



Christmas Tree Growing in Ireland

A sectoral report outlining the opportunities and problems

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Foreword

“The walls and ceilings were so hung with living green, that it looked a perfect grove, from every part of which, bright gleaming berries glistened. The crisp leaves of holly, mistletoe and ivy reflected back the light, as if so many little mirrors had been scattered there.”

A Christmas Carol by Charles Dickens

Decorating homesteads at Christmas time has been associated as much with the celebration of mid-winter and the need to brighten up lives at a particularly dull time of year as it is with the celebration of the birth of the founder of Christianity. Indeed it probably predates Christianity. Within the Irish tradition, the use of evergreen trees in this exercise added a new dimension. The introduction of the Christmas tree into Britain is attributed to the German born prince consort of England, Prince Albert who, in the early 1840s introduced the practice of bringing evergreen trees into households as decoration for the Christmas period.

In Ireland this practice did not become widespread until the 1940s. At that time the rough top offcut of Norway spruce thinnings was the usual source of Christmas trees. As the practice became more widespread, the use of Norway spruce tops declined and purpose grown Norway spruce became the norm. Land beneath power lines subsequently became the favoured location for Christmas tree growing.

The more wide-spread use of home central heating and the propensity of spruce to shed its needles, led to a move towards fir and pine. Today, the production of purpose grown fir and pine Christmas trees is an important new enterprise. As in all other enterprises, quality and price are key factors in commercial success. Irish Christmas tree production will increasingly depend upon the export market where the extra dimension of reliability will determine economic sustainability.

This report is a consensus document. It is one of shared ownership between the Irish Christmas Tree Growers Association and COFORD, and outlines the main information gaps that require filling if the success of the enterprise is to be maintained. It is also a framework programme for Christmas tree research that will address these gaps. A clear manifestation of co-operation between research and industry, it is also an example of their interdependence, where commitment is twinned with focus.

I would like to thank the Christmas Tree Growers Association and each individual member of the working party for their diligence and co-operation in the production of this report. I hope that it will be the means of market expansion. The work of the chairman, Professor J. Gardiner, Professor of Forestry at University College, Dublin and member of the council of COFORD is particularly appreciated.

We look forward to the commencement of a programme of research and innovation that this document heralds. May it contribute to the viability of this particular forest based industry and the joy that Christmas brings.

Fergal Mulloy
Director
COFORD
April 1997



Christmas Tree Growing in Ireland

The Opportunities and Problems

In recent years a range of spruces, pines and firs have become available as Christmas trees, but undoubtedly the most popular species to emerge has been noble fir (*Abies procera* REHD). The popularity of noble fir Christmas trees is due to their symmetrical shape, regular branching and blue green foliage that does not shed indoors. Experience has shown that due to a combination of favourable soils and climate, Ireland has a comparative advantage in producing natural looking noble fir Christmas trees. As a result interest in the business of Christmas tree production has greatly increased over the past few years. At present a number of well-organised groups and a large number of isolated individuals are involved at the growing end. Typically, the smaller growers own something in the region of 3 - 4 hectares (ha) of trees. The large groups may be aligned with a number of growers. They generally have considerable experience of growing and marketing trees into established markets.

It has been estimated that about 1500 ha of Christmas trees have been established in Ireland. However, approximately three-quarters of this is owned by five major groups and the remainder by an estimated 150 growers. The primary species grown and the age of plantations are as outlined in Table 1. The Irish Christmas Tree Growers Association in

1993/4 collated these estimates and it is probable that the area of noble fir currently in existence is in the region of 1500 ha.

Since a recent estimate indicates that total production costs (including cost of land) could be as high as £25,000 per ha, it is clear that plantations already established represent an investment commitment of over £50 million in the industry. In addition, there are considerable costs in harvesting/transport/marketing and infrastructure development. Best estimates of current output indicate a home market for 350,000 trees in the current year with 100,000 trees exported. This represents a gross market value of £6.75 million and export earnings of £1.5 million. No estimate of employment content is available, but using an American figure of one full-time job per 28 ha, the employment content could currently be estimated at 60 full-time equivalents.

The development of the Christmas tree industry in Ireland has enormous potential to contribute to rural development in the context of an alternative farm enterprise. It is significant that, to-date, the industry has developed in a totally free market situation.

