

**EGU2020-3384**

## **Do alter post-wildfire straw mulching application and salvage logging pine natural regeneration after wildfires?**

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**Main objective:**

to analyse the short-term combined effect of straw mulching and salvage logging on initial seedling recruitment and seedling growth immediately after wildfire in two climatically different burned areas:

- (i) a wildfire-affected *P. halepensis* stand with a semiarid Mediterranean climate;
- (ii) a wildfire-affected *P. pinaster* stand with a subhumid Mediterranean climate.















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The A Gudiña experimental forest



The Liétor experimental forest



**Figure 1.** Location of study areas and picture of the site after fire at both A Gudiña and Liétor. Non mulching and logging plots

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**Table 2.** Physico-chemical soil properties (mean  $\pm$  standard deviation) for each experimentation area. A lowercase letter indicates statistically significant differences according to the LSD test ( $P < 0.05$ ) for each measured soil parameter at each experimental site. Statistically significant factors ( $P$ -Value  $< 0.05$ ) are depicted in bold font.

A Gudiña	Treatment	pH	Nitrogen (%)	Organic Matter (%)	Sand (%)	Silt (%)	Clay (%)	Soil texture
	No mulching+no salvage logging	4.11 $\pm$ 0.04 a	0.32 $\pm$ 0.02 a	18.23 $\pm$ 0.86 a	72.74 $\pm$ 2.01 a	14.81 $\pm$ 0.75 a	12.45 $\pm$ 1.04 a	Sandy Loam
	No mulching+salvage logging	4.23 $\pm$ 0.05 a	0.31 $\pm$ 0.03 a	19.26 $\pm$ 0.86a	73.01 $\pm$ 1.00 a	13.92 $\pm$ 0.61 a	13.07 $\pm$ 0.87 a	Sandy Loam
	Mulching+no salvage logging	4.24 $\pm$ 0.05 a	0.35 $\pm$ 0.04 a	19.78 $\pm$ 0.52 a	73.70 $\pm$ 0.58 a	13.83 $\pm$ 0.71 a	12.47 $\pm$ 0.66 a	Sandy Loam
	Mulching+salvage logging	4.12 $\pm$ 0.05 a	0.34 $\pm$ 0.02 a	18.92 $\pm$ 0.86 a	73.18 $\pm$ 0.45 a	14.15 $\pm$ 0.46 a	12.67 $\pm$ 0.55 a	Sandy Loam
Liétor	Treatment	pH	Nitrogen (%)	Organic Matter (%)	Sand (%)	Silt (%)	Clay (%)	Soil texture
	No mulching+no salvage logging	8.45 $\pm$ 0.06 a	0.24 $\pm$ 0.04 a	6.20 $\pm$ 0.73 a	50.39 $\pm$ 3.00 a	41.89 $\pm$ 1.96 a	7.72 $\pm$ 1.04 a	Sandy Loam
	No mulching+salvage logging	8.48 $\pm$ 0.08 a	0.25 $\pm$ 0.02 a	7.13 $\pm$ 0.10 a	51.28 $\pm$ 0.04 a	42.04 $\pm$ 0.04 a	6.68 $\pm$ 0.85 a	Sandy Loam
	Mulching+no salvage logging	8.41 $\pm$ 0.04 a	<b>0.32<math>\pm</math>0.01 b</b>	<b>9.05<math>\pm</math>0.37 b</b>	52.36 $\pm$ 1.04 a	40.00 $\pm$ 0.99 a	7.64 $\pm$ 1.04 a	Sandy Loam
	Mulching+salvage logging	8.48 $\pm$ 0.02 a	0.23 $\pm$ 0.03 a	6.03 $\pm$ 0.48 a	51.36 $\pm$ 1.89 a	40.96 $\pm$ 0.96 a	7.68 $\pm$ 0.93 a	Sandy Loam

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**Table 3.** Seedling morphology parameters (mean and standard deviation) and results of the one-factor ANOVA of treatments (no mulching+no salvage logging (three replicates), mulching+no salvage logging (three replicates), no mulching+salvage logging (three replicates), and mulching+salvage logging (three replicates)) for each experimentation area at the Liétor site. A lowercase letter indicates statistically significant differences according to the LSD test ( $P < 0.05$ ) for each measured soil parameter. Statistically significant factors ( $P\text{-Value} < 0.05$ ) are depicted in bold.

