INTRODUCTION

Traditional production of shrubs for retail or wholesale relies on specialist propagation knowledge which may be a barrier to new business developments in nursery stock production. There are a number of specialist propagation companies in the UK and abroad who produce propagated trees and shrubs in small pots ready for growing to saleable specimens thus by-passing the propagation stage. These plants are normally sold in 9-12 cm diameter pots ready for potting on: the combination of plant and pot is known as a liner. Liner production has become a very successful area of horticultural production and produces plants at competitive prices. These plants may be grown-on, typically in two or three litre pots, to saleable size often within one growing season thus minimising capital lock-up for the grower.

PRODUCTION SYSTEMS

Most producers of trees and shrubs from liners use protected cropping methods. These are commonly polythene tunnels with irrigation systems (often overhead sprinkler lines). Some producers use outside standing areas (see Fig 1) to raise more robust and hardy plants. Growing media are normally bought in pre-mixed from suppliers but may alternatively be mixed by the grower. The growing media normally contain slow release fertilisers which release nutrients over 6-48 months depending on formulation specified.

Figure 1: Growing-on area for shrub liners

SOURCING OF LINERS

The trade journal Horticulture Week publishes an annual Buyers Guide which lists suppliers of plants and other materials. The journal is the trade journal for amenity horticultural production and is a useful weekly reference.

SOURCING OF GROWING MEDIA

Producers usually use specialist wholesale horticultural suppliers (usually found in Yellow Pages). The growing media may be purchased as pre-mixed general formulations or prepared using, for example the components in Table 1. Plant pots are usually available from the same sources at bulk rates.

Table 1. Media preparation for tree and shrub production.

Constituent	Role	Amount
Peat or organic matter	To provide bulk of rooting medium	90% or more
River washed sand (optional)	To provide stability and moisture regulation	5 – 10%
Slow release fertiliser	Provide major and minor nutrients	As specified by manufacturer
Garden lime	To adjust acidity to neutral	Variable
Magnesium limestone	Instead of garden lime for Ericaceous plans	Variable

MIXING OF MEDIA

Media may be turned using a shovel on a concrete floor, using a clean cement mixer (residues of building sand may be too salty for the media) or using a larger scale specialist compost mixer.

CHOICE OF STOCK

Table 2 is intended as a guide showing generally acceptable practices and gives some suggestions for broad categories of stock for growing-on.

Table 2. Choice of liners for growing on to saleable trees and shrubs – table of common practices.

Group	Condition at purchase	Size of final pot
Tree seedlings	Grown in cells	Usually 3 or 5 litres (larger for specimens)
Heathers	9cm – 12cm pots	1 litre pots
Rhododendrons	10cm – 15cm pots	3 or 5 litre pots
Other Ericaceous	9cm – 12 cm pots	1 to 2 litre pots
General shrubs	9cm – 15cm pots	2 or 3 litre pots
Climbers	10cm – 20cm tall pots	3 to 5 litre tall pots
Roses	10cm – 20cm pots	3 to 5 litre tall pots

FINANCIAL RETURNS

While unit prices vary, if an assumption is made that a liner cost may be used to set prices then the following Table (Table 3) broadly relates to pricing structures. Depending upon system used cost of materials including plants will approximate to 25% of retail value excluding VAT.

Table 3. Some suggested approximations for pricing structures of liner raised stock.

Cost of liner	Retail 2 litre	Wholesale 2 litre
Basic cost	Basic cost x 8	(Retail – VAT) / 2 +VAT
£0.50	£4.00	£3.40 / 2 + VAT = £1.70 + VAT
£1.00	£8.00	£6.80 / 2 + VAT = £3.40 + VAT

nb: VAT at 17.5%
Add approximately 50% to output price for 3 litre pots.

MARKETING

Sales of finished trees and shrubs are to a competitive market. However, local advantages may be capitalised upon. For example, where plants are raised out of doors it may be possible to produce hardier plants more suitable for the location at which they are grown. Standard nursery practice requires plants to be well spaced for the growing-on period to produce even and balanced growth. It is also normal to regularly cut back or pinch the tips of plants to encourage bushiness. These methods are used to produce plants for retail sale. Should the market be for bulk landscape and industrial schemes then plants are normally acceptable if not fully balanced and may be grown-on in a less well spaced pattern at the nursery in order to keep production costs down. Market outlets include farm gate sales, farmers markets, garden centres, landscape contractors and plant wholesale agents.

PESTS AND DISEASES

Many plants in the nursery stock industry have more than one grower between propagation and sale. Therefore pest and disease may be spread between nurseries. Certain plants require plant passports if sold to intermediaries. The grower can become certified to issue plant passports and Defra should be consulted to clarify specific intents. Generally nurseries producing woody plants have fewer pest and disease problems because of the diversity of plants produced and many nurseries have minimal or no regular control programmes in place. Some examples of problems relating to growing-on liners are given in Table 4.

Table 4. Some pest and disease problems relating to nursery stock.

Organism	Symptoms
Flatworm	Mainly a marketing problem for finished stock deemed unacceptable
Eelworm	Damage to root vigour
Aphids	Foliage damage
Chewing insects	Foliar damage
Vine weevil	Root damage
Mildew	Poor appearance and damage to growth
Viruses	Loss of vigour
Rabbits	Destroy almost all nursery stock (favourite foods include thorny *Berberis*, but will not eat Rhododendron!)

WOODY PLANT PRODUCTION IN WALES FROM LINERS

Production of plants from liners enables low technology units to produce saleable plants adapted to the conditions of Wales and may provide diversification opportunities for land based industries.