STUDIES WITH DOUGLAS-FIR SEED AND EXOTIC CONIFERS FOR CHRISTMAS TREE PRODUCTION

C. E. Heit[1]

Information gathered from research studies covering a period of 25 years which were conducted in the laboratory and the nursery were presented in summary by color slides and published reprints. Little data and even conclusive findings cannot be given in this article as it would require too much space, but a brief abstract will follow. These findings are completely covered in the published articles listed under literature cited, and all of these are available from the author upon request.

Hundreds of Douglas-fir seed sources were tested in the laboratory and grown in the nursery covering the entire natural range of Rocky Mountain and Inland strains from Northern British Columbia through Idaho, Montana, Utah, Wyoming, Colorado, Arizona, and New Mexico. Germinative characteristics and seed-per-pound data are presented on the various sources. Height growth, foliage color, spring bud break, and late fall growth are shown in either photos or tabular form for many seed sources both as 1- and 2-year-old seedlings. Two-year seedlings growing side by side have varied in height growth from 12 to as much as 18 to 20 inches, and foliage color has varied from a soft, intense, uniform blue to a fairly dark green. A discussion of the characteristics of various sources from individual states and British Columbia, Canada, are also presented in the paper.

Studies on 15 species of pines are covered in the Pinus paper along with photos, growth characteristics, and potential value as a Christmas tree or for

[1]Seed technologist, Department of Seed Investigations, New York Agricultural Experiment Station, Geneva, New York.

ornamental and other uses. Optimum treatment for maximum and uniform seedling stands in the nursery are also presented with recommended time of sowing procedures.

Information on Western, European, and far eastern Chinese and Japanese spruce species is covered in the Picea paper. Geographical variance in seed
size and color and growth characteristics are given for Norway spruce, Engelmann, and Colorado blue spruce. Germinative characteristics and inherited dormancy
of the many spruces are discussed and their relation to time of sowing and nursery techniques for optimum seedling production.

The beautiful Serbian spruce is covered fully and its great potential for Christmas tree appeal. Seven Far Eastern species including Tigertail, Alcock, Sakhalin, Heddo, Dragon, Koyama, and Maximowicz spruces were tested, grown, and studied for planting potential either for Christmas trees or other uses. All of these detailed findings are presented in the spruce paper.

The Abies or fir group are becoming more important and more popular for Christmas tree production because of their beauty, varied unique growth habit and excellent needle holding capacity. In growing tests in the nursery as transplants and larger specimen trees during more than 20 years of these conducted studies both casual and professional, visitors were attracted to the glaucous, silvery-blue Subalpine firs or to the extreme dark green upper needle foliage with whitish lines on the undersurface of the Ernest, King Boris, Bornmeuller, or other exotic European or Japanese firs.

A total of 19 firs are discussed in this Abies paper including 7 American species, 6 European or Mediterranean species, and 6 far eastern Chinese or Japanese species. Variation in seed-per-pound, germinative characteristics, seed source performances, foliage color, growth characteristics, and winter hardiness are reported and discussed as recorded and observed over the years of study. Many of these fir species have excellent production potential as Christmas trees or for breeding work and ornamental plantings. All of these findings and performance studies are available to anyone by
requesting Part 14 of Propagation from Seed as listed under the literature citations.

LITERATURE CITED

1. Propagation from seed - Part 12. 1968. Growing choice, less common and exotic pines. Amer. Nurseryman 127(2):14-15, 112-120.
2. Propagation from seed - Part 13. 1968. Growing some Western and exotic spruce species. Amer. Nurseryman 127(8):12-13, 51-57, 60-63.
3. Propagation from seed - Part 14. 1968. Testing and growing less common and exotic fir species. Amer. Nurseryman 127(10):10-11, 34-45, 48-51.
4. Propagation from seed - Part 17. 1968. Testing and growing Douglas fir seeds from different sources. Amer. Nurseryman 128(10):12-16, 40-49, 52-60.
5. Dickson, Heit, & Stone. 1968. Growing trees in small nurseries. Cornell Ext. Bul. #1198. 21 pp.

DISCUSSION

GABRIEL - Have you seen Abies cephalonica?

HEIT - Yes, I've grown it in the nursery; I have some seedlings now. In the reprints you will see all the firs that we have tested and you will find there seed propagating methods for nursery seedling production and it also gives data on seeds per pound and other pertinent information on all exotic firs. It covers the whole field of seed testing in the laboratory and in the nursery and gives the characteristics of the various firs.

ABRACZINSKAS - Concerning the Douglas-fir in the New Mexico stand -- do they show any sensitivity to early spring frost as compared to your Colorado-Idaho sources?

HEIT - Every year that is one of the problems mentioned. Everyone mentions it -- early or late spring frosts on Douglas-fir. You can talk a half hour on that alone, but the point is, all the years that I have been testing these sources in nursery, I have attempted to make observations in this regard. We don't get many late spring frosts in our area. One year we did get a late spring frost in the middle of May, and the data are presented in one of the tables in this Douglas-fir reprint. On table 5 of the Douglas-fir reprint, you will see the information here. Now it was very unfortunate that year that in this particular series I did not have any Shuswap Lake or other British Columbia sources. These were all the Blue sources and they cover the range from northern Colorado down through New Mexico and Arizona. And,
in that particular series, we also had E. C. Childs' Great Mountain Forest source from Connecticut, which some of you are interested in. The data are right there as 2-0 stock, and as soon as we had taken frost injury information on the seedlings, we took the trees and transplanted them and we have the 2-1 transplant quality information in this other column listed as a good normal leader. We found in this particular series that the ones from New Mexico, Coconino National Forest Arizona, and the one from the Great Mountain Forest
had the least damage. I never observed much differences in spring bud breaking in any of the hundreds of seed sources which I have tested in the nursery. But the point is, if you get a late spring frost on the 17th of May and some of your sources break buds two days later, it might save you. Particularly
this year the more southern sources in Arizona and New Mexico did not bud out until two or three days later and thus we got about 70% damage in some
of the Park County-Rio Grande, Colorado, areas where in the more southern areas we got only 10% frost damage. So there can be quite a difference.

ANONYMOUS - Have you done any first-hand cutting propagation of fir? Are you acquainted with that.

HEIT - No, I've never done any of that, and I'm not particularly interested in that. By the way, I have tried to propagate Ernest fir from cuttings, but with no success. If any of you can propagate it, I can furnish you some stock.