Spearman's correlation coefficient for survival rate of *Pinus thunbergii* seedlings inoculated with *Bursaphelenchus xylophilus*.

Week	Spearman's correlation coefficient (<i>p</i> -value)		
	TBO vs FTBC	TBO vs KYBO	FTBC vs KYBO
5	0.801(0.058)	0.770(0.058)	0.955(0.003)
6	0.759(0.058)	0.600(0.175)	0.941(0.003)
7	0.698(0.136)	0.771(0.058)	0.759(0.058)
8			0.739(0.103)
9	0.794(0.058)	0.770(0.058)	0.739(0.103)
10	0.754(0.103)	0.955(0.003)	0.698(0.136)

Correlation coefficients were calculated for data after the occurrence of dead seedlings.

Table S5. Estimated variance component for survival rate of *Pinus thunbergii* seedlings inoculated with *Bursaphelenchus xylophilus*.

Factor	Estimated variance component \pm SD (proportion, %)									
	5		6		7		9		10	
Site (S)	0.00 \pm 0.00	(0)	5.22 \pm 2.29	(74)	3.43 \pm 1.85	(53)	7.36 \pm 2.71	(49)	5.54 \pm 2.35	(46)
Family (F)	1.34 \pm 1.16	(57)	1.39 \pm 1.18	(20)	2.75 \pm 1.66	(42)	6.49 \pm 2.55	(44)	5.69 \pm 2.39	(47)
(S) x (F)	0.50 \pm 0.71	(22)	0.42 \pm 0.65	(6)	0.24 \pm 0.49	(4)	0.94 \pm 0.97	(6)	0.74 \pm 0.86	(6)
Replication	0.50 \pm 0.70	(21)	0.02 \pm 0.14	(0)	0.09 \pm 0.30	(1)	0.13 \pm 0.35	(1)	0.09 \pm 0.29	(1)