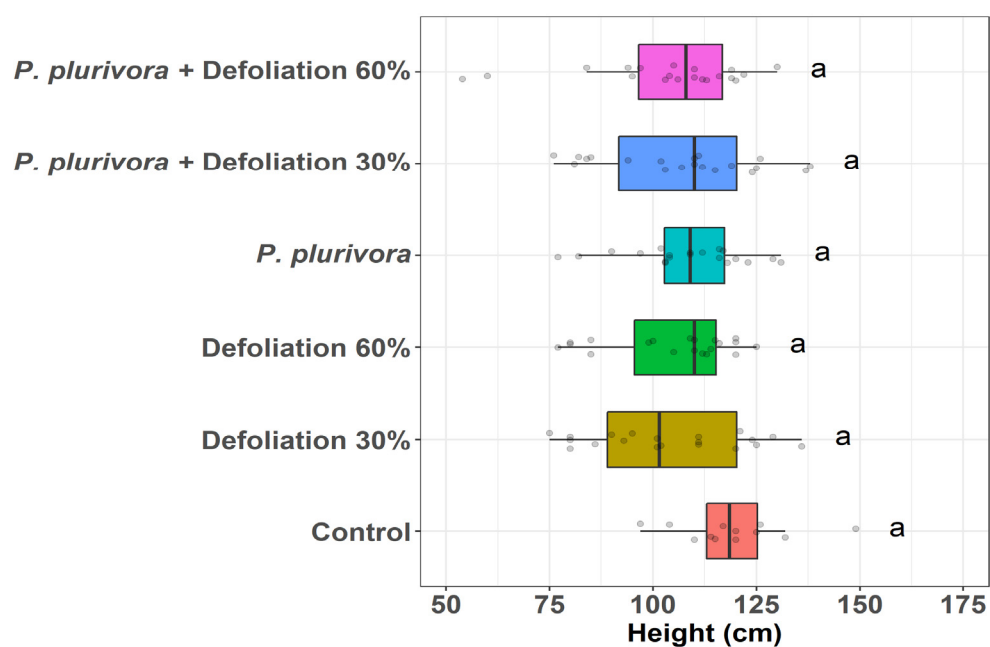


**Table S1.** Height of the seedlings of silver birch.

Trt	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	119.08	3.88	113	118.5	125.25	12.25	97	149
2	0	yes	108.1	3.19	102.75	109	117.25	14.5	77	131
3	30	no	103.55	4.13	89	101.5	120.25	31.25	75	136
4	30	yes	107.05	4.16	91.75	110	120.25	28.5	76	138
5	60	no	104.75	3.42	95.5	110	115.25	19.75	77	125
6	60	yes	103.65	4.33	96.5	108	116.75	20.25	54	130



**Figure S1.** Height of the seedlings of silver birch.

**Table S2.** Root collar diameter sample statistics.

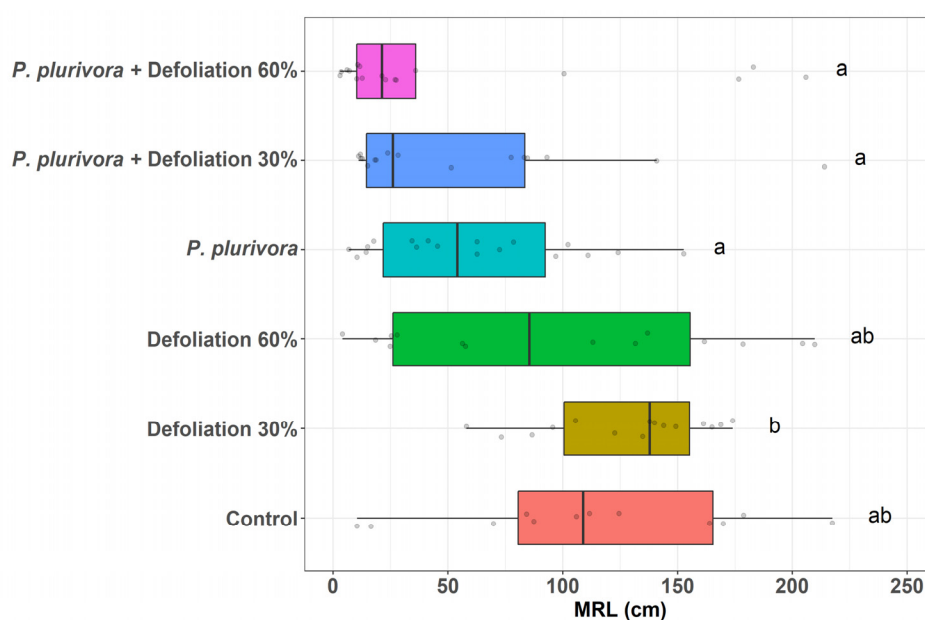
	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	0.74	0.02	0.71	0.73	0.77	0.06	0.67	0.85
2	0	yes	0.64	0.02	0.58	0.65	0.67	0.09	0.45	0.78
3	30	no	0.68	0.02	0.61	0.7	0.75	0.14	0.51	0.85
4	30	yes	0.63	0.03	0.57	0.62	0.69	0.12	0.36	0.97
5	60	no	0.71	0.02	0.63	0.73	0.77	0.15	0.58	0.88
6	60	yes	0.65	0.02	0.6	0.63	0.71	0.1	0.52	0.79

