

COFORD

*Screening and evaluation of a range of forest and
associated woodland ornamental species for cut
foliage suitability 2005-2007*

Research funded by COFORD

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Contents

	Page
Executive Summary	3
Introduction	4
Objectives	4
Methodology	4
Establishment of Field trials	6
Propagation	6
Trial Design & Layout	6
Site Preparation & Planting	6
Field Trial Management	6
Pruning	7
Shelf Life	7
Market Assessments	7
Results & Discussion	8
Appendix 1	
Pictures & details of trial species	9-25

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Screening and evaluation of a range of forest and associated woodland ornamental species for cut foliage suitability 2005-2007

Executive Summary

The aim of this project was to evaluate the commercial potential of a range of potential forest and associated woodland ornamental species suitable for the cut foliage market. To do this, early market feedback and consultation with expert plants and nurserymen was used to make an initial selection of nearly fifty species.

Shelf life experiments investigating basic vase life, field trials to ascertain production characteristics, and further market assessments during the project were used to select species for further development and eventual commercialisation.

It is important to note that given the perennial nature of the species, interim results with observational comments are given at this stage.

Shelf life experiments showed clearly that the majority of forest species had excellent vase life of over three weeks and even longer.

Field trials were conducted in one main area in Co. Kerry.

Because of apical dominance in some of the species, pruning techniques or shoot selection may be required to enhance stem production.

Disease management will be required for some species.

While early field trials showed that some of the species were generally quite vigorous, detailed information regarding yields, time of pruning, fertilisation requirements need to be produced for the selected winners.

Market feedback on foliage products harvested from the field trials indicated that a number of species did have potential as new products in the market, and also indicated that the domestic and export markets have different requirements. Feedback varied between agents. The range of comments was extremely useful, however, for discerning the potential of the species studied.

Using the feedback from the buyers, the limited field trials data gathered in the first to years, a number of species are suggested as being suitable for further development and potential commercialisation for the commodity market. Included are: *Cryptomeria japonica*, *Chamaecyparis lawsoniana* 'Pembury Blue', *Cupressus arizonica* 'Blue-Ice', *Baccharis* 'Magical Star' *Sequoia sempervirens*, *X Cupressocyparis leylandii* 'Gold Rider', *Eucalyptus niphophila* & *Eucalyptus vernicosa*, *Cornus sanguinea* 'Midwinter Fire' Whilst all of the above may have use in design of floral gifts, a number of other species were deemed potentially suitable for this market. They include: *Quercus* spp, *Ilex* spp, *Eucalyptus* spp, *Chamaecyparis lawsoniana* 'Argenteovariagata'

Introduction

New flower and foliage products are in continual demand by the flower industry. Over the last 10 years, non-traditional products have become increasingly popular.

The unique climate of the south of Ireland with its mild moist summers and winters has the ability to grow many species which would otherwise be damaged in most of the rest of Northern Europe.

The selection criteria for new foliage species are interesting colours, leaf shapes and forms, a long vase life, and being economically viable to produce.

Whilst a large proportion of species have attractive foliage it's usually that only a small number fulfill the above criteria and furthermore have the advantage of succeeding best in the south of Ireland.

The existing cut foliage industry is worth over €3million to the economy. There are three main suppliers to a growing European market. One company in the south west clearly dominates as it accounts for 80% of the export sales. The main forest and woodland species currently being exported include *Abies*, *Pinus*, *Betula*, *Eucalyptus* and *Rhododendron* and too a lesser extent *Tsuga* and *Cupressus macrocarpa* 'Gold Crest'. Important horticultural species include *Pittosporum*, *Ozothamnus* and *Viburnum* to mention just a few.

Considerable interest in expanding the flower and foliage industry exists in Ireland. This may be tied to the major changes taking place in Agriculture in Ireland at this present time due to the reformed CAP proposals and the downturn in other sectors of the rural economy. With a clear need for new rural industries and a constant need for new products by the flower and foliage industry, evaluation of a range of species would seem timely.

Objectives

1. To identify species with market potential.
2. To establish field plots in the south of Ireland.
3. To monitor and observe the plants in these plots for growth, susceptibility to pest and disease attack.
4. To strategically prune the plants to encourage branching and vigorous growth from a young age.
5. To partially determine the market demand for each species in both the export and domestic markets.
6. To determine the base vase life of selected species.
7. To communicate the project results to industry.
8. At completion of the project, species deemed to have commercial potential will be put forward for further trialing to complete a blueprint for commercialisation.

