Table S1. Detailed environmental data on collection sites.

Label[a]	T. min[b]	T. max[c]	Precipitation[d]	Rad.[e]	Ratio[f]	Lithology[g]	Vegetation[h]
BAO	2	10	138	8.3	41.75	Metamorphic rocks	Forest clearing (*Quercus* sp.)
CAM	8	15	71.75	9.05	14.25	Alluvial deposits	Forest clearing (*Pinus* sp.)
DOM	5	13	109.25	9.3	14.25	Metamorphic rocks	Forest clearing (*Quercus* sp.)
JER	4	12	65.5	9.3	19.25	Metamorphic rocks	Mediterranean shrub
SIS	8	15	40.5	10	6.75	Marls	Abandoned agricultural lot
SUP	8	15	35.5	10	6.75	Marls	Degraded urban lot

[a]Acronyms used to refer to the studied populations (BAO= Bau Onu, CAM= Capo Mannu, DOM= Domusnovas, JER= Jerzu, SIS= Sant'Isidoro, SUP= Su Planu); [b]mean value of the daily minimum temperature (°C); [c]mean value of the daily maximum temperature (°C); [d]precipitations (mm); [e]solar radiation (MJ/m2); [f]precipitation to temperature ratio; [g] lithological framework; [h]vegetation. The source of climatological, lithological and vegetational data are reported in the main text as [15-17].

Table S2. Integration table to Figure 4. The list of compounds shared by populations (BAO= Bau Onu, CAM= Capo Mannu, DOM= Domusnovas, JER= Jerzu, SIS= Sant'Isidoro, SUP= Su Planu) is reported in the first column. The second column reports the number of populations sharing compounds in each group, the number of compounds shared and the percentage in relation to the total number of compounds identified. The red letter preceding the list of populations refers to the areas in the Venn diagram (Figure 4).

A – BAO ∪ CAM ∪ DOM ∪ JER ∪ SIS ∪ SUP	**6**
Heptanal	
Anisole	
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1.1-dimethylethyl)	
2,4-Decadienal (*E*,*E*)	
2,4-Decadienal (*E*,*Z*)	
Docosane	
Dodecane	
Eicosane	
Farnesol	
Geraniol	
Heneicosane	
Heptacosane	35 (44.3%)
Heptadecane	
(*E*)-2-Heptadecene	
(*E*)-3-Heptadecene	
7-heptadecene	
Hexacosane	
Hexadecanoic acid, methyl ester	
1-Hexadecene	
2-Hexadecene	
Methyl octadecanoate	
2-Methyl-2-pentenal	
Methyl tetradecanoate	
Octacosane	

Octadecane		
Octanal		
Pentacosane		
2-Phenyl ethanol		
Phytane		
p-Cresol		
Tetracosane		
Tricosane		
9-Tricosene		
Tridecane		
Unidentified_2		
B – BAO ∪ CAM ∪ DOM ∪ JER ∪ SUP	**5**	
β-Caryiophyllene		
cis-Verbenol		
Decanal		
Decanoic acid		
g-Terpinene		
β-Sesquiphellandrene		
2-Decenal, (E)		
Dodecanoic acid	16 (20.25%)	
g-eudesmol		
Hexadecane		
Linalool		
3-Methyloctadecane		
Pinocarvone		
Tetradecane		
trans- β-Farnesene		
Unidentified_1		
C – BAO ∪ CAM ∪ JER ∪ SIS ∪ SUP	**5**	
β-Phorone	1 (1.26%)	
D – BAO ∪ DOM ∪ JER ∪ SIS ∪ SUP	**5**	
1-Octanol	1 (1.26%)	
E – CAM ∪ DOM ∪ JER ∪ SIS ∪ SUP	**5**	
7,9-di-tert-butyl-1-oxaspiro[4.5]deca-6,9-diene-2,8-dione		
1-heptadecene	4 (5.06%)	
(*Z*)-3-Heptadecene		
Hexadecanoic acid		
F – BAO ∪ CAM ∪ DOM ∪ JER	**4**	
Borneol		
Diacetone alcohol	4 (5.06%)	
6-methyl-5-hepten-2-one		
Pentadecane, 2,6,10-trinethyl		
G – BAO ∪ CAM ∪ JER ∪ SUP	**4**	
α-Phellandren-8-ol		
Terpinen-4-ol	4 (5.06%)	
trans-Verbenol		
Verbenone		
H – BAO ∪ DOM ∪ JER ∪ SUP	**4**	
Camphor		
Decane	3 (3.80%)	
o-Xylene		

