WP3- Task 3.2.4 : Wood properties and wind resistance for maritime pine

Objectives:

• Feasibilities to have a predictive test for storm tolerance in genetic selection

• Relation between acoustic measurment on standing trees and wood quality (density, MOE,)

Method

•Two progeny trials of genetic cooperative (GIS), Progenies (half sib families) of maritime pine

- Site 1 (Lagnereau, Landes)
- Site 2 (Cestas, Gironde)

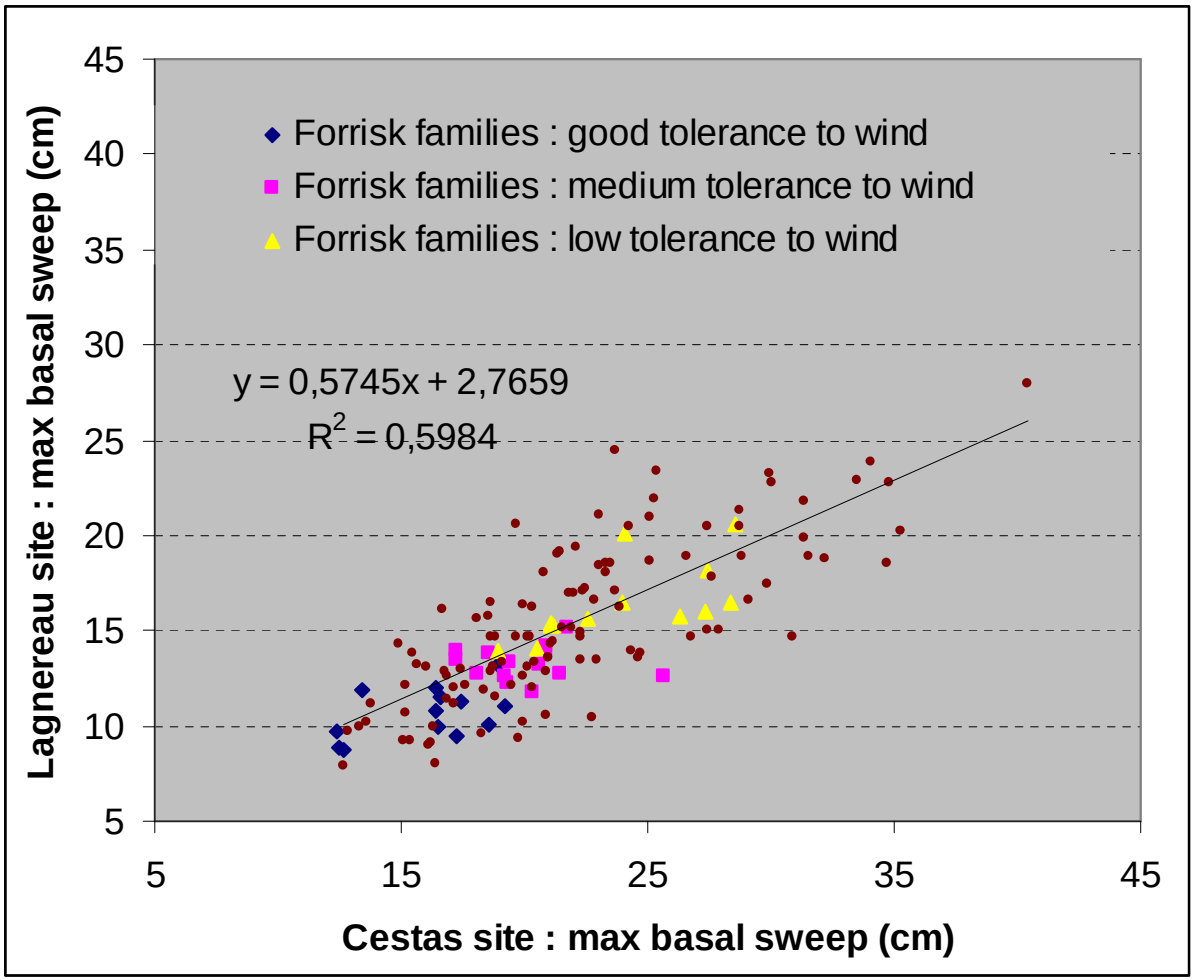
• 14 years old, 1250 stem per hectare (4m X 2m)