**Table S3.** Stem dry mass sample statistics.

	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	16.73	1.31	15.6	17.65	19.35	3.75	8.11	23.17
2	0	yes	14.25	0.72	12.32	14.43	16.37	4.05	6.09	19.46
3	30	no	13.79	0.8	11.69	14.7	15.91	4.21	6.84	19.74
4	30	yes	16.46	0.65	14.47	16.75	18.23	3.76	10.79	22.46
5	60	no	12.04	0.87	9.58	13.5	14.67	5.09	2.65	17.24
6	60	yes	15.47	0.54	13.81	15.38	17.3	3.49	9.84	19.86

**Table S4.** Total root length sample statistics.

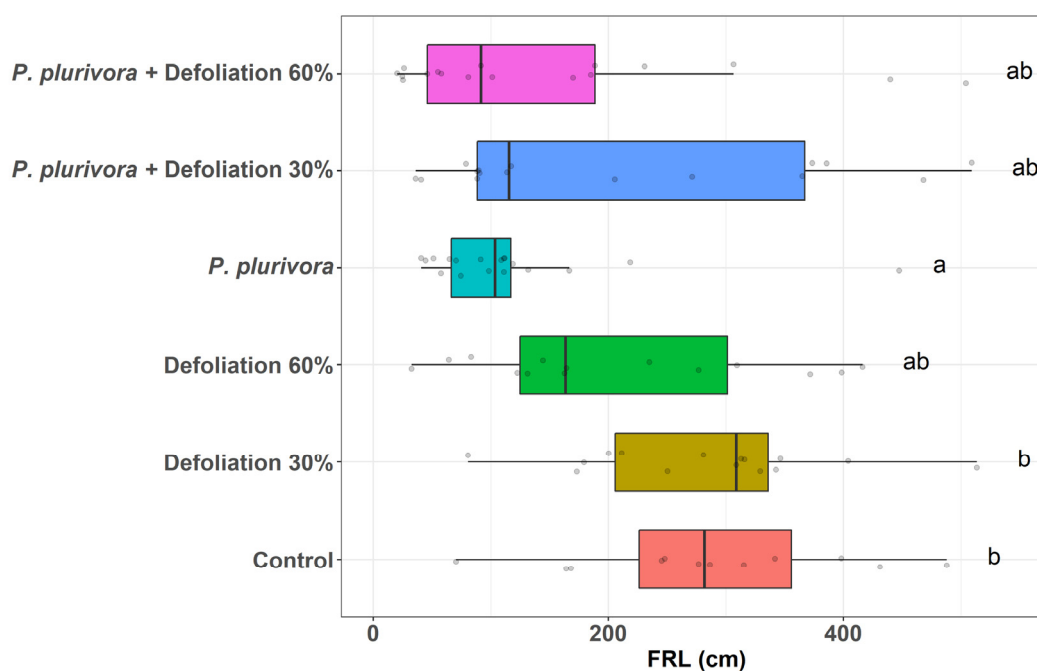
	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	400.89	46.7	307.19	433.81	518.79	211.6	101.79	601.4
2	0	yes	181.28	28.38	94.85	158.69	225.69	130.84	53.62	550.61
3	30	no	411.57	33.37	310.23	425.39	484.68	174.45	153.99	663.01
4	30	yes	270.61	52.74	116.6	150.56	453.58	336.98	53.08	682.55
5	60	no	308.27	49.75	164.19	284.39	489.8	325.61	41.44	595.81
6	60	yes	210	49.02	59.02	119.49	243.02	184	35.28	624.35



**Figure S2.** Root morphology parameters depending on the treatment: MRL -length of the mother roots 2-5 mm). The lower and upper hinges correspond to the first and third quartiles (the 25th and 75th percentiles) and the center line corresponds to the median. The upper whisker extends from the upper hinge to the largest value no further than  $1.5 \times$  IQR from the hinge (where IQR is the inter-quartile range, or distance between the first and third quartiles). Likewise, the lower whisker extends from the lower hinge to the smallest value no further than  $1.5 \times$  IQR from the hinge.

