

Harvesting of heart stumps from Poplar and Maritime Pine forest in South West France

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OBJECTIVES

- Evaluating of a new roots extracting technique
- Products properties analysis
- Integration in silviculture

Figure 1: root architecture of a maritime pine (F. Danjon, 2005)

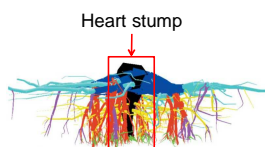


Photo 1: heart stumps



METHODOLOGY

- 4 sites with control plots without extraction
- Time studies for extraction, desilting, forwarding, chipping
- Chip sampling
- Properties: moisture, granulometry, ash content, density, energy content

MATERIALS

Photo 2: extracting machine



Extracting machine:

- tool: 70cm diameter Elletari trepan
- toolholder: crawler excavator Case CX 210 (net power: 119kW, total weight: 21.2t)

EXTRACTING PROCESS (figure 2)

- Extracting heart stumps (1, 2)
- Desilting (3, 4)
- Forwarding
- Chipping roadside
- Haulage

Photo 3: degritter-forwarder



Degritter-forwarder: roller chains mounted on a single-box double-axle trailer (Gourdon, payload: 12t) towed by a farm tractor equipped with a crane (Loglift, lifting moment: 50kNm, max reach: 6m)

Figure 2: extracting process

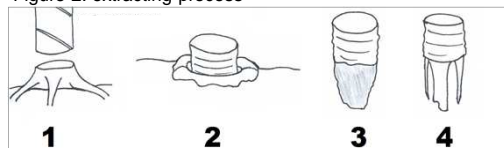
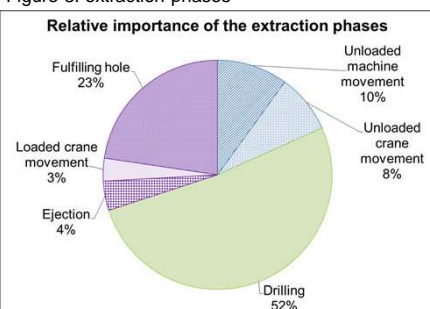


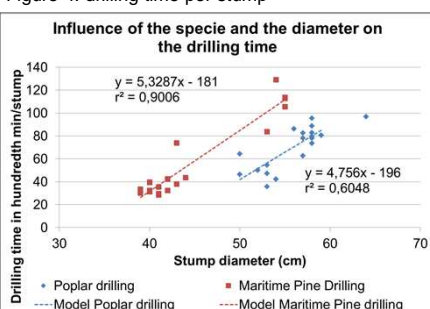
Figure 3: extraction phases



Productivity results in Maritime Pine:

Average diameter: 50 cm
Average density: 163 stumps/ha
Productivity: 38 stumps/productive hour
Average gross weight per stump: 167 kg
Moisture (after 3 months storage): 30 %

Figure 4: drilling time per stump



MAJOR RESULTS

1. Heart stumps extraction of Poplar and Maritime Pine is technically feasible in soils without stones (photo 2)
2. Impact on soils is low
3. Productivity of extraction is cost efficient (figure 3 and 4)
4. Productivity of degritting and forwarding is not cost efficient (photo 3)
5. Chipping process of heart stumps similar to logs (photo 4)
6. Granulometry of chips is good (photo 5)
7. Ash content is acceptable only in dry wetlands (figure 5)

Granulometry of chips (EN 14691)

	P 63 +	P 63	P 45	P 31,5	P 3,15	P 1
Site 1 (Poplar)	3,5	2,3	1,4	83,3	7,8	1,2
Site 2 (Poplar)	6,3	6,0	3,6	74,6	6,3	1,9
Site 3 (Maritime Pine)	5,2	5,0	3,2	76,5	5,2	3,6
Site 4 (Maritime Pine)	3,9	1,7	0,4	83,9	5,8	4,0

The main class is P 31.5 ; more than 75% of chips between 3.5 and 45mm. Screening is necessary to reduce P1 part (< 1mm).

Photo 5: chips from heart stumps



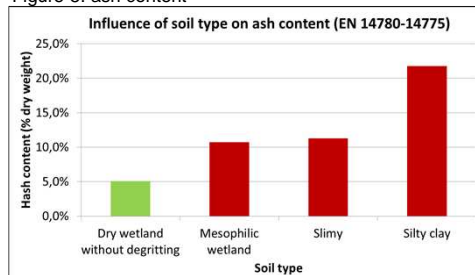
Photo 4: chipper



Chipper: Neuson Ecotech logchipper HC 1266 (mesh size: 50mm, net power: 480kW)

Productivity of chipping heart stumps (maritime pine):
20 gross tons/productive hour

Figure 5: ash content



ABSTRACT

The stump-root system represents a substantial portion of the tree mass which can be attractive for energy use. An extracting machine, equipped with a 70 cm diameter trepan, has been evaluated to harvest the heart of stumps. The impact of this method on soils is lower than techniques which extracts all of the roots. The ash content of woodchips is also lower than whole roots extraction techniques. The aim of the study is to investigate poplar and maritime pine root recovery operations in plantations with time studies, to determine the productivity and delivery costs of the operations and to characterize the products for energy use.

Ref : Richard Emeyriat et al, 2013, « Projet expérimental d'une chaîne d'extraction de cœurs de souches pour un usage énergétique. Rapport final. », FORÊT LOGISTIQUE CONSEIL, CASTAGNET DUMOU, CRPF AQUITAINE, 56 p.

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