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O uso do fogo controlado em áreas invadidas por plantas exóticas

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The problem

- Portugal is an invasion-prone country, given its mild climate and the introduction of many alien plant species
- Some of those species are fire-adapted

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Fire and alien plants may be connected through a fire cycle

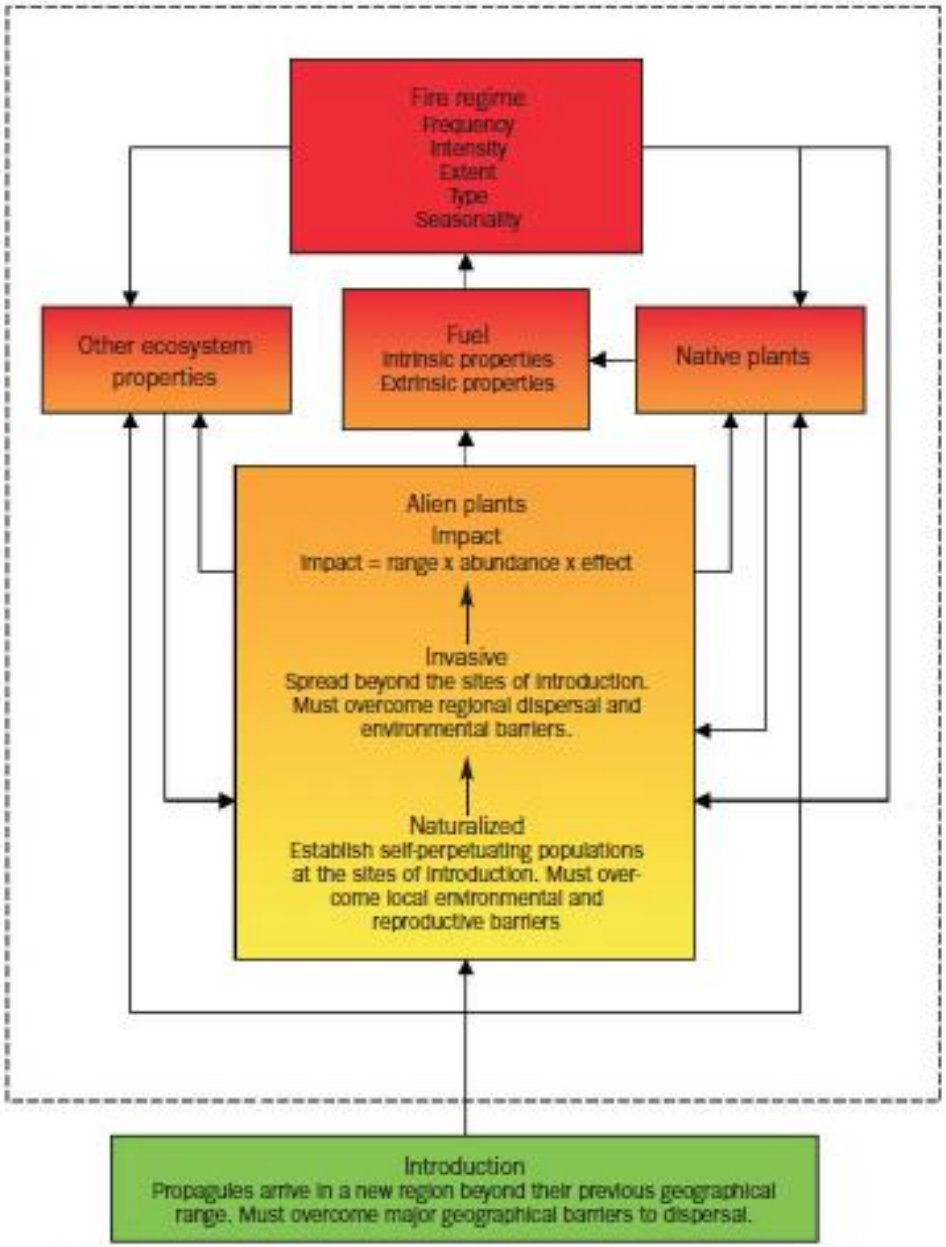

Figure 2. The invasive plant–fire regime cycle. Green, phase 1; yellow, phase 2; orange, phase 3; red, phase 4.

