

Session 2. From the forest owner's point of view. Is resin extraction compatible with other forest uses?

Coordinator



Partners



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Maritime pine exploited for resin in the Mediterranean region

Definition of (new) forestry systems



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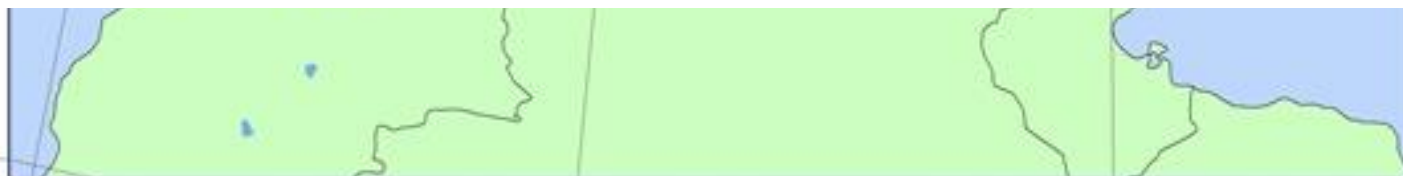
Resin extraction as a building block of sustainable forest multifunctionality

Inter-regional workshop, INRA Cestas, March 5/6, 2019



Maritime pine is an important softwood for Southern Europe, covering over 3 million ha

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This distribution map, including both natural and naturalized occurrence of *Pinus pinaster* was compiled by members of the EUFORGEN Programme

Citation: Distribution map of Maritime pine (*Pinus pinaster*) EUFORGEN 2009, www.euforgen.org.

First published online on 2003 - Updated on 30 July 2008



EUFORGEN, 2008

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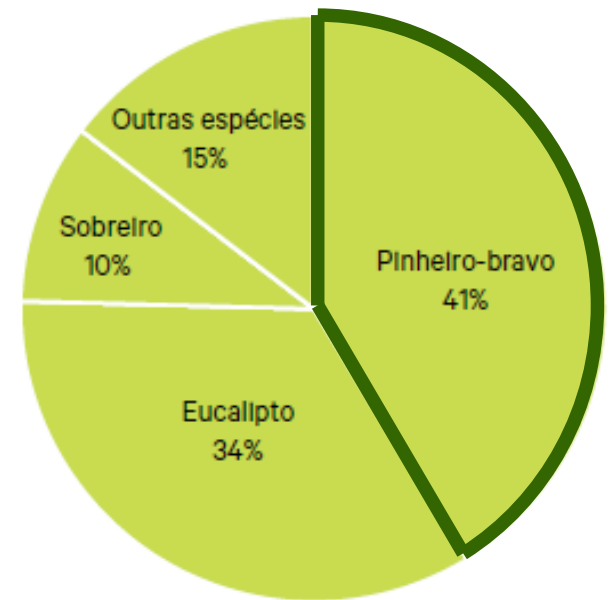
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(ICNF, 2013)

Possible causes for the decrease of area:

- forest fires: frequency and re-occurrence



Distribution of burned area by forest species, 2001-2012 (ICNF, 2013)

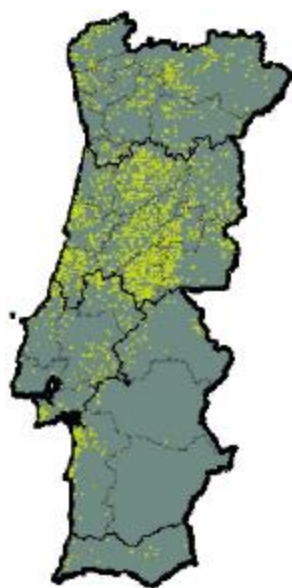
Possible causes for the decrease of area:

- replacement by more economically attractive species (e.g. eucalyptus)



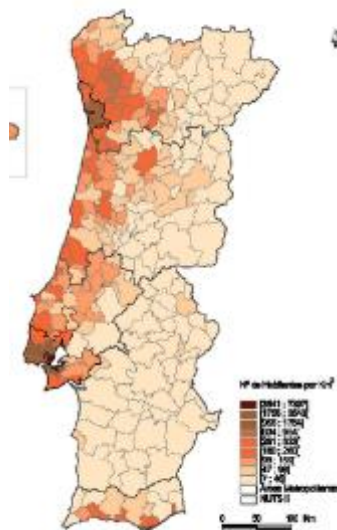
Possible causes for the decrease of area:

- desertification of the country inland and aging of the population



Maritime pine area

Number of inhabitants
(/km²)