Table 1: Area (ha) of Christmas Trees Grown in Ireland By Species and Age

Species	'95	'94	'93	'92	'91	'90	'89	'88	'87	Total
Noble fir	405	100	100	136	143	134	71	40	19	1148
Norway spruce		13	4	3	3	3	3	5	1	35
Lodgepole pine		1	2	11	23	6	3	-	-	46
Nordmann fir		5	4	4	3	5	2	7	-	30
Colorado white fir		-	6	3	-	-	-	-	-	9
TOTALS	405	119	116	157	172	148	79	52	20	1268



Section Two: Silviculture

2.1 Site

The general consensus is that noble fir should be planted on deep free-draining mineral soils (similar to that used for growing malting barley) with a pH of 5.5 to 6.5. In judging the suitability of new land for growing noble fir, one grower insists on opening a number of soil pits to permit profile inspection. Sites for noble fir should ideally be gently sloping with good air circulation and free from frost hollows. For other species, such as Norway spruce and lodgepole pine, good quality land, that can be drained effectively and is not exposed, may be suitable.

2.2 Provenance Research

Provenance is undoubtedly one of the key factors in growing good quality Christmas trees or producing foliage. Most of the seed used in Irish nurseries to produce Christmas tree plants is imported through Coillte Nurseries. All of the material is of certified origin and the certificate is issued to nursery managers on purchase. The issues for most small scale growers would appear to be that they are not aware of the importance of seed origin or provenance and, they are not asking nursery managers for specific origins. At present, most of the noble fir seed comes from one of few major sources:

- collected seed from the Pacific North West (generally wild stands),
- Danish sources - the result of many years of selection,
- Irish, home collected seed from selected stands - all from the above provenances originally,
- Welsh and Scottish sources.

Tree selection and seed source testing is well advanced in both the Pacific Northwest and in Denmark. While US reports have given good results from testing, many Danish tests have not been as conclusive due to climatic problems.

Work in Ireland has been carried out by Coillte and falls into two categories:

- an assessment of an existing noble fir provenance trial and,

- new field provenance trials established in conjunction with Coillte Christmas Tree Farms on farm properties.

In general terms the results from the former show that the Oregon Coast Range provenances (Laurel Mount, Mary's Peak and Grass Mount) are superior to many Cascade origins for Christmas tree production. These provenances from the general Siletz River Drainage area, although very different from each other, combine average to very vigorous height growth with good tree shape. Their foliage, however, is greener than the one Danish provenance tested (Overguard). This latter is clearly superior in colour and is recommended for glaucous blue Christmas trees and/or foliage production. Other provenances from the Siletz River Drainage area which may be worth testing include those from the Riley/Fanno area and Cascade provenances such as Mount Defiance and McKinley Lake. In discussing provenance the following potential problems emerge:

- the wild sources of noble fir in the Pacific Northwest may be coming under threat from several fronts,
- the Danish industry may be reluctant to continue to supply a valuable resource to a major market competitor.

Arising from these is the recognition that considerable genetic potential already exists in noble fir stands in Ireland and the need to safeguard and develop this potential as a seed source.

2.2.1 Research Needs

There is a clear need for a concerted effort in provenance testing. Because of the wide range of site types currently in use for the production of Christmas trees, such testing should be carried out on a range of suitable site types. Provenance research is also important to those outside of the Christmas tree industry, notably the seed producers and the owners of existing stands of suitable genetic material. Provenance trials are needed to identify the most suitable seed sources for Christmas tree production under Irish conditions for the following species:



- noble fir,
- Nordmann fir,
- Frazer fir,
- Scots pine,
- lodgepole pine,
- Norway spruce.

In future testing, the following traits should be monitored:

- tree shape, uniformity and colour,
- bud and branch density,
- flushing and dormancy dates,
- response to cultural work and fertilisers,
- needle curvature.

Additional provenance research may be necessary to identify optimal seed sources of noble and Nordmann firs for foliage production.