Methodology

A series of discussions took place between the main foliage exporting company in Ireland and various plant experts and leading nurserymen on how species for testing should be selected and those eventually chosen.

The criteria used were leaf colour, leaf shape, known potential stem length and productivity information to select species for investigation.

Table 1 outlines those selected for trials.

Table 1. Selected forestry & woodland species

- 1 *Abies concolor* 'Violacea'
- 2 *Athrotaxis cupressoides*
- 3 *Arbutus x andrachnoides*
- 4 *Baccharis* 'Magical Star'
- 5 *Calocedrus decurrens* 'Aureovariagata'
- 6 *Calocedrus decurrens* 'Berrima Gold'
- 7 *Camelia japonica*
- 8 *Cephalotaxus harringtonii* Fastigiata
- 9 *Chamaecyparis lawsoniana* 'Argenteovariagata'
- 10 *Chamaecyparis lawsoniana* "Pembury Blue'
- 11 *Chamaecyparis lawsoniana* 'Chilworth Silver'
- 12 *Chamaecyparis lawsoniana* 'Blue nantais'
- 13 *Chamaecyparis lawsoniana* 'Chantry Gold'
- 14 *Chamaecyparis lawsoniana* 'Lemon Queen'
- 15 *Chamaecyparis lawsoniana* 'Kilworth Column'
- 16 *Chamaecyparis lawsoniana* 'Sulphrea'
- 17 *Chamaecyparis lawsoniana* 'Yvonne'
- 18 *Chamaecyparis pisefera* 'Boulevard '
- 19 *Chamaecyparis pisefera* 'Avenue '
- 20 *Cornus sanguinea* 'Midwinter Fire'
- 21 *Corylus avellana* 'Contorta'
- 22 *Cryptomeria japonica*
- 23 *Cryptomeria japonica* 'Elegans'
- 24 *Cryptomeria japonica* 'Elegans-Viride'
- 25 *Cryptomeria japonica* 'Sekkan-Sugi'
- 26 *Cryptomeria japonica* 'Barabits Gold'
- 27 *Cunninghamia lanceolata*
- 28 *Cupressus arizonica* 'Blue-Ice'
- 29 *Cupressus arizonica* 'Sulphrea'
- 30 *Cupressus bakeri*
- 31 *X Cupressoscyparis leylandii* 'Gold Rider'
- 32 *Eucalyptus nicholii*
- 33 *Eucalyptus niphophila*
- 34 *Eucalyptus pulverulenta* 'Baby Blue Spiral'
- 35 *Eucalyptus vermicosa*
- 36 *Hedera helix* 'Arborescens'
- 37 *Ilex crenata* 'Convexa'
- 38 *Pinus sylvestris* 'Chantry Blue'
- 39 *Pinus strobus* 'Contorta'
- 40 *Prunus lucitanica*
- 41 *Quercus palustris*
- 42 *Quercus palustris* 'Rubra'
- 43 *Sequoia sempervirens*
- 44 *Sequoia giganteum*
- 45 *Sequoia sempervirens* 'Adpressa'
- 46 *Thuja koraiensis*
- 47 *Thujopsis dolobrata*
- 48 *Thujopsis dolobrata* 'Variagata'

Propagation

Most of the plant material was purchased from the trade. It varied from 9cm square pot liner to two liter containers.

Establishment of Field Trials

Development of a trial site for the screening and evaluation of a range of forest and associated ornamental species commenced in Summer 2005 in Ballyard, Tralee, Co. Kerry.

The site was prepared according to good agronomic practice in August 2005.

The elimination of all perennial weeds was achieved using Glyphosate (Roundup). Ground was ploughed and rotavated and prepared for the laying of a polythene membrane for weed control.

An application of the compound 10:10:20 was applied as a base dressing according to soil analysis results.

Following the laying of the polythene at 2 meter intervals, the 'stale seedbed' technique was used to ensure a weed free site. Grass strips were subsequently established in the areas in between the black polythene. These will be mowed 2 -3 times during the growing season. Further herbicide treatments consisted of direct spraying with paraquat and or glyphosate depending on weeds present.

Planting of a range of 48 forest and associated ornamental species took place in early October.

Where necessary staking of those species susceptible to wind blow took place.

The site was fenced for rabbit prevention.

Trial Design and Layout

The availability of plant material in some cases dictated the plot size but in general between 6 and 36 plants of species were planted at a spacing of 2m * 2m. Those with greater numbers were replicated across the site to give three replications.

The trial design was a randomised block design.