• Measurement of acoustic velocity with Hitman, Director ST 300 Fibre-Gen

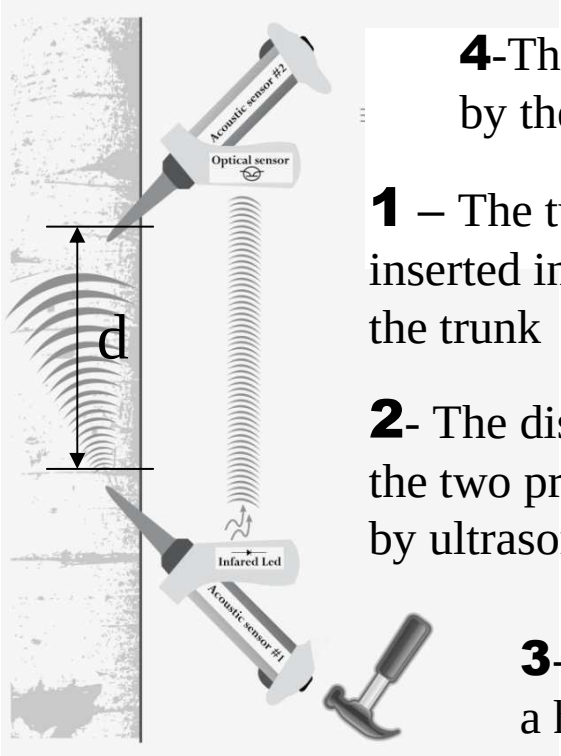
• Evaluation of the results of accoustic measurment at individual an <u>at genetic level</u>

Measurement and sampling :

- Growth and straightness measures on the progenies tests
  - Circumferences and height at 8 and 12 years old (C1,30m)
  - Straightness at 8 years old : stem basal sweep (maximum deflection at 1,50 m)
  - Straightness score (1 : no damage and 5 : uprooted trees) after Klauss storm in 2009
- Sampling and wood quality measurement
  - Spiral grain angle measured on unbarked disk on standing trees
  - Wood density measured by x-ray microdensitometry on prepared sample from drill cores taken on standing trees
  - Acoustic velocity (Cestas site)
    - Sampling of 33 progenies for low, medium and high tolerance to wind resistance estimated by stem basal sweep
    - Measurement on 12 to 14 trees per progeny


Forrisk families : good tolerance to wind
Forrisk families : medium tolerance to wind
Forrisk families : low tolerance to wind
y = 0,5745x + 2,7659
R2 = 0,5984
Lagnereau site : max basal sweep (cm)
Cestas site : max basal sweep (cm)
5
10
15
20
25
30
35
40
45
5
15
25
35
45

- Acoustic velocity *(v)* is measured by The Hitman ST300 device (Fibre-gen, Christchurch, New Zealand)