Brooks *et al.* 2004

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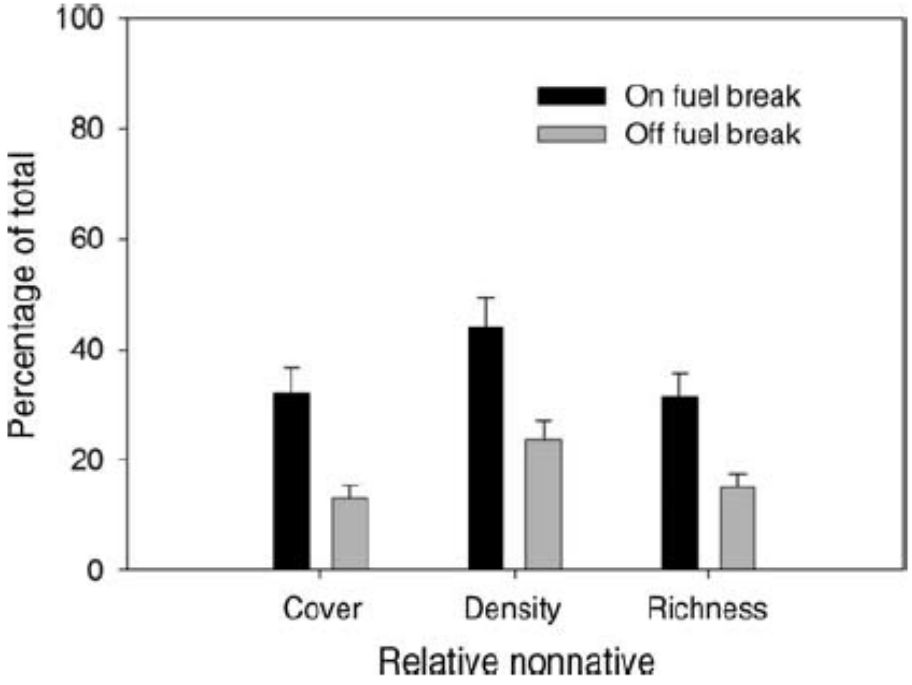
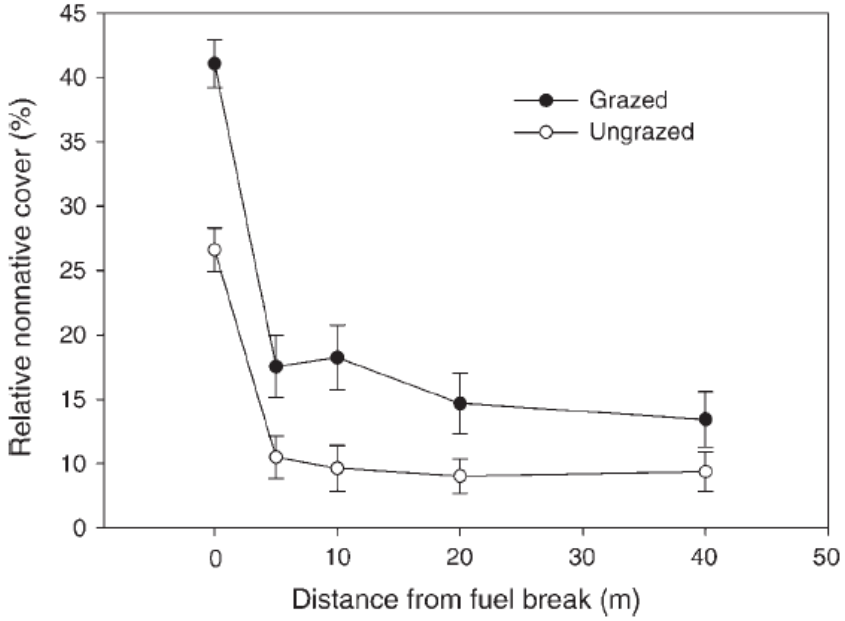
- Most fuel management practices may potentially aggravate the problema of plant invasions
- Even fuel breaks for fire prevention can foster the establishment of invasive plants

In Califórnia (Merriam et al. 2006):

> "We found that nonnative plant abundance was over 200% higher on fuel breaks than in adjacent wildland areas"





Merriam et al. 2006):

Alien plant species introduced to Portugal that are well adapted to fire

- *Acacia dealbata*
  - Australian origin
  - As many other Fabaceae, it develops a soil seed bank
  - The hard-coated seeds may be stored in the soil for decades
  - Fire triggers seed germination
  - It resprouts vigorously after fire
  - Seed pods can be dispersed at considerable distances
  - It has been expanding rapidly across the country

- *Hakea sericea*
  - Another Australian species
  - It is an obligate seeder
  - It develops a canopy seed bank
  - Woody fruits open after fire and disperse the seeds at considerable distances (>100 m), therefore expanding the invaded area

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O projeto Fogo e Invasoras

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- The use of fire as a fuel management tool may aggravate the problem of plant invasions
- Yet, proper management through na informed use of fire, may:
  - At least, minimize the risk of expanding the invasive plants, using an apropriate prescription;
  - If properly used, it may even contribute to locally eliminate the invasive plant species.

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But

- Currently we don’t know how to set a prescription envisaging the achievment of such goals;
- The existing guides on prescribed burning for portuguese conditions:
  - Have the sole goal of managing fuels for fire hazard mitigation
  - Did not consider the risk of plant invasions