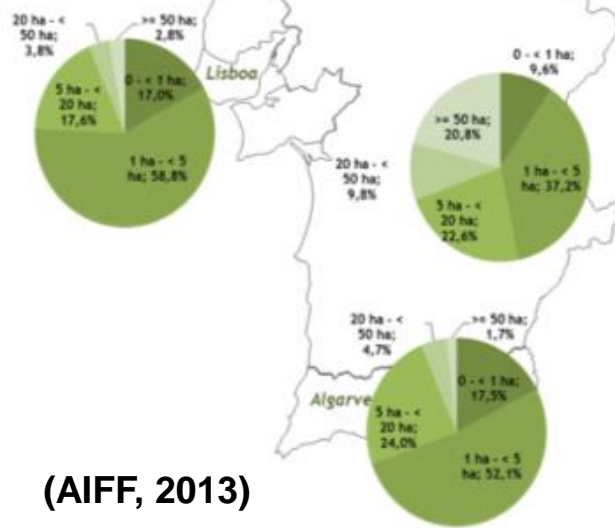
Forest owners (surveys in 2000):
67% were over 60 yrs old
39% were over 70 yrs old

And to make the situation worse

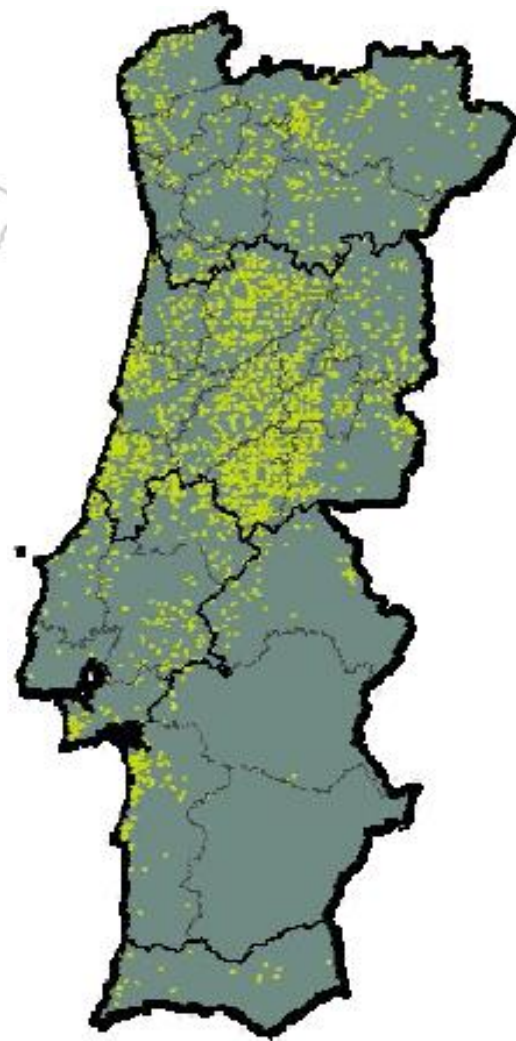
Size of forest property

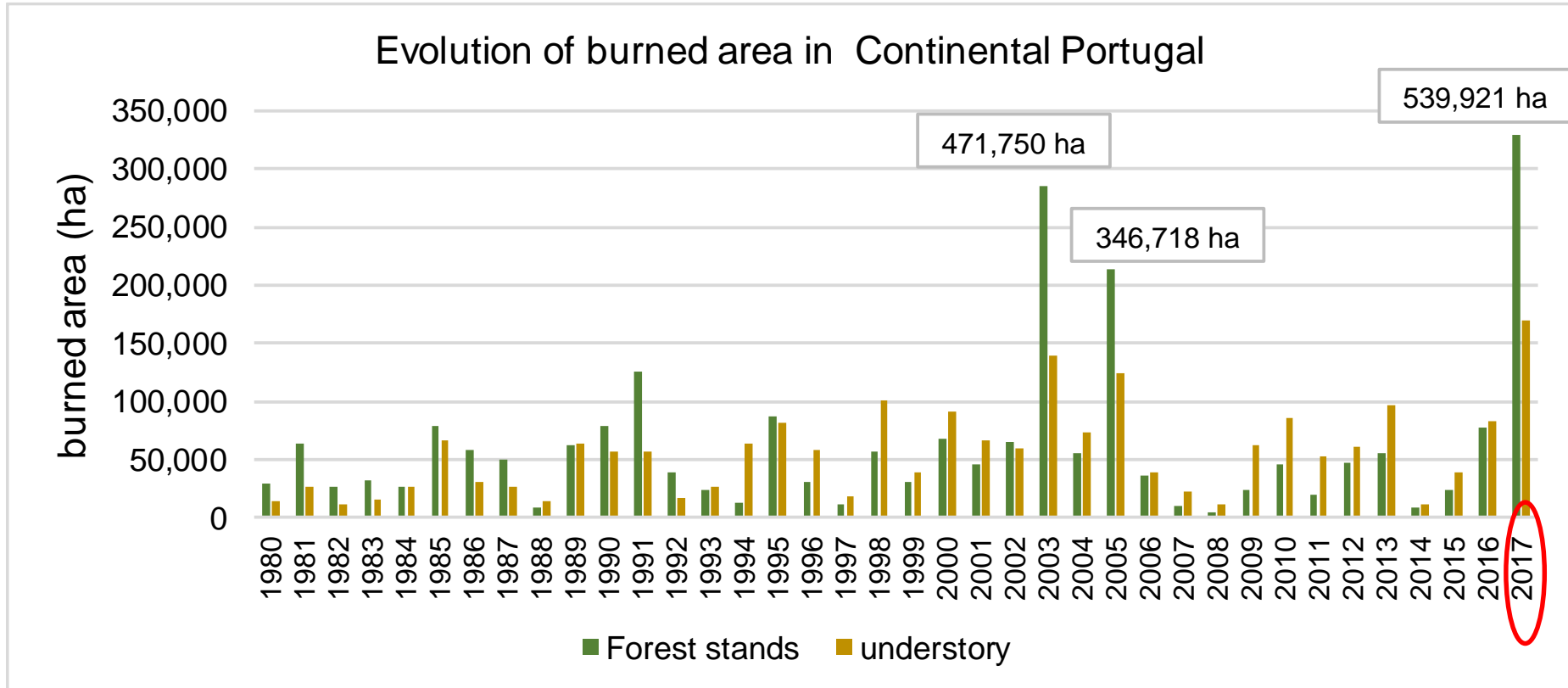
15% < 1 ha
