Supplementary Information

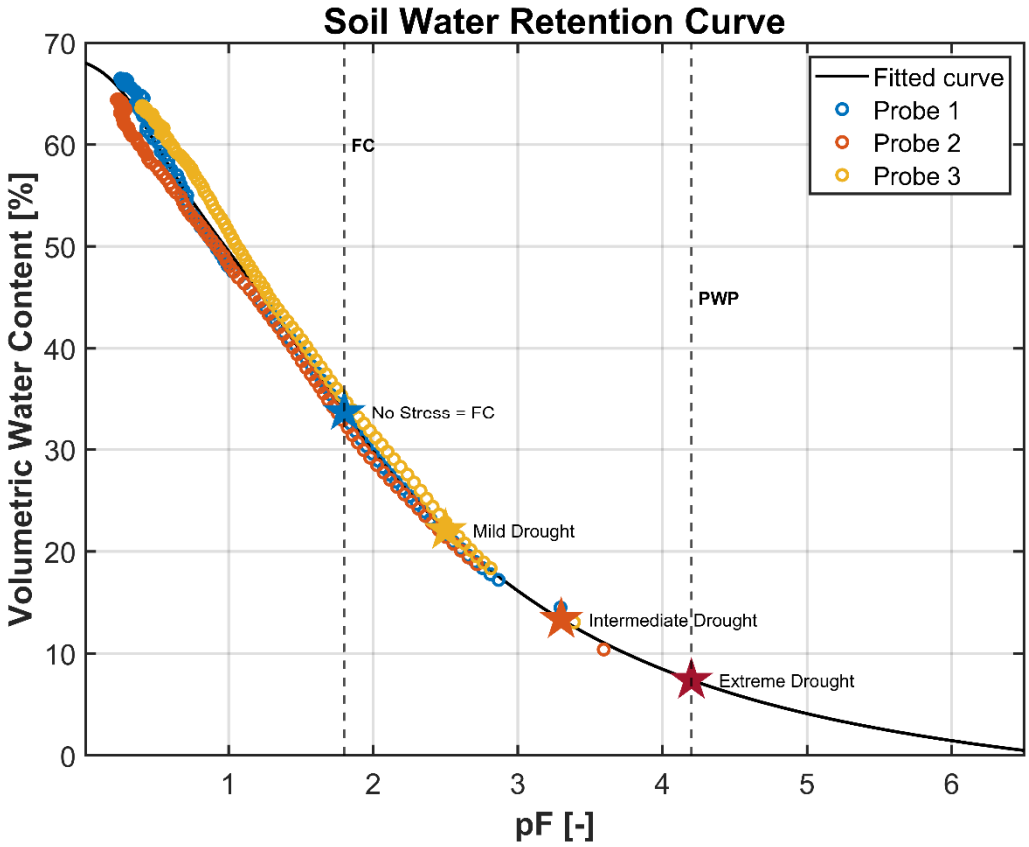

Figure S1: pF curve of the soil used to set volumetric soil water content (Θ_v) levels in the different scenarios of the experiment. Circles represent data acquired by weighing the soil mixture of known density during a controlled drying out. Three different soil samples were used, represented by blued, orange and yellow circles. The black line is the corresponding fit function. Stars denote the Θ_v values we chose as our control and drought treatments. Blue: Control group: Θ_v = Field capacity = 35%; Yellow: Mild drought: Θ_v = 25%; Orange: Intermediate drought: Θ_v = 15%; Red: Severe drought: Θ_v = 10%. Vertical dashed lines symbolize the field capacity (FC) and the permanent wilting point (PWP)