2.3 Planting Stock Production and Quality

It has been estimated that approximately 3.5 million plants, with a value of £0.54 million, were used in the establishment of Christmas tree plantations in 1995. The nursery culture used did not differ significantly from that used to produce conventional planting stock. Coillte uses in the region of 600,000 transplants in its annual Christmas tree planting programme and about 75% of these are bare rooted. The remaining 25%, comprised

mainly of noble fir, are produced on contract by a private sector container nursery. Almost all of the Norway spruce and lodgepole pine required is produced as 2+1 transplants. The type of planting stock used by other private sector growers varies greatly. In the case of noble fir, some bare-root nurseries sell 2+2 stock, while others produce younger and generally smaller undercut stock. One nursery, producing 1U1 noble fir stock, may undercut up to five times between July and September in the second year. A summary of the major stock types and sizes is shown in Table 2.

Grading of plants by morphology is generally similar to that used for ordinary planting stock although culling standards may be somewhat higher. Only one nursery uses the number of branches per whorl and apical dominance as major criteria. Some purchasers are clearly unhappy with the standard of grading but there are no clear standards for the grading of Christmas tree planting stock. Only one nursery is currently evaluating the physiological quality of plants using the root electrolyte leakage test. As with most planting stock there is a problem in matching optimum lifting time with that for field planting. One nursery manager has indicated that he lifts most plants during winter (January/February) when conditions are suitable and then cold stores them for dispatch as required. Most planting stock is, however, lifted to order. All plants are placed in co-extruded polythene bags for storage and dispatch.

TABLE 2: A Summary of Stock Types Produced for Christmas Tree Planting.

Species	Stock Type	Height Category (cm)
Lodgepole Pine	2+0	15 - 30
Norway Spruce	2+1	20 - 40
Noble Fir (Bare rooted)	2+1	20 - 30
	2+0	15 - 25
Noble Fir	Container	15 - 20



It is clear from this limited survey that practice in the raising and handling of stock varies significantly, almost from nursery to nursery.

The survival and growth following field planting of Christmas trees is variable, especially in the case of noble fir. Generally, companies producing a large number of Christmas trees have had good success in establishing new plantations, while those producing a small number of trees have had more problems. The reasons for these differences may be because the larger companies:

- have greater expertise at growing Christmas trees,
- grow (or have grown to order) their own planting stock to specification,
- have the planting stock handled/dispatched to strict guidelines.

For this reason, the effect of handling and storage practices on planting stock quality may be more relevant to farmers and others growing a relatively small number of trees.

The main problems relating to planting stock quality highlighted were:

- the lack of clearly acceptable guidelines on morphological characteristics,
- grading at nursery is sometimes inadequate, perhaps because the stock is often graded as forestry planting stock,
- the physiological quality of the stock may be poor; the stock may appear in good condition but the quality may be poor owing to:
 - i)* handling and storage practices,
 - ii)* environmental conditions during transport; the fact that a large number are imported exacerbates this problem,
- the need for the monitoring and testing of stock (especially physiological status) to detect poor quality trees before planting,
- the need for good record keeping throughout all phases of culture from nursery to field planting is important so that possible reasons for the problems encountered may be elucidated.





2.3.1.1 Research Needs

Nursery cultural practices

- Develop cultural practices to improve the quality and uniformity of planting stock, possibly including:
 - i)* fertiliser application and timing,
 - ii)* optimum lining out time and density for transplants,
- examine the use of precision-sown and undercut stock;
- the use of containerised seedlings versus conventional bare-root seedlings should be further explored.

2.3.1.2 Plant Handling and Storage

- Define morphological characteristics conveying best advantage in field performance,
- determine the effect of lifting date and planting dates on field performance,
- determine the effect of time of lifting to storage, storage method (including cold storage) and duration on plant quality,
- develop methods and procedures for evaluating/monitoring the physiological quality of planting stock.

2.4 Plantation Establishment

Establishment practices vary significantly with most large-scale producers favouring complete cultivation and machine planting, while others plant on a plough ribbon to avail of an elevated weed free planting position. At least one large scale grower prefers to take a crop of barley and to 'burn-off' the residual weeds with Round-up prior to establishment while another, simply rips to a depth of 50 cm with subsequent planting to one side of the rip line. The variation in spacing tends to range from 1.0 to 1.3m square spacing but where working tracks are included at planting time the number of trees per hectare may be as low as 4200. Most growers have experimented on a pilot scale but generally there is no up-to-date information in relation to site type evaluation or best establishment practices.

2.4.1 Research Needs

- Define site characteristics that indicate suitable site types for the planting of all species,
- evaluate different ground preparation techniques, including the use of complete cultivation,
- evaluate different planting methods, including machine planting,
- examine plantation design.