4-The travel time (t) is measured by the upper probe

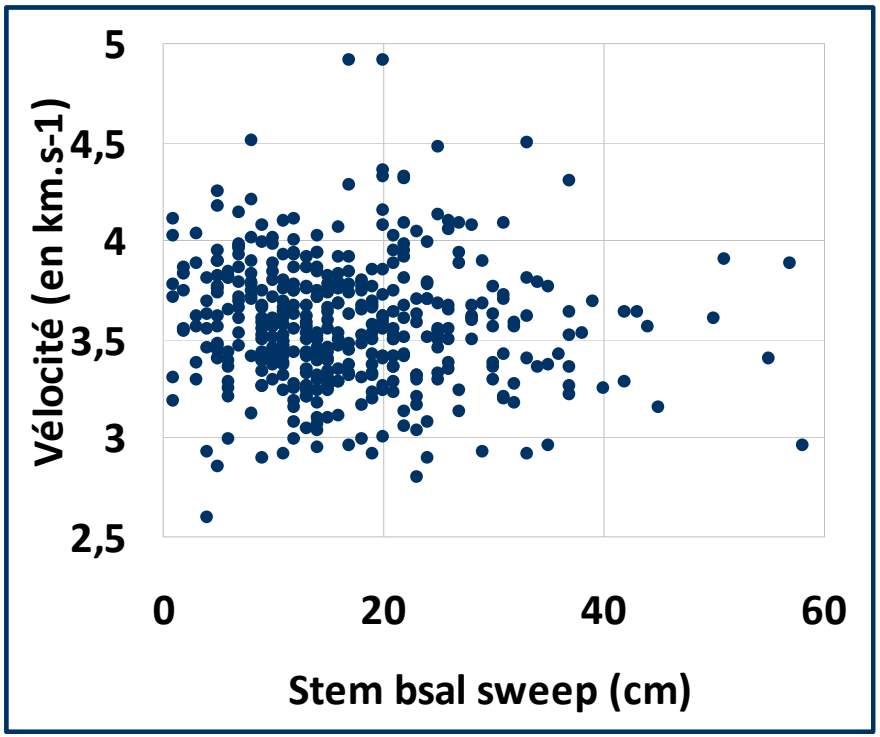
1 – The two probes are inserted in the lower part of the trunk

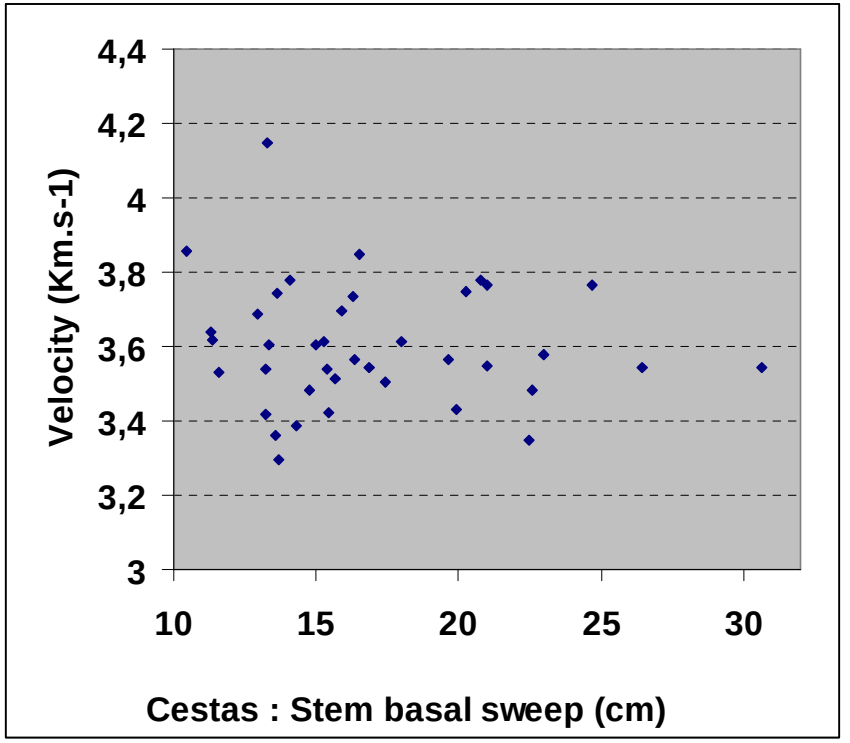
2- The distance (d) between the two probes is measured by ultrasonic sensors

