

2012 IUFRO CONFERENCE DIVISION 5 - FOREST PRODUCTS

8 > 13 JULY '12
ESTORIL CONGRESS CENTRE
LISBON - PORTUGAL

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MINISTÉRIO DA AGRICULTURA,
DO MAR, DO AMBIENTE
E DO ORDENAMENTO DO TERRITÓRIO



Coniferous bark heat treatment for the elimination of the pinewood nematode



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8-13 July 2012

RESEARCH/TECHNICAL GROUPS INVOLVED

Direcção Geral de Alimentação e Veterinária
(DGAV)

Laboratório de Nematologia, Faculdade de
Ciências e Tecnologia, Universidade de
Coimbra (FCTUC)

Laboratório Nacional de Energia e Geologia
(LNEG)

Instituto Nacional de Recursos Biológicos
(INRB)

Portuguese bark companies

Research activities to validate heat treatment for the elimination of the *B. xylophilus* from coniferous bark

RESEARCH ACTIVITY 1:

Validation of the natural heat treatment

RESEARCH ACTIVITY 2:

Evaluation of the screening process of the bark heap

RESEARCH ACTIVITY 3:

Artificial heat treatment validation

RESEARCH ACTIVITY 4:

Nematode survival and reproduction in *Pinus pinaster* bark

RESEARCH ACTIVITY 5:

Risk of bark contamination with the PWN

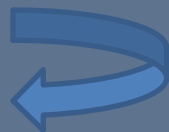
RESEARCH ACTIVITY 6:

Risk assessment of composting process

RESEARCH ACTIVITY 1: Validation of the natural heat treatment

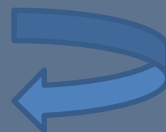
Composting:
Treatment process

60°C / 6h



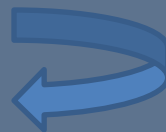
1st turnover

60°C / 6h



2nd turnover

60°C / 3h



3rd turnover

60°C / 3h

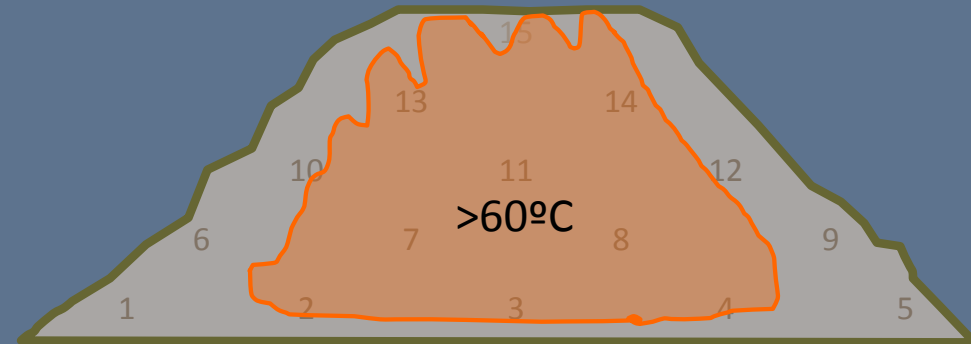
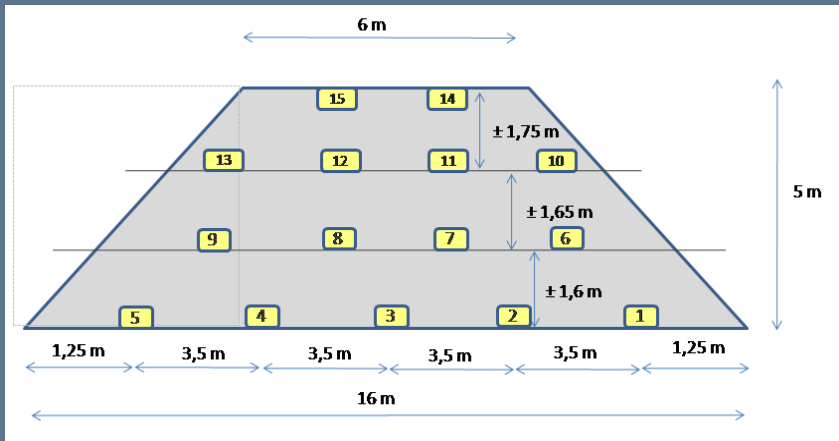


