OVERWINTERING CONTAINER CONIFERS IN PRAIRIE CANADA

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The type of evergreen storage with which we have experimented over the past year is not new to members of this Society. The objective was to see if it would be possible to successfully store evergreens in a poly structure without the aid of auxilary heat in a winter climate as severe as ours. It is not uncommon for the temperature to dip to -40°F. Quite often it will remain at between -25 and -35°F for 2 or 3 weeks at a time.

We knew that poly structures were being using in other parts of Canada and the U.S. To my knowledge no one had tried them on the prairies of Canada, where temperatures and winter conditions are much more severe than in the other areas mentioned.

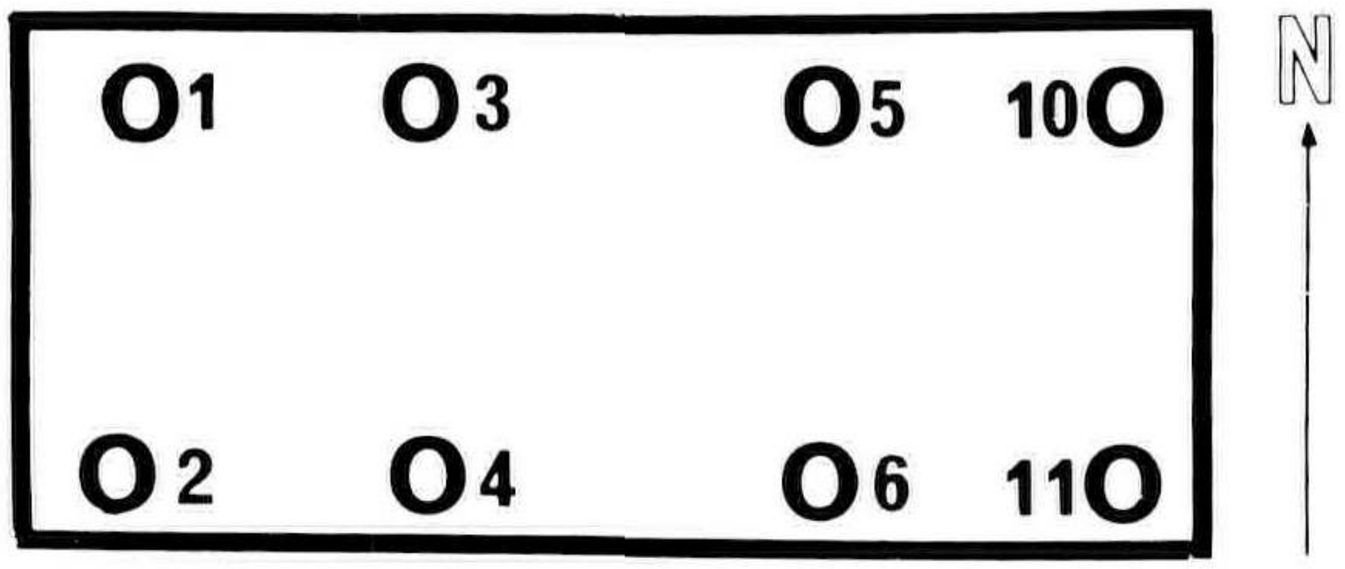
With the cooperation and assistance of the Morden Research Station, Morden, Manitoba, we decided to erect a structure in which to store evergreens and to record temperatures on a weekly basis throughout the winter of 1973-74.

Evergreens were dug with a ball of soil in late August and early September and placed in paper maiche pots. These were irrigated on a regular basis in order to establish a new root system within the containers before freeze-up. The material used for this study were: *Picea pungens, Pinus sylvestris, Pinus ponderosa, Pinus mugo, Thuja occidentalis,* 'Brandon', 'Ware Dwarf' and 'Woodwardii', *Juniperus sabina, J.s.* 'Arcadia', and J.S. 'Skandia'.

A quonset structure, 18 x 96 ft was built in an east-west direction. A walk-in door was placed at one end and a small drop-down door at the opposite end for ventilation. The potted plants were pushed close together leaving enough room to insulate in and around the rootball with dry shavings. A 6 mil clear poly covering was pulled into place the first week of November and painted with white latex paint. It was my intention to use a double layer of poly and blow air in between the layers for extra insulation. However, I did not get the information needed from Dick Bosley as to how to do this until I talked to him in Chicago last December. When I returned home we had had a terrible ice storm and could not touch the poly; we decided to leave it as it was.