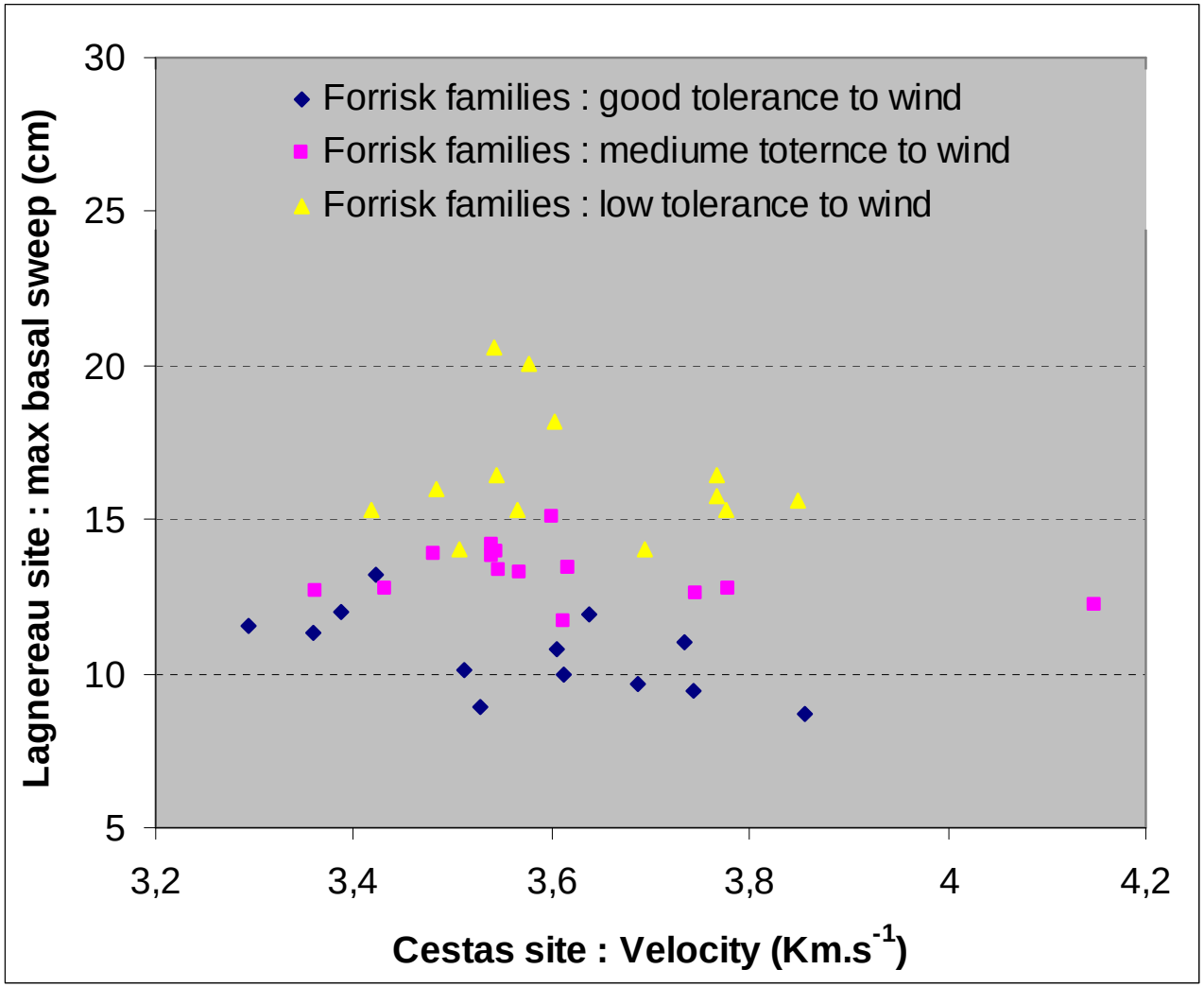
3- Mechanical wave is induced by a hammer on the lower probe

$V\ (m.s^{-1}) = d/t$

Sources : (Normand Paradis *et al*, 2013)


Vélocité (en km.s-1)
5
4,5
4
3,5
3
2,5
0
20
40
60
Stem bsal sweep (cm)


Velocity (Km.s-1)
4,4
4,2
4
3,8
3,6
3,4
3,2
3
10
15
20
25
30
Cestas : Stem basal sweep (cm)


Forrisk families : good tolerance to wind
Forrisk families : mediume toternce to wind
Forrisk families : low tolerance to wind
Lagnereau site : max basal sweep (cm)
30
25
20
15
10
5
3,2
3,4
3,6
3,8
4
4,2
Cestas site : Velocity (Km.s-1)