2.5 Tree Nutrition

For many years application of fertiliser was regarded as an unnecessary if not dangerous activity for Christmas tree producers. However, nowadays it is recognised that crops may frequently be in need of nutrient additions. It is often not clear to the grower if fertiliser is needed, and if it is needed, which fertiliser should be used and how much. To-date, most producers have developed their own prescriptions based on experience and observation but there is an obvious need to develop analytical tools and diagnostic methods to allow individual growers to predict fertiliser requirements. A recent (1996) and extensive survey of growers yielded the following information:

- soil types on which Christmas trees are grown in Ireland range from sandy to peaty and elevations range from sea level to 350 m.
- over the eight years prior to the survey, only a minority of growers carried out any soil or plant tissue chemical analysis; of those who carried out both soil and plant tissue chemical analysis, most analysed only 3-4 samples over the eight-year period,
- based on the plant tissue chemical analysis and using US standards, all sites tested showed some degree of deficiency in a number of essential elements,
- many growers apply no fertiliser; many of those who do fertilise do so without the aid of either soil or plant tissue chemical analysis; others (generally the larger full-time growers) seem to pay close attention to the chemical analysis results,
- the types of fertiliser used are generally low in nitrogen (ground rock phosphate, 0-10-20, 10-10-20),

- an overall conclusion would be that most growers do not see soil or plant tissue analysis as a worthwhile exercise; perhaps they regard it as too much trouble, too expensive or too unreliable in predicting fertiliser needs.

2.5.1 Research Needs

There is a clear need for both short and long term research on Christmas tree nutrition. Short-term research should focus on developing baseline parameters for use with foliar and/or soil analysis. At present little is known of the levels of deficiency and where trees have luxury consumption. By examining a range of different foliage types (i.e. excellent quality, good and poor) it may be possible to establish a correlation between foliage quality and nutrition levels. The establishment of a baseline study will increase the reliability of predicting fertiliser needs for crops under Irish conditions.

Long term research needs to examine the effect of different fertilisers on tree growth and development. Not only will different compounds affect growth but different rates and times of application may also affect the development of the trees.

Therefore long term projects need to be established to examine the following:

- rates of application,
- time of annual applications (e.g. Spring vs. Autumn),
- when is the best age at which to fertilise?,
- the elements that need to be applied and in what combination.

The parameters for assessment should be:

- bud density/bud development,
- height growth/leader increment,
- colour - and colour change responses,
- branch formation.



The removal of a considerable volume of biomass each year from foliage producing strands may result in nutrient deficiency. There is a need to establish nutrient cycles and budgets within stands in order to calculate the replacement fertiliser needs.

Field fertiliser trials at selected locations, to represent specific soil types, using selected species are a basic requirement.

2.6 Weed Control

Weed control is a critical area for Christmas tree producers. Currently, three basic herbicide types are used. Based on their mode of action these can be described as contact, systemic and residual. While the number of chemicals that fall into each of these categories is numerous, only a limited number is commonly used. The most frequently used contact herbicide is Gramoxone 100 (paraquat), followed by Basta. Gramoxone will only kill vegetation it actually comes in contact with and becomes inert on contact with mineral soil. Basta, however, is reputed to have some minimal systemic action against weeds such as stinging nettles. This group of herbicides must always be applied as a directed spray. Gramoxone is extremely toxic to animal life. While it would appear that these herbicides have a role to play in Christmas tree production they are little used at present. This may be due to the perceived danger by the general public.

There are many systemic herbicides on the market. The one best known and most frequently used is Round-up. It is widely used in Christmas tree production as a directed spray. However, it can be safely used as an overall spray when the trees are dormant. It is extremely safe for animal life. Some of the herbicides in this group (e.g. Fusilage) must be used in conjunction with a wetter. Mention should also be made here of the 'Nomix herbi', which is a very valuable spraying system, allowing application of herbicides in a very precise and visible way. Of the herbicides, which have a residual action, the most widely used are the triazine group, atrazine, simazine and terbuthylazine (Gardoprim) (Table 3). These herbicides remain active in the soil for some considerable time and

thus prevent weed growth. In the near future the recommended application rate for Gardoprim will be reduced from 16 to 4l/ha. It will be used in conjunction with a graminicide. Velpar has been widely used in Christmas tree production but has become difficult to obtain in recent years.

