

Irrigating Cork Oaks Trees – First Insights on Growth and Stripping

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Main Question

How do cork oaks grow with irrigation and fertigation since plantation? Is it possible to reduce the time until the first cork stripping?

Introduction and Objectives

The lack of regeneration and well-structured forest stands with trees of different ages are compromising the cork production in the short run future. Since cork is the most profitable forest product in Portugal, a closer involvement of applied research with producers is important. Our studies regarding irrigation and fertigation application in cork oak trees intend to evaluate different treatments for a faster tree growth, reducing the time until the first cork stripping. Our intention is to show the first pointers from irrigated cork oaks with 16 years old (irrigated since plantation). Comparable measurements and parameters will be presented between cork oak growing in irrigated and non-irrigated plots, including some cork formation analysis. Our studies also include cork quality laboratory analysis which are being processed.

Methodology

- Year of plantation: 2001
- Cork oaks irrigated since plantation
- Dendrometric evaluation of the 260 trees planted in lines with a 6 x 4 m compass
- Shrub cut technique for shrub and herbs control
- Cork samples have been collected since trees were 8 years' old: for structural and physical characteristics evaluation
- First stripping: July 2017 – evaluation of pre and post stripping dendrometric parameters, cork weight, humidity and structural and quality analyses
- Tree ecophysiological indicators (sap flow, leaf water potentials (pre-dawn and midday), stomatal conductance, chlorophyll and fluorescence evaluation) are being monitored since June 2017 in a sample of trees

Results

Table 1. Dendrometric results from 2017 from irrigated and non-irrigated cork oak stands (trees with 16 years old). *: Aleatory sample from a permanent plot. **: adult trees with 60 years old.

CAP classes		Irrigated cork oaks Age:16 (Mean ± SE) n = 260			Control (Non-irrigated cork oaks)* Age:16 (Mean ± SE) n = 140		
		N	CAP (1.3 m) (cm)	H (m)	N	CAP(1.3 m) (cm)	H (m)
1	< 35cm	19	27.5 ± 1.7	4.9 ± 0.3	75	24.7 ± 1.0	3.4 ± 1.2
2	36 - 70cm	79	56.5 ± 1.2	7.8 ± 0.1	35	44.5 ± 1.2	5.4 ± 1.1
3.1	71 - 90 cm	93	83.4 ± 0.7	9.3 ± 0.1	-	-	-
3.2	91 - 120 cm	54	99.5 ± 1.5	9.8 ± 0.2	-	-	-
4**	121 - 200 cm	4	162.9 ± 14.7	10.4 ± 0.5			
5**	>= 200 cm	11	231.0 ± 5.8	12.7 ± 0.1			



Figure 1. Cork oak stripping – July 2017.