Field Trial Management

Observations were taken every 6 months and recorded. Where appropriate, stem numbers and lengths were recorded annually since the trial was planted. Observations of pest and disease incidence were noted.

Given the slow growing nature of the majority of the species planted, full results will take a number of years to collate so this report is the first summary of data which will be added to annually.

Hence, initial basic pruning trials will be set up with the most vigorous species in 2008 and on other species thereafter.

Pruning

The aim of the pruning activities is to encourage branching at an early stage of growth. Pruning will be conducted to ensure the maximum number of stems or leaves will be produced in the future.

Pruning will be conducted after the plants are well established and showing vigour – this is expected during 2008 for some species and others a year later. Most will be cut back to a height of approximately 30-40cm from an original single or double stem.

Some species will most likely not be pruned at all, as it is clear that they will not withstand harsh cutting back.

Some tip or summer pruning will be carried out periodically during 2008 and thereafter to encourage further branching on some species.

Post Harvest Evaluation

Basic shelf life tests were conducted on plant material to establish longevity of quality following harvest.

This consisted of placing cut stems in water in cool conditions (8C) for 48 hours and then into ambient temperature (12C-14C) which simulated conditions that foliage is subjected to following harvest and dispatch.

Stems were assessed for quality in terms of leaf freshness, colour over a period of 3 weeks from set up date.

It was clear from an early stage that this aspect of evaluation scored high for the vast majority of trial species and this is not surprising given the nature of the species being assessed.

Market Assessment

On a number of occasions during 2006/07 visits were arranged to the site by current and prospective buyers – mainly packers for supermarkets in UK and Holland and highly reputable Irish Florists.

Comments and suggestions made by these people on various species were noted.

Samples of stems from guard plants were taken regularly by staff of Forest Produce Ltd. for observation and comment from their customers.

Clear thoughts on a number of species quickly emerged as to their suitability in the cut foliage trade and this is highlighted in the results.

Results and Discussion

The results of the evaluation of the range of species is outlined in the following pages. The format used is that of summary of comments and a picture of the relevant species. Species were assessed and rated under the following headings using the following key:

Availability period – month of the year (eg. Period 8-5 available from August to May)

Yield – **L** - low, **M** - medium or **H** - high where low is estimated to be 10,000 stems/ac and less, medium is 15,000 to 25,000 stems/ac and high is > 25,000 stems/ac

Market use – **C** is Commodity or **D** is Design

Shelf life – **1-5** where **1** is poor and **5** is very good

Response to Pruning - **P** is poor , **G** is good and **U** - unknown

Overall Rating - where **1** is unsuitable and should be abandoned and **5** is suitable for further development

Unknown - **U** stands for **Unknown** where data is not yet available.

Using the feedback from the market buyers, field trials and early vase life results, a number of species have already shown potential for further development with possible potential commercialisation in both the commodity and design cut foliage market.

The species include *Cryptomeria japonica*, *Chamaecyparis lawsoniana* ‘Pembury Blue’, *Cupressus arizonica* ‘Blue-Ice’, *Baccharis* ‘Magical Star’ *Sequoia sempervirens*, *X Cupressocyparis leylandii* ‘Gold Rider’ *Eucalyptus niphophila* & *Eucalyptus vernicosa*, *Cornus sanguinea* ‘Midwinter Fire’

Further to the above, early indications suggest that a number of other species could be specifically considered suitable for design purposes. Included are: *Quercus* spp, *Ilex* spp, *Eucalyptus* spp, *Chamaecyparis lawsoniana* ‘Argenteovariagata’

A final decision has not been made on a number of the species as further observation and assessment is required for at least one further season.

Appendix 1: Pictures & details of individual trial species



Abies concolor 'Violacea'

Availability period: 9-3
Yield potential: L
Response to pruning: Unknown
Market category: D
Shelf life: 5
Overall rating: 1

Growth rate very poor.
Nothing to offer over the widely used and popular *Abies procera* (Noble fir)
Should look at *Abies concolor* & other cvs in further trials.



Athrotaxis cupressoides

Availability period: 1-12
Yield potential: Appears low
Response to pruning: Unknown
Market category: D
Response to shelf life: 5

Growth very slow which suggests it is more that likely unsuitable for further development.



Arbutus x andrachnoides

Availability period : 9-4
Yield potential: U
Response to pruning: U
Market category : D
Response to shelf life: 5
Overall rating – 3

Cultivar of native *Arbutus unedo* which is popular in trade. Attractive leaf shape and design – complements a wide variety of cut foliages.