Apart from the normal problems relating to application rates, timing of applications etc., a number of other problems arise in relation to herbicide usage. These may include:

- the build up of resistant weeds where residual herbicides are used frequently, e.g. resistance of groundsel and annual meadow grass,
- contamination of ground water supplies in areas of very free draining soils; for this reason some of the residual type herbicides are already banned in European countries; this may mean that potentially useful herbicides may simply be unobtainable,
- the need to extend the use of Round-up as a directed and overall spray, in the dormant season and as a directed spray in the growing season; this would make it possible to clean a plantation in the autumn where weeds had become competitive during the growing season.

2.6.1 Research Needs

With the increasing number of chemicals being withdrawn from use throughout Europe, research must concentrate upon:

- using fewer residual herbicides,
- investigating more benign systemics such as glyphosate as an overall and directed spray,
- using safer contact sprays such as Basta.

While in the foreseeable future the use of some chemicals will be inevitable other areas which should be investigated are non-chemical weed control measures such as:



- grazing sheep,
- strips of plastic such as in soft fruit production,
- mulching,
- mowing of weeds,
- mechanical weed control.

In order to capitalise on our country's green image growers need to be conscious of the need to produce trees in an environmentally compatible way.

2.7 Cultural Work

It is generally agreed that the need in the market place is for a cone shaped tree of medium density. Such a tree can only be produced by applying some cultural work. This may involve leader correction, leader shortening or leader control combined with side culturing. This latter may be by shearing or bud picking and basal pruning to leave a 20 cm (9 inch) handle. It is generally agreed that such work carried out at the right time can increase the yield of saleable trees to 80%. The key factor with many of these techniques is to apply them speedily and on the basis that prevention is better than cure. In the first three to four years the main techniques include:

- pruning unwanted leaders,
- replacement of poorly shaped trees which have no prospect of recovery and,
- culling of unsuitable trees.

At about year four 'real' culturing, in the form of basal pruning is carried out on noble fir. Basal pruning has three functions:

- leader growth may be reduced by up to 25% in the two years following basal pruning (this result has not yet been confirmed for trees grown under Irish conditions),
- it can lead to improved weed control since herbicides such as Round-up can be applied under the 'skirt' of the trees with little or no damage,
- it produces a 'handle' for harvesting.

Side work on Christmas trees generally begins when the trees are about hip height. This may take the form of bud picking or shearing. Bud picking involves the 'picking out' of the buds on the main lateral branches. This encourages internodal branches to develop and catch-up on the main branches, thereby producing a bushier tree. In subsequent years only the top whorl of branches is bud picked. Bud picking is a seasonal operation and is only useful in the three to four weeks when buds are newly flushed. Shearing serves a similar function to bud picking but is carried out over a longer period. It involves shortening of the lateral shoots by cutting with sharp knives. A disadvantage of this method is that the cuts may be evident following the operation.

Top work covers leader shortening, straightening, removal of unwanted leaders and generating new leaders. The optimum leader length for Christmas trees is thought to be in the region of 30 - 50 cm. Where leaders are longer a standard practice is to cut back to a bud that can generate a new leader. This cut can be made flush with the new terminal bud or can be made to leave a stub of about 5 cm above the bud. Where a stub is left it may subsequently be used as a splint. Flush cutting appears to give a better response than stub cutting in that a higher percentage of trees give a near vertical response. However, leader correction is easier following a stub cut. Irrespective of the type of cut used, new leaders may not always grow straight, so splinting and straightening are used to repair the damage. This work normally takes place in the months of July/August and involves straightening the leader by holding it in place with a bamboo or other type of splint. Splints can be removed after about six weeks. Other top work with noble fir may involve the shortening of the top whorl laterals in order to promote apical dominance and the production of a new leader. While the basic method of leader control is basal pruning, other methods such as hormonal treatment, scarring and light exclusion may be worthy of consideration.



In the culturing of pines and spruces many of the techniques used are similar but they may give entirely different results. However, basal pruning is practised for all species. Pines and spruces can be sheared from an early age (2, 3 or 4 years) using hedge clippers. From year four onwards pines can be sheared with knives or mechanical cutters to develop a better shape and to increase bushiness. In pines it may be necessary to select a single leader each year and to cut this to approximately 20 - 30 cm.