**Table S5.** Mother roots length sample statistics.

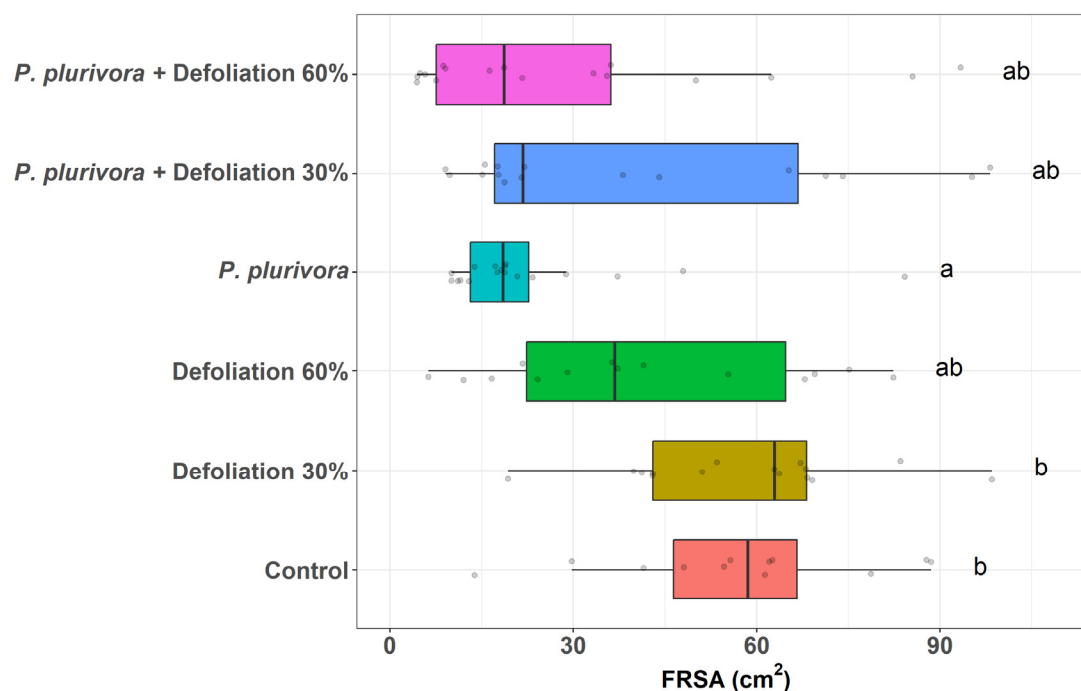
	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	111.7	18.34	80.61	108.83	165.38	84.77	10.44	217.37
2	0	yes	60.3	10.22	21.82	54.07	92.39	70.57	6.8	152.72
3	30	no	127.78	9.37	100.6	137.85	155.27	54.68	58.07	173.97
4	30	yes	56.05	14.38	14.52	26.03	83.53	69.01	11.09	213.93
5	60	no	96.49	19.78	26.03	85.41	155.51	129.48	4.11	209.77
6	60	yes	50.91	16.88	10.27	21.22	35.9	25.63	3.04	205.95



**Figure S3.** Root morphology parameters depending on the treatment: FRL - length of fine roots (0-2 mm). The lower and upper hinges correspond to the first and third quartiles (the 25th and 75th percentiles) and the center line corresponds to the median. The upper whisker extends from the upper hinge to the largest value no further than  $1.5 \times$  IQR from the hinge (where IQR is the inter-quartile range, or distance between the first and third quartiles). Likewise, the lower whisker extends from the lower hinge to the smallest value no further than  $1.5 \times$  IQR from the hinge.