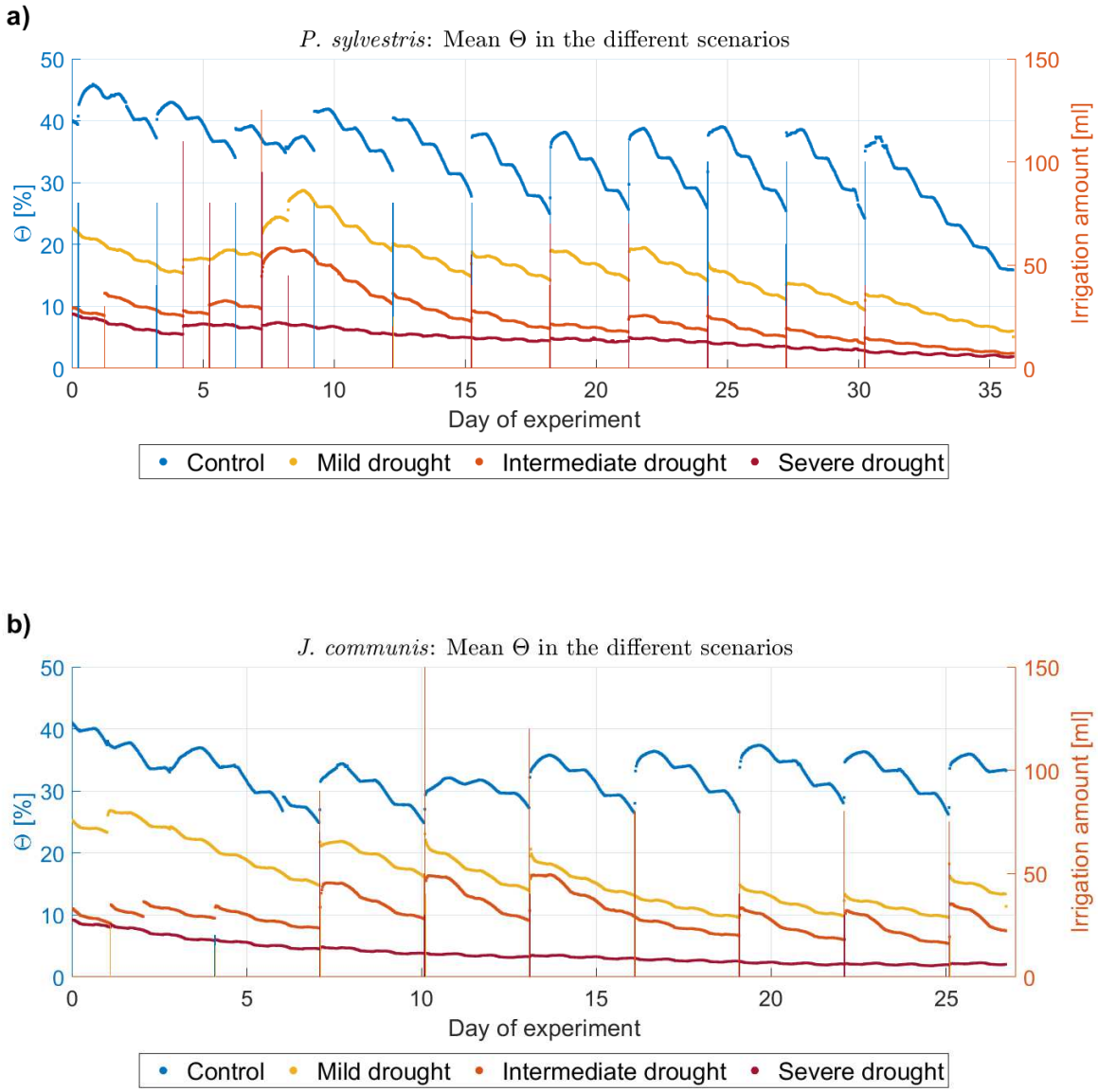

Figure S2: Mean volumetric soil water content (Θ_v) measured during the P. sylvestris (a) and J. communis (b) experiment. The colored lines represent the mean Θ_v values of the soil in the four treatments. Vertical lines represent irrigation events with the height coding the water amount per plant pot (right y-axis).

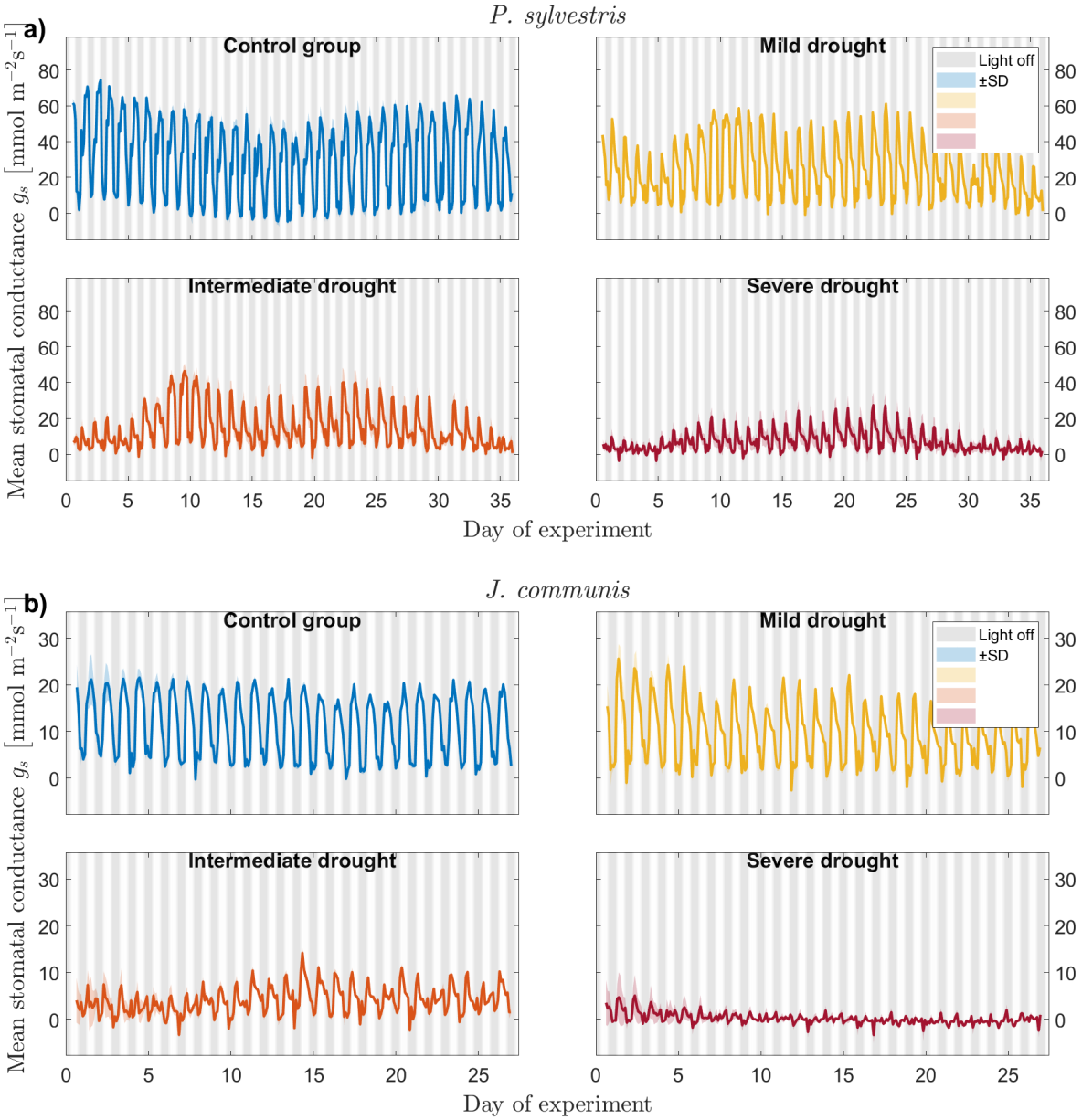

Figure S3: Groupwise mean stomatal conductance for a) P. sylvestris and b) J. communis. The four panels show the four drought groups, respectively. Shaded colored areas indicate the standard deviation and grey areas indicate nighttime periods with lights turned off.