2.7.1 Research Needs

Culturing is an important practice even when it is only carried-out on 'problem' trees. However, it is not a simple task as removal of buds, foliage or branches from any part of the tree will always produce impacts elsewhere.

At present guidelines are not available for any species and research is needed on methods as well as impacts and interactions as follows:

- fundamental studies of the annual cycle of phenological development,
- methods and timing of leader culturing - to include use of hormones, paper caps, scarring and splinting,
- methods and timing of side shearing including bud picking and the impact of side shearing upon tree density,
- methods and timing of basal pruning and the impact of same upon leader growth,
- interactions of fertiliser application and cultural practices.

2.8 Crop Protection

With rotation lengths varying from 6 to 10 years most growers experience problems at some stage. The lack of undergrowth usually means that fire is not a major risk factor while trespass is rarely a problem where plantations have been adequately fenced. The main risk factors arise with insect pests and diseases. For noble fir the nut leaf weevil, *Strophosomus melanogrammus*, can cause unsightly partial defoliation in the upper part of the tree in autumn.

Currently, on detection, this pest can be managed using pyrethroid insecticides. The black stem aphid, *Cinara confinis*, through needle feeding on internodes in the spring, produces denuded patches on the bark. Occasionally exudates from the aphid colonies are the cause of sooty mould infection of branches below. At present the aphid can be managed through the use of a range of insecticides. *Phytophthora* species causing root and stem rot can be responsible for significant mortality on sites with impeded drainage. To date it seems that little remedial action can be taken other than the removal of infected plants and the improvement of drainage where practicable. The fungal organisms *Rhizosphaera kalkhoffii* and *Sclerophoma pithyophila* have both been found to be associated with differing degrees of needle discoloration in noble fir. A number of discoloration conditions are frequently observable, commonly named as noble fir needle browning, red needle, and current year needle necrosis. Less frequently encountered are such root rotting fungi as violet root rot, *Helicobasidium purpureum*, and the root rot, *Cylindrocarpon destructans*. Occasionally grey mould, due to *Botrytis* species may be found infecting outplanted containerised stock; crop losses are usually very low, not requiring any remedial action. The green spruce aphid, *Elatobium abietinum* is the main cause of defoliation in Norway spruce Christmas trees while *Cinara piceae* causes damage in much the same way as *C. confinis* on noble fir. Both can be readily managed using a range of available insecticides.

2.8.1 Research Needs

Some research is in progress on *Phytophthora* diseases while other work has been carried-out on the occurrence of *Rhizosphaera* and *Sclerophoma* in their association with needle browning.

- The main research is required in establishing the cause or causes of the various observed needle discoloration conditions in noble fir and to identify preventative measures,
- in addition, alternative pest management strategies should be investigated for the insect pests *Strophosomus* and *Cinara*.



Section Three: Harvesting and transport

3.1 Harvesting technology

Much of the equipment being used by Christmas tree farmers in harvesting is of North American or European origin and may not always suit Irish conditions. Machine testing and development is necessary for several operations.

At present, trees are usually cut using a standard small bar chainsaw. For some species, notably spruce, a modified trimmer can be used. It may be possible to develop equipment and techniques that would lessen operator fatigue. On-farm haulage can vary from pallets (not disposable) and tractor units, to trailers, and even to helicopters in the US North West. Several of these methods are being used on Irish farms, but considerable work is required to develop systems and equipment (by modification) to suit Irish conditions.

3.2 Packaging - Warehousing

While the whole area of packaging requires assessment, the equipment being used and tested needs modification and development. The use of baling or netting machines along with possible palletising of trees may reduce costs for yard handling and transport. However, palletising in particular has not been found to be totally effective when tested in the US. Important factors are the cost of packaging, labour, net suitability regarding the 'green laws' and the impact on transport.

3.3 Transportation

The final, and probably the most important part of the marketing mix, is the transportation of the trees, at speed, to a destination which can be many hundreds of miles from the production site. There is a need for high efficiency here and so far little research has been carried out on scheduling, timing and availability of transport. Christmas trees, by their nature, are products requiring considerable amounts of space. Furthermore, if the flow lines of the trucking have not been carefully scheduled there is a risk of serious damage to the marketability of the trees.

