

Supplementary Materials

Table S1. Stomatal conductance model parameters, where g_{max} is maximum stomatal conductance, f_{min} is minimum conductance, f_{light_a} is a parameter indicating the curvature of stomatal response curve to light, T_{max} , T_{opt} and T_{min} are maximum, optimal and minimum temperature for describing the variation of g_s with temperature (f_{temp}), VPD_{min} and VPD_{max} are the vapor pressure deficit for attaining minimum and maximum g_s (f_{VPD}).

Parameter			<i>Fagus sylvatica</i>	<i>Phillyrea</i> sp.	<i>Picea abies</i>
g_{max}	(mmol O ₃ m ⁻² PLA s ⁻¹)		145	135	130
f_{min}	(fraction)		0.02	0.02	0.16
f_{light}	a	(constant)	0.006	0.0023	0.01
f_{temp}	T_{opt}	(°C)	21	22	14
	T_{min}	(°C)	4	0	0
	T_{max}	(°C)	37	40	35
f_{VPD}	VPD_{max}	(kPa)	1.0	1.3	0.5
	VPD_{min}	(kPa)	4.0	5.4	3.0
Reference			CLRTAP (2017)	Moura <i>et al.</i> (2022)	CLRTAP (2017)

Parameter			<i>Pinus pinea</i>	<i>Quercus</i> sp. (Deciduous)	<i>Quercus ilex</i> (Evergreen)
g_{max}	(mmol O ₃ m ⁻² PLA s ⁻¹)		145	265	195
f_{min}	(fraction)		0.12	0.13	0.02
f_{light}	a	(constant)	0.0090	0.0023	0.012
f_{temp}	T_{opt}	(°C)	26	22	23
	T_{min}	(°C)	7	0	1
	T_{max}	(°C)	43	40	39
f_{VPD}	VPD_{max}	(kPa)	1.5	1.3	2.2
	VPD_{min}	(kPa)	6.1	5.4	4.0
Reference			Moura <i>et al.</i> (2022)	CLRTAP (2017)	CLRTAP (2017)

Parameter			<i>Populus maximowiczii</i> Henry X P. × <i>berolinensis</i> Dippel	<i>Populus x</i> <i>euramericana</i> I-214	<i>Arbutus unedo</i>
g_{\max}	(mmol O ₃ m ⁻² PLA s ⁻¹)		348	478	95
f_{\min}		(fraction)	0.08	0.06	0.16
f_{light}	a	(constant)	0.0083	0.0033	0.0015
f_{temp}	T _{opt}	(°C)	29	28	22
	T _{min}	(°C)	15	15	6
	T _{max}	(°C)	42	40	50
f_{VPD}	VPD _{max}	(kPa)	1.8	1.8	1.2
	VPD _{min}	(kPa)	5.3	3.7	6.9
Reference			Modified after Hoshika <i>et al.</i> (2018)	Hoshika <i>et al.</i> , unpublished	Moura <i>et al.</i> , 2022

Parameter			<i>Alnus glutinosa</i>	<i>Sorbus aucuparia</i>
g_{\max}	(mmol O ₃ m ⁻² PLA s ⁻¹)		300	240
f_{\min}		(fraction)	0.13	0.17
f_{light}	a	(constant)	0.0024	0.0043
f_{temp}	T _{opt}	(°C)	29	23
	T _{min}	(°C)	5	0
	T _{max}	(°C)	40	40
f_{VPD}	VPD _{max}	(kPa)	1.8	1.2
	VPD _{min}	(kPa)	5.7	7.0
Reference			Hoshika <i>et al.</i> (2020a)	Hoshika <i>et al.</i> (2020a)

Parameter			<i>Rubus</i> spp.	<i>Vaccinium myrtillus</i>
g_{\max}	(mmol O ₃ m ⁻² PLA s ⁻¹)		165	140
f_{\min}		(fraction)	0.23	0.17
f_{light}	a	(constant)	0.0034	0.104
f_{temp}	T _{opt}	(°C)	25	20
	T _{min}	(°C)	15	5
	T _{max}	(°C)	43	40
f_{VPD}	VPD _{max}	(kPa)	1.3	1.2
	VPD _{min}	(kPa)	4.9	4.7
Reference			Moura <i>et al.</i> (2022)	Hoshika <i>et al.</i> (2020a)

Table S2. Leaf Mass per Area (mean \pm standard error, n=3) for the species found in MOTTLES sites.

