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Effect of Autumn and Spring Propagation of Two *Taxus* Cultivars on Summer Growth Rate¹

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Abstract

Two cultivars of *Taxus media* (cvs. Nigra and Densiformis) rooted outdoors in April, produced liners equal or superior to those propagated by conventional methods. The spring propagation method requires no cost for fuel and only eight weeks for propagation.

Index words: *Taxus*, media, propagation

Introduction

Taxus has traditionally been propagated by hardwood cuttings taken in late fall, with rooted cuttings held over until late spring, when they are planted outdoors in shaded liner beds (3, 4). At planting time roots and shoots are trimmed to facilitate mechanical planting. Recently, it was shown that these plants can be propagated outdoors in early spring in insulated, heated mist beds (1, 2). Cuttings rooted in this fashion survive the summer identically to those propagated in the tradi-

tional manner. Currently one commercial nursery uses this method (1).

It has also been observed that spring propagated plants have a faster growth rate than plants propagated in the fall. This could have a two fold significance as indoor bench space would be saved and propagation time reduced, thereby accounting for subsequent savings in fuel costs.

An experiment was initiated in the fall of 1985 to study the growth rates of fall and spring propagated *Taxus* cuttings.

Materials and Methods

Three hundred cuttings each of *Taxus media* 'Nigra' and 'Densiformis' were taken from nursery grown plants in November 1985. Each cutting was 25 cm (9.8

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in) in length and 4-6 mm (0.2-0.3 in) in diameter at the base. Foliage was stripped from the basal 5 cm (2 in) and cuttings were treated with a five second basal dip in an aqueous solution of indole-3-butyric acid (IBA) and naphthalene acetic acid (NAA) (2500 & 1250 ppm resp.) in a 40% solution of polyethylene glycol, (Carbowax 400) for five seconds. Cuttings were placed on a raised greenhouse bench in a rooting medium of sharp bank sand 30 cm (12 m) deep and kept at a minimum temperature of 18°C (65°F). A timer was set to regulate mist at six seconds every six minutes from 7:00 A.M. to 5:00 P.M. Mist was discontinued when cuttings were rooted. They remained in the bed until May 25, 1986 when they were planted on 15 cm (6 in) centers in an outdoor lath covered liner bed in 50% shade.

A similar number of cuttings of each cultivar was taken from the same location in early April 1986. These hardwood cuttings were treated as before except that the propagating bed was an outdoor insulated, shaded mist-bed at ground level. Minimum bottom heat was maintained at 18°C (65°F). Above ground temperatures were ambient air temperatures. On June 12, 1986 cuttings were harvested, primary root numbers were recorded and 100 cuttings were randomly selected to be planted next to the fall rooted cuttings.

Thirty cuttings from each cultivar for each treatment were harvested on November 18, 1986. Ten cuttings were randomly selected and primary root number and root length recorded. Fresh and oven dry weights were recorded for all of the harvested cuttings. Roots were severed from the stem, washed, blotted dry and weighed to 0.01g. Specimens were placed in a drying oven at 44°C (111°F) for seven days and again weighed to 0.01g. Fresh and oven dry weights were subjected to analysis of variance for a split block design using the general linear models procedure.

Results and Discussion

Rooting percentages for both cultivars were similar whether propagated in the fall or spring. The mean number of primary roots for *Taxus media* 'Nigra' was 22-27, while that for *Taxus media* 'Densiformis' was 37-40. These differences were not significantly different in fall or spring propagated plants (Table 1). Treatment mean differences between results obtained from fresh or oven-dry weights was the same, so only oven dry weights are shown (Table 2).

When one considers that while average root length was very different at the time cuttings were removed from the propagating bed (Fig. 1, 2), with fall rooted cuttings having an average root length of 10-12 cm (4-4.5 in) and spring rooted cuttings having an average root length of 2-3 cm (0.75-1.25 in), there was little difference at the end of the growing season (Table 1). Since shoots of spring propagated cuttings are exposed to outdoor air temperatures, bud break is retarded until late May when rooting has already begun. It should also be noted that spring rooted cuttings had a 30 day shorter growing season, yet root systems were equal. Top growth of spring rooted cuttings was larger in both cultivars as shown by root/shoot ratios (Table 2). Larger top growth and balanced root/shoot ratio could put

Table 1. Mean number of primary roots and mean root length of 2 cultivars of *Taxus media* after one growing season

Cultivar	Season of Propagation	Primary roots (no.)	Root length (no.)
Nigra	Fall	22.2	13.4
	Spring	27.0	13.6
	F ratio	1.07	0.02
Densiformis	Fall	38.8	11.3
	Spring	39.6	13.9
	F ratio	0.05	6.60 ²

²Indicates statistical significance, P = 0.05.

Table 2. Oven dry weight of 2 cultivars of *Taxus media* after one growing season.

Cultivar	Season of propagation	Shoots dry wt. (g)	Roots dry wt. (g)	Roots/Shoot ratio
Nigra	Fall	2.4	1.6	0.66
	Spring	4.3	2.2	0.51
	F ratio	113.13**	25.28**	38.78**
Densiformis	Fall	4.2	2.5	0.59
	Spring	5.9	2.5	0.42
	F ratio	33.13**	0.04	63.99**

**Indicates statistical significance, P = 0.01.



Fig. 1. Liners of *Taxus media* 'Densiformis' after one growing season. Upper Row: Spring propagated, March 1986; Bottom Row: Fall propagated November 1985. Harvested November 1986.

these plants at a significant advantage in subsequent years.

Further work is being conducted to determine if fall propagated plants could be stimulated to grow at a

faster rate if exposed to chilling at 3°C (39°F) for 4 to 8 weeks after rooting but prior to planting. If an accelerated growth rate is observed, it would give growers two options: they could either attempt spring propagation, or continue to use fall propagation but remove rooted cuttings for chilling in March or April, followed by field planting in late May. Increased growth could offset any additional handling costs.



Fig. 2. Liners of *Taxus media* 'Nigra' after one growing season. Upper Row: Spring propagated, March 1986; Bottom Row: Fall propagated November 1985. Harvested November 1986.

Significance to the Nursery Industry

The average time to produce a saleable *Taxus* plant is 8 to 12 years. Any practice that can reduce production time would have value to the industry. Spring propagated plants remain in the beds less time, require less bottom heat in the propagation bed and can be propagated in less expensive structures. In addition, the liner derived from spring propagation grows at a faster rate the first year. As a result a heavier liner can be obtained in less time.

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