**Table S6.** Fine roots length sample statistics.

	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	286.18	34.46	226.15	281.64	355.87	129.72	70.47	487.95
2	0	yes	117.76	22.07	66.26	103.47	117	50.73	40.63	447.57
3	30	no	283.3	27.35	205.72	308.97	336.01	130.29	80.61	513.48
4	30	yes	207.62	40.52	88.54	115.51	367.08	278.54	35.94	509.25
5	60	no	208.03	34.02	124.72	163.51	301.3	176.57	32.48	416.3
6	60	yes	150.24	35.68	46.01	91.7	188.62	142.61	20.31	504.32



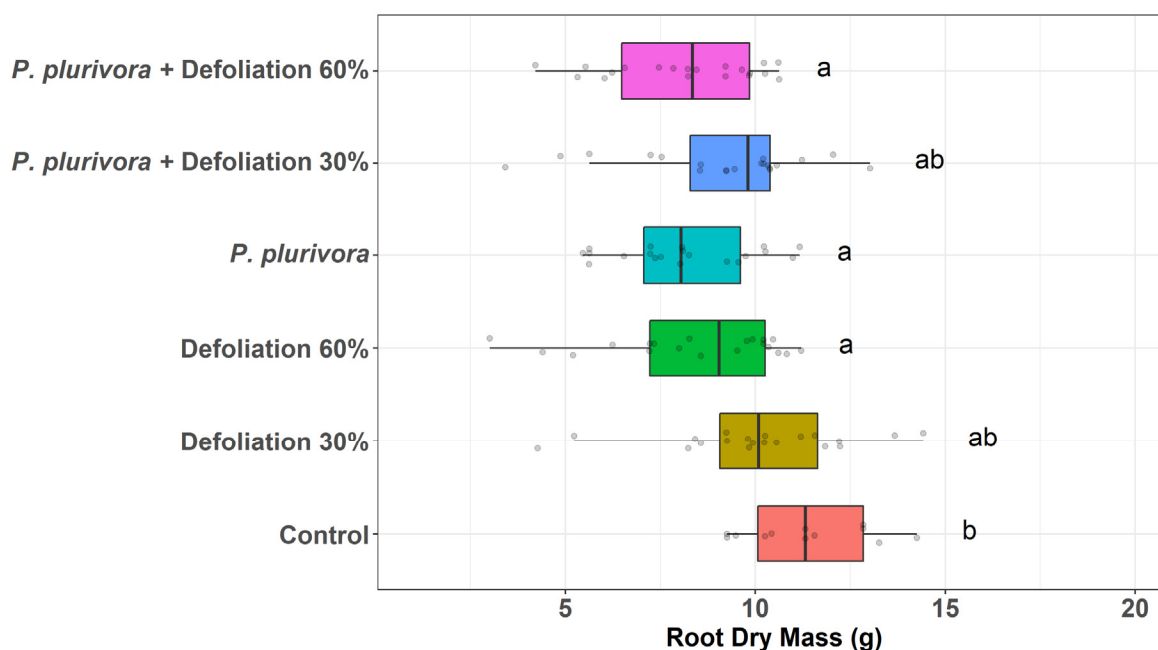
**Figure S4.** Root morphology parameters depending on the treatment: FRSA - fine root area. The lower and upper hinges correspond to the first and third quartiles (the 25th and 75th percentiles) and the center line corresponds to the median. The upper whisker extends from the upper hinge to the largest value no further than  $1.5 \times \text{IQR}$  from the hinge (where IQR is the inter-quartile range, or distance between the first and third quartiles). Likewise, the lower whisker extends from the lower hinge to the smallest value no further than  $1.5 \times \text{IQR}$  from the hinge.

**Table S7.** Fine root area sample statistics.

	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	57.04	6.41	46.42	58.54	66.62	20.2	13.82	88.53
2	0	yes	23.41	4.26	13.12	18.51	22.7	9.58	10.03	84.25
3	30	no	58.15	5.07	42.99	62.91	68.19	25.2	19.31	98.5
4	30	yes	39.59	7.76	17.1	21.78	66.76	49.66	9.06	98.24
5	60	no	41.09	6.67	22.33	36.79	64.75	42.42	6.27	82.41
6	60	yes	29.28	6.9	7.53	18.65	36.13	28.6	4.41	93.4

**Table S8.** Root dry mass sample statistics.

	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	11.34	0.48	10.07	11.32	12.84	2.77	9.26	14.25
2	0	yes	8.09	0.41	7.06	8.05	9.61	2.55	5.46	11.17
3	30	no	10.05	0.55	9.07	10.09	11.64	2.57	4.27	14.42
4	30	yes	9.11	0.53	8.29	9.81	10.38	2.1	3.42	13.02
5	60	no	8.43	0.52	7.22	9.05	10.25	3.04	3.01	11.21
6	60	yes	8.18	0.44	6.48	8.34	9.85	3.37	4.21	10.63



**Figure S5.** Root dry mass. The lower and upper hinges correspond to the first and third quartiles (the 25th and 75th percentiles) and the center line corresponds to the median. The upper whisker extends from the upper hinge to the largest value no further than  $1.5 \times \text{IQR}$  from the hinge (where IQR is the inter-quartile range, or distance between the first and third quartiles). Likewise, the lower whisker extends from the lower hinge to the smallest value no further than  $1.5 \times \text{IQR}$  from the hinge.