I – CAM ∪ JER ∪ SIS ∪ SUP	**4**
Nonadecane	1 (1.26%)
L – BAO ∪ CAM ∪ JER	**3**
(*Z*)-2-Heptadecene	1 (1.26%)
M – BAO ∪ DOM ∪ JER	**3**
Bornyl acetate	2 (2.53%)
4-Methyloctane	
N – BAO ∪ JER ∪ SUP	**3**
Nonacosane	1 (1.26%)
O – DOM ∪ JER ∪ SUP	**3**
2-Ethylhexanol	3 (3.80%)
1-Octadecene	
Unidentified_3	
P – DOM ∪ JER	**2**
1-Tetradecene	1 (1.26%)
Q – JER ∪ SUP	**2**
β-Phellandren-8-ol	2 (2.53%)
Nonanoic acid	

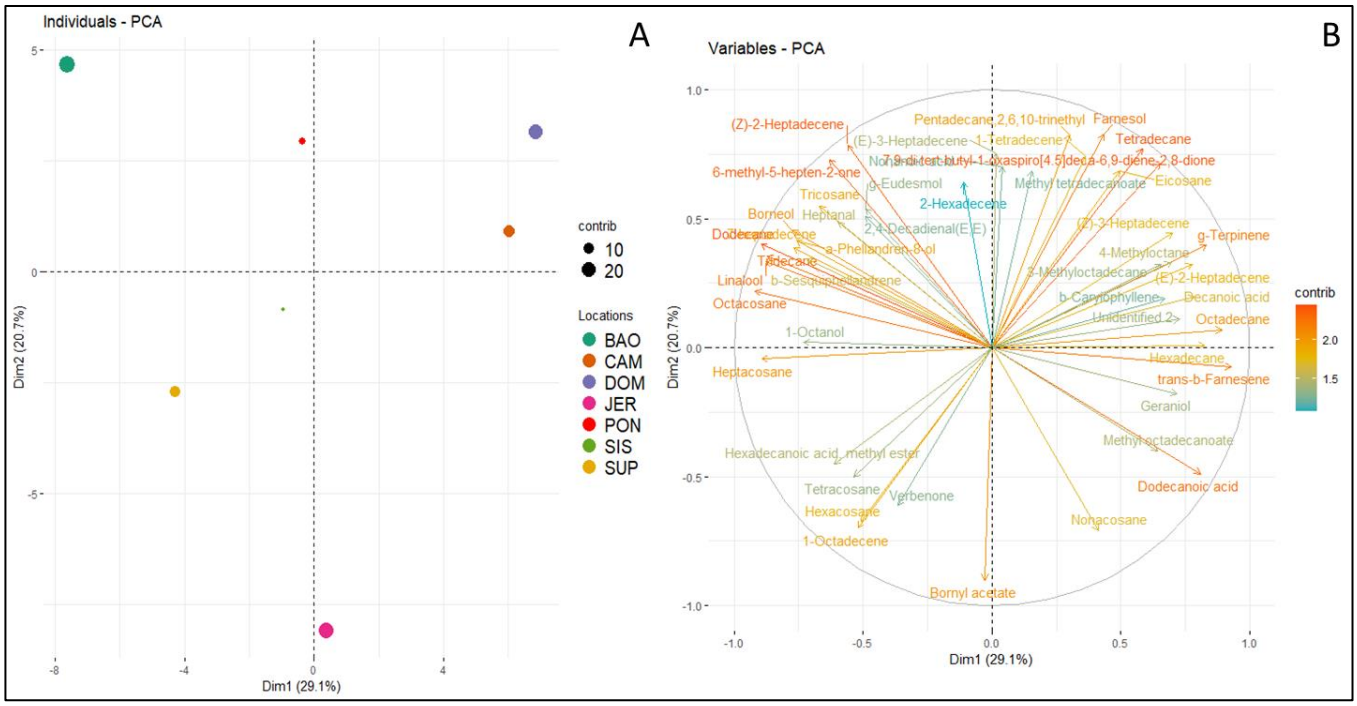

Figure S1. PCA plots of individuals (panel A) and variables (panel B) comprehensive of Ponzone population. In panel A individuals are represented by coloured dots, different colours indicating different geographical origin of the samples, as reported in the legend (BAO= Bau Onu, CAM= Capo Mannu, DOM= Domusnovas, JER= Jerzu, PON= Ponzone, SIS= Sant'Isidoro, SUP= Su Planu). Panel B reports the 44 most contributing variables to the PCA. Variables are represented as arrows originating from the intersection between the two principal axis. Arrows length and colour (from hot to cold colour) are proportional to the contribution of each variable to the PCA. Variables pointing the same direction should be considered as directly proportional, while variables pointing opposite directions should be considered inversely proportional. Variables pointing towards clusters of individuals should be considered highly representative of the features of that cluster.

