

Advances in work resin compatibility analysis

Project SustForest+

2nd Interregional Workshop
Cestas, 5 and 6 March 2019

CRPF Nouvelle-Aquitaine : **Henri Husson and Lucie Rupil**
CPFA : **Laurence Fort and Emmanuel de Montbron**
FCBA : **Jean-Denis Lanvin**



Coordinator



Partners



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www.incredibleforest.net
info@incredibleforest.net

Project Sustforest + : Collaborative strategy and networks for multifunctionality, conservation and employment in Southern Europe through resin extraction

3 task groups :

GT.1

Territorial strategy to improve and promote sustainable forest management of European natural resins

GT.2

Plan for the improvement of working conditions and the sustainability of the resin tapper's profession

GT.3

Plan for the promotion of European natural resin as a technological and sustainable product

The project partners :

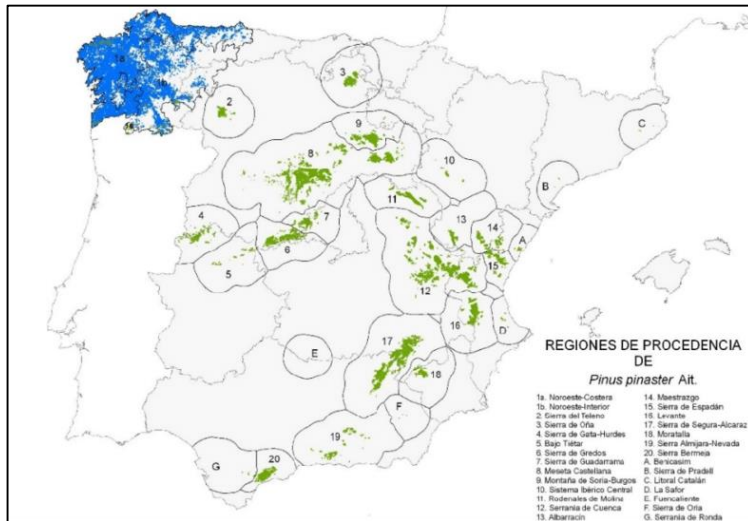


GT 1 : Territorial strategy to improve and promote sustainable forest management of European natural resins

□ 3 activities :

Compatibility of resin production with other forest production:

- Pine cone production (*Pinus pinea*) ➡ **INIAV**
- Wood production (*Pinus pinaster* ssp. *mesogeensis*) ➡ **Cesefor**
- Wood production (*Pinus pinaster* ssp. *Atlantica*) ➡ **CRPF**



- *Pinus pinaster* ssp. *Mesogeensis* :
Green dots
- *Pinus pinaster* ssp. *atlantica* : Blue dots



INPN, MNHN, 1999

Compatibility study of the impact of resin harvesting on pine cone production of *Pinus pinea* - INIAV

➤ Identification of test plots :

- Installation of 3 plots in 3 regions of Portugal : Alcochete, Lagos, Grândola



➤ Monitoring tree growth / resin production / pine cone production :

- Measurements of dendrometric variables on all trees: total height, crown base height, estimated age, stem diameter, crown projection area
- Counting and weighing of pine cone
- Weighing of the collected resin

Measurements during 3 production seasons (2018, 2019, 2020)



➤ **Analysis of the results:**

- Quantify the interaction between resin production and pine production
- Evaluate a correlation between dendrometric variables and pine and resin production
- Search for a relationship between the results and climatic conditions

➤ **Expected deliverables :**

- ✓ Technical report
- ✓ Documentary film
- ✓ Visit of the pilot sites

Characterization of resinous pine resin wood ssp. mesogeensis for commercial promotion - Cesefor

➤ 1st task : : Identification of study plots and trees to be selected

- Study plot in Castilla y León
 - ❖ located near Soria in Tardelcuende
- Selection of resinous trees :
 - ❖ Trees with 5 open « care » (nearly 25 years of resin harvesting)

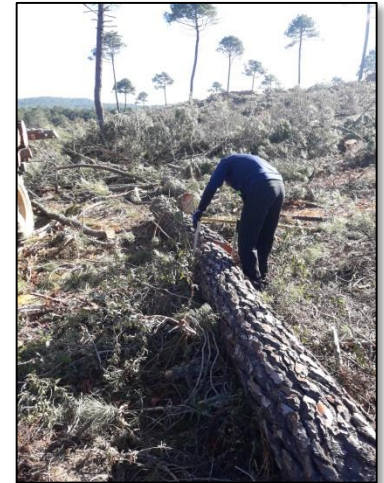


- Measurement of the average diameters of all trees



➤ 2nd task : tree logging and ridge identification

- 3 operators: 2 loggers and a skidder
- Each log is identified with the tree number and the section number number according to its height. Section 1 is the basal log.
- For each log, measurements were taken:
 - ✓ Larger diameter
 - ✓ Smallest diameter
 - ✓ Length



Transport of logs to the sawmill

MASOVA S.L. (SORIA) • TFNO.: 975 22 60 61			
Bruto	8 000	Kgs.	D. CESEFOR
Tara	6 000	Kgs.	CV-6871-H
Neto	13 200	Kgs.	Localidad
			Mercancia MADERA PINO
			11 de FEBRERO de 2019



➤ 3rd task : sawing and drying of the products



- All the pieces were identified with the original tree number, log number and sawn board number for each log.
- Drying the boards in Cesefor under shelter in the open air to reach a humidity level of about 15 %.