**Table S9.** Measurement values for parameters of chlorophyll fluorescence in May.

	Control	Defoliation 30%	Defoliation 60%	<i>P. plurivora</i>	<i>P. plurivora</i> + Defoliation 30%	<i>P. plurivora</i> + Defoliation 60%
Tfm	420.65ab (366.39, 482.93)	339.69a (315.04, 366.26)	494.17b (389.29, 627.30)	347.63ab (324.75, 372.13)	365.84ab (340.86, 392.66)	357.14ab (314.03, 406.18)
Area	23368 a (20507, 26628)	23499a (21592, 25574)	22616ab (18423, 7764)	27981bc (26079, 30022)	28760bc (26573, 31127)	36813c (28527, 47506)
F0	306.52ab (292.03, 321.72)	345.66c (329.13, 363.02)	324.17abc (294.91, 356.33)	298.26a(288.92, 307.91)	333.10bc (316.23, 350.88)	314.67abc (299.76, 330.31)
Fm	1152.9a (1109.3, 1198.2)	1257.8b (1221.0, 1295.9)	1160.1ab (1104.7, 1218.2)	1231.7ab (1195.6, 1268.9)	1238.2ab (1191.6, 1286.7)	1254.4b (1218.8, 1291.1)
Fv	46.35a (804.69, 890.17)	912.19ab (875.92, 949.95)	835.92ab (774.13, 902.64)	933.39b (898.17, 970.00)	905.14ab (867.15, 944.80)	939.76b (904.74, 976.14)

Fv/Fm	0.73223ab (0.71769, 0.74706)	0.79528c (0.77353, 0.81764)	0.71900ab (0.68784, 0.75157)	0.75629b(0.74609, 0.76662)	0.73014a (0.71865, 0.74182)	0.74788ab (0.73498, 0.76101)
ABS/RC	2.0931b (1.9778, 2.215)	2.0960ab (1.9976, 2.1992)	2.0816ab (1.8895, 2.2934)	1.8996a (1.8442, 1.9566)	2.0476b (1.9675, 2.1309)	2.0153ab (1.9185, 2.1169)
Dlo/RC	0.57437b (0.51518, 0.64036)	0.58691b (0.53577, 0.64294)	0.60477ab (0.49466, 0.73941)	0.46707a (0.43814, 0.49790)	0.56987b (0.52689, 0.61636)	0.51935ab (0.47280, 0.57049)
Tro/RC	1.5187a (1.4639, 1.5755)	1.5091a (1.4551, 1.5650)	1.4769a (1.3995, 1.5585)	1.4325a (1.4019, 1.4638)	1.4777a (1.4399, 1.5165)	1.4959a (1.4422, 1.5517)
Eto/RC	0.94324c (0.91148, 0.97609)	0.68740a (0.60925, 0.77557)	0.80013abc (0.70661, 0.90604)	0.88537bc (0.84081, 0.93230)	0.75605a (0.70287, 0.81326)	0.75514ab (0.68476, 0.83276)
PI total	1.8616ab (1.42611, 2.4300)	1.2213a (0.99764, 1.4952)	1.5629ab (0.94732, 2.5786)	2.1975b (1.88402, 2.5631)	2.4485b (2.02755, 2.9570)	1.8798b (1.54959, 2.2804)

\*Mean (upper CL, lower CL). Values marked with the same letter do not different significantly. The numbers in parentheses are the upper and lower 95% confidence limits on the mean above

