

# SUPPLEMENTARY MATERIALS

Table S1. Relationships between flammability variables (TTi: time-to-ignition; CW: Consumed weight; Tmax: Maximum temperature; FD: Flaming duration; FH: Flame height; RP: radiative peak) and flammability cofactors (SVR: Surface-to-volume ratio; FMC: Fuel moisture content) for shoots of *P. halepensis* and *P. sylvestris*. (One-way ANOVA; F = Fisher test, p = probability, NS= non significant).

Shoots	<i>P. halepensis</i>						<i>P. sylvestris</i>					
	SVR		Bulk density		FMC		SVR		Bulk density		FMC	
TTi	F= 20.7 0.0001	p<	NS		F= 43.4 0.0001	p<	F= 23.5 0.0001	p<	NS		F= 21.5 0.0001	p<
CW	F= 4.5 0.035	p=	F= 4.4 0.027	p=	F= 4.2 0.042	p=	F= 10.0 0.002	p=	NS		F= 8.0 0.0052	p=
Tmax	F= 4.5 0.035	p=	F= 4.9 0.027	p=	F= 67.4 0.0001	p<	F= 7.8 0.006	p=	F= 133.7 0.0001	p<	F= 27.7 0.0001	p<
FD	F= 5.7 0.017	p=	F= 4.4 0.036	p=	NS		F= 25.5 0.0001	p<	NS		NS	
FH	NS				F= 130.2 0.0001	p<	F= 18.3 0.0001	p<	F= 11.4 0.0009	p=	F= 10.2 0.002	p=
RP	NS		F= 14.8 0.0001	p=	F= 5.7 0.018	p=	NS		F= 9.9 p= 0.002		F= 5.5 0.020	p=

Table S2. Cofactors (SVR: surface-to-volume ratio; FMC: fuel moisture content; BD: bulk density) significantly related to each shoot flammability variable (using simple linear regression analyses) and results of one-way ANOVA (F = Fisher test, p = probability) performed on each corrected- flammability variable testing the difference between the two fire modalities for both species. In bold: significant results. PHF= *P. halepensis* "Fire" modality, PHNF= *P. halepensis* "No-Fire" modality, PSF= *P. sylvestris* "Fire" modality and PSNF= *P. sylvestris* "No-Fire" modality. N= 380 for *P. halepensis* and N= 293 for *P. sylvestris*.

Shoots	<i>P. halepensis</i>		<i>P. sylvestris</i>	
	Significant cofactors	ANOVA results on corrected flammability variable	Significant cofactors	ANOVA results on corrected flammability variable
Time-to-ignition	SVR; FMC	<b>F= 17.42 ; p &lt; 0.0001</b> <b>PHF &lt; PHNF</b>	FMC; SVR	F= 0.75 ; p= 0.3866
Consumed weight	SVR; BD; FMC	F= 2.59 ; p= 0.1083	FMC; SVR	F= 2.13 ; p= 0.1453
Maximum temperature	FMC; SVR; BD	F= 0.00 ; p= 0.9607	FMC; BD; SVR	<b>F= 25.28 ; p &lt; 0.0001</b> <b>PSF &gt; PSNF</b>
Flaming duration	SVR; BD	<b>F= 8.90 ; p= 0.0030</b> <b>PHF &gt; PHNF</b>	SVR	F= 0.65 ; p= 0.4200
Flame height	FMC	<b>F= 10.89 ; p= 0.0011</b> <b>PHF &lt; PHNF</b>	SVR; BD; FMC	F= 2.35 ; p= 0.1263
Radiative peak	BD; FMC	F= 2.35 ; p= 0.1263	FMC; BD	<b>F= 11.92 ; p= 0.0006</b> <b>PSF &gt; PSNF</b>

Table S3. Relationships between flammability variables (TTi: time to ignition; CW: Consumed weight; Tmax: Maximum temperature; FD Flaming duration; FH: Flame height) and flammability cofactors (SVR: Surface-to-volume ratio) for litter of *P. halepensis* and *P. sylvestris*.