61% [1, 5[ha

22% < 1 ha
63% [1, 5[ha



(AIFF, 2013)





<http://www.pordata.pt/DB/Portugal/Ambiente+de+Consulta/Tabela>

Data source: ICNF/MA-MAFDR

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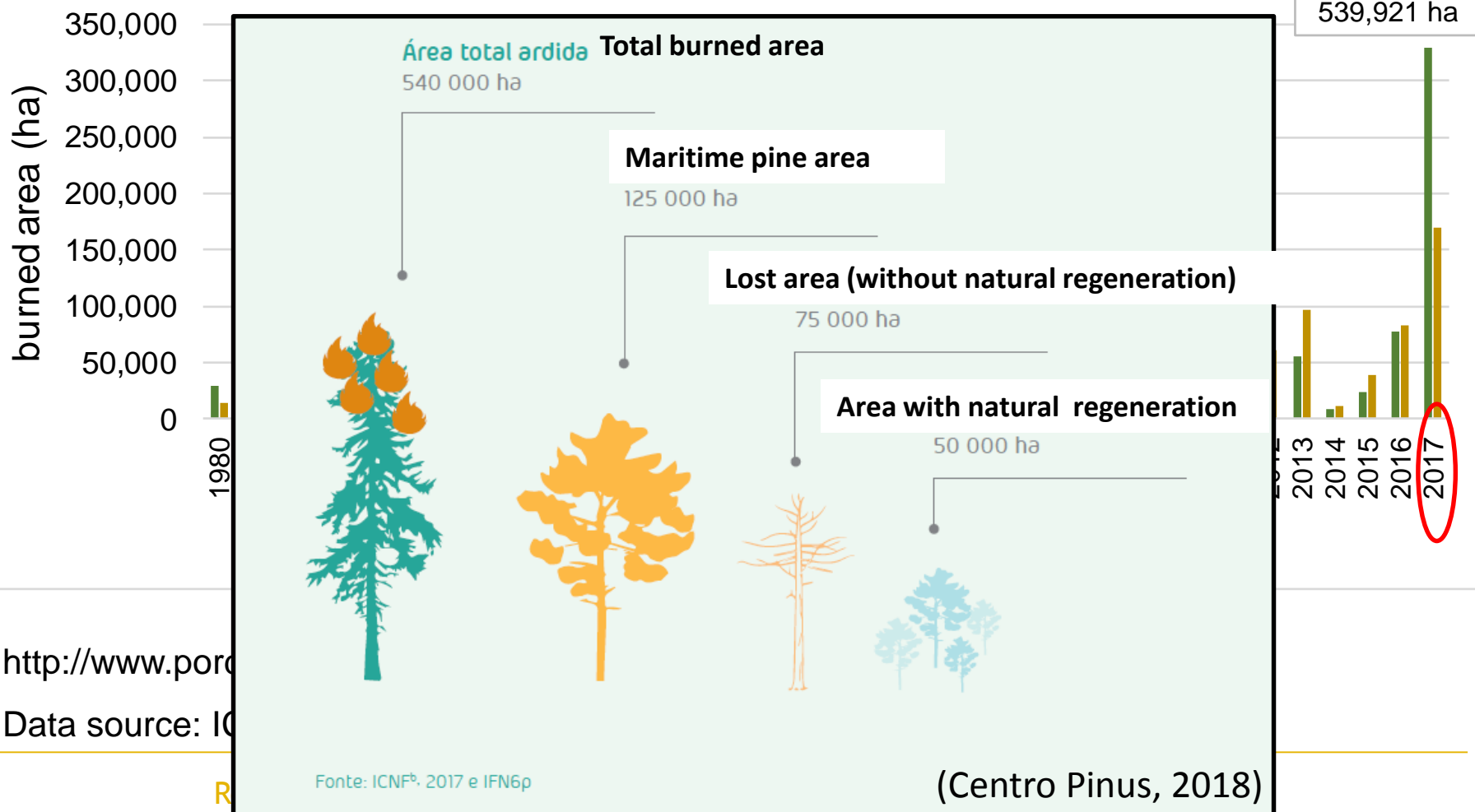
Forest fires - 2017