**Table S10.** Measurement values for parameters of chlorophyll fluorescence in September.

	Control	Defoliation 30%	Defoliation 60%	<i>P. plurivora</i>	<i>P. plurivora</i> + Defoliation 30%	<i>P. plurivora</i> + Defoliation 60%
Tfm	645.0 b (547.9, 759.3)	477.5 a (423.1, 538.9)	465.0a (415.9, 519.9)	616.7 b (583.3, 651.9)	615.8 b (594.1, 638.3)	652.4 b (624.1, 682.0)
Area	27623a (23667, 32239)	34656ab (30361, 39559)	31446a (28691, 34465)	43740 cd (40292, 47483)	46270 d (43164, 49599)	39776 bc (36948, 42821)
F0	301.95c (285.33, 319.54)	277.70bc (265.40, 290.57)	273.32abc (260.82, 286.42)	263.00ab (256.11, 270.08)	253.47a (245.23, 262.00)	259.29ab (252.02, 266.76)
Fm	1401.4a (1332.8, 1473.6)	1449.5a (1414.4, 1485.6)	1434.7a (1387.5, 1483.6)	1539.7b (1502.6, 1577.7)	1554.6b (1508.3, 1602.3)	1512.9ab (11485.9, 1540.4)
Fv	1099.5 a (1035.4, 1167.4)	1171.9a (1138.8, 1205.8)	1161.4a (1110.8, 1214.3)	1276.7b (1242.3, 1312.0)	1301.2b (1262.1, 1341.4)	1253.6b (1231.0, 1276.6)
Fv/Fm	0.78305a (0.76982, 0.79650)	0.80820b (0.79973, 0.81676)	0.80805ab (0.79526, 0.82104)	0.82894c (0.82448, 0.83344)	0.83689d (0.83447, 0.83932)	0.82862c (0.82503, 0.83223)
ABS/RC	1.6783b (1.6134, 1.7457)	1.6970b (1.5380, 1.8724)	1.6719b (1.5375, 1.8180)	1.2829a (1.2042, 1.3667)	1.2005a (1.1590, 1.2434)	1.2429a (1.1512, 1.3419)
Dlo/RC	0.36716b (0.33540, 0.40193)	0.33078b (0.28953, 0.37791)	0.32807b (0.28646, 0.37573)	0.22072a (0.20272, 0.24032)	0.19599a (0.18748, 0.20490)	0.21449a (0.19515, 0.23574)
Eto/RC	0.71784ab (0.63990, 0.80527)	0.75062b (0.72150, 0.78093)	0.76410b (0.70685, 0.82599)	0.64445a (0.62647, 0.66295)	0.61369a (0.59763, 0.63019)	0.61428a (0.58980, 0.63976)
PI total	1.4902a (1.0944, 2.0290)	2.7063abc (1.9208, 3.8129)	2.2986ab (1.7914, 2.9495)	3.9284c (3.1939, 4.8318)	4.3128c (3.5707, 5.2093)	3.7718bc (2.9474, 4.8268)

\*Mean (upper CL, lower CL). Values marked with the same letter do not different significantly. The numbers in parentheses are the upper and lower 95% confidence limits on the mean above

**Table S11.** Sample statistic of the degree of leaf damage according to the Khvasko.

	Defoliation	Infected	Mean	SE	Q1	Median	Q3	IQR	Min	Max
1	0	no	0.8	0.42	0	0	1	1	0	4
2	0	yes	2.72	0.28	2.25	3	3	0.75	0	4
3	30	no	1	0.36	0	0.5	1	1	0	4
4	30	yes	2.6	0.26	2	3	3	1	0	4
5	60	no	1.13	0.2	0.75	1	2	1.25	0	2
6	60	yes	3.1	0.25	2.75	3.5	4	1.25	1	4

