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EXAMINATION OF DOUGLAS-FIR CLONES FOR DIFFERENCES IN SUSCEPTIBILITY TO DAMAGE BY CONE AND SEED INSECTS

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ABSTRACT

In 1974 and 1976, Douglas-fir cones from 51 clones and 150 clones, respectively, were collected and determinations were made of the percentage of seed damaged by the cone insects *Barbara colfaxiana, Contarinia oregonensis, C. washingtonensis* and *Megastigmus spermotrophus.* Although statistically significant differences in percentage of damaged seeds were detected among clones, these differences were not great enough to be of practical importance.

RÉSUMÉ

En 1974 et en 1976, dans respectivement 51 et 150 clones, les auteurs récoltèrent des cônes de Douglas et déterminèrent le pourcentage de graines endommagées par les Insectes *Barbara colfaxiana*, *Contarinia oregonensis*, *C. washingtonensis* et *Megastigmus spermotrophus*. Malgré que des différences statistiquement significatives de pourcentages de graines endommagées fussent détectées parmi les clones, les différences ne se révélèrent pas importantes en pratique.

Significant differences have been reported in cone insect attack among clones, i.e. a group of genetically identical plants derived asexually from a single individual (Snyder, 1972), in slash pine, *Pinus elliottii* Englm. var. *elliottii* (De Barr *et al.*, 1972; Merkel *et al.*, 1965). Thus the present study was conducted to determine if a similar situation is true in seed orchards on Vancouver Island, British Columbia. Fifty-one Douglas-fir clones were sampled in 1974 and 150 in 1976; only 35 of these were sampled in both years but none in 1975, because of a poor cone crop. Twenty cones were taken from each clone and, where possible, from five ramets, i.e. an individual member of a clone, per clone. Damage in percentage of seed per cone, was determined for four common Douglas-fir insect pests: the cone moth, *Barbara colfaxiana* (Kearfott); the cone gall midge, *Contarinia oregonensis* Foote; the cone scale midge, *C. washingtonensis* Johnson, and the seed chalcid, *Megastigmus spermotrophus* Wachtl.

The data were analyzed on the basis of percent damaged seeds per cone, after being transformed, to correct for heterogeneity of variance, to the limited arcsin. The means were compared using the Student-Neuman-Keuls' multiple range test, with extension suggested by Kramer for unequal replications (Steel and Torrie, Principles and Procedures of Statistics, 110-114. 1960).

Because of the size of the experiment (four insect pests x three orchards x 166 total clones) and because so few significant differences were detected, we have summarized the results verbally; the numerical data are available from the authors. The results showed that: damage by the cone moth and cone scale midge did not differ significantly among any of the clones within the same orchard; damage by the cone gall midge did not differ significantly among clones except for one clone which suffered more damage than the others in the same orchard; damage by the seed chalcid was significantly more severe for only two clones in the same orchard. Because the analyses showed only minor differences in extent of insect damage among clones, these differences were generally of no practical importance.

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