➤ Future tasks: physical and technical tests (June 2019)

- Obtain the bending strength, elastic modulus and density values of each of the prepared pieces, according to the bending test UNE EN 408.
- Obtain the characteristic value of each batch according to EN 384 and assign a resistance class to each batch according to EN 338,
- Analyze if there are significant structural differences between resinated and non-resinated wood.



Final objective: Include resinous wood in European market regulations to allow its normative use in structures.

➤ Deliverables (August 2019)

- ✓ **Final report**
- ✓ **Technical file** containing the technical data collected
- ✓ **Information brochure**

Characterization of resinous maritime pine timber for its commercial promotion – CRPF Nouvelle-Aquitaine

- **Objective :** to observe the impact of resin extraction on wood growth and quality and to obtain technical characteristics of resinous maritime pine timber.
- **Tasks :**
 - ✓ Definition of an experimental protocol for monitoring resin harvesting and tree growth
 - ✓ Choice of study plots, selection of trees to be tested : resinous tree and control trees
 - ✓ Monitoring the growth of all trees
 - ✓ Resin harvesting
 - ✓ Logging selected trees
 - ✓ Drying of wood
 - ✓ Physical and technical tests
 - ✓ Writing a technical file



Timescale : 2018-2020

➤ **Deliverables :**

- ✓ **Final report** : description of the protocol, monitoring results...
- ✓ **Technical file** containing the technical data collected
- ✓ **Information brochure** on the compatibility between resin harvesting and wood quality for forest owners and managers

➤ **Partnerships :**

- ✓ Agreement with the **CPFA** (Aquitaine Centre of forest productivity and action)



- ❖ Laurence Fort : Animator
- ❖ Emmanuel de Montbron : Deputy Chairman

➡ **availability of test plots, monitoring of growth and resin harvesting**

- ✓ Agreement with the **FCBA** (Industrial Technical Centre)



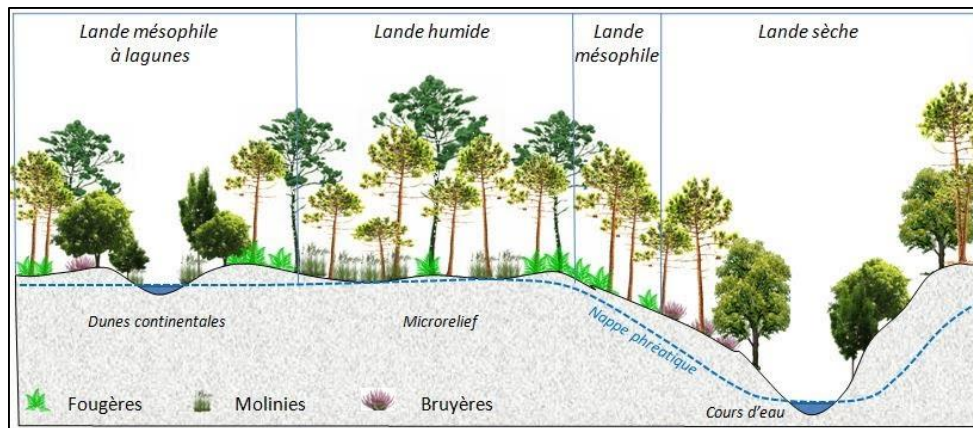
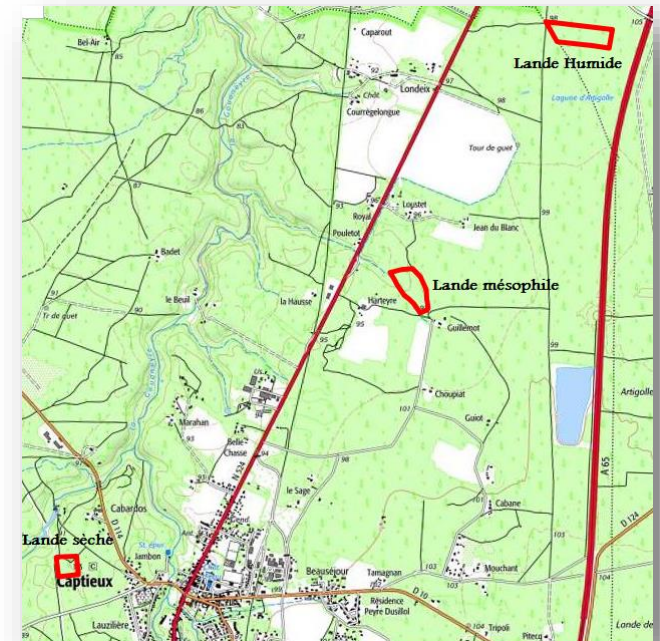
- ❖ Jean-Denis Lanvin : 1st transformation-supply division