**Table S12.** Detailed chemical composition of extracts from birch seedling.

Compound	Control		Defoliation 30%		Defoliation 60%		<i>P. plurivora</i>		<i>P. plurivora</i> + defoliation 30%		<i>P. plurivora</i> + defoliation 60%	
	Area of peak	TIC (%)	Area of peak	TIC (%)	Area of peak	TIC (%)	Area of peak	TIC (%)	Area of peak	TIC (%)	Area of peak	TIC (%)
<b>Flavonoids, including:</b>	<b>9134261</b>	<b>0.48</b>	<b>18743433</b>	<b>0.75</b>	-	-	<b>14322302</b>	<b>0.54</b>	<b>10271268</b>	<b>0.42</b>	<b>139411250</b>	<b>4.78</b>
Catechine, penta-TMS	9134261	0.48	3813810	0.15	-	-	-	-	-	-	14021330	0.48
Kempheride, di-TMS	-	-	14929623	0.60	-	trace**	14322302	0.54	10271268	0.42	53370137	1.83
3-Methylfluteolin, tri-TMS	-	-	-	-	-	-	-	-	-	-	8102471	0.28
Flavonoid, di-TMS	-	-	-	-	-	-	-	-	-	-	10397189	0.36
3,7-Dimethyl quercetin, tri-TMS	-	-	-	-	-	-	-	-	-	-	12134818	0.42
Santin, di-TMS	-	-	-	-	-	-	-	-	-	-	18830469	0.64
Cirsimaritin, di-TMS	-	-	-	-	-	-	-	-	-	-	22554837	0.77
<b>Other phenols, including:</b>	<b>58704663</b>	<b>3.08</b>	<b>104921964</b>	<b>4.22</b>	<b>31885974</b>	<b>1.57</b>	<b>159445716</b>	<b>5.98</b>	<b>86970603</b>	<b>3.54</b>	<b>8753694</b>	<b>0.30</b>
Eugenol, TMS	-	-	4165266	0.17	-	-	5135214	0.19	-	-	-	-
Tyrosol, di-TMS	7336377	0.38	14705370	0.59	-	trace	28113250	1.05	15403733	0.63	-	-
3-Hydroxybenzoic acid, di-TMS	-	-	-	-	4323365	0.21	-	-	-	-	-	-
Betuligenol, di-TMS	30738349	1.61	60004411	2.41	4180671	0.21	87792261	3.29	62363278	2.54	8753694	0.30
Protocatechuic acid, tri-TMS	-	-	-	-	11912406	0.58	7437009	0.28	-	-	-	-
2-(4-Hydroxyphenyl)propionate, di-TMS	10389760	0.54	6242506	0.25	-	trace	18920110	0.71	4580165	0.19	-	-
Rhododendrin, penta-TMS	-	-	6364303	0.26	-	-	-	-	-	-	-	-
1-Docosyl p-coumarate, TMS	10240177	0.54	13440108	0.54	11469532	0.56	12047872	0.45	4623427	0.19	-	trace
<b>Triterpenes, including:</b>	<b>951593465</b>	<b>49.88</b>	<b>1199222885</b>	<b>48.20</b>	<b>368381931</b>	<b>18.08</b>	<b>1173606558</b>	<b>44.04</b>	<b>1255047108</b>	<b>51.11</b>	<b>1894876897</b>	<b>64.90</b>
Squalene	-	-	5695481	0.23	-	-	-	-	-	-	6576519	0.23
Triterpenoide C30H48O2, TMS	6894451	0.36	15255600	0.61	-	trace	11563422	0.43	14064248	0.57	31081329	1.06
3,4-seco-Dammara-4(29),20(21),24(25)-trien-3-oic acid, TMS	515590976	27.03	808651895	32.50	149652371	7.35	781034971	29.31	793500748	32.31	988548239	33.86
Dammaradien-3-one	31852698	1.67	67246401	2.70	12159382	0.60	55840910	2.10	53614810	2.18	117063704	4.01
Triterpenoid C30H50O, TMS	8049931	0.42	17922851	0.72	-	trace	6056861	0.23	7589746	0.31	19038492	0.65