Litter	<i>P. halepensis</i>		<i>P. sylvestris</i>	
	SVR		SVR	
TTi	NS		F= 20.1	p< 0.0001
CW	NS		-	
Tmax	NS		NS	
FD	F= 6.1	p= 0.014	F= 4.6	p= 0.033
FH	F= 5.7	p= 0.018	F= 4.5	p= 0.035

Table S4. Cofactor (SVR: surface-to-volume ratio) significantly related to each litter flammability variable (using simple linear regression analyses; NS when non-significant) and results of one-way ANOVA (F = Fisher test, p = probability and KW = Kruskal-Wallis test, p = probability) performed on corrected-flammability variable (i.e. residuals extracted) testing the difference between both fire modalities for both species. In bold: significant results. PHF= *P. halepensis* "Fire" modality, PHNF= *P. halepensis* "No-Fire" modality, PSF= *P. sylvestris* "Fire" modality and PSNF= *P. sylvestris* "No-Fire" modality. N= 344 for *P. halepensis* and N= 279 for *P. sylvestris*. For *P. sylvestris*, consumed weight was 100% and the rate of spread was not measured so these variables were not taken into account in the analyses.

Litter	<i>P.halepensis</i>		<i>P. sylvestris</i>	
	Significant cofactors	ANOVA results on corrected flammability variable	Significant cofactors	ANOVA results on corrected flammability variable
Time-to-ignition	NS	<b>F= 34.48 ; p &lt; 0.0001</b> <b>PHF &lt; PHNF</b>	SVR	<b>KW = 10.63 ; p= 0.001</b> <b>PSF &gt; PSNF</b>
Consumed weight	NS	<b>F= 10.17 ; p= 0.0016</b> <b>PHF &gt; PHNF</b>	-	-
Maximum temperature	NS	F= 0.01 ; p= 0.9222	NS	<b>F= 23.09 ; p&lt; 0.0001</b> <b>PSF &gt; PSNF</b>
Flaming duration	SVR	<b>F= 5.23 ; p= 0.0232</b> <b>PHF &lt; PHNF</b>	SVR	<b>KW = 18.94 ; p&lt; 0.0001</b> <b>PSF &lt; PSNF</b>
Flame height	SVR	<b>KW = 21.93 ; p &lt; 0.0001</b> <b>PHF &gt; PHNF</b>	SVR	<b>F= 107.38 ; p&lt; 0.0001</b> <b>PSF &lt; PSNF</b>
Rate of spread	NS	<b>F= 14.75 ; p= 0.0001</b> <b>PHF &lt; PHNF</b>	-	-

Table S5. Terpene molecules identified in *P. halepensis* with their chemical formula and their concentration (mg g<sup>-1</sup> DM; mean  $\pm$  standard deviation) according to the fire modality.

	Formule	"Fire"	"No-Fire"
Thujene	C10H16	0.050 ( $\pm$ 0.044)	0.038 ( $\pm$ 0.040)
$\alpha$ -pinene	C10H16	0.737 ( $\pm$ 0.415)	0.663 ( $\pm$ 0.463)
Camphene	C10H16	0.008 ( $\pm$ 0.004)	0.007 ( $\pm$ 0.005)
$\beta$ -pinene	C10H16	0.428 ( $\pm$ 0.321)	0.363 ( $\pm$ 0.308)
$\delta$ -3-carene	C10H16	0.114 ( $\pm$ 0.112)	0.092 ( $\pm$ 0.094)
$\alpha$ -terpinene	C10H16	0.010 ( $\pm$ 0.009)	0.008 ( $\pm$ 0.009)
Limonene	C10H16	0.087 ( $\pm$ 0.084)	0.077 ( $\pm$ 0.078)
Ocimene	C10H16	0.069 ( $\pm$ 0.056)	0.059 ( $\pm$ 0.057)
$\gamma$ -terpinene	C10H16	0.042 ( $\pm$ 0.033)	0.035 ( $\pm$ 0.033)
Terpinolene	C10H16	0.506 ( $\pm$ 0.348)	0.442 ( $\pm$ 0.384)
$\alpha$ -terpineol	C10H18O	0.014 ( $\pm$ 0.010)	0.016 ( $\pm$ 0.016)
$\beta$ -caryophyllene	C15H24	2.555 ( $\pm$ 1.130)	2.201 ( $\pm$ 1.228)
$\alpha$ -humulene	C15H24	0.406 ( $\pm$ 0.208)	0.342 ( $\pm$ 0.206)
Farnesene	C15H24	0.223 ( $\pm$ 0.121)	0.186 ( $\pm$ 0.105)
Germacrene-D	C15H24	0.037 ( $\pm$ 0.032)	0.033 ( $\pm$ 0.032)
Valencene	C15H24	0.118 ( $\pm$ 0.140)	0.910 ( $\pm$ 0.132)
$\alpha$ -muurolene	C15H24	0.609 ( $\pm$ 0.969)	0.602 ( $\pm$ 1.220)
$\gamma$ -cadinene	C15H24	0.068 ( $\pm$ 0.063)	0.049 ( $\pm$ 0.053)
$\beta$ -cadinene	C15H24	0.317 ( $\pm$ 0.407)	0.265 ( $\pm$ 0.385)
Elemol	C15H26O	1.053 ( $\pm$ 1.231)	0.837 ( $\pm$ 1.103)
Caryophyllene-oxide	C15H24O	0.772 ( $\pm$ 0.815)	0.590 ( $\pm$ 0.598)
Cembrene	C20H32	0.441 ( $\pm$ 0.703)	0.293 ( $\pm$ 0.530)
Thunbergol	C20H34O	0.424 ( $\pm$ 0.641)	0.324 ( $\pm$ 0.525)