The screenshot displays a Windows 10 desktop environment. At the top, a web browser window shows an email from 'Eu' with the subject 'impressionante' and recipient 'Margarida Tomé <magatome@isa.ulisboa.pt>'. The email content features a map of Portugal with numerous black dots indicating forest fire locations in 2017. The map is overlaid on a Google Maps interface, with a 'Layers Panel' on the left showing 'EFFIS', 'Google P...', and 'Google S...'. The taskbar at the bottom includes icons for the Start menu, File Explorer, Microsoft Edge, and several open applications like PowerPoint, Word, and Excel. The system tray on the right shows the date '6 novembro 2017', time '16:50', and network status.

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Evolution of burned area in Continental Portugal

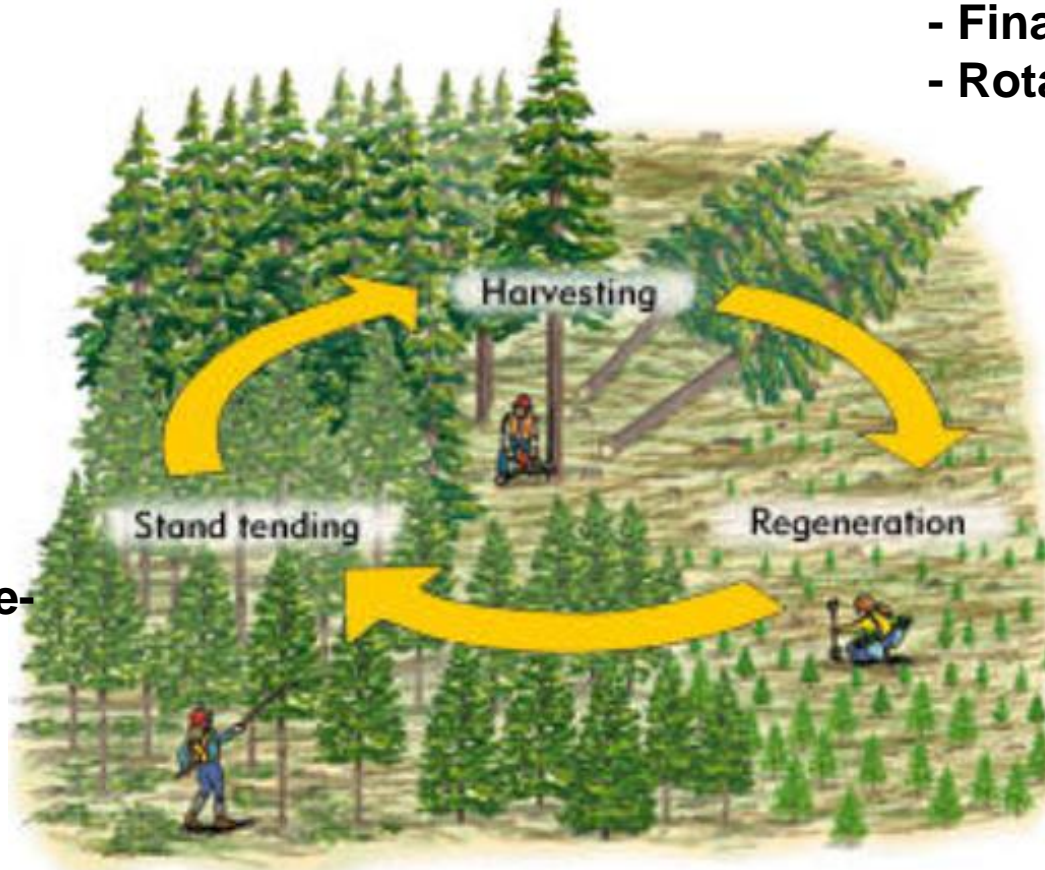


<http://www.porc>

Data source: IC

R

Silvicultural system



- Final cut
- Rotation age

- Natural/artificial regeneration

- Clearing of (fire-prone) shrubs
- Pruning(s)
- Thinnings

<https://www.for.gov.bc.ca/hfd/pubs/ssintroworkbook/whatisss.htm>

Resin extraction as a building block of sustainable forest multifunctionality

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pulp and paper production



palettes



biomass



chipboard



sawmill

Resin extraction as a building block of sustainable forest multifunctionality

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Table 3.7 Management regime for timber production

High site quality			Low site quality		
Age	Trees/ha	Operation	Age	Trees/ha	Operation
0-20	1500	Pre-commercial thinning if N > 1500 Low pruning to 2.5 m when trees are 7-7.5 m tall (900 trees/ha)	0-25	1500	Pre-commercial thinning if N > 1500 Low pruning to 2.5 m when trees are 7-7.5 m tall (1000 trees/ha)
20	850-900	Semi-systematic thinning High pruning to 5.5 m when trees are 15 m tall (400-500 trees/ha)	25-30	1000	Semi-systematic thinning
30	550-600	Thinning from below	40-45	600	Thinning from below
40	350-400	Thinning from below	55-60	400-450	Thinning from below