***Baccharis* 'Magical Star'**

Availability period: 10-11
Yield potential: H
Response to pruning: VG
Market category: C
Shelf life: 5
Overall rating: 5

Species worth expanding despite short window of availability. Good filler features and no sign of any major pest or disease.



***Calocedrus decurrens*
'Aureovariegata'**

Availability period: 9-4
Yield potential: VL
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Attractive colour but growth rate is uneconomic.



***Calocedrus decurrens* 'Berrima Gold'**

Availability period: 8-5
Yield potential: L
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1-2

Offers nothing special to date & shows poor growth rate.



***Camelia japonica* cvs**

Availability period: 8-4
Yield potential: U
Response to pruning: U
Market category: C & D
Shelf life: 5
Overall rating: 4-5

Only in trial for 1 year but showing promise. Quick to establish. Good colour and texture. Likes semi shaded conditions. Stems look uniform.



***Cephalotaxis harringtonii* 'Fastigiata'**

Availability period:8-5
Yield potential: VL
Response to pruning: U
Market category: U
Shelf life: 5
Overall rating: 1

Extremely slow growing with no interesting features.



Chamaecyparis lawsoniana
'Argenteovariagata'

Availability period: 1-12
Yield potential: M
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 4

Liked by designers. Very useful for Christmas. One of the more interesting cultivars worth continuing with.



Chamaecyparis lawsoniana
'Pembury Blue'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D & C
Shelf life: 5
Overall rating: 4-5

Very positive reaction from buyers to date. Excellent colour and form and easy to handle and pack. Best 'blue' *Chamaecyparis* cultivar in this trial.



Chamaecyparis lawsoniana
'Chilworth Silver'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 2-3

Two colour tone, potential for basket arrangements. Dense branching habit. Woody scent. Continue trialing.



Chamaecyparis lawsoniana
'Blue Nantais'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 3

Similar to *C. l* 'Pembury Blue'
Too early to draw conclusions.



Chamaecyparis lawsoniana **'Chantry Gold'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 4-5

Interesting 'yellow' type with soft clean stems.
Most vigorous of 'yellows' with very obvious leader.



Chamaecyparis lawsoniana
'Lemon Queen'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Softish stems but doesn't appear to be as good as
'Chantry Gold'
Too early to draw conclusions.



***Chamaecyparis lawsoniana* 'Kilworth Column'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1-2

Stem colour appears dullish.



***Chamaecyparis lawsoniana* 'Sulphrea'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Similar to 'Kilworth Column'. Appears crowded near centre of shrub.



***Chamaecyparis lawsoniana* 'Yvonne'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Early indications show similarities with *C. l* Goldcrest but superior to *C. l* Sulphrea.



***Chamaecyparis pisefera* 'Boulevard'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U
Attractive dense foliage, mainly short pieces.
Centres die off. Appears to be quite slow.
Cut pieces very similar in shape and growth habit to *Polytrichum commune* (star moss). Continue monitoring this feature at least another year.



***Chamaecyparis pisefera* 'Avenue'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U
Similar to the cultivar 'Boulevard' in most features. Probably not suitable for trade.
Has 'moss' like features like 'Boulevard'
Worth watching and monitoring further.



***Cornus sanguinea* 'Midwinter Fire'**

Availability period: 10-4
Yield potential: M/G
Response to pruning: VG
Market category: C & D
Shelf life: 5
Overall rating: 3
Grows well. Interesting two tone colour. Twig market only. Probably merits small scale planting at this stage.



Corylus avellana 'Contorta'

Availability period: 10-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Only 1 year in trial and whilst shows interesting features in shape and texture of twigs, it's too early to say.



Cryptomeria japonica

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: C & D
Shelf life: 5
Overall rating: 4-5

Probably one of the most promising species in trial.
Very vigorous in first two years. Seeded stems an added attraction. Packers and designers very keen.



Cryptomeria japonica 'Elegans'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Interesting colour variation on *C. japonica*.
Shows very poor growth rate to date.



Cryptomeria japonica
'Elegans Viride'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Appears slower than the superior *C. japonica*.



Cryptomeria japonica 'Sekkan-Sugi'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Slow growing . Has developed a brown cast on needles rendering unmarketable. Cause unknown and requires investigation.



Cryptomeria japonica 'Barabits Gold'

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Best of variegated types to date. Slow growth, yield low and also suffers from browning of needles which requires investigation.



Cunninghamia lanceolata

Availability period: 9-5
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Interesting ornamental tree but due to slow growth and prickly nature is unsuitable for foliage trade. No further recording.