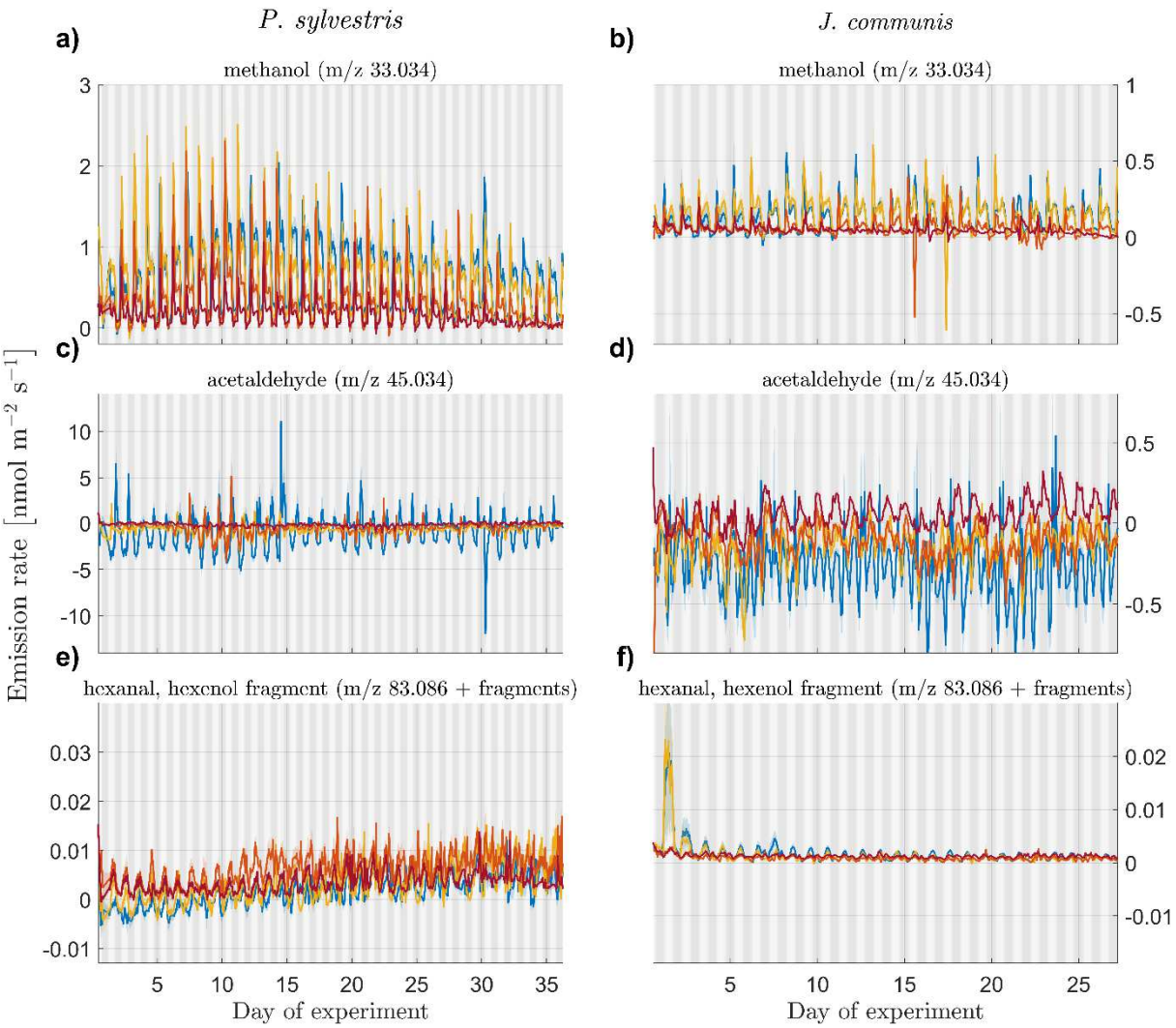

Figure S4: Emission rates of selected VOCs over the whole experiment duration for a) and d): methanol, b) and e) acetaldehyde, c) and f): GLVs from P. sylvestris (left panels) and J. communis (right panels), respectively. The colored lines represent the mean VOC emission rates in the different treatments and the colored, shaded areas the respective standard error (SE). Grey areas indicate periods when the light was turned off. Please note the different scaling of the y axes in the individual panes.

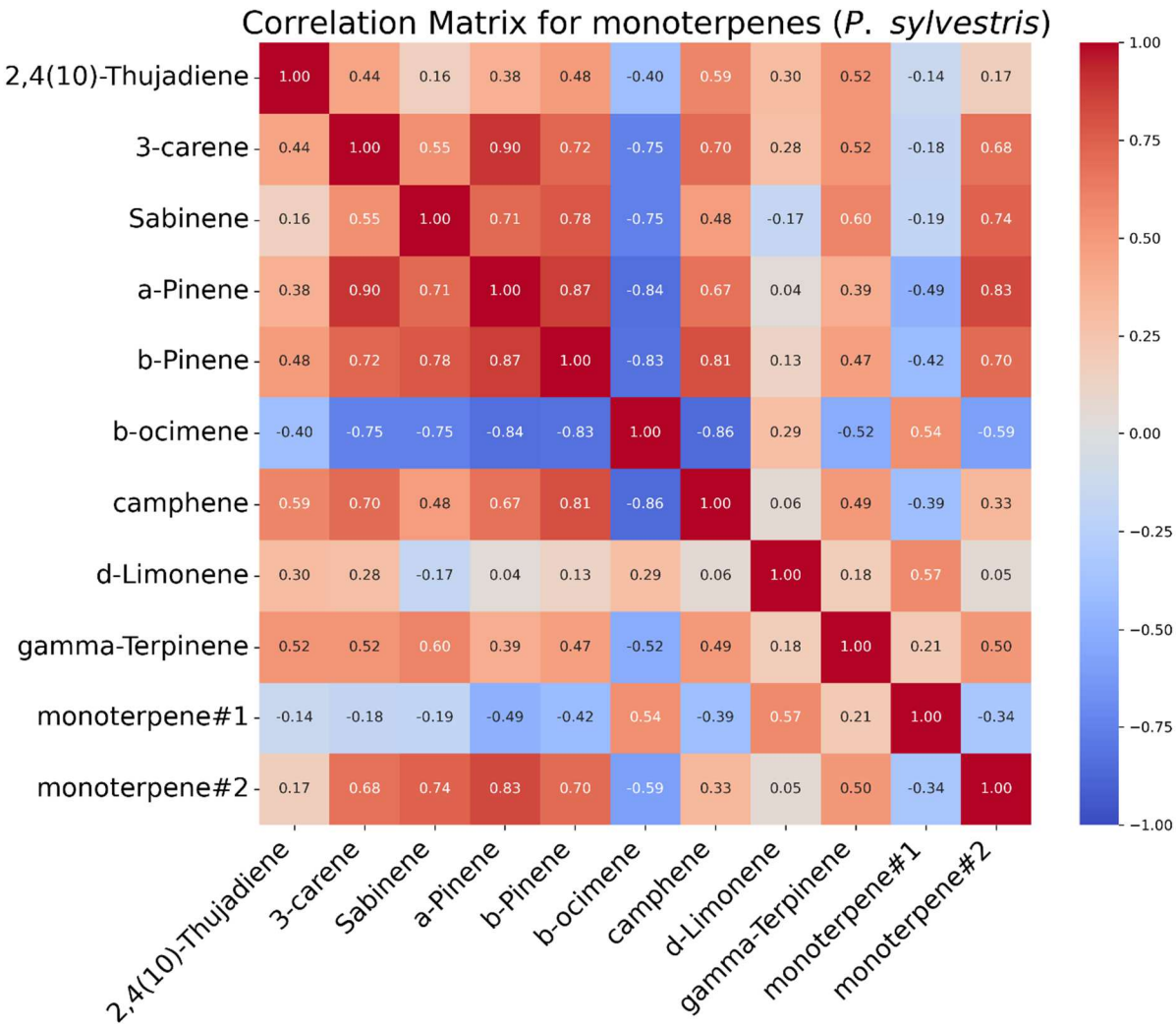

Figure S5: Correlation matrix for monoterpene compounds emitted by P. sylvestris. Normalized and background-subtracted signal intensities were averaged per compound and sampling date and pairwise correlation coefficients calculated. Monoterpene #1 and #2 denote monoterpenes that could be identified as such through their fragmentation pattern, but could not be further identified with sufficient certainty.