50	250-300	Thinning from below	80		Regeneration cut
60-70		Regeneration cut			

(Baskent EZ, Küçüker DM, Cañellas I, Bonet C, Paulo JA, Guerra JG, Miina J, Sheppard J, Salo K, Fontes L, Kurttila M, Sánchez-González M, Tomé M, Soares P, De Miguel S, Mutke S, 2014. Description of existing silvicultural systems for some selected MPTs and NWFP In: Tomé M, Faias SP (eds). State of the art, review of silviculture, models and decision support tools for multipurpose trees (MPT) and non-wood forest products (NWFP). Deliverable 2.1 of the StarTree project. 176 pp.
http://star-tree.eu/images/deliverables/WP2/Deliverable2_1.pdf



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resin

Resin extraction as a building block of sustainable forest multifunctionality

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Table 3.8 Management regime for combined timber and resin production

High site quality			Low site quality		
Age	Trees/ha	Operation	Age	Trees/ha	Operation
0-20	1000	Pre-commercial thinning if N > 1000 Low pruning to 2 m when trees are 6 m tall (500 trees/ha)	0-25	1000	Pre-commercial thinning if N > 1000 Low pruning to 2 m when trees are 6 m tall (500 trees/ha)
20	500	Thinning from below High pruning to 4 m when trees are 12 m tall (300 trees/ha)	25-30	500	Thinning from below High pruning to 4 m when trees are 12 m tall (300 trees/ha)
25	250	Thinning from below	35-40	250	Thinning from below
30	200	Thinning from below Start production sub cycle	45-50	200	Thinning from below Start production sub cycle
80-100		Regeneration cut	100-120		Regeneration cut

(Baskent EZ, Küçüker DM, Cañellas I, Bonet C, Paulo JA, Guerra JG, Miina J, Sheppard J, Salo K, Fontes L, Kurttila M, Sánchez-González M, Tomé M, Soares P, De Miguel S, Mutke S, 2014. Description of existing silvicultural systems for some selected MPTs and NWFP In: Tomé M, Faias SP (eds). State of the art, review of silviculture, models and decision support tools for multipurpose trees (MPT) and non-wood forest products (NWFP). Deliverable 2.1 of the StarTree project. 176 pp.