3.4 Research Needs

- The most important area of research is the packaging, warehousing and transportation to export markets; little work has been carried-out in this area. The research should identify the most efficient and time saving method of packaging. It should study the flow lines as related to yards and loading bays and the continuous on stream methods of truck size and availability.
- there has been little advance on the uses of machinery for harvesting, research is needed in this area,
- research is needed on needle retention and correct time of harvest.





Section Four: Marketing of Christmas Trees



4 MARKETING OF CHRISTMAS TREES

There is one factor above all others that governs the marketing of Christmas trees and that is 'TIMESCALE'. The research of the market, the planning of the product, the pricing, the channels of distribution, the personal selling and the promotion and advertising may all be carried out on a long timescale. But the harvesting, packaging, warehousing and transportation must all be fitted into a maximum time span of four weeks. This creates special problems, which are seldom apparent for most other perishable products. It also needs to be remembered that, after that timescale, Christmas trees cannot even be sold at a knockdown price and must remain a total loss.

4.1 Research of the market

The European Christmas tree market is in the order of 60 million trees. The two main markets for Irish grown trees would appear to be the UK and Germany. These two countries absorb a total of approximately 28 million trees annually. In the case of the UK market we know that 60% are home grown and the balance imported. With regard to the German market, 60/70% are home grown with Denmark the major exporter into the market.

4.2 Planning the product

There appears to be an increasing demand in these countries for true firs (*Abies* species), which are replacing spruce. It is also known that the patterns of shearing and pruning as carried-out in Ireland, produce the type of open tree which is in demand in both of the above countries.

4.3 Pricing

In recent years high prices have been achieved on the home market. This has been due to a shortage of product and it will be necessary to develop and maintain records on price trends in target markets to formulate a plan for the future.



4.4 Channels of distribution

These can range from the simplest, i.e. “choose and cut”, where consumer and producer meet and thereby eliminate the middlemen, to dealing with large wholesalers in foreign markets, where several levels must be passed before meeting the consumer. Different markets and different sectors within markets will have distribution channels suitable or adapted to this market. Research is required to examine the costs and benefits of operating in these different market sectors.

4.5 Personal selling, promotion and advertising

While these functions relate to a great extent to the individual grower or supplier, it should be said, however, that it is possible that considerable advantage could be gained by adopting a unified promotional approach in the export market. The success of quality branded products in other fields, emphasises the advantages of a unified approach. The significance of branding in the Christmas tree business is, at present, unknown and the return on the investment necessary for this kind of marketing approach requires much investigation.

4.6 Research Needs

- Very few Christmas trees will be exported from Ireland if the market is not comprehensively researched; this research needs to embrace the markets that are available, the type of tree required, its shape, colour, size and price range; it should also look at the channels of distribution; it is possible that some work has already been carried-out, either by the Irish Trade Board or by individual companies and it would be helpful, if it were possible, to combine these different approaches,
- promotion of Christmas trees from Ireland needs to be examined and in conjunction with this a clear view of the competition needs to be assessed; it would be helpful to take a look at other perishable goods, which have been promoted in differing ways, and to see whether this approach is to the advantage of the industry.

4.6 DECORATIVE FOLIAGE PRODUCTION

Foliage production has the potential to be an important ancillary activity to the Christmas tree industry. In countries such as Denmark, where the industry is well developed it is generating in the order of £18 million revenue for the forestry sector with sales of approximately 20,000 tonnes per annum.

The material is used throughout northern Europe for Advent wreaths, grave decoration and other floral decorations. It is estimated that the total potential market is approximately 30,000 tonnes per annum. The main species used is noble fir. The Danish producers have selected noble fir for foliage production qualities, such as colour and needle shape, as opposed to Christmas tree qualities. At present approximately 400 tonnes are harvested in Ireland and exported to Germany, Denmark, Holland and the U.K. Irish foliage producing plantations are presently undermanaged. However, initiatives are underway by Coillte to considerably intensify management and consequently yield.



Section Five: Decorative Foliage Production

5.1 Several research issues arise in this area. Provenance

Ireland has some of the potentially most suitable seed stands for the production of noble fir foliage.

Provenance trials, and seed source testing must begin immediately along with an inventory of existing potential stands. Although there may be overlapping of provenance work on Christmas trees different attributes must be examined.