**Table S6.** Terpene molecules identified in *P. sylvestris* with their chemical formula and their concentration (mg g<sup>-1</sup> DM; mean  $\pm$  standard deviation) according to the fire modality.

	Formule	"Fire"	"No-Fire"
Tricyclene	C10H16	0.394 ( $\pm$ 0.40)	0.406 ( $\pm$ 0.404)
$\alpha$ -pinene	C10H16	2.790 ( $\pm$ 1.072)	1.072 ( $\pm$ 1.266)
Camphene	C10H16	0.561 ( $\pm$ 0.360)	0.535 ( $\pm$ 0.307)
$\beta$ -pinene	C10H16	0.382 ( $\pm$ 0.310)	0.324 ( $\pm$ 0.234)
$\beta$ -Myrcene	C10H16	0.412 ( $\pm$ 0.408)	0.438 ( $\pm$ 0.485)
$\alpha$ -phellandrene	C10H16	0.002 ( $\pm$ 0.006)	0.001 ( $\pm$ 0.001)
$\delta$ -3-Carene	C10H16	0.056 ( $\pm$ 0.183)	0.102 ( $\pm$ 0.273)
$\alpha$ -terpinene	C10H16	0.001 ( $\pm$ 0.002)	0.001 ( $\pm$ 0.002)
Ocimene	C10H14	0.001 ( $\pm$ 0.001)	< 0.001
Limonene	C10H16	0.053 ( $\pm$ 0.037)	0.050 ( $\pm$ 0.035)
Eucalyptol	C10H18O	0.004 ( $\pm$ 0.007)	0.003 ( $\pm$ 0.004)
$\beta$ -ocimene	C10H16	0.156 ( $\pm$ 0.099)	0.165 ( $\pm$ 0.081)
$\gamma$ -terpinene	C10H16	0.006 ( $\pm$ 0.008)	0.007 ( $\pm$ 0.009)
Terpinolene	C10H16	0.019 ( $\pm$ 0.037)	0.016 ( $\pm$ 0.024)
Linalool	C10H18O	0.001 ( $\pm$ 0.002)	0.001 ( $\pm$ 0.002)
Camphor	C10H16O	0.003 ( $\pm$ 0.004)	0.004 ( $\pm$ 0.004)
Borneol	C10H18O	0.010 ( $\pm$ 0.012)	0.010 ( $\pm$ 0.012)
$\alpha$ -terpineol	C10H18O	0.009 ( $\pm$ 0.014)	0.007 ( $\pm$ 0.007)
Nerol	C10H18O	< 0.001	< 0.001
Elemene	C15H24	0.092 ( $\pm$ 0.135)	0.075 ( $\pm$ 0.098)
$\alpha$ -cubebene	C15H24	0.168 ( $\pm$ 0.216)	0.185 ( $\pm$ 0.217)
Ylangene	C15H24	0.023 ( $\pm$ 0.036)	0.033 ( $\pm$ 0.069)
$\alpha$ -copaene	C15H24	0.195 ( $\pm$ 0.245)	0.207 ( $\pm$ 0.247)
$\beta$ -bourbonene	C15H24	0.015 ( $\pm$ 0.022)	0.017 ( $\pm$ 0.023)
$\beta$ -cubebene	C15H24	0.050 ( $\pm$ 0.038)	0.048 ( $\pm$ 0.036)
$\beta$ -elemene	C15H24	0.033 ( $\pm$ 0.033)	0.025 ( $\pm$ 0.028)
Longifolene	C15H24	< 0.001	0.001 ( $\pm$ 0.001)
$\beta$ -caryophyllene	C15H24	0.405 ( $\pm$ 0.176)	0.443 ( $\pm$ 0.220)
Aromandendrene	C15H24	0.024 ( $\pm$ 0.027)	0.024 ( $\pm$ 0.028)
Humulene	C15H24	0.066 ( $\pm$ 0.043)	0.072 ( $\pm$ 0.047)
sesqui unk_34,5	C15-	0.101 ( $\pm$ 0.102)	0.084 ( $\pm$ 0.095)
sesqui unk_35,17	C15-	0.185 ( $\pm$ 0.428)	0.187 ( $\pm$ 0.345)