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pulp and paper production



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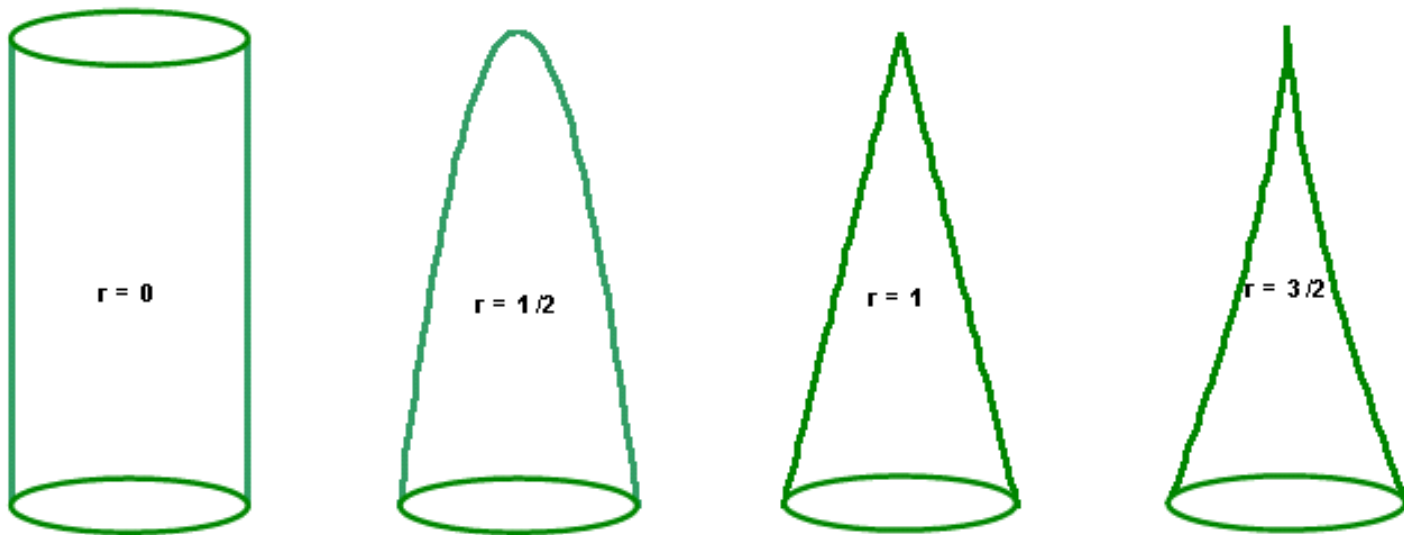


resin

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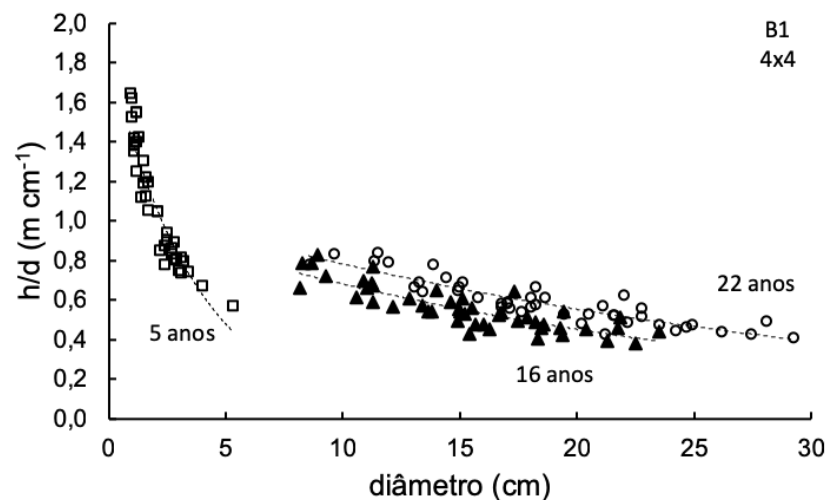
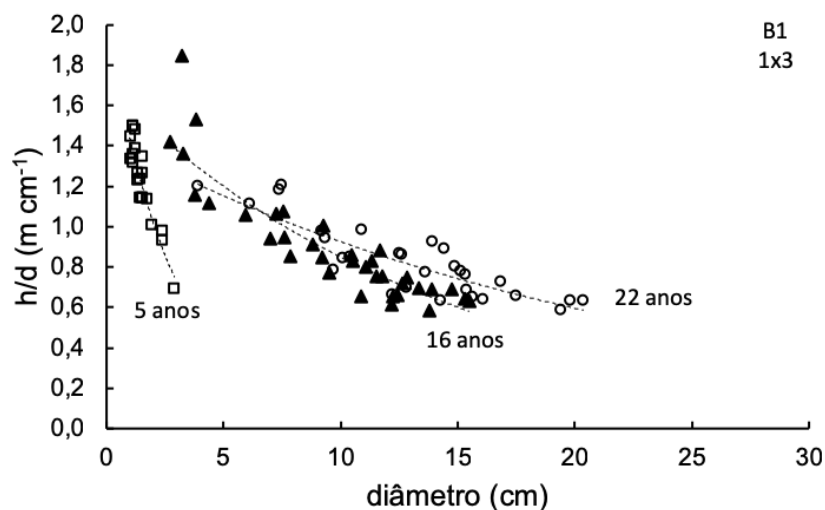
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What do we know?



