

We are unable to supply this entire article because the publisher requires payment of a copyright fee. You may be able to obtain a copy from your local library, or from various commercial document delivery services.

From Forest Nursery Notes, Winter 2008

© 128. **Chlorophyll fluorescence, root growth potential, and stomatal conductance as estimates of field performance potential in conifer seedlings.** L'Hirondelle, S. J., Simpson, D. G., and Binder, W. D. *New Forests* 34:235-251. 2007.

Chlorophyll fluorescence, root growth potential, and stomatal conductance as estimates of field performance potential in conifer seedlings

Sylvia J. L'Hirondelle • David G. Simpson
Wolfgang D. Binder

Received: 11 April 2006 / Accepted: 6 February 2007 / Published online: 12 April 2007
© Springer Science+Business Media B.V. 2007

Abstract After cold storage, conifer seedlings in British Columbia are tested for field growth potential before planting. We compared three tests of performance potential using container-grown seedlings of Douglas-fir, interior spruce, lodgepole pine, and western larch (14 seedlots total). On several autumn dates, seedlings were lifted and stored at -2°C . The following spring we tested stored seedlings for root growth potential (RGP), chlorophyll fluorescence (CF), and stomatal conductance (Gs), and then planted seedlings in nursery beds. We assessed survival and shoot dry weight (SDW) after one growing season. Performance test results were significantly correlated with [seedling performance and field survival](#) varied with lift date. The best performance predictor was the sum of CF and RGP ($R^2 = 0.79$ for 78 seedlot by lift-date combinations), which minimized the risk of planting poor seedlings and not planting good seedlings. A sum of 83 for CF (Fv/Fm %) and RGP (new roots >1 cm) provided a threshold above which survival and growth were good. For evergreen conifers, Gs was a good performance predictor, but required extra time to measure leaf area. We recommend a combination of CF and RGP to assess vigor of shoot and root systems before planting.

Keywords Stock quality • Cold storage • Survival • Shoot growth • Seedling physiology

Wolfgang D. Binder—Scientist Emeritus.

S. J. L'Hirondelle (✉) • W. D. Binder
B.C. Ministry of Forests and Range, Research Branch Laboratory, PO Box 9536, Stn Prov Govt,
Victoria, BC, Canada V8W 9C4
e-mail: Sylvia.L.Hirondelle@gov.bc.ca

D. G. Simpson
B.C. Ministry of Forests and Range, Kalamalka Forestry Centre, 3401 Reservoir Road, Vernon, BC,
Canada V1B 2C7