

How many trees did you plant today?

An exploratory study of the factors affecting the productivity of a group of planters working in the Abitibi and Outaouais regions of Québec

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Approximately 138 million forest seedlings are planted annually in Quebec, on an area totalling close to 87,000 ha. Unlike other jurisdictions, the provincial government, through le ministère des Ressources naturelles et de la faune (MRNF), is responsible for producing and distributing all of the seedlings destined for reforestation. Because a tree planter's salary is based on the number of seedlings that she/he plants, it is important to identify the factors that influence a planter's productivity

Methodology:

The productivity of 12 tree planters working for *La forêt de demain*, a division of *Outland Reforestation Inc.*, was studied during the 2005 planting season (May-August). The study group was composed of nine men and three women. Nine of the twelve had previous planting experience. The average age of the planters was 22 years old and nine of the planters were students (Fig. 1).

During the evaluation period, 3,000,000 seedlings were planted on 14 different sites in the Abitibi and Outaouais regions of Québec (Fig 2). The management and cutting rights on the planting sites belong to Tembec Inc., and Bowater Inc. Because the amount of debris and type of terrain differed among sites, the planting prescriptions also varied (Table 1, Fig. 3). The data for this exploratory study was collected daily for a period of 51 days. For the purposes of this study, productivity is defined as the number of seedlings planted per hour per production day (seedlings/hour/day worked). Based on the results of previous studies and an informal survey of planters during the 2004 season, eleven variables were selected for analysis (Table 2).



Fig. 1. Planting crew

Table 1. Description of planting sites.

*JP: jack pine, BS: black spruce, WS: white spruce, RP: red pine, WP: white pine, L: larch)

**FP: fill planting, to compensate for insufficient natural regeneration (<1.4m spacing) of conifers (spruce, fir, larch, jack pine), planting at 2 to 2.5m spacing. FP (mix): to compensate for insufficient natural regeneration of conifers, birch and aspen, FP(P): fill planting to compensate for insufficient natural regeneration of red and white pine, FS: fill planting on the skid trails to compensate for insufficient natural regeneration of conifers, FS (mix): fill planting on the skid trails to compensate for insufficient natural regeneration of conifers and aspen, LN: plantation establishment on a landing where natural regeneration is virtually absent (note: a site is insufficient stocked at <1.4m spacing for JP, L, WS, BS & 2.1m spacing for RP and WP. seedlings are planted at 2 to 2.5m spacing)

Planting site	Company	No. of days	Species planted*	Type of plantation**
1. Bousquet	Tembec	5	JP, BS	FP
2. Besserde	Tembec	13	JP, BS	FP, FP (mix), FS (mix)
3. Corbet	Bowater	9	BS, WS	FS, LN
4. Dumoine	Bowater	9	BS, RP	FP, LN, FP(P)
5. Dumont	Bowater	4	WS, WP	FP, LN, FP(P)
6. Landemeau	Bowater	2	WS	LN
7. Manneville	Tembec	2	BS, L	FP, FS
8. Michaud	Bowater	2	JP	FP, LN
9. Moccasin	Bowater	2	WS	LN
10. Montaner	Tembec	2	BS	FP
11. Mull	Bowater	2	JP, BS, WS	FS, LN
12. Thorne	Bowater	2	WS	FP
13. Ward	Bowater	6	JP, WS	FP
14. Wawegosc	Tembec	4	JP	FP



Fig. 2 Tembec and Bowater sites in the Abitibi and Outaouais regions of Québec



Fig. 3a. The humid portions of the Manneville site with little advanced regeneration were fill planted with larch.



Fig.3b. Natural regeneration was adequate at the Mull site, where only the skid trails had to be planted.



Fig. 3c. Ward (Bowater) site, where debris had not yet been piled, prohibiting planting in the landing.



Fig. 3d. Given that it had neither natural regeneration, nor vegetative competition, fill planting was prescribed on the Dumoine site.

Table 2. The eleven variables studied and their significance

Group	Variables measured	Significance in present study (P ≤ 0.05)
Harvesting method	Presence of windrows	no
Reforestation	Type of plantation (density)	no
	Type of plant	no
Climate	Mid-day temperature	no
Individual planter		yes
	Travel time in vehicle (camp-drop off point)	yes (-)
	Walking time (drop off point-planting site)	yes (-)
	Number of consecutive days of planting without break	no
	Number of hours worked/day	yes (+)
Planter efficiency	Remuneration/seedling	yes (-)
	Number of days since the beginning of the study	yes (+)

Results and Discussion:

The six variables that had a significant effect on planter productivity (Table 2, Fig. 4) were related to either the moral or physical well-being of the individual planter. Travelling induces fatigue and it may also be difficult for a planter to remain motivated during if distances between the camp and the planting sites are long (Fig. 4a).

The inverse relationship between remuneration and productivity is to be expected (Fig. 4b), given that planters are paid more per seedling under more difficult conditions.

The number of hours that a planter works on a given day has a very positive effect on his/her productivity. The percentage of time lost to breaks tends to decrease as the working day gets longer. Planters are also less motivated when they know that they will only be planting for a portion of the day (Fig. 4c).

As the season progressed and planters gained experience, productivity increased (Fig. 4d).

The average number of seedlings planted per hour varied among planters (Fig. 4e) and not all planters reacted in the same manner to changing conditions (i.e. type of plantation Fig. 4f).

Fig.4