sesqui unk_35,28	C15-	0.375 (±0.476)	0.339 (±0.380)
sesqui unk_35,46	C15-	0.020 (±0.023)	0.021 (±0.024)
Valencene	C15H24	0.047 (±0.047)	0.044 (±0.048)
$\alpha$ -Muurolene	C15H24	0.066 (±0.066)	0.071 (±0.070)
$\Upsilon$ -cadinene	C15H24	0.463 (±0.310)	0.451 (±0.323)
$\beta$ -cadinene	C15H24	0.519 (±0.329)	0.483 (±0.311)
$\alpha$ -cadinene	C15H24	0.037 (±0.045)	0.037 (±0.044)
$\alpha$ -bisabolol	C15H26O	0.006 (±0.011)	0.008 (±0.013)
mix cyclic sesquiterpene alcohol	C15-	0.243 (±0.187)	0.243 (±0.246)
Caryophyllene oxide	C15H24O	0.381 (±0.395)	0.454 (±0.546)
$\tau$ -cadinol	C15H26O	0.089 (±0.119)	0.092 (±0.130)
$\alpha$ -cadinol	C15H26O	0.038 (±0.049)	0.036 (±0.049)

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Table S7. Terpene molecules related to each flammability variable according to the fire modality (PH: *Pinus halepensis*; F: fire modality; NF: no-fire modality) for *P. halepensis*' shoot. Terpene molecules were considered as related to flammability when they were at the intersect of the two types of random forest analyses (i.e. VSURF and Boruta). In bold: common molecules to both fire modalities.

	PHF	PHNF
Time-to-ignition	$\alpha$ -terpineol; <b>cembrene</b>	$\beta$ -caryophyllene; <b>cembrene</b> ; elemol; terpinolene ; thujene
Maximum temperature	$\alpha$ -humulene; $\beta$ -caryophyllene; <b>cembrene</b> ; germacrene-D ; limonene ; thujene	$\alpha$ -muurolene; $\alpha$ -terpineol; $\beta$ -cadinene; caryophyllene-oxide; <b>cembrene</b> ; elemol
Flaming duration	$\alpha$ -pinene; $\alpha$ -terpinene; $\beta$ -caryophyllene	$\alpha$ -muurolene; cembrene; valencene
Flame height	<b><math>\alpha</math>-muurolene</b> ; $\alpha$ -pinene; $\beta$ -cadinene; <b>camphene</b> ; <b>caryophyllene-oxide</b> ; <b>cembrene</b> ; elemol; $\gamma$ -cadinene; germacrene-D; limonene; ocimene	$\alpha$ -muurolene; camphene; caryophyllene-oxide; cembrene; valencene
Radiative peak	$\alpha$ -pinene; $\alpha$ -humulene; <b><math>\beta</math>-caryophyllene</b> ; $\beta$ -pinene; camphene; caryophyllene-oxide; elemol; farnesene; terpinolene	$\alpha$ -muurolene; <b><math>\beta</math>-caryophyllene</b> ; limonene
Consumed weight	$\alpha$ -humulene; <b><math>\alpha</math>-muurolene</b> ; $\alpha$ -terpinene; $\beta$ -pinene; $\beta$ -cadinene $\beta$ -caryophyllene; caryophyllene-oxide; elemol; farnesene	<b><math>\alpha</math>-muurolene</b> ; limonene; thunbergol; valencene