Species	Site	LMA (g m ⁻²)
<i>Fagus sylvatica</i>	PIE1	61.04 \pm 3.72
<i>Fagus sylvatica</i>	VEN1	50.42 \pm 4.38
<i>Fagus sylvatica</i>	ABR1	67.01 \pm 3.22
<i>Quercus petraea</i>	EMI1	82.27 \pm 3.54
<i>Quercus cerris</i>	LAZ1	96.20 \pm 5.03
<i>Quercus ilex</i>	CPZ1	142.65 \pm 6.38
<i>Phillyrea latifolia</i>	CPZ2	144.64 \pm 5.80
<i>Pinus pinea</i>	CPZ3	192.47 \pm 2.08
<i>Picea abies</i>	TRE1	262.10 \pm 17.44
<i>Rubus</i> spp.	ABR1	76.83 \pm 3.43
<i>Rubus</i> spp.	EMI1	62.62 \pm 1.27
<i>Rubus</i> spp.	LAZ1	78.29 \pm 3.06
<i>Rubus</i> spp.	PIE1	55.20 \pm 5.64
<i>Rubus</i> spp.	CPZ3	71.13 \pm 6.27
<i>Vaccinium myrtillus</i>	PIE1	55.76 \pm 7.87
<i>Vaccinium myrtillus</i>	TRE1	34.60 \pm 5.69

Table S3. Leaf Mass per Area (mean \pm standard error) for the species subjected to O₃ fumigation in FACE experiment.

Year	Species	O ₃ treatment	LMA (g m ⁻²)
2016	<i>Populus maximowiczii</i> Henry \times <i>berolinensis</i> Dippel	Ambient Air	83.77 \pm 3.3
		1.5x	78.30 \pm 2.5
		2.0x	92.60 \pm 3.5
2017	<i>Arbutus unedo</i>	Ambient Air	133.12 \pm 1.9
		1.5x	126.33 \pm 10.6
		2.0x	134.45 \pm 5.4
2018	<i>Phillyrea angustifolia</i>	Ambient Air	176.04 \pm 7.8
		1.5x	209.41 \pm 6.8
		2.0x	178.15 \pm 6.1
2018	<i>Vaccinium myrtillus</i>	Ambient Air	75.90 \pm 2.9
		2.0x	85.43 \pm 11.0
2018	<i>Sorbus aucuparia</i>	Ambient Air	94.33 \pm 4.5
		2.0x	86.30 \pm 3.8
2018	<i>Alnus glutinosa</i>	Ambient Air	48.40 \pm 2.9
		2.0x	48.00 \pm 2.8
2019	<i>Pinus pinea</i>	Ambient Air	232.85 \pm 8.7
		1.5x	260.76 \pm 9.0
		2.0x	278.16 \pm 21.0
2020	<i>Populus maximowiczii</i> Henry \times <i>berolinensis</i> Dippel	Ambient Air	80.95 \pm 5.2
		1.5x	76.96 \pm 7.8
		2.0x	78.29 \pm 2.4
2020	<i>Populus x euramericana</i> I-214	Ambient Air	94.21 \pm 4.8
		1.5x	88.91 \pm 3.3
		2.0x	73.82 \pm 9.1

Table S4. Values of AOT40 and POD₁ calculated in each site for the period 2018-2022.

Species	Site	Year	AOT40 (ppb·h)	POD ₁ (mmol m ⁻²)
<i>Fagus sylvatica</i>	ABR1	2022	25295	7.99
	PIE1	2022	31469	11.16
	VEN1	2022	16889	24.06
	ABR1	2021	30181	6.43
	PIE1	2021	25227	21.65
	VEN1	2021	19257	25.27
	ABR1	2020	22587	6.92
	PIE1	2020	17926	19.32
	VEN1	2020	17536	24.14
	ABR1	2019	31216	12.56
	PIE1	2019	29505	21.73
	VEN1	2019	22449	24.12
	ABR1	2018	54588	22.33
	PIE1	2018	34310	18.67
	VEN1	2018	25974	30.88
<i>Rubus</i> spp.	ABR1	2022	25295	6.61
	CPZ3	2022	8377	4.88
	EMI1	2022	36664	9.24
	LAZ1	2022	36876	8.70
	PIE1	2022	31469	9.97
	CPZ3	2021	19916	7.67
	EMI1	2021	24044	7.72
	LAZ1	2021	23404	7.05
	PIE1	2021	25227	11.10
	CPZ3	2020	38369	14.69
	EMI1	2020	20281	6.15
	LAZ1	2020	18023	6.23
	LAZ1	2019	25908	7.83
	ABR1	2018	54588	12.45
	EMI1	2018	35086	11.25
	LAZ1	2018	35657	9.81
<i>Vaccinium myrtillus</i>	PIE1	2022	31469	13.09
	TRE1	2022	14261	19.91
	PIE1	2021	25227	23.29
	TRE1	2021	16612	28.47
	TRE1	2020	12057	26.83
	TRE1	2019	29505	23.21
	PIE1	2018	34310	20.34
<i>Pinus pinea</i>	CPZ3	2022	8377	2.55