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GUIA DE CAMPO PARA FOGO CONTROLADO EM MATOS

GUIA DE FOGO CONTROLADO EM EUCALIPTAL

Piro Pinus

PRESCRIBED BURNING GUIDE FOR MARITIME PINE STANDS

Version 2.3, August 2011

Paulo Fernandes
Carlos Loureiro
Hermínio Botelho

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Burn, March 2014

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March 2016

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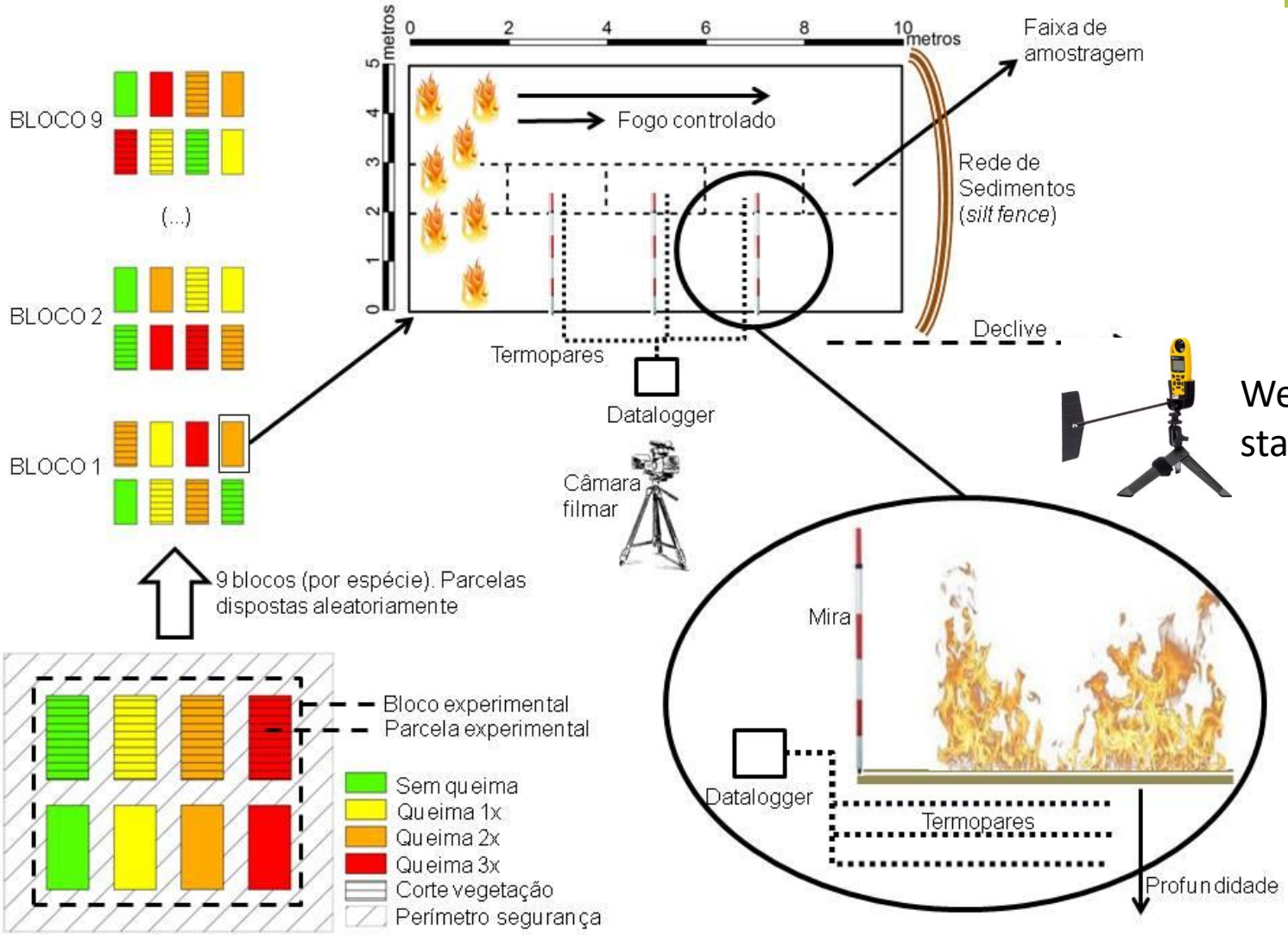
Abril de 2018

Experimental design – initial version



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Preliminary results

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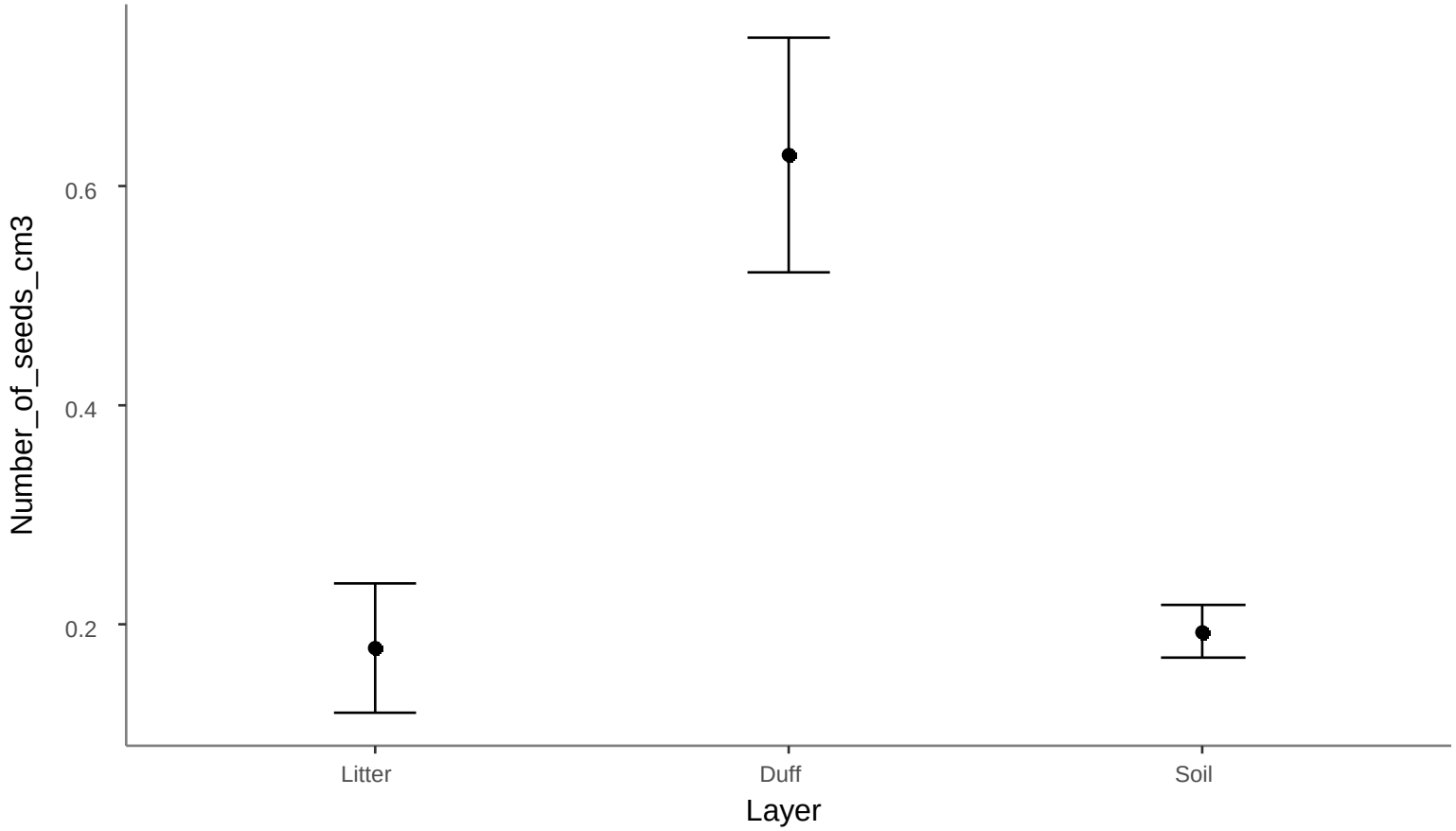

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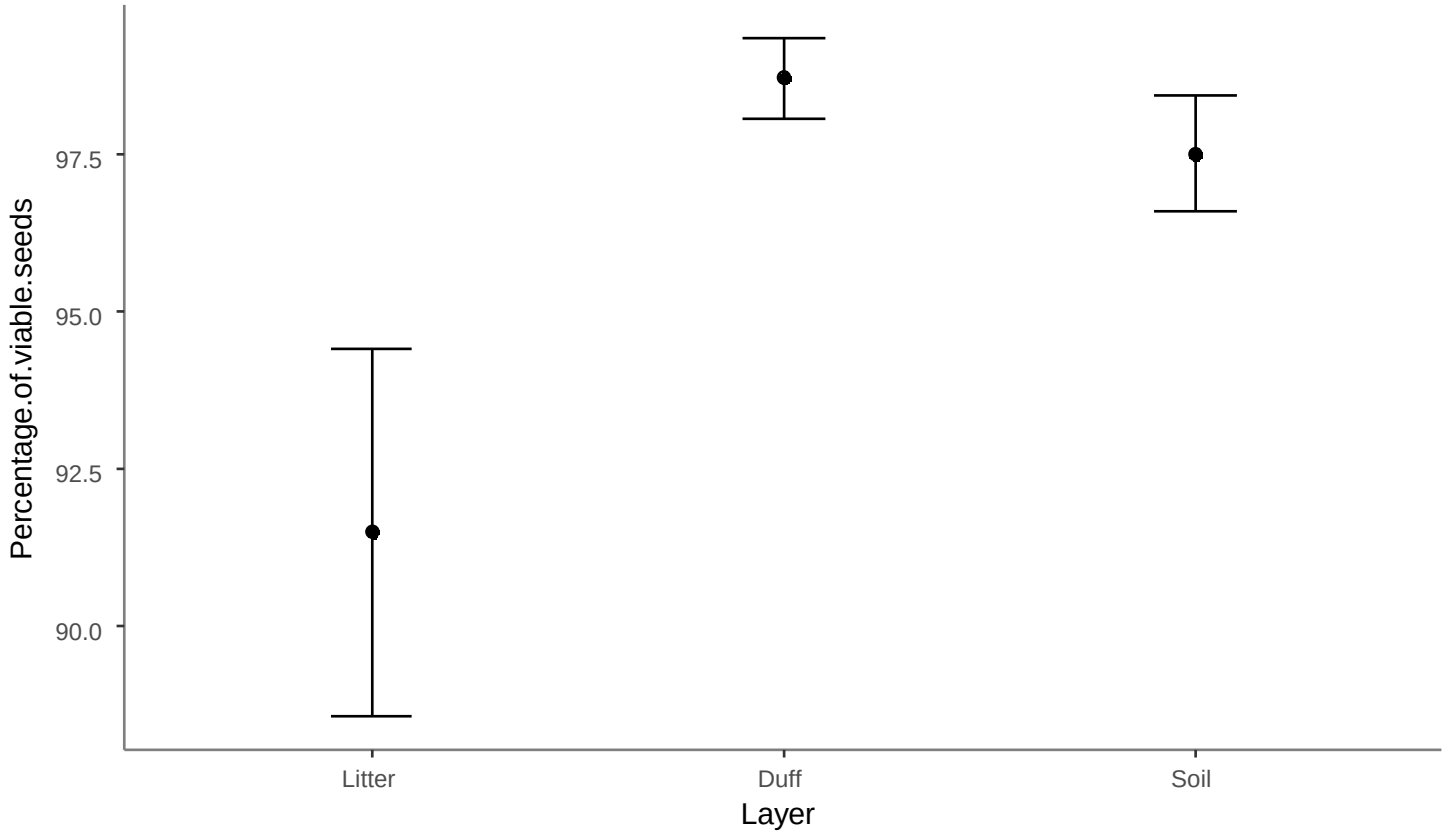
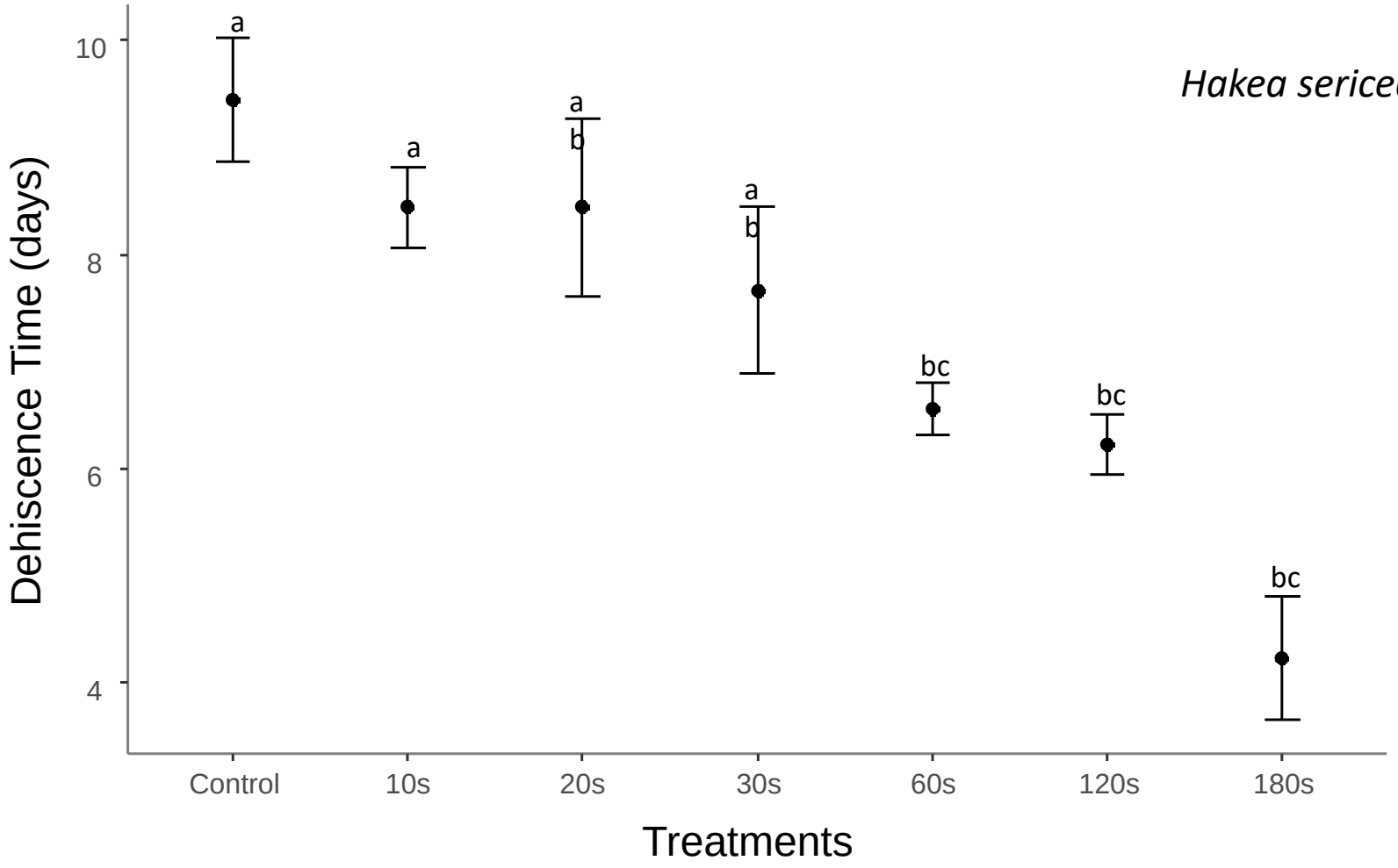