***Cupressus arizonica* 'Blue Ice'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 5

Shows real promise and liked by trade and designers. Uniform stems. Colour tones and frosted appearance in unusual and different. Good shape, texture and bushy habit. Possibly slow and expensive to establish.



***Cupressus arizonica* 'Sulphurea'**

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Appears slow and whilst shows interesting foliage texture, doesn't appear to offer anything special as a variegated type.



Cupressus bakeri

Availability period: 1-12
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Attractive textured foliage but probably too 'green' to be interesting to trade over and above *C. a* 'Blue Ice' at present.



X Cupressocyparis leylandii **'Gold Rider'**

Availability period: 1-12
Yield potential: M/H
Response to pruning: U
Market category: C
Shelf life: 5
Overall rating: 4-5

Uniform, vigorous, variegated type showing real potential. Stands full sun. Appears free from pest or disease.



Eucalyptus nicholii

Availability period: 9-12
Yield potential: U
Response to pruning: G
Market category: C & D
Shelf life: 5
Overall rating: 3-4

Interesting fern like species different to current commercial species. Sensitive to wind and very hard frost. Aim to harvest before Christmas. The species *E. mourii-nana* is hardier and superior for the Irish climate.



Eucalyptus niphophila

Availability period: 8-5
Yield potential: H
Response to pruning: G
Market category: C
Shelf life: G
Overall rating: 5

Attractive leaf & stem shape and colour
Easy to harvest, handle & pack.



***Eucalyptus pulveruenta* 'Baby Blue Spiral'**

Availability period: 8-4
Yield potential: M
Response to pruning: G
Market category: C & D
Shelf life: G
Overall rating: 5

Popular amongst florist trade.
Should be planted on a small scale.



Eucalyptus vernicosa

Availability period: 8-12
Yield potential: H
Response to pruning: G
Market category: C
Shelf life: 5
Overall rating: 5

Unique leaf shape and texture
Harvest before Christmas.



***Hedera helix* 'Arborescens'**

Availability period: 9-4
Yield potential: L
Response to pruning: Unknown
Market category: D & C
Shelf life: G
Overall rating: 3

Attractive and unique. Natural woodland foliage.
Popular in trade.



***Ilex crenata*
'Convexa'**

Availability period: 10-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: U

Slow to establish but shows promise. No hurtful spines!



***Pinus sylvestris* 'Cantry Blue'**

Availability period: 9-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Appears extremely slow.
Nothing to offer over Lodgepole pine.
Should trial other strains of *P. sylvestris*



***Pinus strobus* 'Contorta'**

Availability period: 9-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Unusual but extremely slow to establish.
Trade not excited.



Prunus lusitanica

Availability period: 9-4
Yield potential: U
Response to pruning: U
Market category: D & C
Shelf life: 5
Overall rating: U

Commonly known as Portugal laurel. Slow to establish but only in trial for 1 year so too early to say but looks interesting. Liked by buyers.



Quercus palustris

Availability period: 10-11
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 4
Overall rating: U

Too early to be conclusive but may have possibilities for Design trade.



Quercus palustris 'Rubra'

Availability period: 10-11
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 4
Overall rating: U

The red form appears more interesting than the green form. May have a place in Design.



Sequoia sempervirens

Availability period: 8-5
Yield potential: M/H
Response to pruning: U
Market category: C & D
Shelf life: 5
Overall rating: 4-5

Vigorous species with uniform stem development and shows promise. Unusual interesting texture but a 'burning/browning' of needles in second season is casting some doubt over potential. Requires investigation.



Sequoia giganteum

Availability period: 8-5
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

Like *Tsuga heterophylla* (Hemlock) but offers nothing special – Hemlock is far superior. Stems unmarketable due to a needle die back symptom the cause of which is unknown and should be investigated.



***Sequoia sempervirens*
'Adpressa'**

Availability period: 9-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1

To date appears extremely slow growing offering nothing very interesting.



Thuja koraiensis

Availability period: 8-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 3

Two tone colour is most interesting feature of species but slow nature and habit probably renders it unsuitable longterm.



Thujopsis dolabrata

Availability period: 9-4
Yield potential: U
Response to pruning: U
Market category: D
Shelf life: 5
Overall rating: 1-2

Unusual texture and it whilst appears slow, it's worth monitoring for another couple of seasons. May have a place in design trade.



Thujaopsis dolobrata
'Variagata'

Availability period: 9-4

Yield potential: U

Response to pruning: U

Market category: D

Shelf life: 5

Overall rating: 1

Even slower than *T. dolobrata* !