Temperatures were recorded from December 18 to March 5, giving readings for the coldest period of the winter. Fig. 1 indicates the location of the pots in the storage showing the variations in individual pot temperatures for January 8. The outside air temperature was -20°F and the inside air temperature was 4°F. It did not appear to matter whether the location of the pot was on

the north or south side as is indicated by the temperatures in pots 1, 2, 3 and 4. The difference in temperature between insulated and non-insulated pots was 8°F.



Location		Temperature Celsius	Farenheit
Outside	Air	-28.9	-20.0
Inside	Air	-15.6	+ 4.0
Pot	#1*	- 9.5	+15.0
Pot	#2*	- 7.5	+18.0
Pot	#3*	- 7.2	+19.0
Pot	#4*	-10.0***	+14.0***
Pot	#5*	- 6.5	+20.0
Pot	#6*	- 6.1	+21.0
Pot	#10**	-13.5	+ 8.0
Pot	#11**	-14.0	+ 7.0

* insulated with shavings
** non-insulated
*** lowest temperature recorded for insulated pots

Figure 1. Variations in individual pot temperatures in a poly storage shed on January 8, 1974.

Fig. 2 indicates variation in outside air, inside air and insulated pot temperatures over a 12 week period. The temperatures of

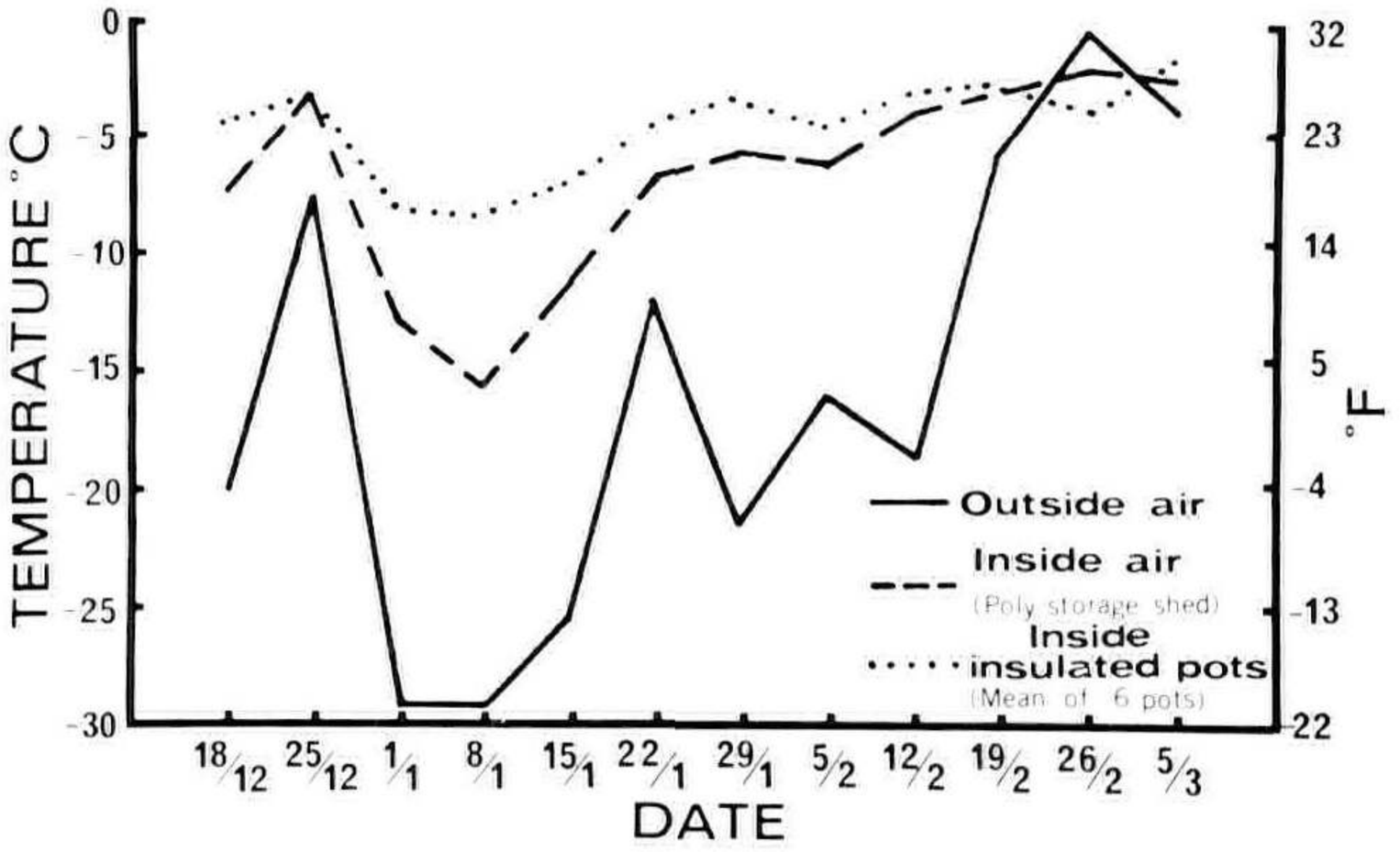


Figure 2. Variation in outside air, inside air and insulated pot temperatures over a 12 wk period during winter of 1973-74. (Temperatures of non-insulated pots closely followed inside air temperature).

non-insulated pots closely followed inside air temperatures. The insulated pot temperatures ranged between 14° and 26°F while the outside temperature ranged from -20 to 30°F.

Fig. 3 indicates minimum outside air, inside air and insulated pot temperatures recorded during the winter. Outside air went to 20°F, inside air to 4°F, and insulated pots went to 17°F (mean temperature for six pots).

Fig. 4 indicates mean temperature for the coldest 2 week period, January 1 to 15, with reference to outside air, inside air and insulated pot temperatures.

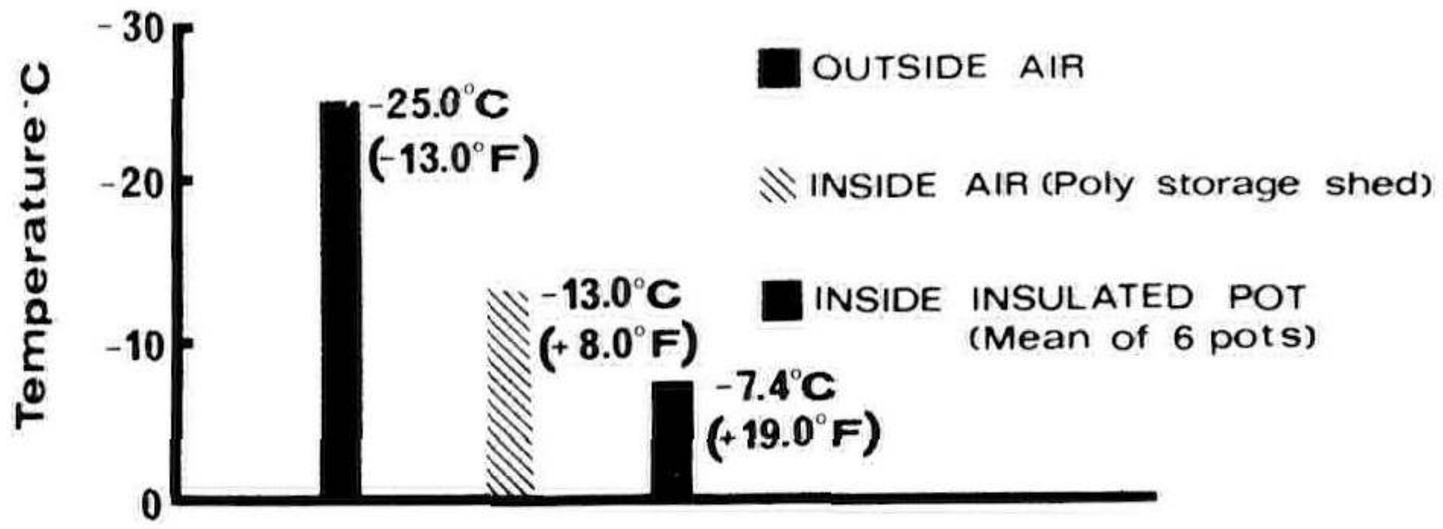


Figure 3. Minimum outside air, inside air and insulated pot temperatures recorded during winter of 1973-74.

