

Supplementary Material

Supplementary Table 1. The sites surveyed for downy mildew *Peronospora sparsa* disease severity in *Rubus arcticus*, *R. chamaemorus*, and *R. saxatilis* in 2019. Mean infection prevalence and severity are shown.

Site	Abbreviation	Latitude	Longitude	Species present	Infection prevalence	Mean disease severity
Alajärvi	ala	62.999923	23.815814	<i>R. arcticus</i>	0.10	0.10
Kauhajoki	kauh	63.186563	23.294037	<i>R. arcticus</i>	0.66	0.06
Kajaani	arm	64.174243	27.715207	<i>R. chamaemorus</i>	0.90	0.33
Takkarannantie, Kajaani	tak	64.247510	27.839014	<i>R. arcticus</i>	0.50	0.04
Takkarannantie, Kajaani	tak	64.247510	27.839014	<i>R. chamaemorus</i>	0.80	0.25
Honkalampi	hon	63.025314	28.1729245	<i>R. arcticus</i>	0.50	0.04
Honkalampi	hon	63.025314	28.1729245	<i>R. saxatilis</i>	0.10	0.03
Jormua	jor	64.297225	27.9876965	<i>R. arcticus</i>	0.15	0.04
Jormua	jor	64.297225	27.9876965	<i>R. saxatilis</i>	0.05	0.02
Kaurastensuo	kau	61.031624	24.976035	<i>R. arcticus</i>	1.00	0.05
Kaurastensuo	kau	61.031624	24.976035	<i>R. saxatilis</i>	0.90	0.03
Kestilä	kes	64.183833	26.3703685	<i>R. arcticus</i>	0.90	0.05
Kestilä	kes	64.183833	26.3703685	<i>R. saxatilis</i>	0.90	0.04
Koskitie, Kestilä	kos	64.183833	26.370385	<i>R. arcticus</i>	0.30	0.02
Koskitie, Kestilä	kos	64.183833	26.370385	<i>R. saxatilis</i>	0.20	0.02
Kahilantie, Kurikka	kahi	62.567315	22.554436	<i>R. arcticus</i>	0.20	0.05
Kahilantie, Kurikka Pättikankaantie, Kurikka	pat	62.653455	22.3201875	<i>R. arcticus</i>	0.80	0.08
Peuraniemi	pn	64.252572	27.851174	<i>R. arcticus</i>	0.30	0.11
Peuraniemi	pn	64.252572	27.851174	<i>R. chamaemorus</i>	0.60	0.16
Peuravaara	pv	64.637464	28.163065	<i>R. arcticus</i>	0.17	0.04
Peuravaara	pv	64.637464	28.163065	<i>R. chamaemorus</i>	0.68	0.11
Ranta, Muuruvesi	rant	63.010897	28.214126	<i>R. arcticus</i>	0.10	0.07
Kuopio	kuo	62.783636	27.502745	<i>R. arcticus</i>	0.95	0.12
Kuopio	kuo	62.783636	27.502745	<i>R. saxatilis</i>	0.30	0.01
Kurikka	saar	62.540290	22.058072	<i>R. arcticus</i>	0.30	0.04
Kajaani	teb	64.232523	27.7965815	<i>R. arcticus</i>	0.05	0.02
Berry farm, Muuruvesi	marj	63.012262	28.2140395	<i>R. arcticus</i>	1.00	0.11
Varessäikkä	var	64.884687	24.8196765	<i>R. arcticus</i>	1.00	0.09
Varessäikkä	var	64.884687	24.8196765	<i>R. saxatilis</i>	0.05	0.11
Viinikka	vii	63.162677	23.323661	<i>R. arcticus</i>	0.60	0.09
Viinikka	vii	63.162677	23.323661	<i>R. chamaemorus</i>	0.30	0.19

Supplementary Table 2. The sites used in the *Rubus arcticus* trap plant experiment in 2021.

