Overwintering Container-grown Ornamentals under Thermo-blankets with and without Clear, White, or Black Polyethylene

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Abstract. Early spring flowering of Forsythia × intermedia Zab. (forsythia) and growth of Cydonia sinensis Thouin (Chinese quince) can be prevented by over-wintering container grown plants under microfoam thermo-blankets covered with black, white, or clear polyethylene (poly) spray painted in late winter and diluted white latex paint. Although covering microfoam with black poly may extend its useful life and suppress the growth of winter weeds, it appears damaging to X Cupressocyparis leylandii A. J. Jacks & Dallin. (Leyland cypress) and Prunus laurocerasus L. (cherry laurel), Viburnum rhytidophyllum Hems. (leatherleaf viburnum) and Euonymous alata Thunb. ‘Compacta’ (dwarf winged euonymus) responded equally well to all treatments. Thermo-blankets protected the roots from minimum killing temperatures but highest maximum temperatures were measured under polyethylene foam and microfoam covered with clear or woven clear polyethylene.

Premature flowering and early spring growth is a problem frequently experienced by nurserymen using the structureless thermo-blanket system for over-wintering container grown ornamentals. This problem was investigated using forsythia, Japanese holly, cherry laurel, Chinese quince and leatherleaf viburnum growing in 2.8 liter containers and Leyland cypress and dwarf winged euonymus growing in 7.6 liter containers were placed under 6 thermo-blanket treatments on November 23, 1978 as described by Gouin and Link (2). Five of the thermo-blankets were made of 0.63 cm thick microfoam covered with 1 of 5 different types of 4 mil polyethylene. Because microfoam is perforated, a solid polyethylene cover is necessary as a wind break and to prevent moisture loss. The sixth thermo-blanket was made of 0.63 polyethylene foam which is solid and

Table 1. Evaluation of Chinese quince and forsythia immediately after removal of thermo-blankets.

<table>
<thead>
<tr>
<th>Thermo-blankets</th>
<th>Chinese quince</th>
<th>Forsythia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microfoam + clear polyethylene</td>
<td>3.0 ± 2</td>
<td>2.7 ± 3</td>
</tr>
<tr>
<td>+ clear woven polyethylene</td>
<td>3.3 ± 1</td>
<td>3.0 ± 1</td>
</tr>
<tr>
<td>+ white polyethylene</td>
<td>1.3 ± 1</td>
<td>1.3 ± 1</td>
</tr>
<tr>
<td>+ black polyethylene</td>
<td>1.0 ± 1</td>
<td>1.0 ± 1</td>
</tr>
<tr>
<td>+ clear woven polyethylene</td>
<td>1.0 ± 1</td>
<td>1.0 ± 1</td>
</tr>
<tr>
<td>spray painted in March</td>
<td>5.0 ± 1</td>
<td>4.0 ± 1</td>
</tr>
</tbody>
</table>

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2 The author acknowledges assistance from E. I. DuPont de Nemours & Co. (Inc.) Film Department, Wilmington, DE 19898 for supplying microfoam; white and black poly and woven clear poly; Conwed Corporation, Foam Operations, 1567 Prospect St., High Point, N.C. 27261 for supplying polyethylene foam and Dr. J. C. Bouwkamp and Mr. M. Marcotrigiano, Dept. of Horticulture, University of Maryland in computer programming.

Fig. 1. Tops of Leyland cypress 1 month after termination of over-wintering treatments: A. The needles on leaders in each plant over-wintered under microfoam covered with black poly turned brown and the branchlets drooped; B. Leader and foliage of plants from all other treatments.
sythia under clear polyethylene and woven clear polyethylene were just beginning to show flower color. Chinese quince under both polyethylene foam and microfoam covered with clear polyethylene had initiated new growth.

All Leyland cypress under microfoam covered with black polyethylene exhibited terminal die-back and about 10% of the cherry laurel exhibited leaf-scorch type injury. However, Japanese holly, leatherleaf viburnum, and dwarf winged euonymus were not adversely affected. All containers under microfoam covered with black polyethylene were weed-free while containers in all other treatments had a high population of *Stellaria media* (L.) Cyr. (common chickweed) and *Cardamine pratensis* L. (bitter cress).

In late April, when the plants were re-evaluated, the cherry laurel which had exhibited leaf scald injury in March, had dropped their damaged leaves and were initiating new growth. However, Leyland cypress under the black polyethylene treatment continued to exhibit terminal die-back (Fig. 1). Examination of roots on the outer edge of the root ball of all plants indicated no visible root damage. White active roots could be seen growing near or from the primary roots of all plants, regardless of treatment.

Daily minimum air temperatures under each thermo-blanket were similar during the entire storage period (Fig. 2). These figures do not fully agree with earlier studies when minimum temperatures under microfoam with white poly were cooler (1). When outside ambient air temperatures dropped below 0°C, minimum temperatures beneath all thermo-blankets were consistently higher. However, daily maximum air temperatures varied according to thermo-blankets and weather conditions. The temperatures under polyethylene foam were consistently higher than in all other treatments during sunny and partly cloudy days, while temperatures under microfoam covered with white polyethylene were consistently lower. Temperatures under microfoam covered with black polyethylene were frequently cooler during the latter part of the over-wintering period than microfoam covered with clear polyethylene and woven clear polyethylene. Spraying white latex paint over microfoam covered with woven clear polyethylene resulted in temperatures similar to microfoam covered with white polyethylene. Snow cover had the greatest effect on minimizing temperature fluctuations on all treatments.

These findings indicate that early spring growth experienced by nurserymen and reported by Smith (3) can be delayed by spraying diluted white latex paint over the clear plastic in late winter, or by covering microfoam with white or black polyethylene. The benefits of being able to cover microfoam with black polyethylene could mean better winter weed control, delayed flowering and growth of some species, and longer useful life for microfoam. However, current studies indicate that covering microfoam with black polyethylene could be detrimental to some species of ornamentals and this practice is not currently recommended.

**Fig. 2.** Daily air temperature fluctuations during the winter of 1978-1979 under 6 thermo-blankets as influenced by daily weather conditions.

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**Literature Cited**