	CPZ3	2021	19916	5.75
	CPZ3	2020	38369	19.28
	CPZ3	2019	29273	10.77
	CPZ3	2018	25924	20.81
<i>Picea abies</i>	TRE1	2022	14261	18.12
	TRE1	2021	16612	33.01
	TRE1	2020	12057	30.19
	TRE1	2019	18778	23.72
	TRE1	2018	38970	21.78
<i>Quercus petraea</i>	EMI1	2022	36664	12.09
	EMI1	2021	24044	13.59
	EMI1	2020	20281	7.73
	EMI1	2019	28276	14.60
	EMI1	2018	35086	16.51
<i>Quercus cerris</i>	LAZ1	2022	36876	11.69
	LAZ1	2021	23404	11.40
	LAZ1	2020	18023	8.89
	LAZ1	2019	25908	14.73
	LAZ1	2018	35657	15.66
<i>Quercus ilex</i>	CPZ1	2022	8377	0.76
	CPZ1	2021	19916	9.93
	CPZ1	2020	38369	4.34
	CPZ1	2019	29273	6.88
	CPZ1	2018	25924	10.78
<i>Phillyrea latifolia</i>	CPZ3	2022	8377	1.40
	CPZ3	2020	38369	15.91
	CPZ3	2019	29273	7.42
	CPZ3	2018	25924	14.04
	CPZ2	2022	8377	0.33
	CPZ2	2021	19916	3.53
	CPZ2	2020	38369	1.21
	CPZ2	2019	29273	2.24
	CPZ2	2018	25924	4.05

Table S5. Species subjected to fumigation in O₃ FACE (years 2016 – 2020). For each species O₃ treatment (Ambient Air, 1.5x, 2.0x), AOT40, POD₁ and LIF are reported.

Year	Species	O ₃ treatment	AOT40 (ppb·h)	POD ₁ (mmol m ⁻²)	LIF (mmol g ⁻¹)
2016	<i>Populus maximowiczii</i> Henry X <i>P. × berolinensis</i> Dippel	Ambient Air	13774	37.03	0.44
		1.5x	39637	53.23	0.68
		2.0x	68698	75.15	0.81
2017	<i>Arbutus unedo</i>	Ambient Air	22723	2.79	0.02
		1.5x	42247	4.48	0.04
		2.0x	59974	6.13	0.05
2018	<i>Phillyrea angustifolia</i>	Ambient Air	18377	7.97	0.05
		1.5x	47198	13.76	0.07
		2.0x	72839	18.55	0.10
2018	<i>Vaccinium myrtillus</i>	Ambient Air	11525	4.55	0.06
		2.0x	43961	10.8	0.13
2018	<i>Sorbus aucuparia</i>	Ambient Air	17257	17.67	0.19
		2.0x	65713	36.04	0.42
2018	<i>Alnus glutinosa</i>	Ambient Air	11221	14.51	0.30
		2.0x	43110	28.56	0.60
2019	<i>Pinus pinea</i>	Ambient Air	24243	18.03	0.08
		1.5x	59140	28.66	0.11
		2.0x	79646	35.03	0.13
2020	<i>Populus maximowiczii</i> Henry X <i>P. × berolinensis</i> Dippel	Ambient Air	17950	31.65	0.39
		1.5x	41098	46.09	0.60
		2.0x	74479	65.46	0.84
2020	<i>Populus x euramericana</i> I-214	Ambient Air	17950	27.94	0.30
		1.5x	41098	40.9	0.46
		2.0x	74479	57.87	0.78

LESS and ITP



Rubus spp

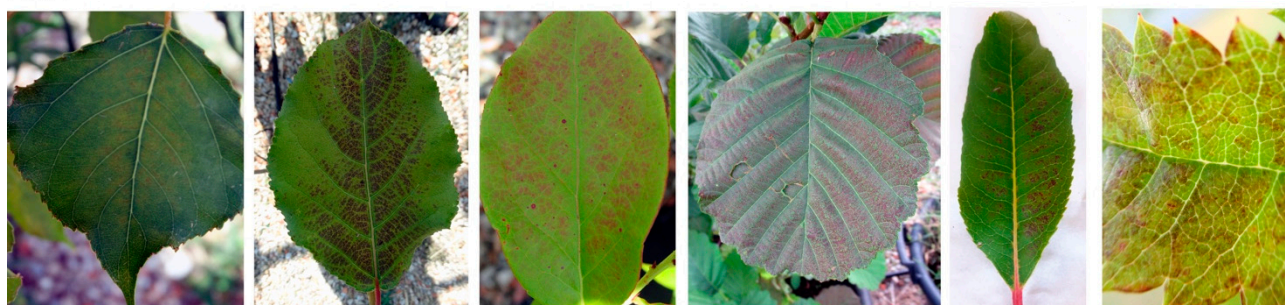
Vaccinium myrtillus

Fagus sylvatica

Pinus pinea

Picea abies

FACE



Populus X
euramericana I-214

Populus maximowiczii Henry X
P. x berolinensis Dippel

Vaccinium myrtillus

Alnus glutinosa

Arbutus unedo

Sorbus aucuparia

Figure S1. Species-specific O₃ VFI recorded during field surveys (LESS and ITP) and FACE experiment.