Percentage.of.viable.seeds
97.5
95.0
92.5
90.0
Litter
Duff
Soil
Layer



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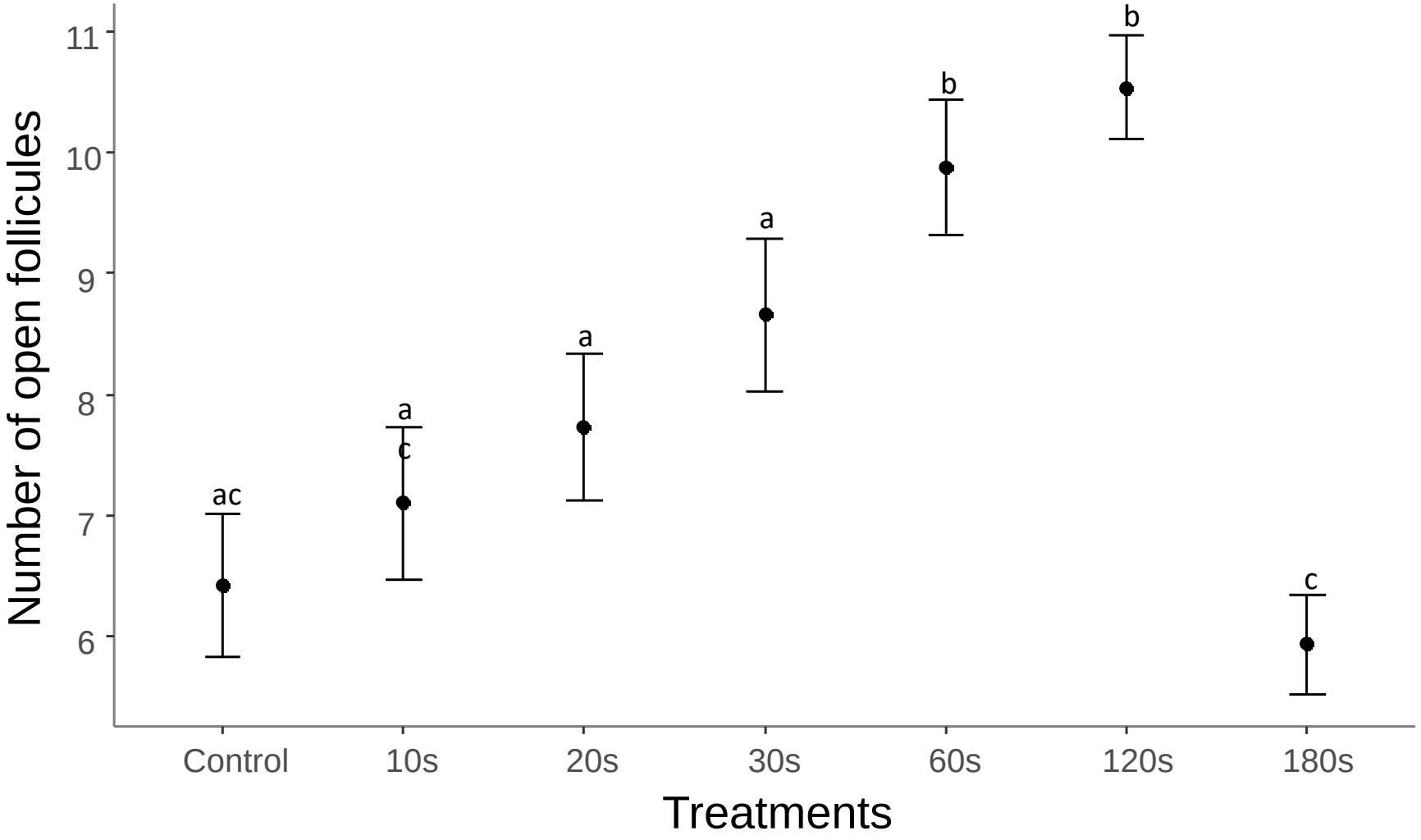

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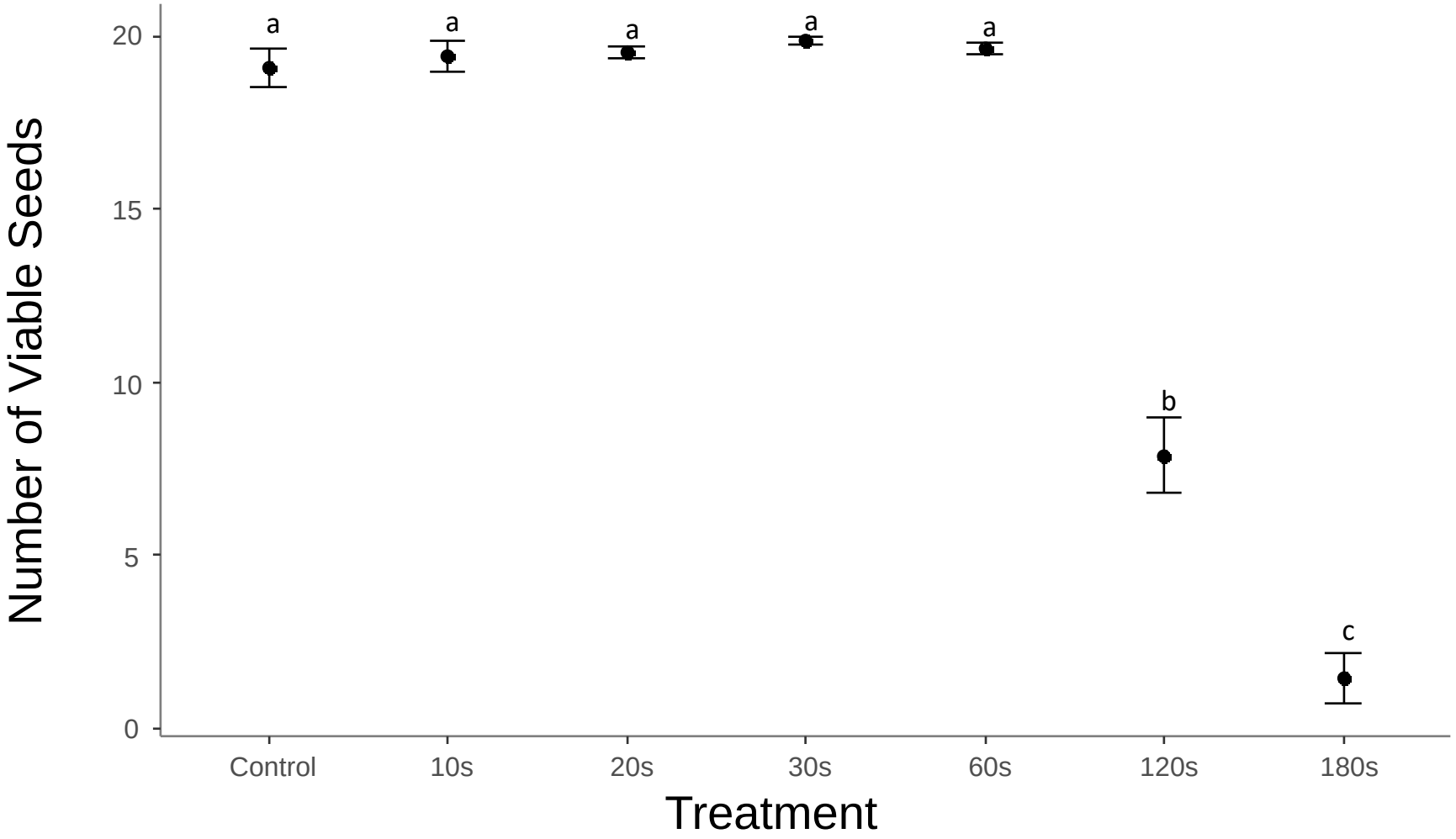