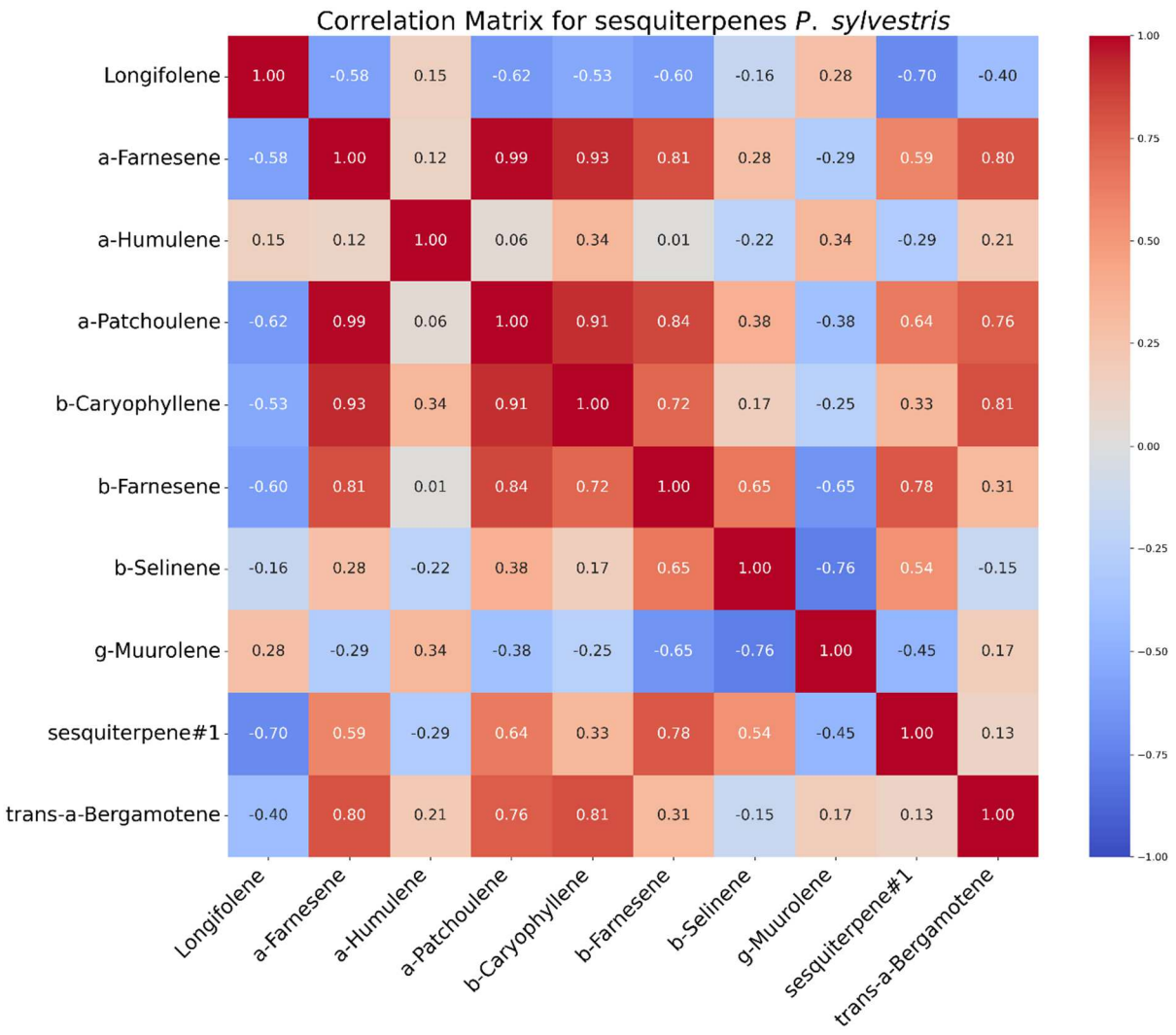

Figure S6: Correlation matrix for sesquiterpene compounds emitted by P. sylvestris. Normalized and background-subtracted signal intensities were averaged per compound and sampling date and pairwise correlation coefficients calculated. Sesquiterpene #1 denotes a sesquiterpene that could be identified as such through its fragmentation pattern, but could not be further identified with sufficient certainty.

