To: A. E. McDonald

From: Silviculture Branch
Date: 86-03-24
File: 955-21

Re: Sx 86207Q Shading Trial to Initiate Bud Set

Introduction

Current methods of achieving bud set in fast growing species include changing nutrition to high P formulations, and in drought stressing to severe limits. Extreme drought stress is generally effective but can be difficult to achieve on uncovered crops. It is also a hazardous procedure that may be resulting in physiological damage. Other possible methods include shortened photoperiod, which is expensive and in which difficulties arise in avoiding excessive temperatures, and chemical control (Ethrel) which has not been sufficiently refined to be practical.

It has been observed that relatively minor changes in light levels sometimes result in a crop achieving bud set, or in breaking buds when light levels increase. This trial will determine if heavy shading can replace drought stress as a means of achieving bud set.

Experimental Design

All treatments will consist of four 313A Stryblocks each. They will be greenhouse started and moved to treatment locations as required. The section to be moved outdoors will be moved when canopy closure has occurred. The section to receive heavy shade will be moved to the shadeframe when treatments are to commence.

All treatments will contain 3 kg/m³ Green Valley 10 mesh and finer dolomite lime and 130 g/m³ FTE 503. Spruce treatments will contain 6.5 kg/m³ Osmocote 18-6-12, and cedar and fir treatments will contain 4.5 kg/m³ Osmocote 18-6-12 in the growing medium. All treatments will be started and finished with Green Valley 10-51-16. Green Valley 20-20-20 will be applied at 125 ppm N during the growing season is soil salinities or growth indicate the need. Fertilizers will change from grower to finisher when the height termination procedures commence.

The seedlots to be used are:
Sw (SZ 3110) 93H11/B3/4177/.914 - 89%
CW (SZ 1070) 92J11/B3/3456/.860 - 84%
Pdc (SZ 1090) 92M10/B3/7752/.460 - 94%

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Treatments

1. Greenhouse. At the time when it is desirable to initiate bud set, this treatment will remain in the double poly greenhouse where the trial was started. Photoperiod lighting will be discontinued and fertilizer applications will change from grower to finisher formulations. Moderate to severe drought stress will be utilized to ensure bud set is achieved.

2. Greenhouse. At the time when it is desirable to initiate bud set (as in Treatment 1) this treatment will remain in the double poly greenhouse. Photoperiod lighting will be discontinued and fertilizer applications will change from grower to finisher formulations. Shadecloth will be used to achieve a total of 60% light reduction. Severe drought stress will be avoided and this treatment will remain on a moderate growing regime. At the end of three weeks this treatment will remain in the greenhouse with shadecloth removed.

3. Shadeframe. At the time when it is desirable to initiate bud set (as in Treatment 1), this treatment will be moved to a shadeframe. Photoperiod lighting will be discontinued and fertilizer applications will change from grower to finisher formulations. Shadecloth will be used to achieve a 60% reduction in natural light. Severe drought stress will be avoided and this treatment will remain on a moderate growing regime. At the end of three weeks this treatment will be returned to full light.

4. Shadeframe. This treatment will be the same as Treatment 3, except it will be moved into full light after two weeks of heavy shading.

5. Outdoors. After initial growth in the greenhouse, this treatment will be moved outdoors after trees are tall enough to protect stems from intense sun (canopy closure). When height growth is anticipated to reach target, photoperiod lighting will be discontinued and fertilizer applications will change from grower to finisher formulations. Moderate to severe drought stress will be utilized to ensure bud set is achieved.

Observations Required

Observations will include calculating the percentage of seedlings that initiate terminal buds six weeks after the beginning of shading or drought stress treatments in fir and spruce. Further observations will calculate the percentage of seedlings that break bud and commence further growth. All treatments will be processed for morphological description in late 1986. At this time samples will also be taken for Root Growth Capacity testing.

G. Matthews
Agrologist
Silviculture Branch

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