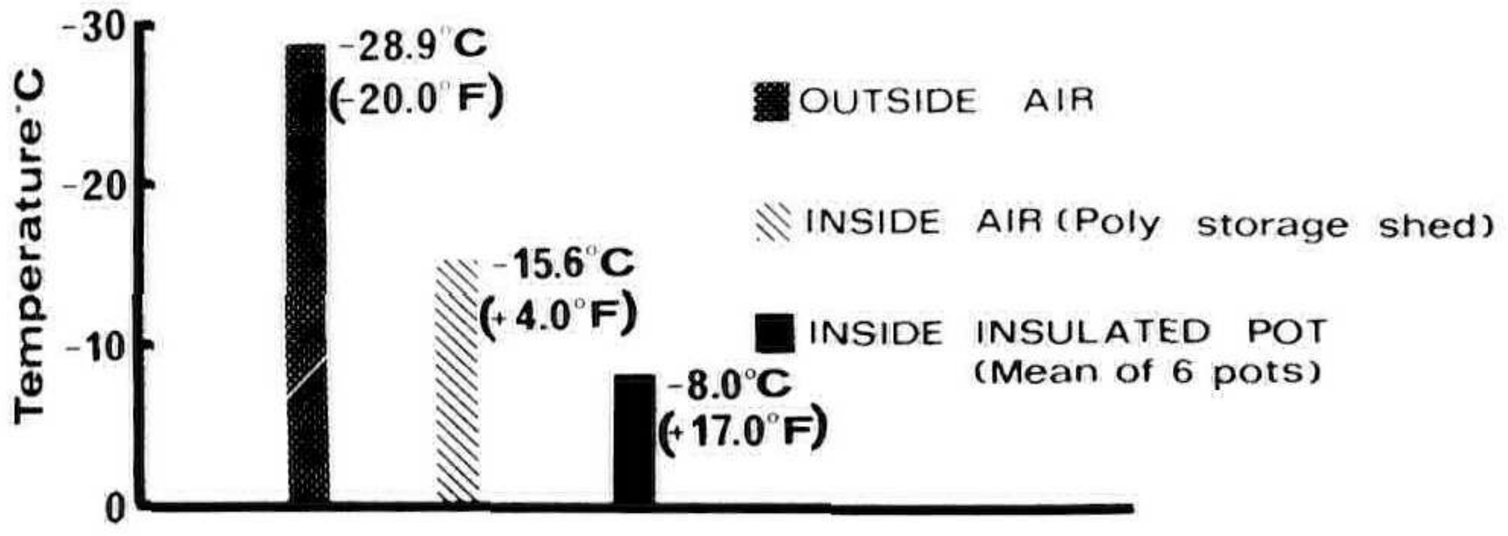


Figure 4. Mean outside air, inside air and insulated pot temperatures recorded for coldest 2 wk period in winter of 1973-74.

RESULTS AND CONCLUSIONS

Around the middle of March the structure collapsed with the weight of the heavy snow. However, we were able to get in and jack-up the 1 inch square tubing which formed the quonset.

The poly cover was removed April 25. The reason for the late date, was an extremely late spring so that earlier removal was impossible. Root injury was not apparent and foliage came through in fine colour. However, due to the structure collapsing we did have a few broken branches on some of the larger material. At this particular time it appears that this type of storage will work for us as it has for so many of you. We intend to record temperatures for

the next 2 years in order to get a much better picture of the situation.

I would like to thank Dr. Cumming, Mr. Henry Hiebert and Dr. Wilbert Ronald from the Morden Research Station for their contribution. Without their help and cooperation in preparing slides and providing us with the monitoring equipment this project would not have been possible.

MODERATOR ROLLER: Thank you, Mr. Aubin. Our last speaker is Dr. Elton Smith who will give us some information concerning the nutrition of lining out stock.

NUTRITION OF LINING-OUT AND FIELD NURSERY STOCK

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Nutrition is just as important as other cultural practices in the production of high quality lining-out and finished nursery stock. Adequate amounts of fertilizer in the beds helps to assure a healthy, vigorous liner for field planting and subsequent proper amounts in the field assists in harvesting quality plants in the shortest possible time.

To ascertain the amount of fertilizer necessary to produce optimum growth of plants in lining-out beds and the nursery, numerous studies have been conducted in cooperation with commercial nurseries during the past several years in Ohio.

Typically, the rates of fertilizer in most studies ranged from 0 to 10 lb. of actual N/1000 sq ft/yr. In all studies, the P and K were brought to a satisfactory level, according to soil tests, prior to adding the N or were applied with the N. The time of fertilizer application varied between fall, early spring and early summer. In most cases, the fertilizer was applied with a rotary granular distributor. The lining-out stock, and field grown shrubs and evergreens were measured by harvesting at the soil line and weighing. The trees in the studies were evaluated by measuring the trunk caliper 1 ft from the soil line.

All the data from each of the various experiments is not included in this report; however, three typical studies are summarized in the tables.

The data in Table 1 suggest an optimum range of 5 lb. of N/1000 sq ft/yr is optimum for lining-out stock of forsythia and taxus. The growth of the plants in lining-out beds varies from nur-