Propagation of Spicebush (*Lindera benzoin*)©

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INTRODUCTION

Lindera benzoin, commonly known as spicebush, of the Lauraceae family, is a shrub native to most of the Eastern United States from Maine to Florida and west to Kansas (Dirr, 1998). Spicebush has a dense, rounded growth habit in full sun, a more open growth habit in shade, and prefers moist, well-drained soil. It bears small clusters of yellow flowers in early spring and has smooth light green leaves in the summer that turn bright yellow in the fall. In addition to the aesthetic qualities, there are no serious insect or disease problems (Dirr, 1998).

There is an increasing interest in the introduction of native plant alternatives as concern grows about nursery production of species designated as exotic invasive plants. Thus, there is potential for spicebush to be utilized in the landscape industry as a marketable native shrub.

Previous anecdotal research shows that vegetative propagation of spicebush by cuttings has been difficult (Dirr, 1998). Therefore, propagation from seeds is currently the most common production method. The most often referenced suggestion for a dormancy release treatment for spicebush is 1 month of warm followed by 3 months of chilling stratification (Dirr and Heuser, 1987) (Young and Young, 1992). Dirr and Heuser (1987) also suggest that spicebush seeds only require 3.5 months of chilling stratification for dormancy release. The objective of the current study was to determine the need for both warm and chilling stratification on dormancy release in a native Kentucky accession by finding an appropriate stratification treatment. In addition to dormancy-breaking requirements, ease of seedling establishment was determined.

METHODS AND MATERIALS

Seeds for this study were collected near Nicholasville, Kentucky in early November of 2005. The seeds were removed from the fruits, and broken seeds were discarded. Seeds were cleaned, and dry seeds were placed into cold storage at 5 °C until the start of the experiment. Prior to stratification, seeds were surface disinfested by soaking in a 10% bleach solution for 10 min followed by three rinses of sterile water. Seeds were placed in 15 mm plastic Petri dishes with 60 g of autoclaved sand and 15 ml sterile water (20 seeds per plate). Plates were wrapped with Parafilm and placed into germination chambers set to warm or cold temperatures. Using a factorial experimental design, dormancy release treatments included 0, 4, and 6 weeks of warm stratification at 25 °C, followed by 0, 6, 12, and 18 weeks of chilling stratification at 5 °C, for a total of 12 treatment combinations with 80 seeds (four plates) per treatment. Upon completion of the stratification period, dishes were moved to a growth chamber of 25 °C with 16/8 h of light and dark. Germination (radicle emergence) was recorded weekly for 4 weeks following the stratification treatment(s).

Upon germination, seedlings were removed from the Petri dishes and potted up into 7 in. × 5¼ in. × 3¾ in. six-cell packs using 560 Metro Mix and placed under greenhouse conditions. The seedlings were watered as needed and fertilized with a Peters 20N–10P–20K solution every 7–10 days.

Table 1. Seed germination of spicebush exposed to combinations of warm followed by chilling stratification.

Stratification		Germination
Weeks at 25 °C	Weeks at 5 °C	percentage[z]
0	0	15.8 c
	6	50.0 b
	12	90.0 a
	18	86.3 a
4	0	15.8 c
	6	18.8 c
	12	37.5 b
	18	53.8 a
6	0	12.5 c
	6	8.8 c
	12	57.5 b
	18	68.8 a
ANOVA	F-value[y]	
Main effects		
Warm stratification (W)	45.24**	
Chilling stratification (C)	101.78**	
Interaction Effects		
W × C	7.54**	

[z] Means followed by the same letter within a warm stratification treatment were not significantly different at P < 0.01 by Tukey's HSD test.

[y]** indicates significant differences at the 0.01 level.

RESULTS

Germination data shows that approximately 15% of spicebush seeds germinate without any stratification treatment. The highest germination percentages occurred after 12 weeks of chilling stratification without a prior warm stratification period (Table 1).

The 12 weeks of chilling stratification treatment showed a mean germination percentage of 90%.

In terms of seedling establishment, a survival rate of 84.7% (188 of 222) was achieved for seeds potted up immediately following germination. Seedlings were similar in survival, appearance, and vigor across all germinated seedlings regardless of stratification treatment.

DISCUSSION

Those seeds exposed to warm stratification prior to chilling stratification showed significantly lower germination percentages compared to chilling alone. In addition, the warm pre-treatment appeared to delay dormancy release during the subsequent chilling period. Therefore, a warm stratification period is not necessary to achieve a high germination percentage. There is also morphological evidence that supports this conclusion in that spicebush seeds have a fully developed embryo; therefore, a warm stratification period is unnecessary for embryo growth.

The spicebush seed lot used in this study displayed an intermediate physiological endogenous type of dormancy (Hartmann, et al., 2002) that only required chilling stratification. The negative effect of warm stratification appears to be due in part to the induction of secondary dormancy that requires a longer chilling stratification period for dormancy release (Table 1). Additionally, some seed contamination due to exposure to warm temperatures and moist conditions may be reducing overall viability in the warm stratified seeds.

A second germination study is currently under way using a Pennsylvania seed lot to further determine the chilling stratification requirement of spicebush, as well as any geographical differences in dormancy release treatments that may require the combination or warm and chilling stratification.

The combination of high germination percentages and seedling establishment indicate the ability of spicebush to be grown commercially for the landscape industry.

LITERATURE CITED

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