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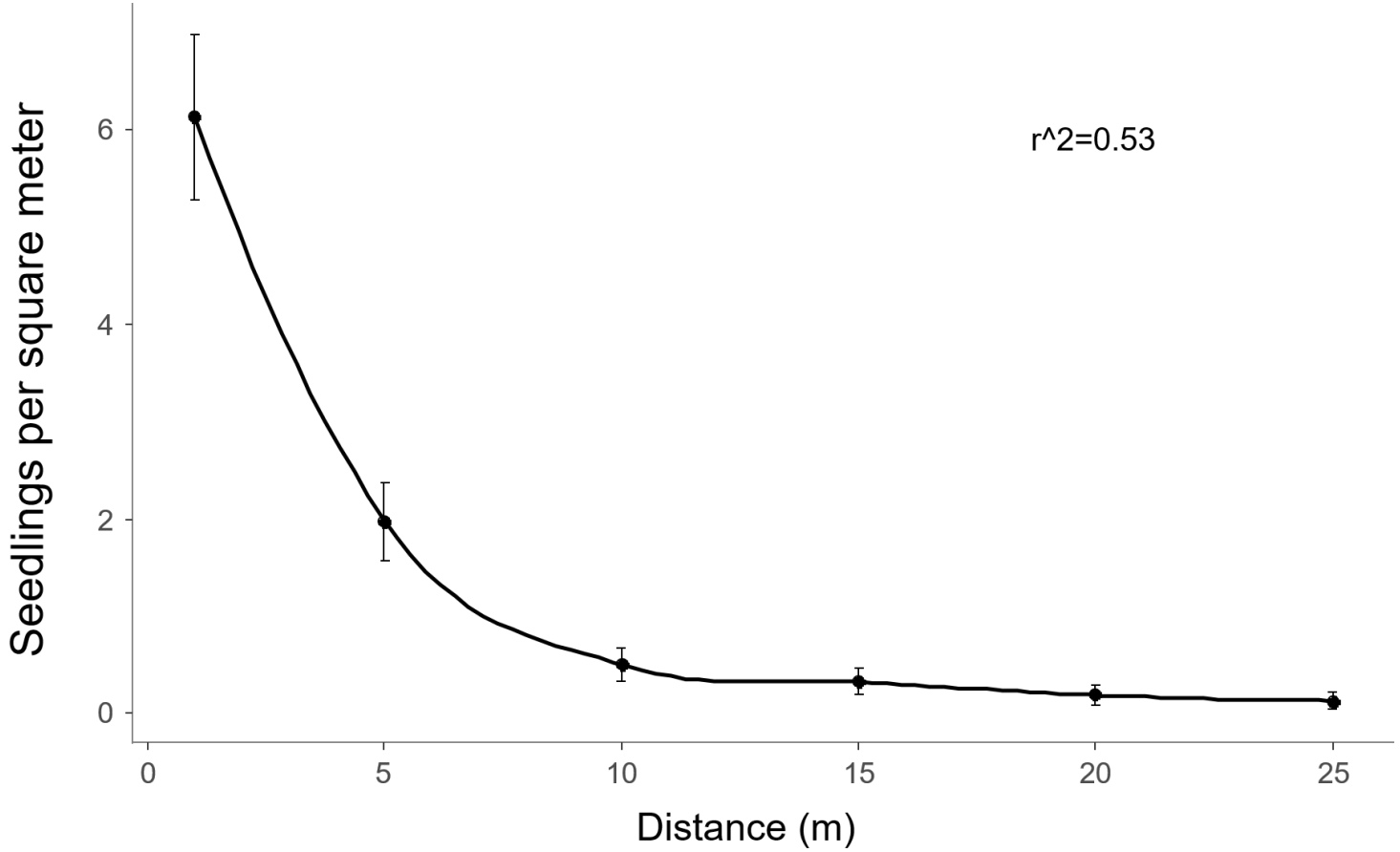