Table S8. Terpene molecules related to each flammability variable according to the fire modality (PH: *Pinus halepensis*; F: fire modality; NF: no-fire modality) for *P. halepensis*' litter. Terpene molecules were considered as related to flammability when they were at the intersect of the two types of random forest analyses (i.e. VSURF and Boruta). In bold: common molecules to both fire modalities.

	PHF	PHNF
Time-to-ignition	$\alpha$ -muurolene; $\alpha$ -terpinene; $\alpha$ -terpineol ; farnesene ; $\gamma$ -terpinene; ocimene; thujene	$\beta$ -cadinene; cembrene; limonene
Maximum temperature	<b><math>\beta</math>-cadinene</b> ; camphene ; <b>elemol</b> ; ocimene; valencene	$\alpha$ -terpineol; <b><math>\beta</math>-cadinene</b> ; <b>elemol</b> ; germacrene-D; ocimene
Flaming duration	<b>cembrene</b> ; elemol; $\gamma$ -cadinene; germacrene-D; limonene	$\alpha$ -muurolene; $\beta$ -cadinene; <b>cembrene</b>
Flame height	<b><math>\alpha</math>-pinene</b> ; <b><math>\alpha</math>-terpineol</b> ; <b><math>\beta</math>-caryophyllene</b> ; <b>camphene</b> ; germacrene-D; ocimene; valencene	$\alpha$ -humulene; <b><math>\alpha</math>-pinene</b> ; <b><math>\alpha</math>-terpineol</b> ; <b><math>\beta</math>-caryophyllene</b> ; <b>camphene</b> ; caryophyllene-oxide; limonene
Rate of spread	cembrene	camphene; caryophyllene-oxide; germacrene-D; limonene; terpinolene; thujene; valencene
Consumed weight	<b><math>\alpha</math>-terpineol</b> ; <b>camphene</b> ; ocimene; <b>valencene</b>	<b><math>\alpha</math>-terpineol</b> ; $\beta$ -cadinene; <b>camphene</b> ; caryophyllene-oxide; cembrene; germacrene-D; terpinolene; <b>valencene</b>



Table S9. Terpene molecules related to each flammability variable according to the fire modality (PS: *Pinus sylvestris*; F: fire modality; NF: no-fire modality) for *P. sylvestris*' shoot. Terpene molecules were considered as related to flammability when they were at the intersect of the two types of random forest analyses (i.e. VSURF and Boruta). In bold: common molecules to both fire modalities.

	PSF	PSNF
Time-to-ignition	$\alpha$ -pinene; $\alpha$ -terpineol, tricyclene	$\Delta$ -3-carene; humulene; unknown-sequi-35,46
Maximum temperature	$\alpha$ -muurolene; $\alpha$ -terpinene; $\beta$ -myrcene; <b>borneol</b> ; elemene; $\gamma$ -terpinene; <b>unknown-sequi-34,5</b> ; tricyclene; valencene	$\Delta$ -3-carene; $\alpha$ -terpineol; $\beta$ -myrcene; <b>borneol</b> ; <b>unknown-sequi-34,5</b> ; unknown-sequi-35,46
Flaming duration	borneol; camphor; elemene	-
Flame height	$\alpha$ -phellandrene; $\alpha$ -terpineol; $\beta$ -myrcene; camphor; eucalyptol; tricyclene; valencene	aromadendrene; unknown-sequi-35,46; ylangene
Radiative peak	$\alpha$ -terpineol	-
Consumed weight	$\delta$ -3-carene; camphene; unknown-sequi-35,46	-

Table S10. Terpene molecules related to each flammability variable according to the fire modality (PS: *Pinus sylvestris*; F: fire modality; NF: no-fire modality) for *P. sylvestris*' litter. Terpene molecules were considered as related to flammability when they were at the intersect of the two types of random forest analyses (i.e. VSURF and Boruta). In bold: common molecules to both fire modalities.