3,4- <i>seco</i> -Olean-4(24)-en-19-on-3-oic acid, TMS	12065892	0.63	10975938	0.44	9079157	0.45	6827182	0.26	11524323	0.47	10261838	0.35
3,4- <i>seco</i> -Urs-4(23),20(30)-dien-3-oic acid, TMS	54641206	2.86	53805192	2.16	8752468	0.43	47365947	1.78	64755728	2.64	101882027	3.49
Triterpenoide C30H48O2, TMS	-	-	-	-	-	-	13658041	0.51	24521560	1.00	62496663	2.14
20-Hydroxy-3,4- <i>seco</i> -dammara-4(28),24-dien-3-oic acid, di-TMS	43185171	2.26	21367346	0.86	44261040	2.17	20963730	0.79	29620406	1.21	59920992	2.05
Triterpenoid C30H48O3, di-TMS	33752317	1.77	43984718	1.77	10260531	0.50	26295713	0.99	39166174	1.59	84649947	2.90
Dipterocarpol, TMS, isomer 20R	18474325	0.97	13955661	0.56	-	trace	19174617	0.72	17484861	0.71	29213800	1.00
3,4- <i>seco</i> -Urs-4(23),20(30)-dien-19-ol-3-oic acid, di-TMS	-	-	-	-	-	-	-	-	6751244	0.27	17525192	0.60
Dipterocarpol, TMS, isomer 20S	47600643	2.50	16362068	0.66	7265989	0.36	25550279	0.96	33134665	1.35	39865802	1.37
Triterpenoid C30H48O3, di-TMS	-	-	-	-	-	-	-	-	-	-	21033032	0.72
Triterpenoide, TMS	-	-	-	-	-	-	-	-	15937828	0.65	22552578	0.77
Triterpenoid, TMS	22966976	1.20	18711232	0.75	9813017	0.48	8028160	0.30	10740352	0.44	75479708	2.59
Betulin, di-TMS	10162702	0.53	6108021	0.25	16446404	0.81	7288105	0.27	9038699	0.37	34341764	1.18
Oleanolic acid, di-TMS	11618619	0.61	5524983	0.22	10036120	0.49	11554035	0.43	5045629	0.21	9911921	0.34
Betulinic acid, di-TMS	15120499	0.79	8619403	0.35	14844995	0.73	14217471	0.53	8445657	0.34	20505188	0.70
Kabraleon, TMS	12769730	0.67	8201085	0.33	8288367	0.41	9531390	0.36	12108610	0.49	34523019	1.18
Methyl acetylbetulinate	8528922	0.45	7940434	0.32	38302628	1.88	10935061	0.41	9666533	0.39	13984116	0.48
Triterpenoid, TMS	25831853	1.35	11975223	0.48	-	trace	17547145	0.66	11235880	0.46	24060812	0.82
Triterpenoid, TMS	43797660	2.30	35379493	1.42	17627469	0.87	59873119	2.25	60373724	2.46	58469824	2.00
Triterpenoid, TMS	28688894	1.50	21539862	0.87	11591993	0.57	20300399	0.76	16725683	0.68	11890391	0.41
<b>Sterols, including:</b>	<b>99105427</b>	<b>5.19</b>	<b>124923232</b>	<b>5.02</b>	<b>251610495</b>	<b>12.35</b>	<b>104666220</b>	<b>3.93</b>	<b>95493917</b>	<b>3.89</b>	<b>166132127</b>	<b>5.69</b>
Campesterol, TMS	-	-	-	-	15241371	0.75	6580917	0.25	6099381	0.25	17154668	0.59
β-Sitosterol, TMS	91548212	4.80	113989773	4.58	199608362	9.80	91106763	3.42	82643675	3.37	138443568	4.74
Stigmastanol, TMS	7557215	0.40	10933458	0.44	36760762	1.80	6978540	0.26	6750861	0.27	10533891	0.36
<b>Fatty acids &amp; fatty acids esters, including:</b>	<b>369382967</b>	<b>19.36</b>	<b>521102567</b>	<b>20.94</b>	<b>809440027</b>	<b>39.73</b>	<b>584116495</b>	<b>21.92</b>	<b>488385335</b>	<b>19.89</b>	<b>402699428</b>	<b>13.79</b>
Hexanoic acid, TMS	8171174	0.43	16209604	0.65	16995447	0.83	34898114	1.31	24531674	1.00	-	-
Heptanoic acid, TMS	8145411	0.43	4972568	0.20	20275212	1.00	5624030	0.21	-	-	-	-
Tetradecanoic acid, TMS	10624526	0.56	8346978	0.34	7657049	0.38	7203809	0.27	11306281	0.46	-	-
Palmitic acid, TMS	143956021	7.55	157984334	6.35	165955624	8.15	165884891	6.22	136268652	5.55	57560918	1.97
Linoleic acid, TMS	44982122	2.36	82765734	3.33	185446281	9.10	73206553	2.75	95446902	3.89	66534823	2.28
Oleic acid, TMS	97908942	5.13	147659480	5.93	208847053	10.25	143260355	5.38	141415397	5.76	122506890	4.20
Elaidic acid, TMS	13471339	0.71	18519441	0.74	28299097	1.39	12516576	0.47	22641767	0.92	8675297	0.30
Stearic acid, TMS	14593461	0.76	20044204	0.81	48011456	2.36	22532070	0.85	14553597	0.59	10978694	0.38
Eicosyl acetate	-	-	-	-	-	-	4707164	0.18	-	trace	4056780	0.14
Eicosanoic acid, TMS	8202175	0.43	13899563	0.56	42687534	2.10	16361636	0.61	9825577	0.40	11009305	0.38

trace\*\*, < 0,1 %TIC; (1), Defoliation 30% (2), Defoliation 60% (3), *P. plurivora* (4), *P. plurivora* + defoliation 30% (5), *P. plurivora* + defoliation 60% (6).