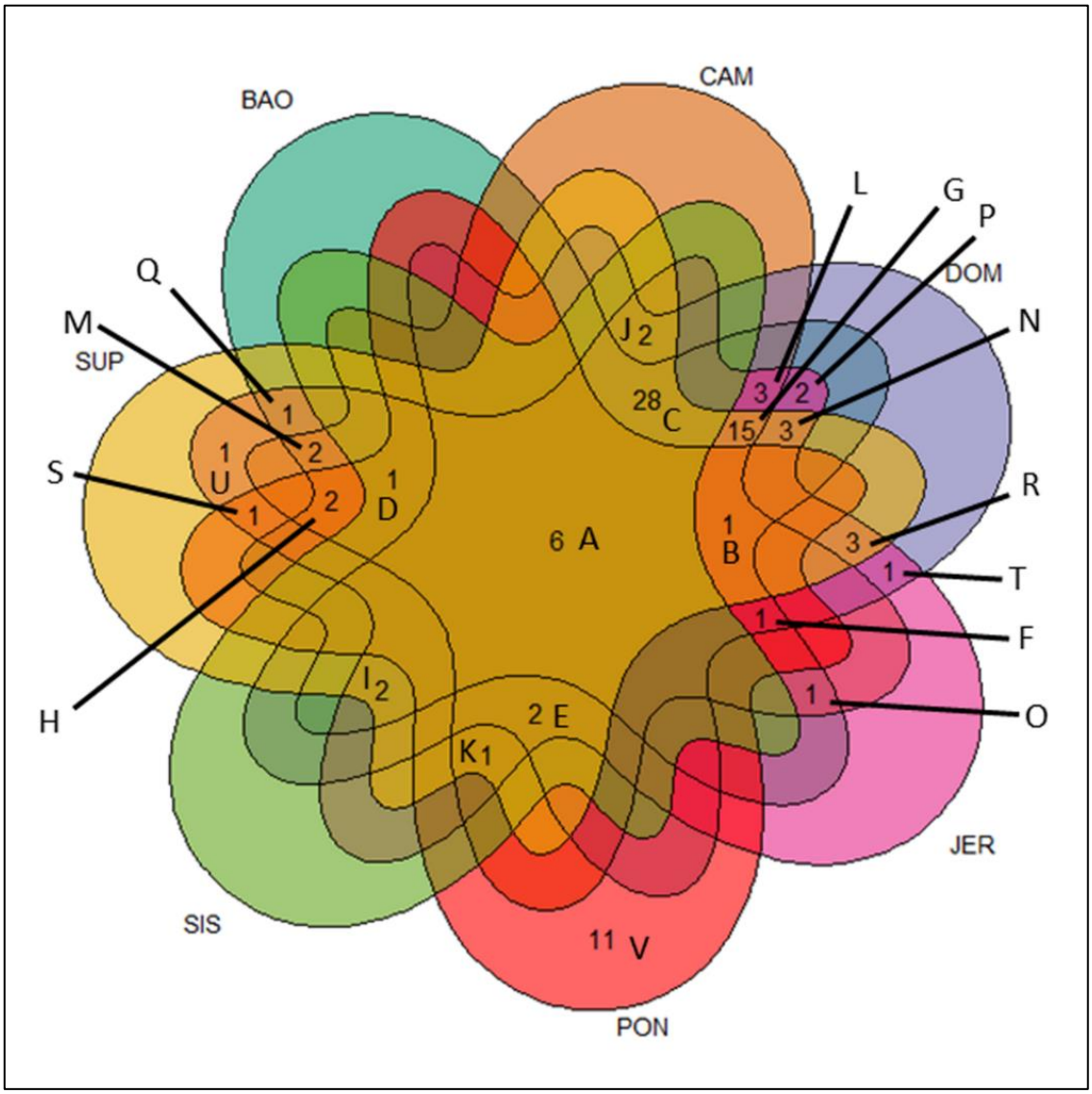

Figure S2. Venn's diagram with the number of compounds shared among Sardinian and Ponzone populations. The letters refer to the supplementary table (Table S3) reporting the identity of the compounds shared by the localities (BAO= Bau Onu, CAM= Capo Mannu, DOM= Domusnovas, JER= Jerzu, PON= Ponzone, SIS= Sant'Isidoro, SUP= Su Planu).

Table S3. Integration table to Figure S2. The list of compounds shared by populations (BAO= Bau Onu, CAM= Capo Mannu, DOM= Domusnovas, JER= Jerzu, SIS= Sant'Isidoro, SUP= Su Planu) is reported in the first column. The second column reports the number of populations sharing compounds in each group, the number of compounds shared and the percentage in relation to the total number of compounds identified. The red letter preceding the list of populations refers to the areas in the Venn diagram (Figure S2).