➡ **drying of the boards, physical and technical tests, comparison of the results between resinous and non-resinous timber**

❖ Impact of resin harvesting on tree growth and variation in resin production in three types of moorland (CPFA)

- ❑ Comparison of the growth of resinous and non-resinous trees on the same plot
- ❑ Monitoring of resin production on 3 types of moorland
- ❑ Measures over 3 years: 2018, 2019, 2020

→ Tree cutting at the end of 2020 for wood quality analysis



❖ Impact of resin harvesting on tree growth and variation in resin production in three types of moorland (CPFA)

- ❑ 3 ha of resinous trees by moorland type (wet, mesophilic, dry)
 - ✓ 5 prickings between june and september (with a bag on left and a bag on right)
- ❑ On each plot, 40 resinous trees and 40 non resinous trees measured (circumference, height)
- ❑ On the 40 resinous trees, monitoring of resin production on 23 trees (right and left bags weighing before each new pricking)



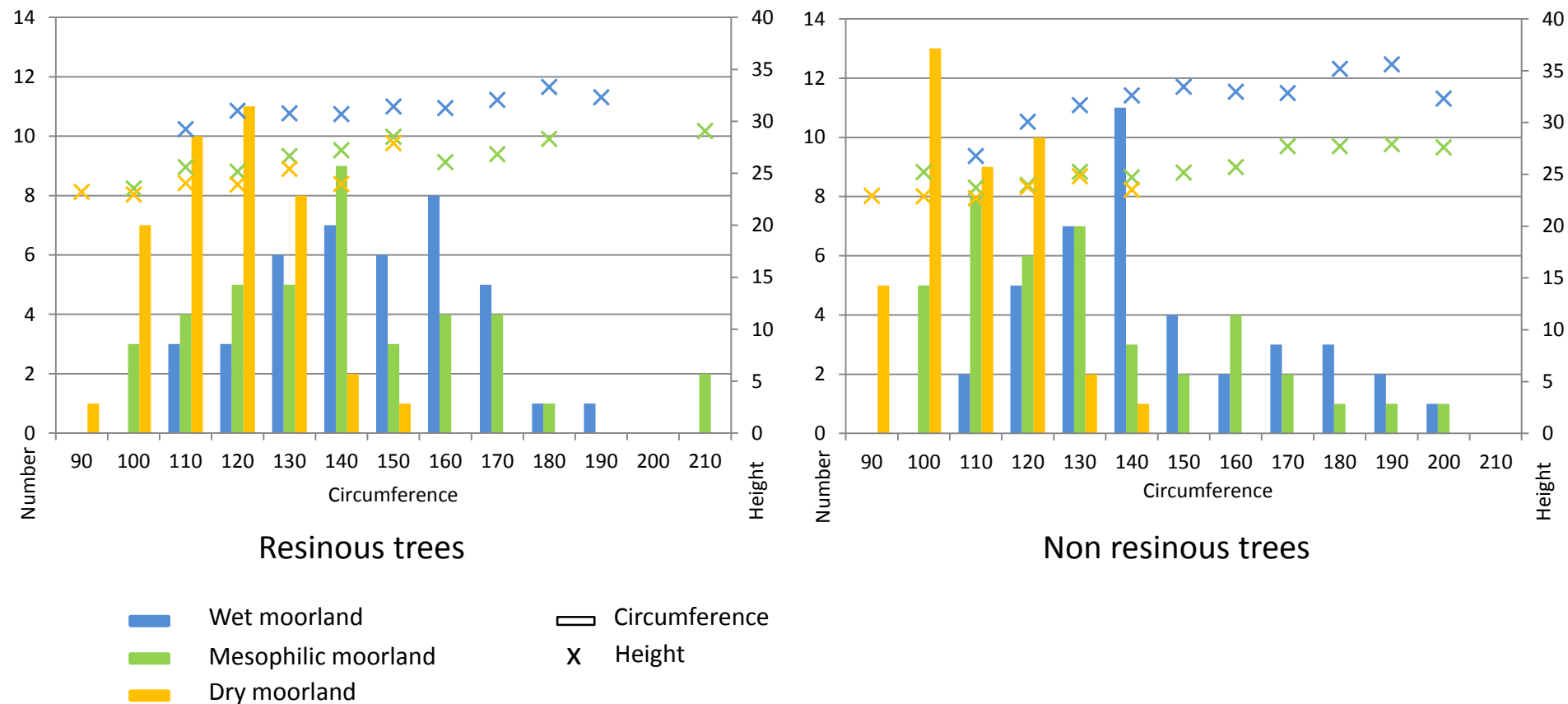
❖ Impact of resin harvesting on tree growth and variation in resin production in three types of moorland (CPFA)