	PSF	PSNF
Time-to-ignition	$\alpha$ -copaene; <b><math>\alpha</math>-terpineol</b> ; $\beta$ -bourbonene; humulene; linalool	<b><math>\alpha</math>-terpineol</b> ; linalool; mix-sesquiterpene
Maximum temperature	$\delta$ -3-carene; $\alpha$ -bisabolol; $\alpha$ -cadinene; $\alpha$ -cadinol; $\alpha$ -copaene; $\alpha$ -cubebene; $\alpha$ -terpinene; $\beta$ -bourbonene; borneol; camphor; elemene; eucalyptol; humulene; linalool; unknown-sequi-35,17; <b>unknown-sequi-35,46</b> ; $\tau$ -cadinol; ylangene	$\alpha$ -phellandrene; $\alpha$ -terpineol; $\beta$ -caryophyllene; <b>unknown-sequi-35,46</b>
Flame height	$\alpha$ -cadinol; $\alpha$ -terpineol; $\beta$ -bourbonene; elemene; eucalyptol; humulene; <b>linalool</b> ; ocimene; unknown-sequi-35,17; $\tau$ -cadinol; <b>tricyclene</b>	$\delta$ -3-carene; $\beta$ -myrcene; $\beta$ -caryophyllene; caryophyllene-oxide; <b>linalool</b> ; nerol; <b>tricyclene</b>
Flaming duration	$\alpha$ -terpineol; ; $\beta$ -bourbonene; borneol; linalool; ylangene	-

Table S11. Partial least square (PLS) regression analyses (p= p value, R<sup>2</sup>= determination coefficient, Cp= number of component) performed on both fire modalities (PH: *Pinus halepensis*; F: fire modality; NF: no-fire modality) and each *P. halepensis*' shoots flammability variables highlighting the scaled regression coefficients (R) of the significant terpene molecules. In bold: main flammability driver. MT: Monoterpenes; ST: Sesquiterpenes; DT: Diterpenes.

	PHF		PHNF	
Time-to-ignition	<b>α-terpineol (MT)</b> p< 0.0001 ; R <sup>2</sup> = 0.18 ; Cp = 1	<b>R= 0.43</b>	NS	
Maximum temperature	α-humulene (ST) <b>β-caryophyllene (ST)</b> limonene (MT) thujene (MT) p< 0.0001 ; R <sup>2</sup> = 0.50 ; Cp = 4	R= -1,65 <b>R= 2.17</b> R= -0.31 <b>R= 0.28</b>	<b>α-terpineol (MT)</b> p< 0.0001 ; R <sup>2</sup> = 0.44 ; Cp = 1	<b>R= 0.66</b>
Flaming duration	NS		<b>valencene (ST)</b> p= 0.002 ; R <sup>2</sup> = 0.06 ; Cp = 1	<b>R= -0.24</b>
Flame height	camphene (MT) <b>elemol (ST)</b> γ-cadinene (ST) p< 0.0001 ; R <sup>2</sup> = 0.51 ; Cp = 2	R= -0.47 <b>R= 2.24</b> R= 0.30	<b>camphene (MT)</b> cembrene (DT) valencene (ST) p< 0.0001 ; R <sup>2</sup> = 0.45 ; Cp = 2	<b>R= -0.53</b> R= 0.23 R= 0.28
Radiative peak	camphene (MT) α-pinene (MT) β-caryophyllene (ST) <b>β-pinene (MT)</b> terpinolene (MT) p< 0.0001 ; R <sup>2</sup> = 0.24 ; Cp = 5	R= 0.22 R= -0.52 R= 0.51 <b>R= 0.61</b> R= -0.52	<b>β-caryophyllene (ST)</b> <b>limonene (MT)</b> p= 0.003 ; R <sup>2</sup> = 0.07 ; Cp = 2	<b>R= 0.29</b> <b>R= -0.29</b>
Consumed weight	NS		α-humulene (ST) <b>limonene (MT)</b> thunbergol (DT) p= 0.002 ; R <sup>2</sup> = 0.09 ; Cp = 3	R= 0.30 <b>R= -0.31</b> R= -0.24