A – BAO ∪ CAM ∪ DOM ∪ JER ∪ PON ∪ SIS ∪ SUP	**7**
2,4-Decadienal (*E*,*E*)	
Heptadecane	
1-Hexadecene	
Pentacosane	6 (6.67%)
p-Cresol	
Tricosane	
B – BAO ∪ CAM ∪ DOM ∪ JER ∪ PON ∪ SUP	**6**
Decanal	1 (1.11%)
C – BAO ∪ CAM ∪ DOM ∪ JER ∪ SIS ∪ SUP	**6**
Anisole	
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1.1-dimethylethyl)	
2,4-Decadienal (*E*,*Z*)	
Docosane	
Dodecane	
Eicosane	
Farnesol	
Geraniol	
Heneicosane	
Heptacosane	
(*E*)-2-Heptadecene	
(*E*)-3-Heptadecene	
7-heptadecene	
Heptanal	
Hexacosane	28 (38.11%)
Hexadecanoic acid, methyl ester	
2-Hexadecene	
Methyl octadecanoate	
2-Methyl-2-pentenal	
Methyl tetradecanoate	
Octacosane	
Octadecane	
Octanal	
2-Phenyl ethanol	
Phytane	
Tetracosane	
9-Tricosene	
Tridecane	
D – BAO ∪ CAM ∪ JER ∪ PON ∪ SIS ∪ SUP	**6**
β-Phorone	1 (1.11%)
E – CAM ∪ DOM ∪ JER ∪ PON ∪ SIS ∪ SUP	**6**
1-heptadecene	
Hexadecanoic acid	2 (2.22%)
F – BAO ∪ CAM ∪ DOM ∪ JER ∪ PON	**5**
Diacetone alcohol	1 (1.11%)

G – BAO ∪ CAM ∪ DOM ∪ JER ∪ SUP	**5**
β-Caryiophyllene	
β-Sesquiphellandrene	
cis-Verbenol	
Decanoic acid	
2-Decenal, (*E*)	
Dodecanoic acid	
g-eudesmol	
g-Terpinene	15 (16.67%)
Hexadecane	
Linalool	
3-Methyloctadecane	
Pinocarvone	
Tetradecane	
trans-b-Farnesene	
Unidentified 1	
H – BAO ∪ CAM ∪ JER ∪ PON ∪ SUP	**5**
Terpinen-4-ol	2 (2.22%)
trans-Verbenol	
I – BAO ∪ DOM ∪ JER ∪ SIS ∪ SUP	**5**
1-Octanol	2 (2.22%)
Unidentified 2	
J – CAM ∪ DOM ∪ JER ∪ SIS ∪ SUP	**5**
7,9-di-tert-butyl-1-oxaspiro[4.5]deca-6,9-diene-2,8-dione	2 (2.22%)
(*E*)-3-Heptadecene	
K – CAM ∪ JER ∪ PON ∪ SIS ∪ SUP	**5**
Nonadecane	1 (1.11%)
L – BAO ∪ CAM ∪ DOM ∪ JER	**4**
Borneol	
6-methyl-5-hepten-2-one	3 (3.33%)
Pentadecane, 2,6,10-trinethyl	
M – BAO ∪ CAM ∪ JER ∪ SUP	**4**
α-Phellandren-8-ol	2 (2.22%)
Verbenone	
N – BAO ∪ DOM ∪ JER ∪ SUP	**4**
Camphor	
Decane	3 (3.33%)
o-Xylene	
O – BAO ∪ CAM ∪ JER	**3**
(*Z*)-2-Heptadecene	1 (1.11%)
P – BAO ∪ DOM ∪ JER	**3**
Bornyl acetate	2 (2.22%)
4-Methyloctane	
Q – BAO ∪ JER ∪ SUP	**3**
Nonacosane	1 (1.11%)
R – DOM ∪ JER ∪ SUP	**3**
2-Ethylhexanol	
1-Octadecene	3 (3.33%)
Unidentified 3	
S – JER ∪ PON ∪ SUP	**3**
Nonanoic acid	1 (1.11%)

T – DOM ∪ JER	**2**
1-Octadecene	1 (1.11%)
U – JER ∪ SUP	**2**
β-Phellandren-8-ol	1 (1.11%)
V – PON	**1**
α-Isophorone	
α-Terpineol	
2,4 Di-tertbutylphenol	
Heptanoic acid	
Isopropyl myristate	
Nonanal	11 (12.22%)
Octadecanal	
2-Phenoxy ethanol	
p-Cimen-8-ol	
p-Vinyl-phenol	
Unidentified 5	