☐ 3 selected plots

Moorland	Regeneration	Year	Density	Average Circ	Average Height
Wet	Drill sawing	1965	206 trees/ha	142 cm	31,7 m
Mesophilic	Drill sawing	1968	219 trees/ha	138 cm	25,8 m
Dry	Drill sawing	1972	366 trees/ha	114 cm	23,7 m

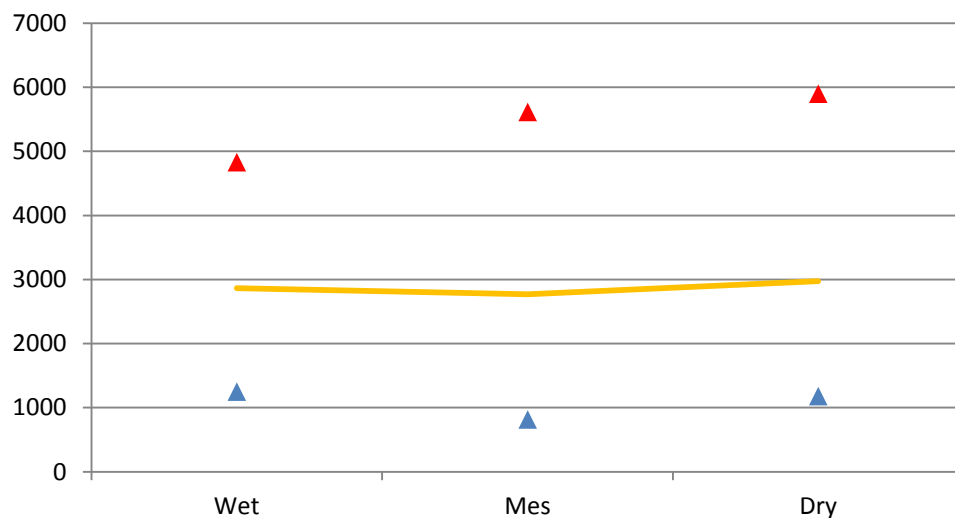
❖ Impact of resin harvesting on tree growth and variation in resin production in three types of moorland (CPFA)

Repartition of the circumference by type of moorland (2018)



❖ Impact of resin harvesting on tree growth and variation in resin production in three types of moorland (CPFA)

2018 - Resin harvest average by type of moorland (kg)



	Wet	Mesophilic	Dry
Average (kg)	2,866	2,768	2,975
Min (kg)	1,254	0,817	1,182
Max (kg)	4,832	5,615	5,900

❖ Technological characterization of resinous and non-resinous pine trees (FCBA)

- ❑ Selection of 10 resinous trees and 10 non resinous trees to obtain 150 to 170 boards that will be dried and tested using several methods
 - Harvesting with CRPF : Tag on stems – logs
 - Sawing lumber : on site (mobile sawmill) or in sawmill / Tag on lumber
 - Grading machine : on site (MTG) or in sawmill (XYLOCLASS)
 - Transfert in FCBA (Bordeaux)



❖ Technological characterization of resinous and non-resinous pine trees (FCBA)

❑ Grading machine

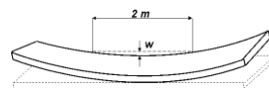
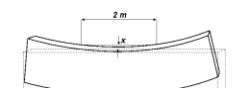
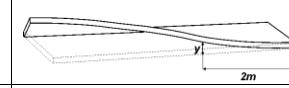

- on site (MTG)
Manual
- Or in sawmill (XYLOCLASS)
Automatic



❑ Transfert in FCBA (Bordeaux)

- Drying
 - 2 batches (maritime pine drying table 11)
 - resinous pine and
 - non-resinous pine
 - Measurement
 - Weight in processing
- Measurement
 - Deformation
 - Resin pocket



Critères	visualisation
flèche de face (Bow) :	
flèche de rive (spring)	
gauchissement (twist)	
tuilage (cup)	

❖ Technological characterization of resinous and non-resinous pine trees (FCBA)

❑ FCBA (Bordeaux)

- Bending test (EN 408)
 - MOE
 - MOR
- Hardness
 - Brinell test (EN 1534)
- Degradation QUV (ageing test)
 - Same coating on specimen
 - resinous pine and
 - non-resinous pine