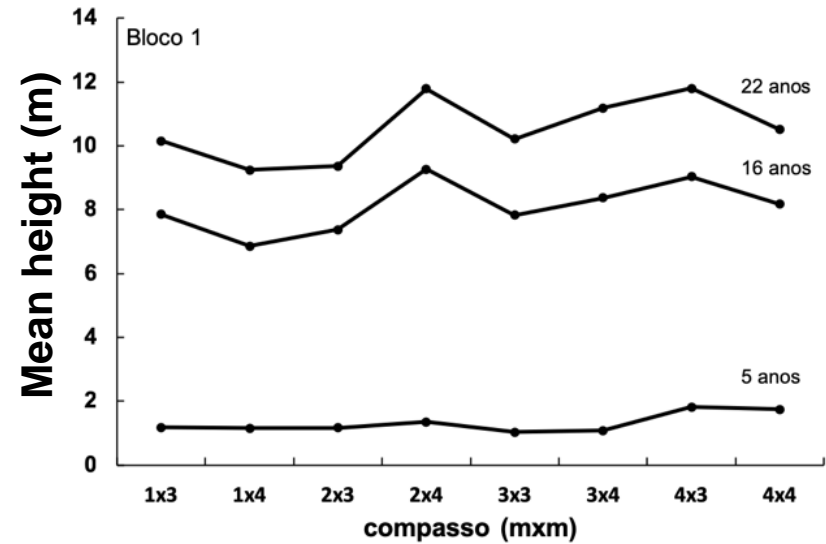
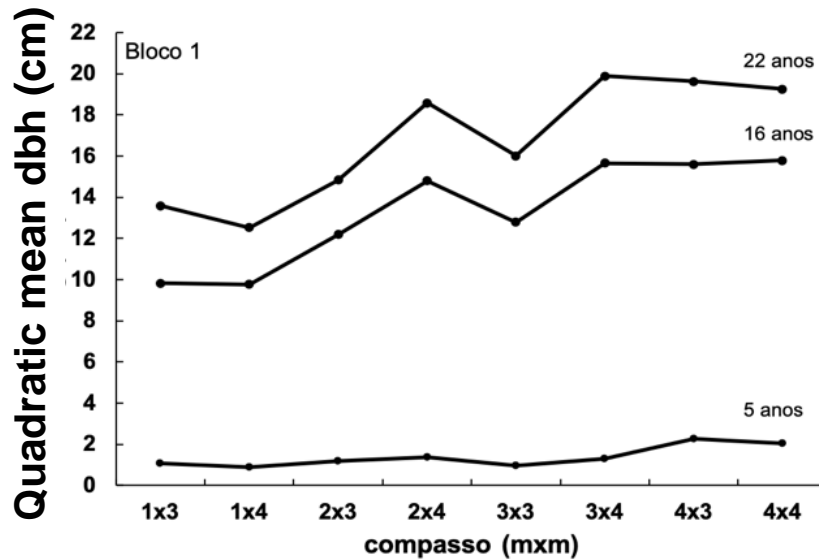
The shape of the tree is affected by the density of the stand

What do we know?



Maritime pine spacing trial in central Portugal – 1x3 versus 4x4

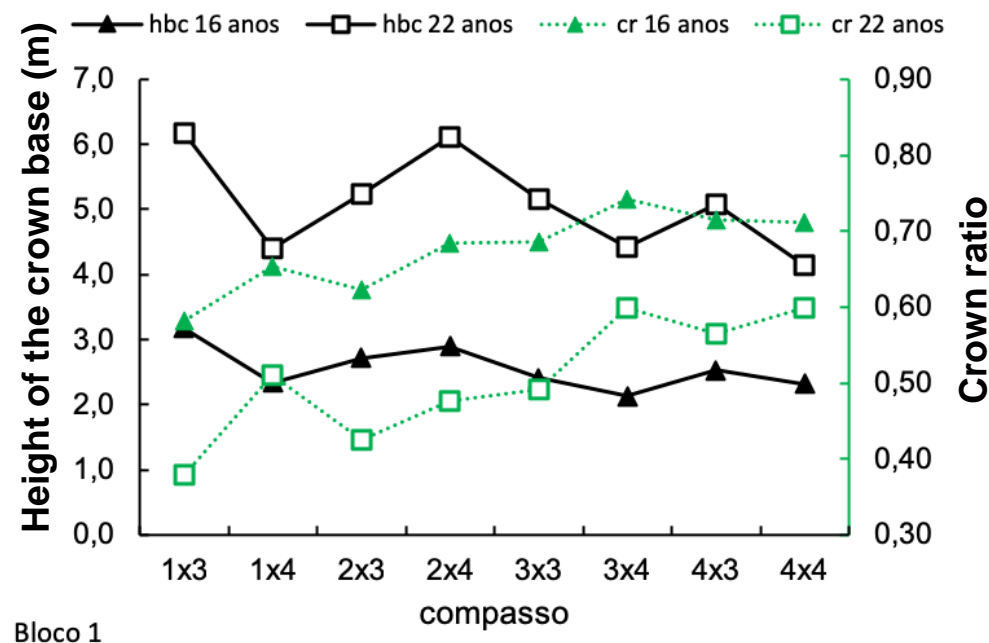
What do we know?



