

# **Evaluation and Disease Resistance of *Chamaecyparis thyoides* (Atlantic white cedar)**

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## **Nature of the Work and Results & Discussion:**

### A. Growth and Development

Atlantic white cedar was evaluated for use as a suitable needle evergreen for the nursery, landscape and Christmas tree industries. The collection contains 54 different taxa of Atlantic white cedar and was tested under field situations and standard container nursery production conditions.

Fifty taxa were planted in triplicate in a randomized plot at the University of Georgia horticulture farm (Athens, GA) in April 1998. Plants were in 1-gallon containers at the time of transplanting. Height and width data were recorded at planting and every three months thereafter. Plants were also evaluated for aesthetic characteristics such as needle color, habit, shape, density and winter needle-retention.

The collection of Atlantic white cedar was evaluated under standard container nursery conditions at the Center for Applied Nursery Research in Dearing, GA.. Twenty-six taxa were transplanted from liners into 3-gallon containers in March 1997 and then shifted to 10-gallon containers in April 1998. Twenty-four additional taxa were added in April 1998 and were transplanted as liners into 3-gallon containers. This collection of 50 taxa was grown outdoors in full sun and was evaluated for growth rate, color, habit, shape, density and winter needle-retention.

To date, Atlantic white cedar has proven a reliable performer in containers and the field exhibiting rapid growth and desirable aesthetic characteristics. Some of the dwarf forms average as little as 6 inches of growth per growing season while the more upright forms may average as much as 30 inches per growing season. The following table is a summation of the most popular taxa (according to surveys and observations) and a brief description of each. Field growth data represent how much the plant grew in height  $\times$  width over a 7 month period (April 13, 1998 to October 14, 1998). Container growth data represent how much the plant grew in height  $\times$  width, considering an average initial liner size of 6  $\times$  4 inches, over an 8 month period (March 11, 1997 to October 9, 1997).

Taxa	Description	Foliage color	Field (in.)	Container (in.)
'Rachel' (Webb 2)	upright, dense, vigorous	bright green, purple tips in winter	18 × 15	16 × 11
'Blue Sport'	upright, central leader, will need pruning for density	bluest of the collection	26 × 29	28 × 11
'Webb Gold'	irregular,dense	creamy yellow variegation	12 × 10	12 × 14
'Okefenokee'	vigorous, upright	bright green, purple tips in winter	18 × 13	22 × 10
'Andelyensis'	compact, pyramidal, upright	pfitzer sage green, purple tips in winter	10 × 6	10 × 5

## B. Disease Screening

Selected taxa of *Chamaecyparis thyoides* were screened for resistance/susceptibility against two fungal canker-causing pathogens (*Seiridium* and *Botryosphaeria*), which are problematic on × *Cupressocyparis leylandii* (Leyland cypress). Two experiments were designed and implemented to generate comparative results among several Atlantic white cedar and Leyland cypress cultivars. The first experiment is a field inoculation trial that includes 13 Atlantic white cedar taxa and 3 Leyland cypress cultivars, each replicated 3 times within the randomized plot. Three gallon plants were planted at the University of Georgia horticulture farm in July 1998. On October 1, 1998 plants were inoculated with the fungi *Seiridium unicorne*, *Fusicoccum* sp. and *Botryodiplodia* sp. (imperfect stages of *Botryosphaeria dothidea* and *B. robusta*, respectively) by wounding the plant and then applying a pre-inoculated Leyland cypress stem section. Plants are being monitored for wound responses and symptoms over time and the experiment will conclude Fall 1999.

The second experiment was performed at the University of Georgia greenhouses in Athens, Georgia and included 5 taxa of Atlantic white cedar and 1 cultivar of Leyland cypress. Each of the four groups contained 10 plants of each of the 6 cultivars for a total of 60 plants per group. Ten plants of each cultivar were individually inoculated with either *Seiridium*, *Fusicoccum*, *Botryodiplodia* or not inoculated (control group). On October 16, 1998 plants were inoculated by wounding the stem and applying a pre-inoculated Leyland cypress stem section. Wraps and pre-inoculated stems were removed 4 weeks after inoculation and stems and wounds were evaluated for resin flow, callus formation, discoloration and sunken tissue. Eight weeks after inoculation each plant was measured for height, harvested and evaluated for canker formation. Caliper, length and width of wound on the surface and interior tissues, resin flow, discoloration,

sunken tissue and other symptoms resulting from infection were recorded. Representative canker tissue from each group was removed, sterilized and placed on plates of potato dextrose agar to re-isolate the pathogens from the infected tissue. Results are not available at this time as these data are presently being organized and analyzed. The experiment will be repeated in the spring of 1999.

Disease screening results are preliminary and evaluation of data is taking place at this time. To date, *Seiridium* appears to be much more pathogenic than *Fusicoccum* or *Botryodiplodia* on Leyland cypress and Atlantic white cedar. Symptoms of *Seiridium* infection are also different on Leyland cypress compared to Atlantic white cedar. Leyland cypress exhibits resin flow and expanding discoloration on the surface while damage to Atlantic white cedar is most evident on the interior tissues (cambial layer and xylem).

**Significance to the Industry:** Adaptable, fast growing, screening needle evergreen plant materials are essential components of modern landscapes. A significant need exists for alternatives to *Cupressocyparis leylandii* (Leyland cypress), *Cryptomeria japonica* and upright juniper taxa. *Chamaecyparis thyoides* (Atlantic white cedar) offers the greatest potential to provide new genetic resources. As a native conifer from Maine to Florida and west into Mississippi, its north to south adaptability range exceeds that of any other native needle evergreen. The variability in growth habit and foliage colors is great and to date 54 different taxa have been accumulated. Further, the Christmas tree industry is seeking alternatives to Virginia pine and Leyland cypress, particularly to reduce chemical usage and cultural practices. This species offers low chemical input and ease of propagation and production.