Composite sample 1SAMPLE/100m³

RESEARCH ACTIVITY 1: Validation of the natural heat treatment

Research activities of LNEG

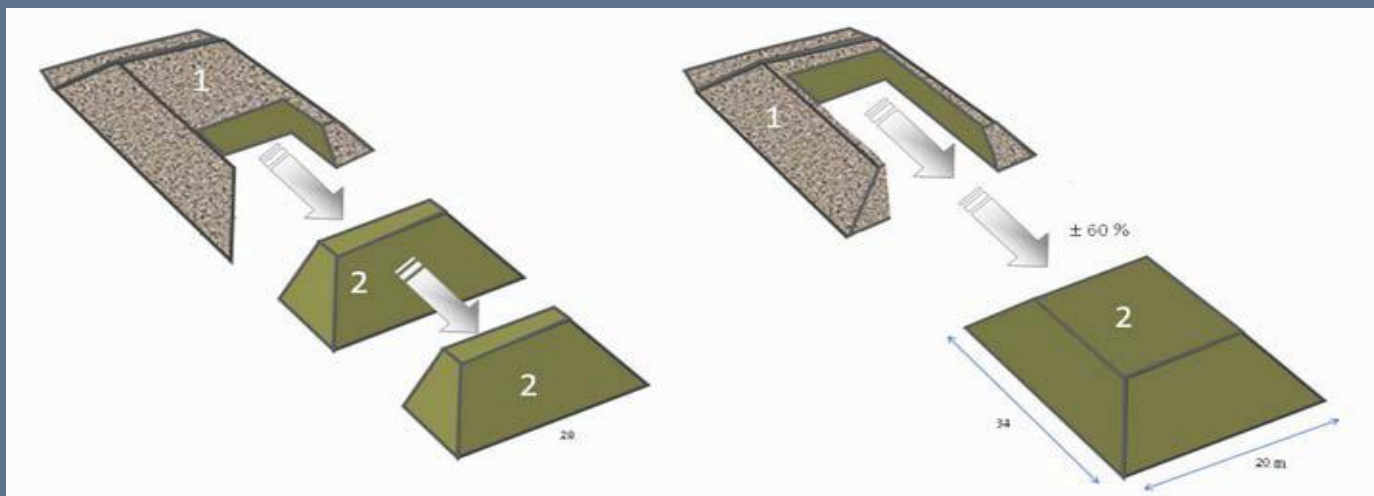
Temperature profile



RESEARCH ACTIVITY 1: Validation of the natural heat treatment

Improve turning process

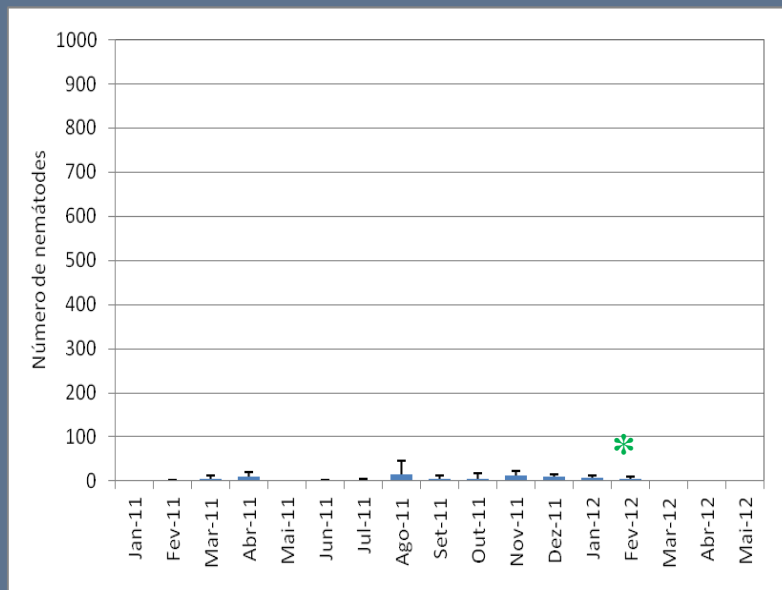
Removal of internal portion



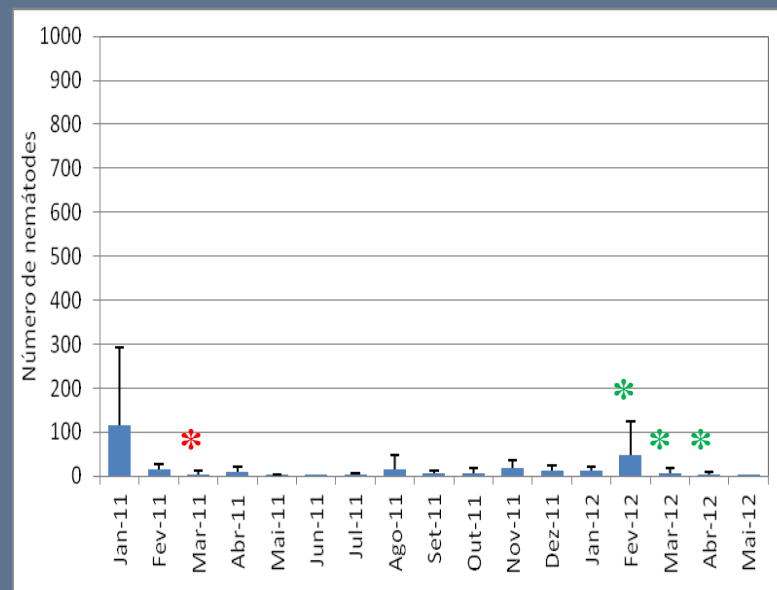
RESEARCH ACTIVITY 1: Validation of the natural heat treatment

Research activities of FCTUC

Leal & Soares Lda.