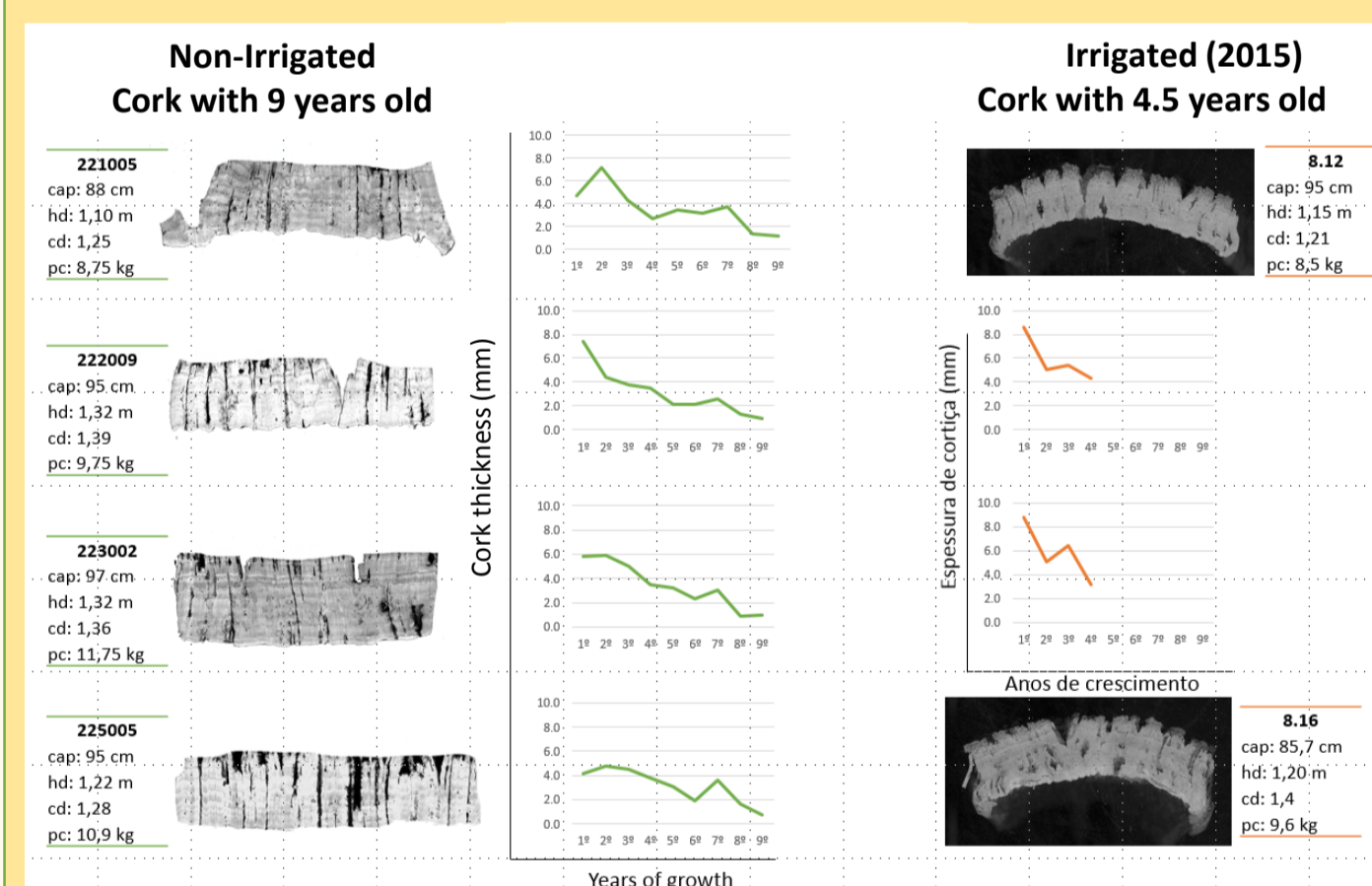


Figure 2. Comparative analysis of cork thickness from irrigated and non-irrigated trees.

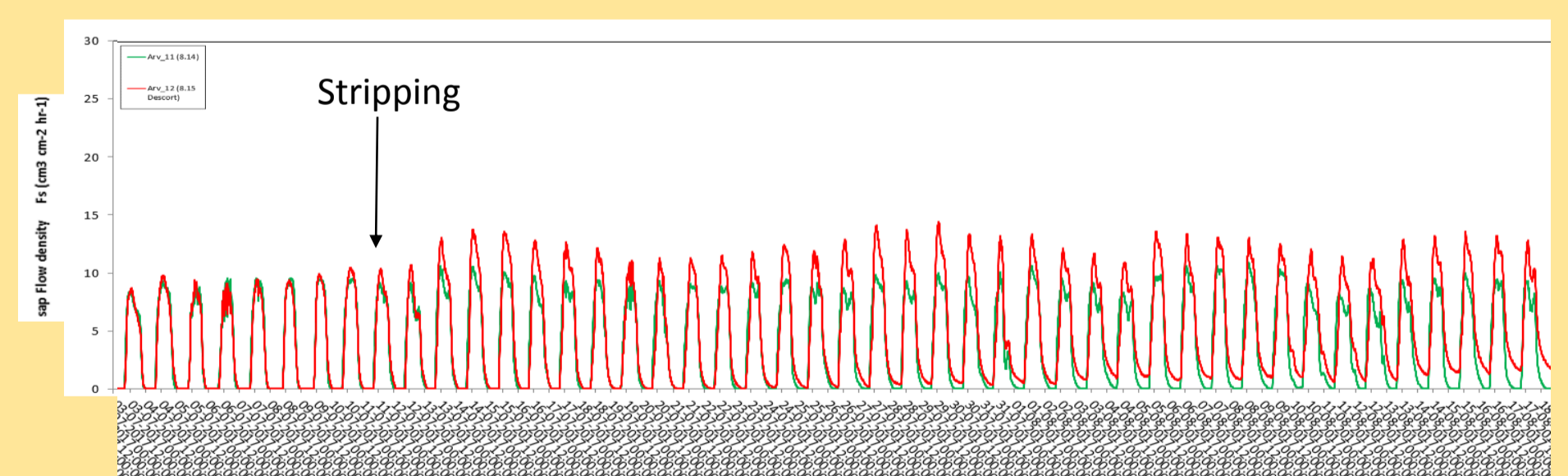


Figure 3. Example of sap flow monitoring from irrigated cork oak trees before, during and after stripping. Red line: stripped tree; green line: control.

Discussion

- 62 % of the 16 years old irrigated trees were stripped, presenting more than 70 cm of CAP. In the control (non-irrigated plot), no tree presented more than 70 cm Cap at the age of 16. Also, differences in total height were observed, with the irrigated trees presenting higher values.
- From tests made in earlier years, cork from irrigated trees present similar thickness with 4.5 years than from control with 9 years. Cork removed this year (2017) is under structural and quality analysis.
- No significant differences of sap flow density were observed between stripped trees and control (non-stripped) before, during and after the removal process.