Maritime pine spacing trial in central Portugal

Low stand densities: large diameters, higher (?) heights

What do we know?



Maritime pine spacing trial in central Portugal

Low stand densities: large crown ratios

What do we know?

Influence of stand density in resin yield

There is no significant difference in resin yield in stands with high (882 trees/ha) and low (332 trees/ha) densities.

Stands with low densities have, on average, more resin yield per tree.

Project Resimprove (UTAD+GIFF)
<http://www.giff.pt/website/resimprove.php>

What do we know?

Influence of resin tapping on tree diameter growth

Negative effect: Gomes (1954), Figueiredo & Filho (1991), Palma (2007)

No effect: Rodríguez-Garcia et al. (2015), Silva et al. (2018)

What do we know?

Influence of climatic conditions on resin yield

Is it possible to define resin productivity classes or resin productivity regions?

There is a positive relationship between resin yield and ...

- (a) solar radiation, potential evapotranspiration and mean temperature**
- (b) tree face exposition (N, S, SW...)**

(Palma 2007; Rodríguez-Garcia et al. 2014, 2015; Pereira 2015; Rodríguez-Garcia 2016)

Wildfire in the Mediterranean region

Approaches for forest fire prevention and management

At stand level

- **horizontal discontinuity: number of trees per ha; evenaged/unevenaged**
- **vertical discontinuity: number of trees per ha; evenaged/unevenaged; tree height of the base crown (need of pruning/close spacings); clearing of fire-prone shrubs**

Wildfire in the Mediterranean region

Approaches for forest fire prevention management

At stand level

- horizontal distribution: number of trees per ha; evenaged/unevenaged
- vertical structure: number of trees per ha; evenaged/unevenaged; tree height of the base of the crown (pruning/close spacings); clearing of fire-susceptible shrubs

Some of them incompatible

Management regime for combined resin production and timber

High site quality			Low site quality		
Age	Trees/ha	Operation	Age	Trees/ha	Operation
0-20	850	Low pruning to 3 m when trees are 6 m tall (500 trees/ha)	0-20	850	Low pruning to 3 m when trees are 6 m tall (500 trees/ha)
20	500	Thinning from below	20	500	Thinning from below
25	300	Thinning from below Starting resin tapping (tree dbh>20 cm)	30	300	Thinning from below Starting resin tapping (tree dbh>20 cm)
30	200	Thinning from below	40	200	Thinning from below
80-100		Regeneration cut	100-120		Regeneration cut

In Portugal: Resin tapping to life - minimum dbh: 20 cm (63 cm of perimeter)

(Soares, not published)

Management regime for combined resin production and timber

High site quality			Low site quality		
Age	Trees/ha	Operation	Age	Trees/ha	Operation
0-20	850	Low pruning to 3 m when trees are 6 m tall (500 trees/ha)	0-20	850	Low pruning to 3 m when trees are 6 m tall (500 trees/ha)
20	500	Thinning from below	20	500	Thinning from below
25	300	Thinning from below Starting resin tapping (tree dbh > 20 cm)	25	300	Thinning from below Starting resin tapping (tree dbh > 20 cm)
30	200	Thinning from below	40	200	Thinning from below
80-100		Regeneration cut	100-120		Regeneration cut

A possible fact-sheet?

In France, resin tapping to life - minimum dbh: 20 cm (63 cm of perimeter)
(Soane & al., 2019, unpublished)



Coordinator



Partners



Forestas

Agência florestal regional pro sãilago de su território e de s'ambiente de sa Sardenha
Agência florestal regional pro lo sviluppo del territorio e dell'ambiente della Sardegna
SardegnaForeste



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