Madeca



Efficacy elimination PWN

RESEARCH ACTIVITY 1: Validation of the natural heat treatment

Research activities of FCTUC

RESEARCH ACTIVITY 2 : Evaluation of the screening process of the bark heap

Efficacy elimination PWN



Biomassa



Fibras



00/08mm



08/15mm



15/25mm



15/25mm Gold



25/45mm



25/45mm
Gold



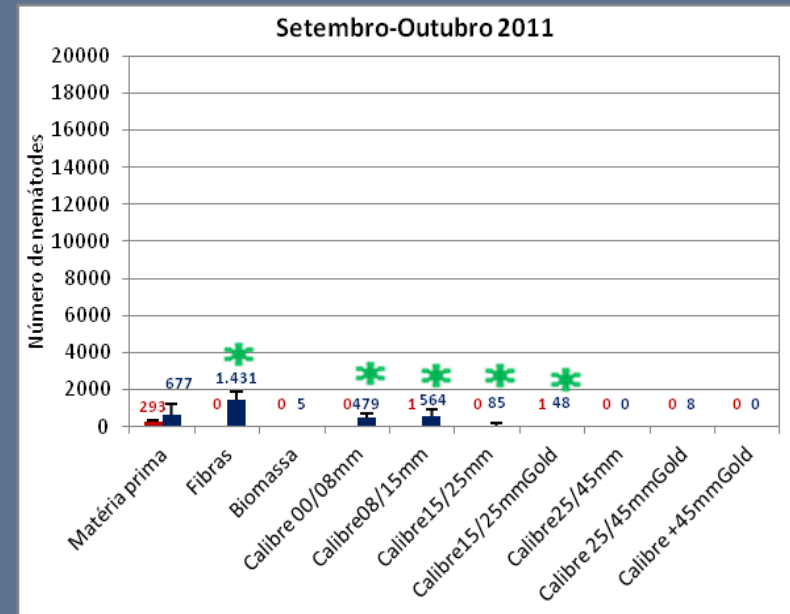
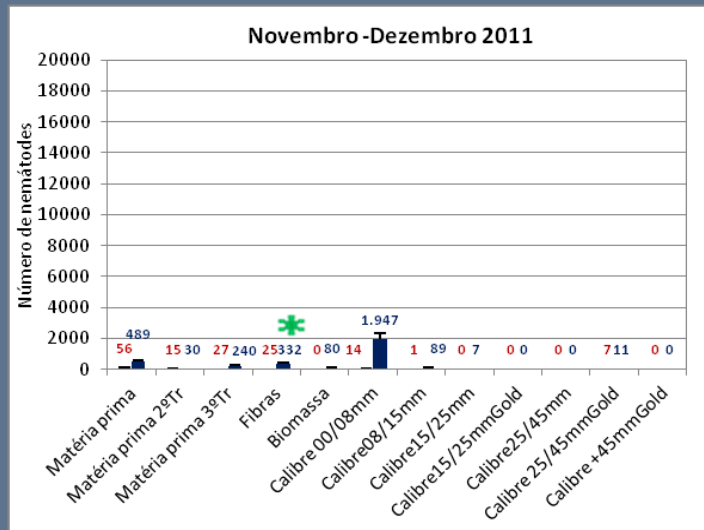
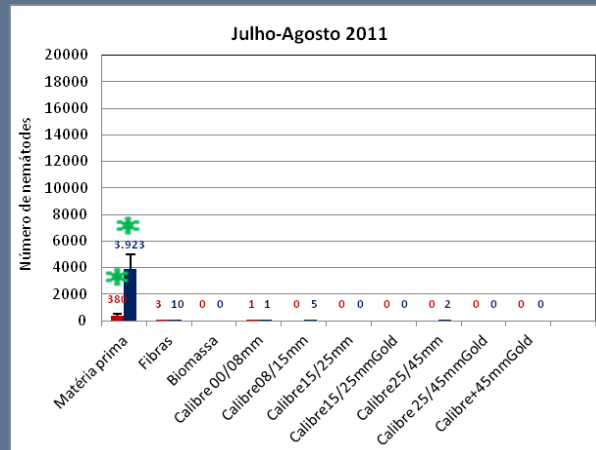
+ 45mm Gold

RESEARCH ACTIVITY 2 : Evaluation of the screening process of the bark heap

Research activities of FCTUC

Sampling	Before treatment *	After treatment-official sampling *	After calibration w/out incubation	After calibration w/ incubation
Nematodes	Bx and others	Bx and others	Bx and others	Bx and others
Raw material Initial pile	X	X		
After calibration				
Residues or biomass			X	X
Dust and fibers			X	X
Bark sizes				
0-30mm			X	X
30-50mm			X	X
50-80 mm			X	X

RESEARCH ACTIVITY 2 : Evaluation of the screening process of the bark heap



RESEARCH ACTIVITY 1: Validation of the natural heat treatment

RESEARCH ACTIVITY 2 : Evaluation of the screening process of the bark heap

Research activities of LNEG/ FCTUC

Conclusions

1- Characterisation of the temperature profile within each treated lot.

“There is a high level of uncertainty that the lethal temperature for PWN will be reached throughout the lot particularly in lower zones of the bark.”

2- Because a considerable reproduction of other *Bursapelenchus* species after composting in samples after incubation period this protocol cannot ensure efficacy of composting: 100% free.