Treatment:			No mulching+no salvage logging		No mulching+salvage logging		Mulching+no salvage logging		Mulching+salvage logging	
variable	F-ratio	P-value	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Density (seedlings m <sup>-2</sup> )	6.10	<b>0.004</b>	0.645a	0.18	0.66a	0.11	0.94b	0.18	0.99b	0.22
Diameter (mm)	0.08	0.841	3.10a	1.54	3.11a	1.26	3.54a	1.14	3.43a	1.40
Seedling height (mm)	3.82	<b>0.011</b>	108.59ab	61.55	98.28a	27.72	123.83b	34.64	118.24b	44.61
Canopy length (mm)	0.49	0.691	14.56a	6.54	16.16a	5.76	14.84a	4.64	17.56a	7.56
Root length (mm)	0.42	0.739	16.08a	7.64	17.27a	5.84	18.18a	5.28	18.96a	5.03
Canopy dry weight (g)	0.11	0.955	2.94a	3.38	2.51a	2.76	3.20a	1.89	2.98a	2.87
Stem dry weight (g)	0.16	0.925	7.335a	9.08	5.68a	6.52	7.64a	4.57	6.94a	6.67
Root dry weight (g)	0.02	0.9951	1.01a	0.99	0.95a	0.736735	1.02a	0.44	1.03a	0.69



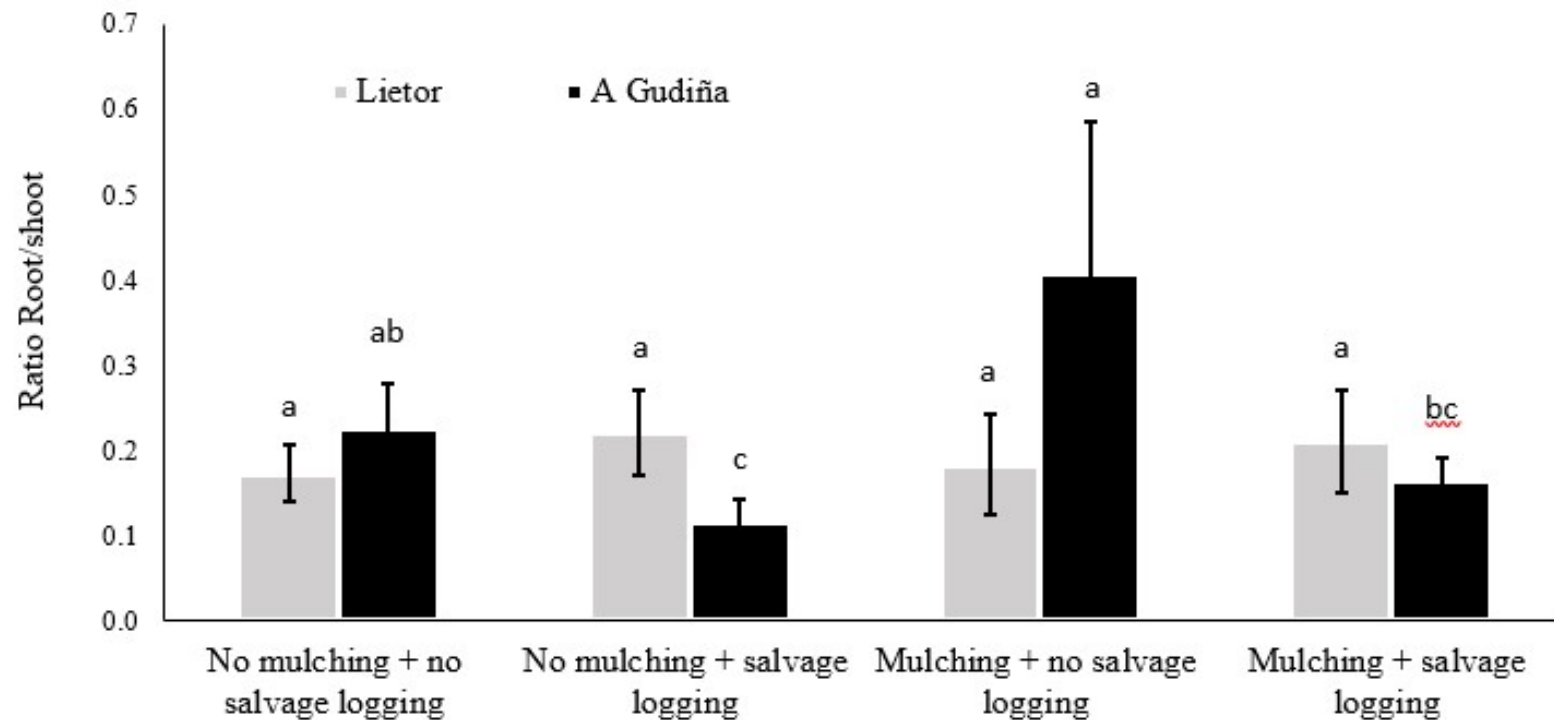
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**Table 4.** Physico-chemical soil properties (mean and standard deviation) and results of the one-factor ANOVA of treatments (no mulching+no salvage logging (three replicates), mulching+no salvage logging (three replicates), no mulching+salvage logging (three replicates) and mulching+salvage logging (three replicates) for each experimentation area at the A Gudiña site. A lowercase letter indicates statistically significant differences according to the LSD test ( $P < 0.05$ ) for each measured soil parameter. Statistically significant factors ( $P$ -Value  $< 0.05$ ) are depicted in bold.

