

## Impacts of Planting Quality on Conifer Seedling Survival and Growth

### Project Summary and Preliminary Findings

**INTRODUCTION:** With an average provincial reforestation rate of 218 million seedlings per year, tree planting is a valuable tool used in the regeneration of forests. As a result, significant effort is applied to avoid improper planting techniques and common planting faults.

**OBJECTIVES:** This study is intended to demonstrate the impacts of shallow planting of seedling root plugs and placement in improper planting medium on spruce seedling survival, health and growth.

**METHODS:** Established in 2017, 150 spruce seedlings were planted within CNC Research Forest Unit G, cutblock G-4. Planted by Research Forest staff, three treatments (50 trees/treatment) were implemented, a control (planted as per provincial planting industry standards) and two common planting fault treatments, including shallow planting (root plug exposure) and inadequate planting medium (chunky wood rot, needles, duff and other non-decomposed woody litter). To assess if common planting faults impact seedling growth and survival, measurements including incremental (leader) growth, condition and root collar diameter were obtained for seedlings planted within each treatment.

**RESULTS:** Assessed in both 2018 and 2019, the following data was obtained:

- In both 2018 and 2019, seedlings in Treatment C (control) had highest mean incremental growth of 10cm and 14.5cm respectively. Maximum incremental growths of 25cm were noted in both 2018 and 2019.
- Seedlings planted in Treatment A (shallow planting/plug exposure) had mean incremental growth of 6.9cm and 11.1cm and maximum incremental growths of 18cm and 22cm in both 2018 and 2019 respectively, while seedlings planted in Treatment B (inadequate planting medium) had a mean incremental growth of 6.2cm and 12.5cm in both 2018 and 2019 respectively. Maximum incremental growths of 19cm and 29cm were also recorded.
- There was no significant difference in root collar diameter among treatments in both 2018/2019 ( $P > 0.05$ )
- Since establishment in 2017, calculated survival rates indicate 86% of seedlings planted in Treatment A survived, with 7 documented mortalities, compared to 90% survival in Treatment B, with 5 mortalities, and 98% survival in the Control, with 1 mortality event documented in Treatment C (control)



Significant growth observed on Tree #9 (left), and tree #72 (right) planted within inadequate planting mediums (Tree #9 in chunky red rot and Tree #72 in woody debris), measured in late summer (Treatment B).