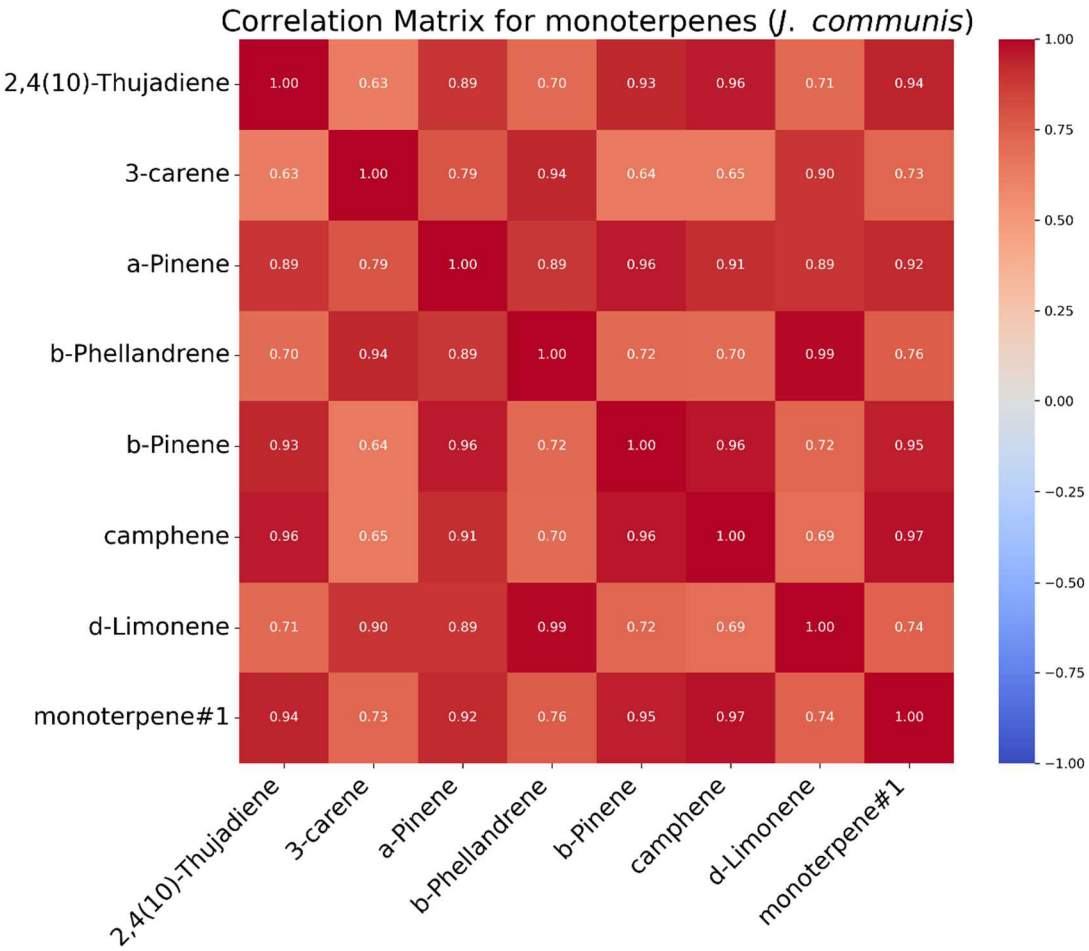

Figure S7: Correlation matrix for monoterpene compounds emitted by J. communis. Normalized and background-subtracted signal intensities were averaged per compound and sampling date and pairwise correlation coefficients calculated. Monoterpene #1 denotes a monoterpene that could be identified as such through its fragmentation pattern, but could not be further identified with sufficient certainty.

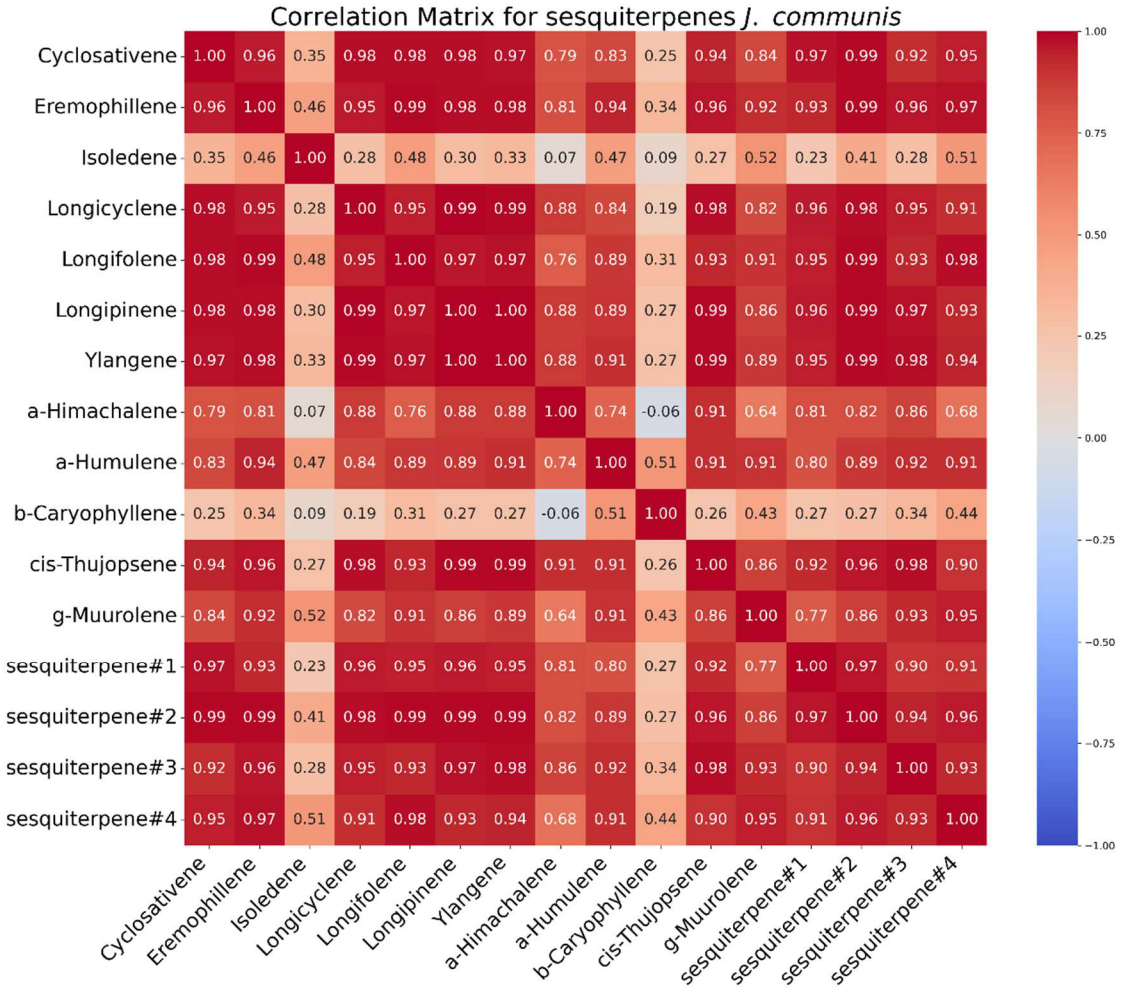

Figure S8: Correlation matrix for monoterpene compounds emitted by J. communis. Normalized and background-subtracted signal intensities were averaged per compound and sampling date and pairwise correlation coefficients calculated. Sesquiterpene #1 – sesquiterpene #4 denote sesquiterpenes that could be identified as such through their fragmentation pattern, but could not be further identified with sufficient certainty.