The primary traits for assessment include:

- colour,
- needle shape and branch architecture,
- yield potential - tonnes of saleable foliage per ha per annum.

5.2 Stand Management

Yield from stands, properly managed, can be as high as 8 tonnes per ha per annum, however, this is dependent on stocking density and cutting methods.

Research in this area should concentrate on:

- developing stocking density management tables,
- harvesting methods.

5.3 Nutrition

The removal of large quantities of stand biomass on a systematic basis over several years will result in the removal of much of the nutrients normally recycled in the stand.

Research needs in this area include:

- establishing nutrient cycles and movements,
- nutrition replacement requirements,
- baseline studies for use in determining the above.

5.4 Stand layout

The development of stand layout systems suitable to Irish harvesting and growth need to be investigated and developed.

5.5 Foliage quality

Keepability and quality in relation to time of harvest, destination of product and storage should be investigated.



Section Six: Priority Research Needs of the Sector

6 PRIORITY RESEARCH NEEDS OF THE SECTOR

Based on the above evaluation of the sector, the following areas are identified as priority areas for research within the Christmas tree sector.

6.1 Marketing

It is important for the strategic development of the industry as a whole that several areas are examined and subsequently reviewed on a regular basis. Disposable income and the general economic health of a country may affect the purchase of Christmas trees and related products in both type and quantity used. Christmas tree consumer research should concentrate on European national markets with a view to developing indicators for these markets so that trends and predictions can be made. Predicting trends, both types of trees being used and likely numbers will be important for the long term strategic development of the sector and will play an important part in setting production targets and other practices.

Market research should examine:

- products, quality and quantity used in markets and changes from year to year,
- economic indicators - per capita income etc.

A second area of market research, which is more operational, would best be carried out by companies or individuals and should rightly be funded by Bord Glas or Bord Trachtala.

6.2 Nutrition

The main need under this heading is for baseline studies, which would provide guidelines for optimum fertiliser usage.

6.3 Provenance Studies

To identify provenances that are most suitable for Christmas tree production in Ireland. Use could be made here of seed collected from existing noble fir stands in Ireland along with Danish and U.S. seed sources.

6.4 Vegetation Management

For environmental reasons there is a need to get away from the use of residual herbicides and to identify practical ways of extending the use of more acceptable herbicides along with mechanical and other methods of vegetation management.

6.5 Culturing

Particular emphasis here should be on leader control.

6.6 Disease and pest control

The emphasis here should be upon the identification of the causes of needle necrosis in noble fir and on developing preventative measures.

6.7 Harvesting and transport

- An investigation of the most cost effective method of harvesting, transport on farms, packaging with particular reference to environmental controls and transport to the market,
- evaluation of equipment for harvesting, extraction and packaging,
- evaluation of correct harvest time with particular reference to needle retention,
- evaluation of transport infrastructure available - trucks, ferry space etc.

ORGANISATION OF RESEARCH FUNDING

Unlike other sectors of the forest industry, where research into the best growing techniques has been undertaken



Section Seven: Organisation of Research Funding

7 since the late 1950s, Christmas tree growing is a new business in Ireland, with many specific requirements and needs. Therefore, it is essential that funding be allocated at the maximum level possible, given that universities and state agencies have not as yet met this need, and it is of great importance to prime the research effort relative to other sectors of the forest industry.

Many Christmas tree producers are either small operators or regionally based, with a wide variety of soil types, management approaches, species and provenance types. Added to this, many of these growers have little or no formal training or education in scientific forestry. Collaboration with other growers may be the best way to give leadership and scientific back-up to the smaller growers.

In order to encourage more collaboration consideration should be given to a larger than normal allocation to collaborative projects to encourage growers, particularly those with more knowledge than others, to become involved in research.

It is essential to note that all Christmas tree growers in Ireland are involved in an entirely commercial operation with no grants for establishment of plantations. Therefore all members, regardless of size, must be at liberty to propose, and operate, only those projects that they regard as commercial. Enforced collaboration will only result in the withholding of information and techniques.

Many of the proposed Christmas tree projects will, by their nature, be relatively small and of short duration. However, at this point in our knowledge of the techniques and problems of the Christmas tree industry, they might well yield better results for each £ spent than one or two large-scale projects lasting several years. A number of smaller projects will also encourage and develop an understanding of the need for all growers to be involved in research and the value of such research.



Notes:
