FirEProd

Prescribed burning, fire risk and eucalypts productivity: from research to practice

Prescribed Fire Management Strategy for Post-Harvest Eucalypt Plantations in Portugal

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Context

> Prescribed fire is considered to be an efficient method to decrease fuel loads and reduce fire risk.

The use of prescribed fire in the management of eucalyptus plantations continues to be a challenge in Portuguese reality.

> Technical guidelines for the use of prescribed fire in the management of eucalyptus wood debris in Portugal are particularly required.

Objectives

The FirEProd Project aims to increase understanding of the effects of prescribed fire on the soil and productivity of eucalyptus. More particularly aims:

- To evaluate the use of prescribed fire as a management strategy for wood debris management following harvesting.

- To investigate the impact of this method on the survival and growth of the plantation.
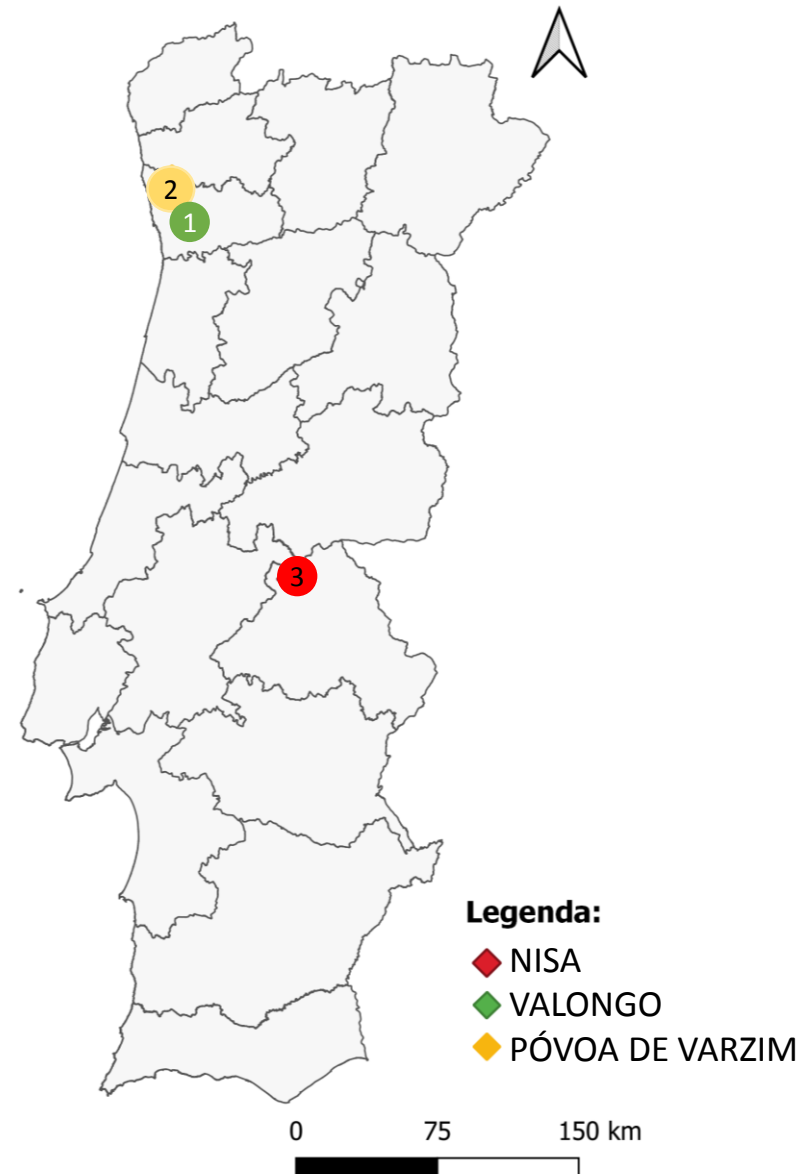
Trials
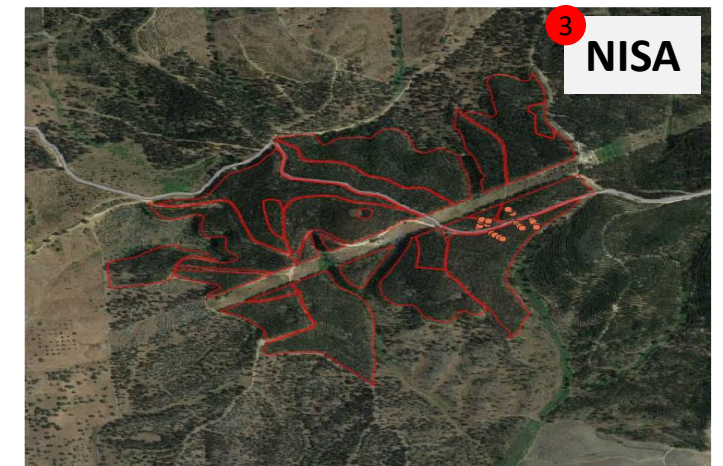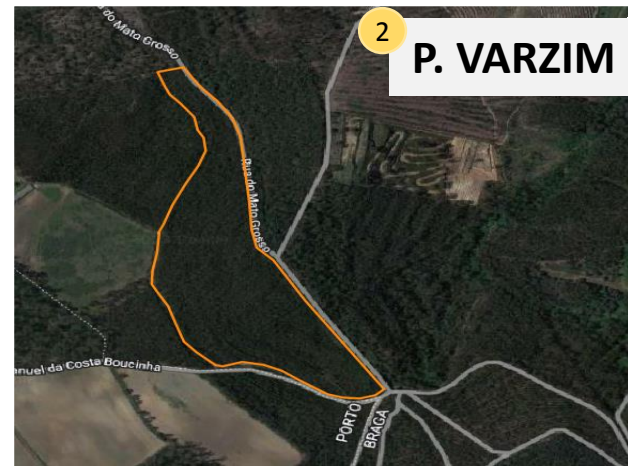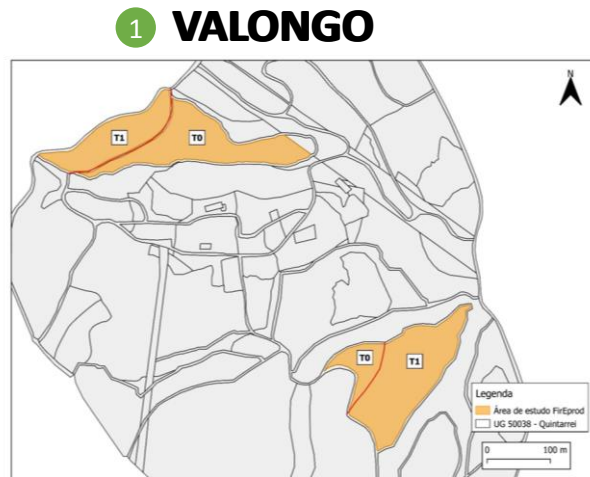
Instalação:

December 2021
- Valongo

March 2023
- Póvoa de Varzim
- Nisa

Legenda:
- NISA
- VALONGO
- PÓVOA DE VARZIM

0   75   150 km

Experimental design

VALONGO
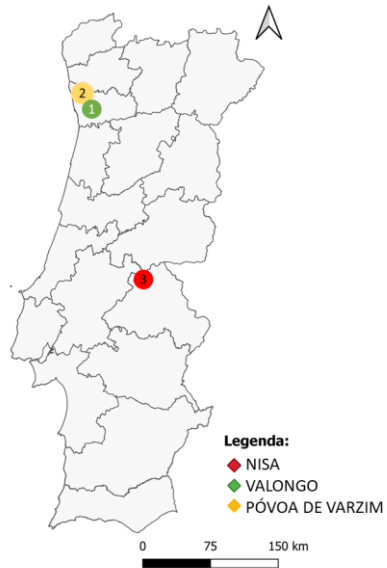
P. VARZIM

NISA

Study areas

- *Eucalyptus globulus* plantations between 10 and 14 years old, first rotation

- Harvesting:
    - Ø 3 months prior to fire in 2021 (Valongo) - 2 Blocks
    - Ø 2 months prior to fire in 2023 (Póvoa de Varzim e Nisa)

- Treatments:
    - ➢ T0 No fire – Control area
    - ➢ T1 Fire – Prescribed fire area

Biomass distribution

1 VALONGO

Distribution following biomass accumulation stripes

2 P. VARZIM

3 NISA

Homogeneous distribution across the experimental area.

Prescribed fire

- **Valongo** - Afocelca/ The Navigator Company – 16th December 2021
- **Póvoa de Varzim** - Portucalea/ Bombeiros Voluntários da Póvoa de Varzim – 2nd March 2023
- **Nisa** - Afocelca/ The Navigator Company – 16 th March 2023

<u>Method:</u> Ignition using a drip-torch, propagation against the slope and against the wind.

Results

Moisture content and fire severity

① VALONGO

② P. VARZIM

③ NISA

FWY 4.1 - 6.8 DMC 3.3 - 16.6	**+**	Moisture content (range)

Moisture content (range)

| biomass 3% - 43% | litter 11% - 128% | soil 9% - 16% |

Visual assessment of fire severity:

- <u>class 1</u> **(Vega et al., 2013)**

Organic layer (lower duff) partially or totally intact.

Mineral soil undisturbed.

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(Vega et al., 2013, DOI 10.1007/s11104-012-1532-9)

Soil temperature during fire

Maximum temperature at soil surface:

① VALONGO

    Block 1: 20 °C and 76 °C

    Block 2: 16°C and 40 °C
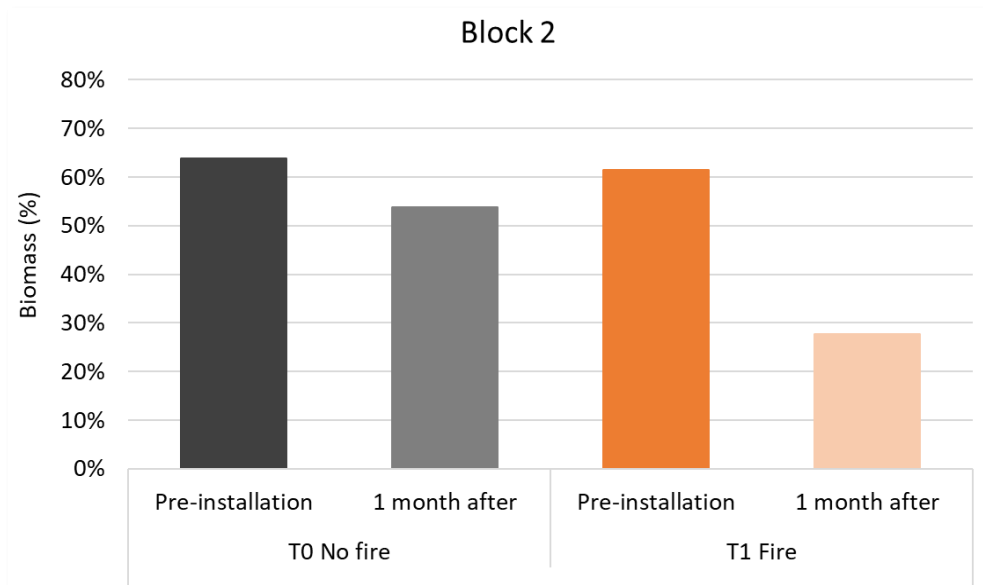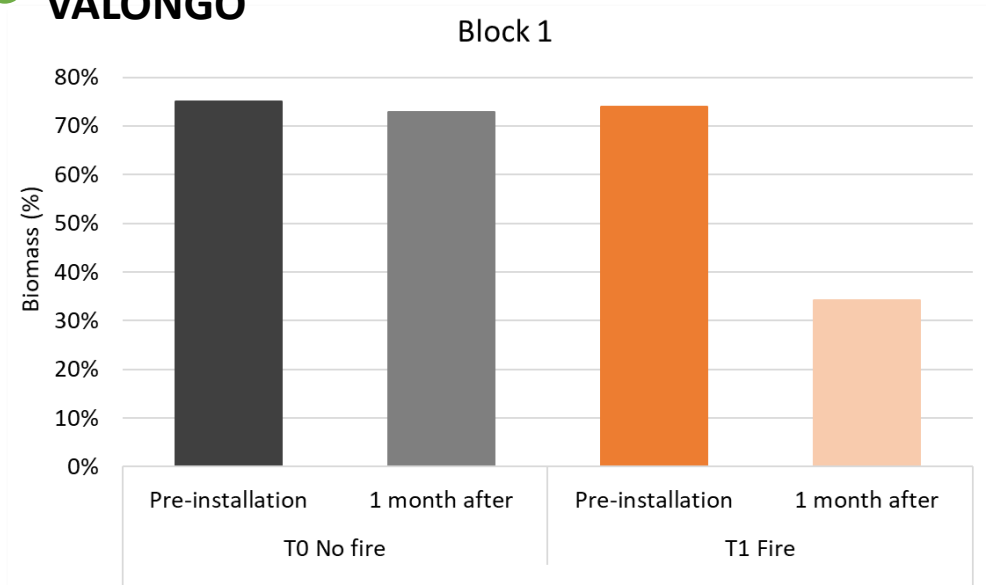
② P. VARZIM

