

Twelfth-year response of Douglas-fir to area of weed control and herbaceous versus woody weed control treatments¹

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Abstract: Coastal Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco var. *menziesii*) response to eight weed control treatments was measured 12 years after planting at two Oregon sites. Treatments included four areas of weed control around individual trees (0.375, 1.49, 3.35, and 5.95 m²), no weed control (check), total vegetation control, control of herbaceous competition only, or control of woody competition only. Douglas-fir growth and woody-species invasion differed between the Coast Range site (Summit) and the Cascade Range foothills site (Marcola). Woody species reinvasion was more intense at Summit, with Douglas-fir cumulative mortality in the check treatment reaching 23% in year 12. Woody-only control improved Douglas-fir growth at Summit but had no significant effect on growth at Marcola. Total vegetation control had a profound effect on stem volume growth 12 years after planting. At Summit, total vegetation control resulted in a 355% increase in volume per hectare relative to the check. At Marcola the increase was only 63%. At Summit, growth increased with each increase in area of weed control, whereas at Marcola growth increased with increasing area of weed control up to 3.35 m² of control. Results suggest that much of the gain in volume growth attributable to weed control may be lost if weed-control treatments are not highly efficacious. The differential response to woody control indicates that its benefit at a given site is strongly related to the abundance of competitive hardwood species, which may be predicted from the preharvest stand structure and vegetation community.

Resume : La reaction du douglas vert (*Pseudotsuga menziesii* (Mirb.) Franco var. *menziesii*) typique a huit traitements de maitrise de la vegetation competitrice a ete mesuree 12 ans apres la plantation dans deux stations de l'Oregon. Les traitements incluait la maitrise de la vegetation competitrice sur des superficies de quatre dimensions differentes autour d'arbres individuels (0,375, 1,49, 3,35 et 5,95 m²), un temoin (pas de traitement de maitrise de la vegetation), la maitrise de toute la vegetation, la maitrise de la vegetation herbacee seulement et la maitrise de la vegetation ligneuse seulement. La croissance du douglas vert et l'invasion par les especes ligneuses differaient entre la station de la chaine coteiere (Summit) et la station situee dans les contreforts de la chaine des Cascades (Marcola). L'invasion par les especes ligneuses a etc plus intense a Summit oil la mortalite cumulative du douglas vert atteignait 23 %, 12 ans apres la plantation. La maitrise de la vegetation ligneuse seulement a augmente la croissance du douglas vert a Summit mais n'a eu aucun effet significatif sur la croissance a Marcola. La maitrise de toute la vegetation a eu un effet prononce sur la croissance en volume des tiges 12 ans apres la plantation. A Summit, ce traitement a produit une augmentation de 355 % du volume a l'hectare par rapport au temoin. A Marcola, l'augmentation n'a ete que de 63%. A Summit, la croissance a augmente avec chaque augmentation de la superficie traitee jusqu'a 3,35 m² de maitrise de la vegetation. A Marcola, la croissance en volume attribuable a la maitrise de la vegetation a etc plus prononcee avec l'augmentation de la superficie traitee. Les resultats suggerent que beaucoup du gain en croissance en volume attribuable a la maitrise de la vegetation peut etre perdu si les traitements de maitrise de la vegetation ne sont pas hautement efficaces. La difference de reaction sur une station donnee sont fortement lies a la structure et de la composition du peup.

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Introduction

The growth form of competing vegetation greatly influences crop seedling survival and growth in forest plantations (Miller et al. 2003). Within the range of coastal Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco var. *menziesii*), her-

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