Table S12. Partial least square (PLS) regression analyses (p= p value, R<sup>2</sup>= determination coefficient, Cp= number of component, NS=non-significant) performed on both fire modalities (PH: *Pinus halepensis*; F: fire modality; NF: no-fire modality) and each *P. halepensis*' litter flammability variables and highlighting the scaled regression coefficients (R) of the significant terpene molecules. In bold: main flammability driver. MT: Monoterpenes; ST: Sesquiterpenes; DT: Diterpenes.

	PHF			PHNF	
Time-to-ignition	$\alpha$ -terpinene (MT)	R= 0,55		<b>limonene (MT)</b>	<b>R= -0.25</b>
	<b><math>\gamma</math>-terpinene (MT)</b>	<b>R= -1.05</b>		p= 0.003 ; R <sup>2</sup> = 0.06 ; Cp = 1	
	ocimene (MT)	R= -0.34			
	thujene (MT)	R= 0.60			
	p< 0.0001 ; R <sup>2</sup> = 0.14 ; Cp = 4				
Maximum temperature	<b><math>\beta</math>-cadinene (ST)</b>	<b>R= -0.62</b>			
	camphene (MT)	R= 0.42		<b><math>\alpha</math>-terpineol (MT)</b>	<b>R= 0.57</b>
	elemol (ST)	R= 0.52		elemol (ST)	R= -0.20
	ocimene (MT)	R= -0.39		p< 0.0001 ; R <sup>2</sup> = 0.44 ; Cp = 1	
	valencene (ST)	R= -0.30			
	p< 0.0001 ; R <sup>2</sup> = 0.57 ; Cp = 4				
Flaming duration	elemol (ST)	R= 0.20		<b><math>\beta</math>-cadinene (ST)</b>	<b>R= -0.24</b>
	<b>limonene (MT)</b>		<b>R= 0.30</b>	cembrene (DT)	R= -0.22
	p< 0.0001 ; R <sup>2</sup> = 0.21 ; Cp = 1			p< 0.0001 ; R <sup>2</sup> = 0.17 ; Cp = 1	
Flame height				<b><math>\alpha</math>-humulene (ST)</b>	<b>R= -0.49</b>
	$\alpha$ -pinene (MT)	R= 0.27		$\alpha$ -pinene (MT)	R= -0.23
	$\beta$ -caryophyllene (ST)	R= 0.33		$\beta$ -caryophyllene (ST)	R= 1.18
	camphene (MT)	R= -0.33		p< 0.0001 ; R <sup>2</sup> = 0.33 ; Cp = 2	
	germacrene D (ST)	R= -0.34			
	<b>ocimene (MT)</b>	<b>R= -0.40</b>			
	p< 0.0001 ; R <sup>2</sup> = 0.21 ; Cp = 5				
Rate of spread		NS		<b>terpinolene (MT)</b>	<b>R= 0.27</b>
				valencene (ST)	R= -0.26
				p= 0.003 ; R <sup>2</sup> = 0.11 ; Cp = 2	
Consumed weight	<b><math>\alpha</math>-terpineol (MT)</b>	<b>R= -0.47</b>		$\alpha$ -terpineol (MT)	R= -0.23
	p< 0.0001 ; R <sup>2</sup> = 0.22 ; Cp = 1			camphene (MT)	R= -0.22
				<b>caryophyllene-oxide (ST)</b>	<b>R= 0.28</b>
				p< 0.0001 ; R <sup>2</sup> = 0.27 ; Cp = 1	

Table S13. Partial least square (PLS) regression analyses (p= p value, R<sup>2</sup>= determination coefficient, Cp= number of component, NS=non-significant) performed on both fire modalities (PS: *Pinus sylvestris*; F: fire modality; NF: no-fire modality) and each *P. sylvestris*' shoot flammability variables and highlighting the scaled regression coefficients (R) of the significant terpene molecules. In bold: main flammability driver. MT: Monoterpenes; ST: Sesquiterpenes.