3-Most of the samples were Negative for *Bursaphelenchus xylophilus*

RESEARCH ACTIVITY 3: Artificial heat treatment validation

Research activities of LNEG / FCTUC

Artificial heating

Hot air

Steam

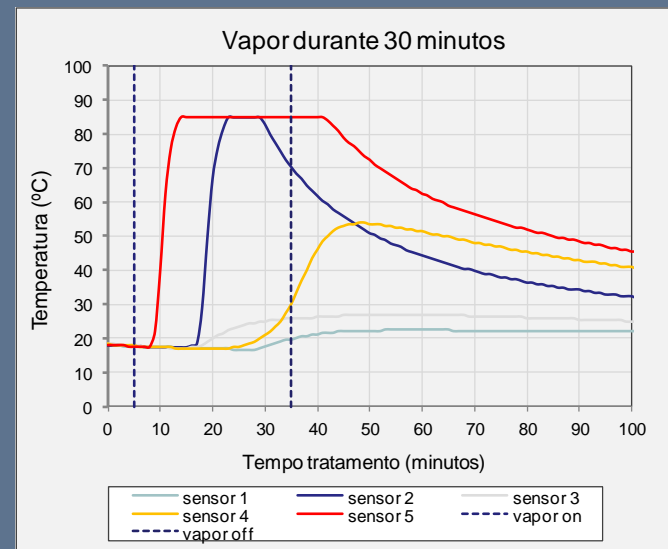
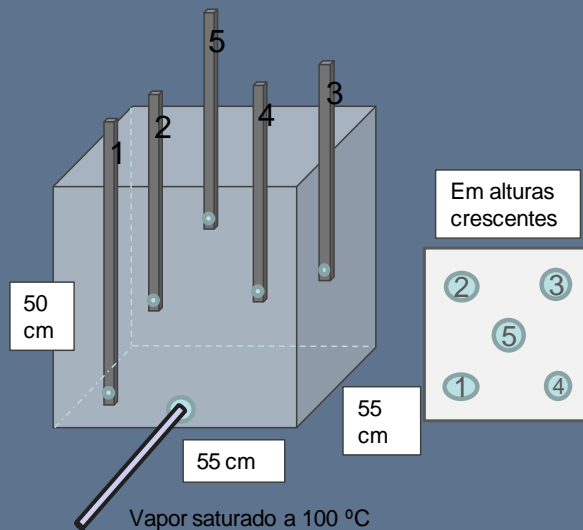
Micro waves



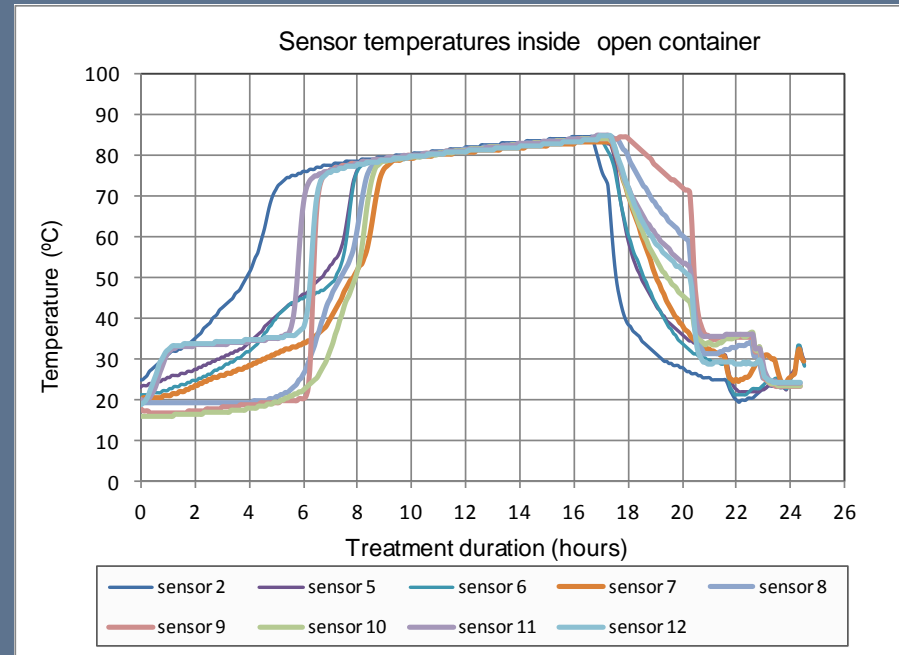
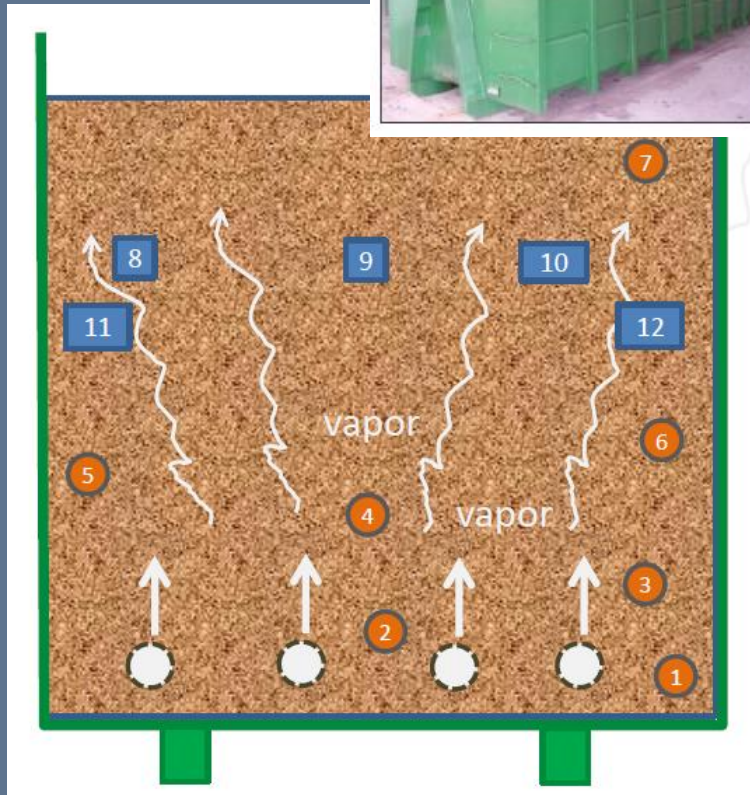
Thermal calculations / prototypes being tested



