DEPARTMENT OF FORESTRY · CANADA

Timber Talks

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MOISTURE STRESS FAVOURS SEED PRODUCTION

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The increasing importance of the forests to the economy of Canada and the concomitant improvement in forestry practices and expanded programs of reforestation has emphasized the need for a dependable and assured supply of coniferous seed. Although some seed may be produced annually, bountiful crops that will meet our requirements occur infrequently. Good Douglas-fir seed crops are infrequent and in intervening years the seed supply is limited or negligible.

The formation of flower buds and the periodicity of seed crops is considered to be related to climatic variations, particularly temperature and drought. Their relative importance is not clear nor has the critical time and duration of flower-inducing weather been closely defined.

Douglas-fir clones grafted on potted root-stocks and retained in a greenhouse where routine watering ensured that the plants were not subjected to water stress, did not develop reproductive tissues. When the plants were moved outdoors many grafts developed cones. Cone production was attributed to moisture stress in the plant during periods of unfavourable weather. The higher-than-average temperature in the greenhouse was not a requirement for floral initiation, and routine watering was more favourable to the development of vegetative than to reproductive tissues.

A reciprocal transfer of greenhouse and outside plants that were subjected to drought and routine watering confirmed the regulatory role of moisture stress on cone production. None of the well-watered plants developed reproductive tissues, but over 25% of those that were subjected to drought produced flowers.

The differentiation of bud initials into reproductive rather than vegetative buds, seems dependent on the mechanism responsible for its being triggered at the appropriate developmental stage by conditions temporarily unfavourable to vegetative growth. Conditions that could result in floral initiation due to moisture stress within a plant include hot dry weather, root-pruning, spring flooding, root rot diseases, girdling of the tree and a temporary salt effect of fertilizers on the root system.

REPORT: Drought-Induced Flowering of Potted Douglas Fir Clones. L. F. Ebell, Forest Research Laboratory, Victoria, B. C.