Site	Abbreviation	Latitude	Longitude	Infection prevalence	Mean disease severity
Honkalampi	HON	63.025314	28.1729245	0.58	0.17
Hongikonluoma	HONG	63.177292	23.32972652	1.00	1.00
Kaihlakyrö	KAIH	62.508367	22.5961235	0.93	0.37
Kestilä	KEST	64.183833	26.3703685	0.77	0.19
Kevo	KEV	69.723507	27.0408455	0.83	0.55
Station, Kevo	KEVS	69.757128	27.0107795	0.77	0.34
Korretoja	KOR	69.623164	27.128794	1.00	0.52
Kortteisen tekojärvi	KORJ	64.174479	26.1048475	0.90	0.22
Muuruvesi	MARJ	63.012262	28.2140395	0.92	0.67
Ojaniementie	OJA	62.47891	22.3608345	0.91	0.81
Pahkalampi	PAH	63.1246021	28.17965175	0.55	0.20
Pättikankaantie, Kurikka	PÄT	62.653455	22.3201875	0.79	0.35
Revonkanta	REV	64.419568	28.4196135	0.50	0.12
Ristimaantie	RIS	63.15507	23.09796815	0.67	0.63
Säärenperä	SÄÄ	64.90069	25.01446965	1.00	0.96
Takalahdenkuja	TAKA	63.22758	23.26324448	0.84	0.29
Tavastperä	TAV	64.169853	26.4197305	0.96	0.20
Kajaani	TEB	64.232523	27.7965815	0.71	0.57
Tikkaperä	TIK	64.76379	25.2793305	0.91	0.40
Varessäikkä	VAR	64.884687	24.8196765	0.69	0.15

Supplementary Table 3. The material used in the *Peronospora sparsa* inoculation experiment on *Rubus arcticus*, *R. chamaemorus* and *R. saxatilis*.

Material	Site of origin	latitude	longitude
<i>Peronospora sparsa</i> strains			
HONG	Hongikonluoma	63.17729	23.32973
KAIH	Kaihla kyrö	62.50837	22.59612
KEV	Kevo	69.72351	27.04085
MARJ	Berry farm, Muuruvesi	63.01226	28.21404
OJA	Ojaniementie	62.47891	22.36083
PAH	Pahkalampi	63.1246	28.17965
SÄÄ	Säärenperä	64.90069	25.01447
TAV	Tavastsaikkä	64.16985	26.41973
TEB	Kajaani	64.23252	27.79658
TIK	Tikkaperä	64.76379	25.27933
<i>Rubus arcticus</i> genotypes			
Pima	Cultivar		
kos	Koskitie, Kestilä	64.183833	26.370385
P	Pättikankaantie, Kurikka	62.65346	22.32019
Teb	Kajaani	64.23252	27.79658
kau	Kaurastensuo	61.031624	24.976035
KEST	Kestilä	64.18383	26.37037
m22	Honkalampi	63.02531	28.17292
JOM	Jormua	64.29723	27.98769
HONG	Hogikonluoma	63.17729	23.32973
VAR	Varessaikkä	64.88469	24.81968
VII	Viinikka	63.162677	23.323661
<i>Rubus chamaemorus</i> genotypes			
Haaga	Haaga	60.22158	24.89354
LAM	Lamminjärvi	61.07532	25.0505
VIIN	Viinikka	63.162677	23.323661
ARM	Kajaani	64.174243	27.715207
<i>Rubus saxatilis</i> genotypes			
VA	Varessaikkä	64.88469	24.81968
ÅI	Åland Islands	60.16973	19.97117
HON	Honkalapi	63.02531	28.17292
kes	Kestiläntie	64.18383	26.37037
kevo	Kevo	69.72351	27.04085

Supplementary Table 4. The results from regression analyses among the site variables in the *Rubus arcticus* trap plant experiment.

Latitude	R^2	P
<i>R. chamaemorus</i> coverage	0.0188	0.5582
<i>R. saxatilis</i> coverage	0.0858	0.1976
<i>R. arcticus</i> coverage	0.1491	0.0921
Shannon's diversity	0.0321	0.4495

Shannon's diversity	R^2	P
<i>R. chamaemorus</i> coverage	0.142	0.1015
<i>R. saxatilis</i> coverage	0.061	0.2938
<i>R. arcticus</i> coverage	0.002	0.9564

<i>R. arcticus</i> coverage	R^2	P
<i>R. chamaemorus</i> coverage	0.0816	0.2094
<i>R. saxatilis</i> coverage	0.0039	0.7868

Supplementary Figure 1. (a) The wild and cultivated sampling and survey locations of *Peronospora sparsa* on *Rubus arcticus*, *R. chamaemorus*, and *R. saxatilis* in 2019. Symptoms of *P. sparsa* on (b) *R. arcticus*, (c) *R. chamaemorus*, (d) *R. saxatilis*.