    41°C and 117°C

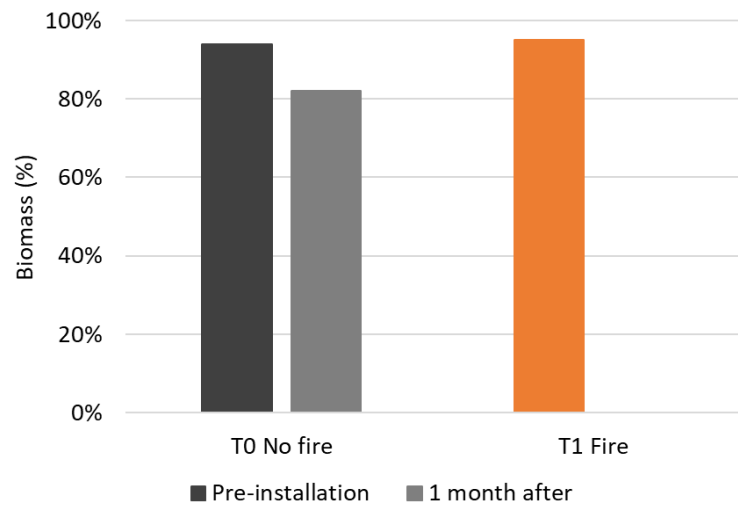**③ NISA**

    64°C and 108°C.

Biomass

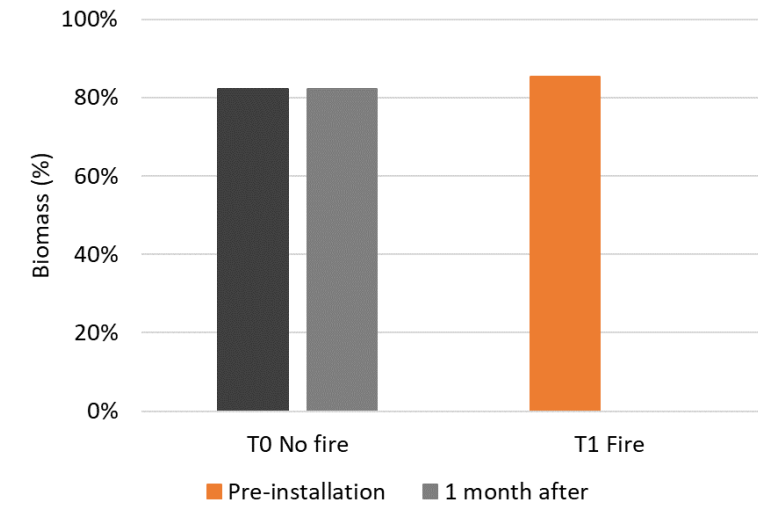Fine wood debris: diameter less or equal to 6 mm, bask and leaves..