Table S1: List of mass to charge ratios measured by PTR-ToF-MS showing a diurnal cycle characteristic of plant derived compounds in the P. sylvestris experiment

Exact mass (m/z)	Sum formula of protonated compound	Possible compound
33.0341	CH_3OH-H^+	methanol
45.0340	$C_2H_4O-H^+$	acetaldehyde
47.0497	$C_2H_5OH-H^+$	ethanol
57.0340	$C_3H_4O-H^+$	acrolein
59.0497	$C_3H_6O-H^+$	acetone
63.0446	$C_2H_6O_2-H^+$	e.g. ethylene glycol
69.0704	$C_5H_8-H^+$	isoprene / methylbutenol fragment
71.0497	$C_4H_6O-H^+$	e.g. methyl vinyl ketone / methacrolein
81.0704	$C_6H_8-H^+$	e.g. monoterpene / hexenal fragment
83.0497	$C_5H_6O-H^+$	e.g. fragment / methylfuran
83.0861	$C_6H_{10}-H^+$	e.g. hexanal / hexenol fragment
87.0810	$C_5H_{10}O-H^+$	e.g. pentanal / pentenone / methylbutenols
89.0239	$C_3H_4O_3-H^+$	e.g. pyruvic acid
91.0548	$C_7H_6-H^+$	e.g. thujone / linalool fragment
93.0704	$C_7H_8-H^+$	e.g. toluene, monoterpene fragment
95.0861	$C_7H_{10}-H^+$	likely SQT fragment
97.1017	$C_7H_{12}-H^+$	e.g. 2,4-heptadiene
99.0810	$C_6H_{10}O-H^+$	hexenals
105.0704	$C_8H_8-H^+$	e.g. styrene or SQT fragment
107.0861	$C_8H_{10}-H^+$	e.g. xylene, ethylbenzene
109.1017	$C_8H_{12}-H^+$	likely SQT fragment
111.0810	$C_7H_{10}O-H^+$	e.g. 2,3-dimethyl-2-cyclopentenone
111.1174	$C_8H_{14}-H^+$	e.g. fragment / 4-methyl-1,3-heptadiene
121.1017	$C_9H_{12}-H^+$	e.g. trimethylbenzene
123.1174	$C_9H_{14}-H^+$	likely SQT fragment
135.1160	$C_{10}H_{14}-H^+$	likely SQT fragment / p-cymene
137.1330	$C_{10}H_{16}-H^+$	monoterpenes
139.0395	$C_7H_6O_3-H^+$	e.g. salicylic acid
149.1330	$C_{11}H_{16}-H^+$	likely SQT fragment
153.0552	$C_8H_8O_3-H^+$	e.g. methyl salicylate
153.1280	$C_{10}H_{16}O-H^+$	e.g. camphor
155.1436	$C_{10}H_{18}O-H^+$	e.g. eucalyptol, linalool
161.1330	$C_{12}H_{16}-H^+$	likely SQT fragment
163.1487	$C_{12}H_{18}-H^+$	e.g. SQT fragment / 1,2,4-triethylbenzene
171.1385	$C_{10}H_{18}O_2-H^+$	e.g. linalool oxide, 2β-hydroxy-1,8-cineole
179.1436	$C_{12}H_{18}O-H^+$	e.g. propofol / 1-adamantyl methyl ketone
205.1956	$C_{15}H_{24}-H^+$	sesquiterpenes (SQT)
217.1956	$C_{16}H_{24}-H^+$	e.g. diterpenoid fragment
221.1906	$C_{15}H_{24}O-H^+$	e.g. campherenone / farnesene- / caryophyllene epoxide
223.2062	$C_{15}H_{26}O-H^+$	e.g. farnesol / cadinol
229.2168	$C_{14}H_{28}O_2-H^+$	e.g. tetradecanoic acid
273.2582	$C_{20}H_{32}-H^+$	e.g. diterpenoids

Table S2: List of mass to charge ratios measured by PTR-ToF-MS showing a diurnal cycle characteristic of plant-derived compounds in the J. communis experiment

Exact mass (m/z)	Sum formula of protonated compound	Possible compound
31.0184	CH_2O-H^+	formaldehyde
33.0341	CH_3OH-H^+	methanol
42.0344	$C_2H_3N-H^+$	acetonitrile
45.0340	$C_2H_4O-H^+$	acetaldehyde
47.0133	$HCOOH-H^+$	formic acid
49.0112	CH_4S-H^+	methanethiol
57.0340	$C_3H_4O-H^+$	acrolein
59.0497	$C_3H_6O-H^+$	acetone
61.0290	$C_2H_4O_2-H^+$	acetic acid
69.0340	$C_4H_4O-H^+$	e.g. furan
69.0704	$C_5H_8-H^+$	isoprene / methylbutenol fragment
71.0497	$C_4H_6O-H^+$	e.g. methyl vinyl ketone / methacrolein
73.0290	$C_3H_4O_2-H^+$	e.g. methyl glyoxal
73.0653	$C_4H_8O-H^+$	e.g. methyl ethyl ketone
81.0704	$C_6H_8-H^+$	e.g. monoterpene / hexenal fragment
83.0497	$C_5H_6O-H^+$	e.g. fragment / methylfuran
83.0861	$C_6H_{10}-H^+$	e.g. hexanal / hexenol fragment
85.0290	$C_4H_4O_2-H^+$	e.g. furanone
85.0653	$C_5H_8O-H^+$	e.g. pentenal
87.0810	$C_5H_{10}O-H^+$	e.g. pentanal / pentenone / methylbutenol
89.0239	$C_3H_4O_3-H^+$	e.g. pyruvic acid
89.0603	$C_4H_8O_2-H^+$	e.g. ethyl acetate / butanoic acid
93.0341	$C_6H_4O-H^+$	fragment
93.0704	$C_7H_8-H^+$	toluene, monoterpene fragment
95.0861	$C_7H_{10}-H^+$	likely SQT fragment
99.0810	$C_6H_{10}O-H^+$	hexenals
103.0759	$C_5H_{10}O_2-H^+$	e.g. pentanoic acid
105.0704	$C_8H_8-H^+$	e.g. styrene, SQT fragment
109.1017	$C_8H_{12}-H^+$	likely SQT fragment
111.0446	$C_6H_6O_2-H^+$	e.g. methylfurfural
117.0915	$C_6H_{12}O_2-H^+$	e.g. hexanoic acid
119.0861	$C_9H_{10}-H^+$	likely SQT fragment
121.1017	$C_9H_{12}-H^+$	e.g. trimethylbenzene
123.0446	$C_7H_6O_2-H^+$	e.g. benzoic acid
123.1174	$C_9H_{14}-H^+$	likely SQT fragment
131.1072	$C_7H_{14}O_2-H^+$	e.g. methyl hexanoate / ethyl pentanoate
133.0654	$C_9H_8O-H^+$	e.g. cinnamaldehyde
133.1017	$C_{10}H_{12}-H^+$	likely SQT fragment
135.1160	$C_{10}H_{14}-H^+$	likely SQT fragment / p-cymene
137.1330	$C_{10}H_{16}-H^+$	monoterpenes
139.0395	$C_7H_6O_3-H^+$	e.g. salicylic acid
141.0552	$C_7H_8O_3-H^+$	e.g. furfuryl acetate
143.1072	$C_8H_{14}O_2-H^+$	e.g. hexenyl acetate
145.1228	$C_8H_{16}O_2-H^+$	e.g. butyl butanoate
147.1174	$C_{11}H_{14}-H^+$	likely SQT fragment / cyclopentylbenzene
149.1330	$C_{11}H_{16}-H^+$	likely SQT fragment
153.0552	$C_8H_8O_3-H^+$	e.g. methyl salicylate
161.1330	$C_{12}H_{16}-H^+$	likely SQT fragment

163.1123	$C_{11}H_{14}O-H^+$	e.g. valerophenone
163.1487	$C_{12}H_{18}-H^+$	e.g. SQT fragment / 1,2,4-triethylbenzene
171.1749	$C_{11}H_{23}O-H^+$	e.g. undecanal / undecanone
175.1487	$C_{13}H_{18}-H^+$	likely SQT fragment
177.1643	$C_{13}H_{20}-H^+$	likely SQT fragment
189.1643	$C_{14}H_{20}-H^+$	likely SQT fragment
195.1385	$C_{12}H_{18}O_2-H^+$	myrtenyl acetate
203.1800	$C_{15}H_{22}-H^+$	sesquiterpenes (SQT)
205.1956	$C_{15}H_{24}-H^+$	sesquiterpenes (SQT)
217.1593	$C_{15}H_{20}O-H^+$	e.g. oxygenated SQTs (e.g. turmerones)
221.1906	$C_{15}H_{24}O-H^+$	e.g. campherenone
223.2062	$C_{15}H_{26}O-H^+$	e.g. farnesol / cadinol
229.2168	$C_{14}H_{28}O_2-H^+$	e.g. tetradecanoic acid
273.2582	$C_{20}H_{32}-H^+$	e.g. diterpenoids

Table S3: VOCs identified by GC-MS in the P. sylvestris experiment

Compound	Sum formula	Hydrocarbon type/ Functional group
Isoprene	C_5H_8	Isoprenoid (C_5)
2,3-dihydroxy-propanoic acid	$C_3H_6O_4$	Oxygenated VOC (acid/polyol)
Benzene	C_6H_6	Aromatic hydrocarbon
Heptane	C_7H_{16}	Aliphatic hydrocarbon
Toluene	C_7H_8	Aromatic hydrocarbon
Acetic acid, butyl ester	$C_6H_{12}O$	Oxygenated VOC (ester)
Ethylbenzene	C_8H_{10}	Aromatic hydrocarbon
p-Xylene	C_8H_{10}	Aromatic hydrocarbon
o-Xylene	C_8H_{10}	Aromatic hydrocarbon
3-methyl-2-buten-1-ol acetate	$C_7H_{12}O_2$	Oxygenated VOC (ester)
monoterpene #1	$C_{10}H_{16}$	Monoterpene
α-Pinene	$C_{10}H_{16}$	Monoterpene
Camphene	$C_{10}H_{16}$	Monoterpene
2,4(10)-Thujadiene	$C_{10}H_{16}$	Monoterpene
Benzaldehyde	C_7H_6O	Aromatic oxygenated VOC
Sabinene	$C_{10}H_{16}$	Monoterpene
β-Pinene	$C_{10}H_{16}$	Monoterpene
Decane	$C_{10}H_{22}$	Aliphatic hydrocarbon
1,2,3-trimethylbenzene	C_9H_{12}	Aromatic hydrocarbon
3-Carene	$C_{10}H_{16}$	Monoterpene
2-ethyl-1-hexanol	$C_8H_{18}O$	Oxygenated VOC (alcohol)
p-Cymene	$C_{10}H_{14}$	Aromatic monoterpenoid
d-Limonene	$C_{10}H_{16}$	Monoterpene
Eucalyptol	$C_{10}H_{18}O$	Oxygenated monoterpene

β-Ocimene	$C_{10}H_{16}$	Monoterpene
cis-2,6-dimethyl-2,6-octadiene	$C_{10}H_{18}$	Monoterpenoid hydrocarbon
Citronellol	$C_{10}H_{20}O$	Oxygenated monoterpene
γ-Terpinene	$C_{10}H_{16}$	Monoterpene
Acetophenone	C_8H_8O	Aromatic oxygenated VOC
monoterpene #2	$C_{10}H_{16}$	Monoterpene
Undecane	$C_{11}H_{24}$	Aliphatic hydrocarbon
Linalool	$C_{10}H_{18}O$	Oxygenated monoterpene
Nonanal	$C_9H_{18}O$	Oxygenated VOC (aldehyde)
Camphor	$C_{10}H_{16}O$	Oxygenated monoterpene
Borneol	$C_{10}H_{18}O$	Oxygenated monoterpene
1,3,8-p-Menthatriene	$C_{10}H_{14}$	Monoterpene
cis-Verbenol acetate / Carveol	$C_{12}H_{18}O_2$	Oxygenated monoterpene (ester)
Methyl salicylate	$C_8H_8O_3$	Aromatic oxygenated VOC
Decanal	$C_{10}H_{20}O$	Oxygenated VOC (aldehyde)
Trimethyl-dodecane	$C_{15}H_{32}$	Branched alkane
Bornyl acetate	$C_{12}H_{20}O_2$	Oxygenated monoterpene (ester)
α-Terpinyl acetate	$C_{12}H_{20}O_2$	Oxygenated monoterpene (ester)
Bergamotol	$C_{15}H_{24}O$	Oxygenated sesquiterpene
sesquiterpene #1	$C_{15}H_{24}$	Sesquiterpene
Tetradecane	$C_{14}H_{30}$	Aliphatic hydrocarbon
β-Selinene	$C_{15}H_{24}$	Sesquiterpene
Tridecanal	$C_{13}H_{26}O$	Oxygenated VOC (aldehyde)
Longifolene	$C_{15}H_{24}$	Sesquiterpene
β-Caryophyllene	$C_{15}H_{24}$	Sesquiterpene
β-Farnesene	$C_{15}H_{24}$	Sesquiterpene
α-Humulene	$C_{15}H_{24}$	Sesquiterpene
trans-α-Bergamotene	$C_{15}H_{24}$	Sesquiterpene
Pentadecane	$C_{15}H_{32}$	Aliphatic hydrocarbon
α-Farnesene	$C_{15}H_{24}$	Sesquiterpene
γ-Muurolene	$C_{15}H_{24}$	Sesquiterpene
2,6,10-trimethyl-tetradecane	$C_{17}H_{36}$	Branched alkane
cis-Lanceol	$C_{15}H_{24}O$	Oxygenated sesquiterpene
α-Patchoulene	$C_{15}H_{24}$	Sesquiterpene
Ageratriol	$C_{15}H_{24}O$	Oxygenated sesquiterpene
τ-Cadinol	$C_{15}H_{26}O$	Oxygenated sesquiterpene
oxygenated sesquiterpene (oSQT)	$C_{15}H_{24}O$	Oxygenated sesquiterpene
d-2-Carene	$C_{10}H_{16}$	Monoterpene, **internal standard**

Table S4: VOCs identified by GC-MS in the J. communis experiment

Compound	Sum formula	Group
Isoprene	C_5H_8	Isoprenoid (C_5)
Benzene	C_6H_6	Aromatic hydrocarbon
Heptane	C_7H_{16}	Aliphatic hydrocarbon
Toluene	C_7H_8	Aromatic hydrocarbon
Octane	C_8H_{18}	Aliphatic hydrocarbon
Acetic acid, butyl ester	$C_6H_{12}O$	Oxygenated VOC (ester)
Ethylbenzene	C_8H_{10}	Aromatic hydrocarbon
p-Xylene	C_8H_{10}	Aromatic hydrocarbon
o-Xylene	C_8H_{10}	Aromatic hydrocarbon
monoterpene #1	$C_{10}H_{16}$	Monoterpene
α-Pinene	$C_{10}H_{16}$	Monoterpene
Camphene	$C_{10}H_{16}$	Monoterpene
2,4(10)-Thujadiene	$C_{10}H_{16}$	Monoterpene
Benzaldehyde	C_7H_6O	Aromatic oxygenated VOC
β-Pinene	$C_{10}H_{16}$	Monoterpene
Decane	$C_{10}H_{22}$	Aliphatic hydrocarbon
1,2,3-trimethylbenzene	C_9H_{12}	Aromatic hydrocarbon
3-Carene	$C_{10}H_{16}$	Monoterpene
2-ethyl-1-hexanol	$C_8H_{18}O$	Oxygenated VOC (alcohol)
o-Cymene	$C_{10}H_{14}$	Aromatic monoterpenoid
d-Limonene	$C_{10}H_{16}$	Monoterpene
β-Phellandrene	$C_{10}H_{16}$	Monoterpene
Eucalyptol	$C_{10}H_{18}O$	Oxygenated monoterpene
Dodecane, 2,6,11-trimethyl-	$C_{15}H_{32}$	Branched alkane
Acetophenone	C_8H_8O	Aromatic oxygenated VOC
Undecane	$C_{11}H_{24}$	Aliphatic hydrocarbon
Linalool	$C_{10}H_{18}O$	Oxygenated monoterpene
Nonanal	$C_9H_{18}O$	Oxygenated VOC (aldehyde)
Camphor	$C_{10}H_{16}O$	Oxygenated monoterpene
Carveol	$C_{10}H_{16}O$	Oxygenated monoterpene
Dodecane	$C_{12}H_{26}$	Aliphatic hydrocarbon
1,3,8-p-Menthatriene	$C_{10}H_{14}$	Monoterpene
Methyl salicylate	$C_8H_8O_3$	Aromatic oxygenated VOC
α-Terpineol	$C_{10}H_{20}O_2$	Oxygenated monoterpene
Decanal	$C_{10}H_{20}O$	Oxygenated VOC (aldehyde)
Trimethyl-dodecane	$C_{15}H_{32}$	Branched alkane
Bornyl acetate	$C_{12}H_{20}O_2$	Oxygenated monoterpene (ester)
sesquiterpene #1	$C_{15}H_{24}$	Sesquiterpene
Longipinene	$C_{15}H_{24}$	Sesquiterpene
Ylangene	$C_{15}H_{24}$	Sesquiterpene
Cyclosativene	$C_{15}H_{24}$	Sesquiterpene

oxygenated sesquiterpene #1	$C_{15}H_{24}O$	Oxygenated sesquiterpene
Longicyclene	$C_{15}H_{24}$	Sesquiterpene
oxygenated sesquiterpene #2	$C_{15}H_{24}O$	Oxygenated sesquiterpene
Tetradecane	$C_{14}H_{30}$	Aliphatic hydrocarbon
sesquiterpene #2	$C_{15}H_{24}$	Sesquiterpene
Isolongifolene, 4,5-dehydro-	$C_{15}H_{22}$	Sesquiterpene
Longifolene	$C_{15}H_{24}$	Sesquiterpene
β-Caryophyllene	$C_{15}H_{24}$	Sesquiterpene
cis-Thujopsene	$C_{15}H_{24}$	Sesquiterpene
Isoledene	$C_{15}H_{24}$	Sesquiterpene
α-Himachalene	$C_{15}H_{24}$	Sesquiterpene
sesquiterpene #3	$C_{15}H_{24}$	Sesquiterpene
Octacosane	$C_{28}H_{58}$	Aliphatic hydrocarbon
α-Humulene	$C_{15}H_{24}$	Sesquiterpene
Pentadecane	$C_{15}H_{32}$	Aliphatic hydrocarbon
Eremophilene	$C_{15}H_{24}$	Sesquiterpene
γ-Muurolene	$C_{15}H_{24}$	Sesquiterpene
Isoaromadendrene epoxide	$C_{15}H_{24}O$	Oxygenated sesquiterpene
oxygenated sesquiterpene #3	$C_{15}H_{26}O_2$	Oxygenated sesquiterpene
Juniperol	$C_{15}H_{26}O$	Oxygenated sesquiterpene
oxygenated sesquiterpene #4	$C_{15}H_{24}O$	Oxygenated sesquiterpene
sesquiterpene #4	$C_{15}H_{24}$	Sesquiterpene
d-2-Carene	$C_{10}H_{16}$	Monoterpene, **internal standard**