	PSF		PSNF	
	NS		NS	
Time-to-ignition				
Maximum temperature	<b>borneol (MT)</b>	<b>R= 0.41</b>	<b><math>\alpha</math>-terpineol (MT)</b>	<b>R= 0.35</b>
	elemene (ST)	R= -0.25	$\beta$ -myrcene (MT)	R= -0.25
	$\gamma$ -terpinene (MT)	R= -0.26	unknown-sequi-35,46 (ST)	R= -0.31
	p< 0.0001 ; R <sup>2</sup> = 0.60 ; Cp = 3		p< 0.0001 ; R <sup>2</sup> = 0.62 ; Cp = 1	
Flaming duration	NS		NS	
Flame height	$\alpha$ -terpineol (MT)	R= -0.22	<b>aromadendrene (ST)</b>	<b>R= 0.23</b>
	$\beta$ -myrcene (MT)	R= 0.22	unknown-sequi-35,46 (ST)	R= 0.22
	<b>tricyclene (MT)</b>	<b>R= 0.24</b>	p< 0.0001 ; R <sup>2</sup> = 0.18 ; Cp = 1	
	p< 0.0001 ; R <sup>2</sup> = 0.24 ; Cp = 2			
Radiative peak	NS		NS	
Consumed weight	$\delta$ -3-carene (MT)	R= 0.20	NS	
	<b>unknown-sequi-35,46 (ST)</b>	<b>R= 0.30</b>		
	p< 0.0001 ; R <sup>2</sup> = 0.14 ; Cp = 1			

Table S14. Partial least square (PLS) regression analyses (p= p value, R<sup>2</sup>= determination coefficient, Cp= number of component, NS=non-significant) performed on both fire modalities modalities (PS: *Pinus sylvestris*; F: fire modality; NF: no-fire modality) and each *P. sylvestris*' litter flammability variables and highlighting the scaled regression coefficients (R) of the significant terpene molecules. In bold: main flammability driver. MT: Monoterpenes; ST: Sesquiterpenes.

	PSF	PSNF
Time-to-ignition	<b><math>\alpha</math>-copaene (ST)</b> R= <b>0.24</b> $\beta$ -bourbonene (ST) R= 0.21 linalool (MT) R= 0.22 p< 0.0001 ; R <sup>2</sup> = 0.31 ; Cp = 1	$\alpha$ -terpineol (MT) R= -0.22 <b>linalool (MT)</b> R= <b>0.23</b> p< 0.0001 ; R <sup>2</sup> = 0.16 ; Cp = 2
Maximum temperature	$\tau$ -cadinol (ST) R= 0.39 $\alpha$ -cadinene (ST) R= 0.37 $\alpha$ -cadinol (ST) R= -0.47 <b><math>\alpha</math>-copaene (ST)</b> R= <b>-0.51</b> borneol (MT) R= 0.25 camphor (MT) R= 0.31 elemene (ST) R= -0.38 unknown-sequi-35,46 (ST) R= 0.29 p< 0.0001 ; R <sup>2</sup> = 0.57 ; Cp = 8	<b><math>\alpha</math>-phellandrene (ST)</b> R= <b>-0.24</b> $\beta$ -caryophyllene (ST) R= 0.21 p= 0.0006 ; R <sup>2</sup> = 0.11 ; Cp = 1
Flaming duration	$\alpha$ -terpineol (MT) R= 0.26 <b>borneol (MT)</b> R= <b>0.37</b> linalool (MT) R= -0.32 p< 0.0001 ; R <sup>2</sup> = 0.41 ; Cp = 2	NS
Flame height	<b><math>\tau</math>-cadinol (ST)</b> R= <b>0.47</b> $\alpha$ -cadinol (ST) R= -0.25 $\alpha$ -terpineol (MT) R= -0.28 linalool (MT) R= 0.20 tricyclene (MT) R= -0.34 p< 0.0001 ; R <sup>2</sup> = 0.45 ; Cp = 5	NS