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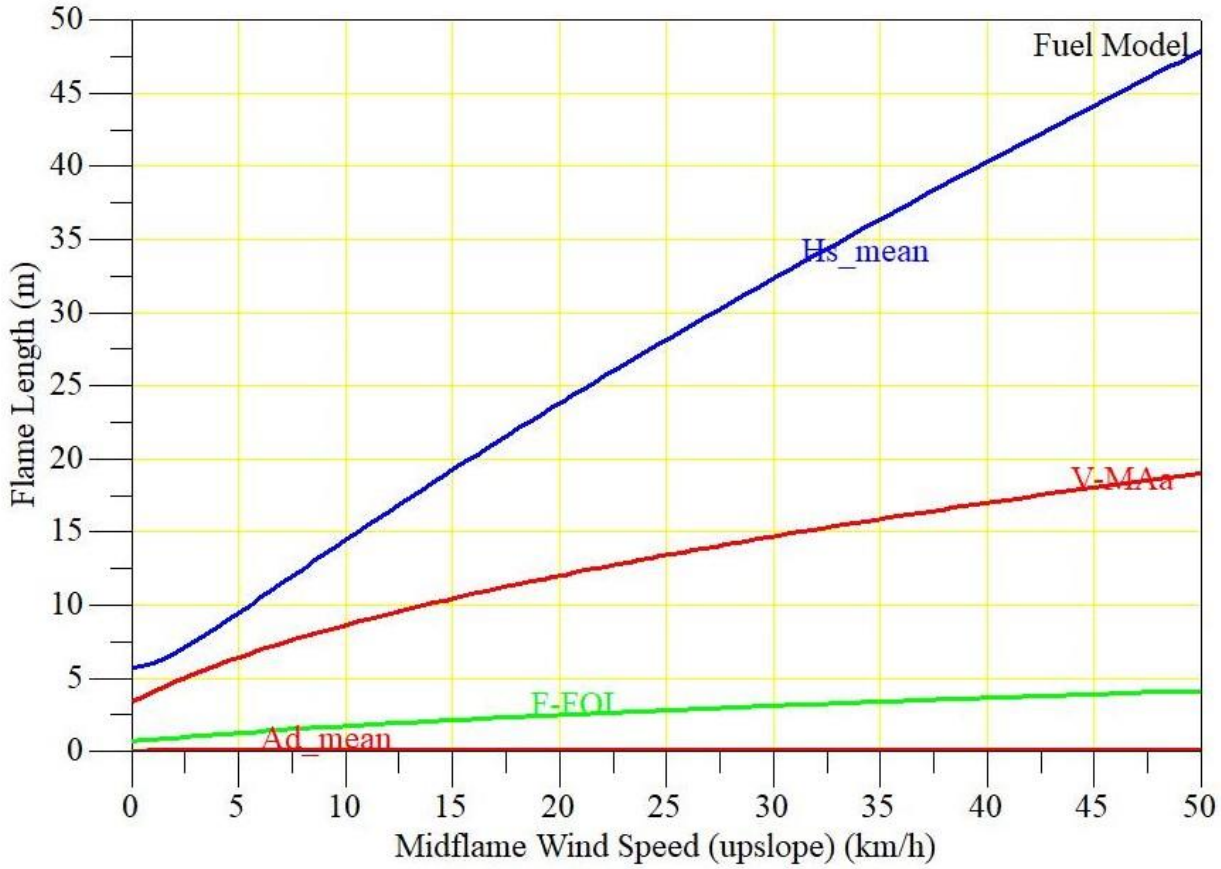
Parâmetros de combustível

	A. dealbata	Broadleaf forest	H. sericea	Tall shrubland
1-h load	7.59±1.25*	2.67	17.85±5.15	9.50
10-h load	2.10±0.53	1.27	0.04±0.04*	2.50
100-h load	0.00	0.69	0.00	0.00
Live woody load	0.00	1.16	27.32±7.43	14.50
Herbaceous load	0.00	0.00	0.00	0.00
Fuel depth	0.02±0.00*	0.15	1.69±0.33	1.05
Flame length	0.00	1.20	6.22±1.64	5.90

Average (±SE) fuel characteristics and simulated flame length (moisture scenario D1L1, wind speed = 5km/h, slope = 0%) for *H. sericea* and *A. dealbata* stands (n=9), compared to reference fuel models of native plant communities in Portugal. Fuel loads are in ton/ha. Fuel depth and flame length are in meters. Significance of one-sample t-tests is indicated by an asterisk.

Comportamento potencial do fogo

Results of fire behavior (Flame length) simulated with BehavePlus 5.0.5 for the average *H. sericea* fuel model (Hs_mean), the tall shrubland fuel model (V-MAa), the broadleaves fuel model (F-FOL) and the average *dealbata* fuel model (Ad_mean). Simulations were performed using the D1L1 moisture scenario (very low dead-fuel moisture) and a 30% slope (wind running upslope).



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Queimas experimentais

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