Treatment			No mulching+no salvage logging		No mulching+salvage logging		Mulching+no salvage logging		Mulching+salvage logging	
variable	F-ratio	P-value	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Density (seedlings m <sup>-2</sup> )	7.14	<b>0.002</b>	0.12a	0.08	0.05a	0.04	0.10a	0.09	0.29b	0.15
Diameter (mm)	1.35	0.274	1.68a	0.94	2.06a	0.93	1.66a	0.75	2.30a	1.13
Seedling height (mm)	3.41	<b>0.027</b>	91.88ab	29.75	78.00a	21.97	81.79a	24.54	114.67b	38.15
Canopy length (mm)	3.69	<b>0.020</b>	67.50ab	17.32	64.00ab	19.81	59.64a	23.73	90.33b	33.03
Root length (mm)	1.88	0.150	59.38a	52.54	65.00ab	23.98	103.21b	49.44	90.67ab	46.17
Canopy dry weight (g)	3.21	<b>0.034</b>	0.44a	0.34	0.82ab	0.60	0.34a	0.19	0.95b	0.83
Stem dry weight (g)	3.05	<b>0.040</b>	0.47a	0.37	0.85ab	0.62	0.38a	0.21	1.02b	0.90
Root dry weight (g)	0.30	0.828	0.12a	0.14	0.11a	0.08	0.16a	0.17	0.17a	0.15

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**Natural regeneration:**

- Mulching improved seedling density in the short term for the semiarid Mediterranean climate regardless of trees being felled or not, whereas the mulching+logging combination showed the highest seedling density.
- Thus mulching may enhance initial recruitment by making improvements to post-fire microclimate conditions (increased soil moistures, lower soil temperature) at Liétor, a water-stressed environment.
- The more light available after felling trees and the almost null effect of the machinery used on logging may favour initial seedling recruitment at A Gudiña, where *P. Pinaster* does not grow in a water-limited ecosystem.

**Overall, the results of this study indicate the contrasting response of straw application and logging in areas burned by high-severity fire to initial recruitment seedling and seedling growth.**





Thanks!!