Biomass

2 P. VARZIM

Fine wood debris

3 NISA

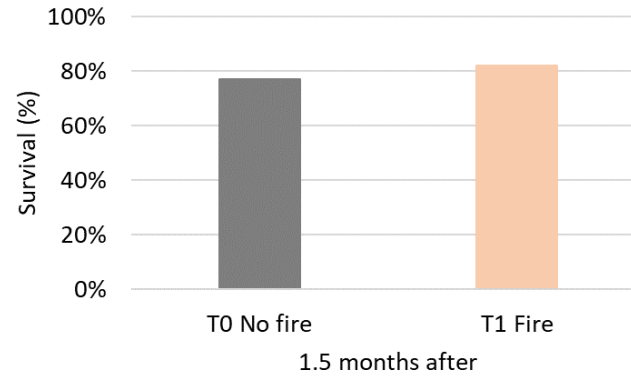**Fine wood debris**

Biomassa fina: Sobrantes lenhosos com diâmetro inferior a 6 mm, casca e folhas de eucalipto.

Tree survival

1 VALONGO

Block 1

Survival (%) — axis: 0%, 20%, 40%, 60%, 80%, 100%

T0 No fire   T1 Fire

1.5 months after

Block 2

Survival (%) — axis: 0%, 20%, 40%, 60%, 80%, 100%

T0 No fire   T1 Fire

1.5 months after

2 P. VARZIM

Survival (%) — axis: 0%, 20%, 40%, 60%, 80%, 100%

T0 No fire   T1 Fire

1.5 months after

3 NISA

Survival (%) — axis: 0%, 20%, 40%, 60%, 80%, 100%

T0 No fire   T1 Fire

1.5 months after
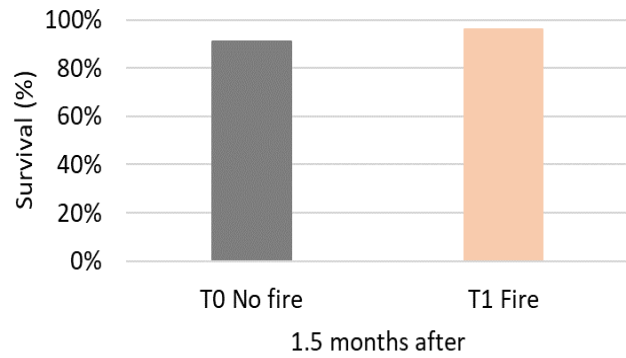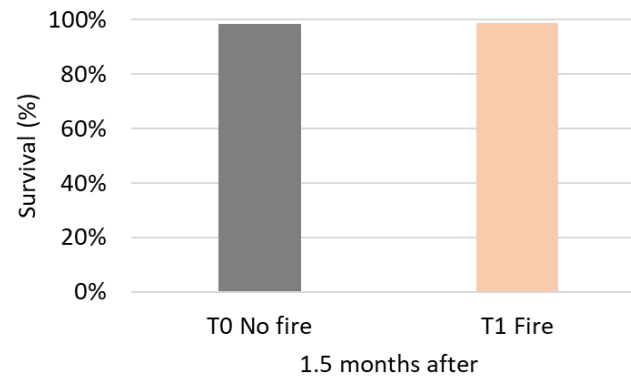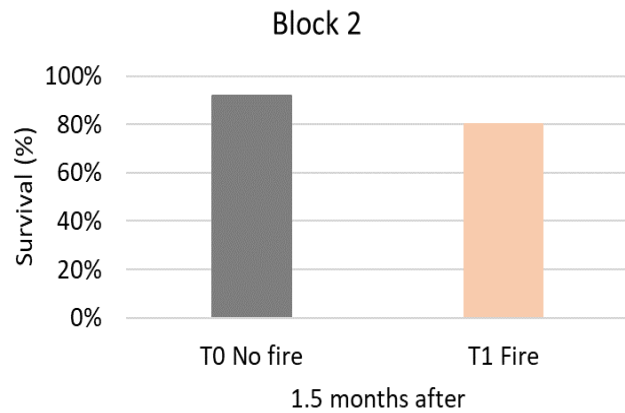
Final remarks

- Even with varying moisture contents, prescribed fire proved to be effective in lowering biomass loads at the three trials.

- At all sites, the degree of soil fire severity was low (class 1), although the pre-fire differences in biomass accumulation profiles.

- The survival of the trees was not adversely affected by the fire.

Thank you!