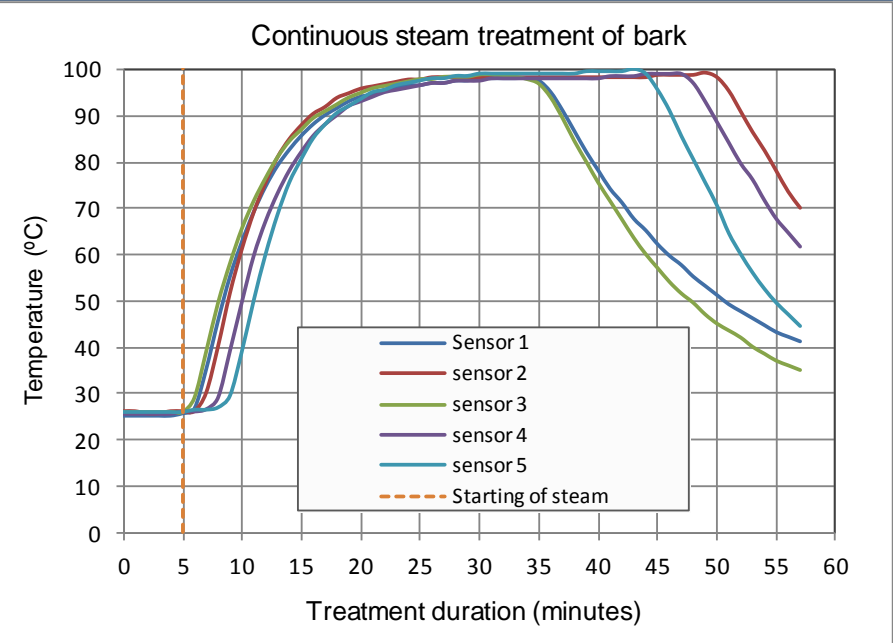
RESEARCH ACTIVITY 3: Artificial heat treatment validation



RESEARCH ACTIVITY 3: Artificial heat treatment validation



RESEARCH ACTIVITY 3: Artificial heat treatment validation



RESEARCH ACTIVITY 3: Artificial heat treatment validation

The parameters time and temperature set up in the equipment comply with
The requirements $>56^{\circ}\text{C}$ / 30 min

The bark is heat treated in industrial scale – continuous flow

Efficacy elimination PWN

*Biological assays to evaluate the efficacy of elimination of *Bursaphelenchus xylophilus* and other nematodes will be performed and data will be statistical analysed using PROBIT 9 test*

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Thank you



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