Plant quality – What the grower needs

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INTRODUCTION

I agreed to present this paper because I feel foresters in the private sector, with their extensive experience in the field, have much to offer on this topic and should become more involved in seminars, meetings and workshops. I then, however, got a bit nervous when I realised I would be talking about plant quality to an audience that would consist of the cream of the nursery sector in Ireland, if not the world, and I wondered what could I tell these people about plant quality. However, to begin I need to clarify two terms.

Firstly I feel I need to clarify the word `grower'. A grower in this instance refers to the forester or private forestry company utilising plants supplied by the nursery sector to establish *a* plantation on behalf of a farmer or investor.

The second issue which I wish to clarify is the understanding of the words 'plant quality'. In my opinion plant quality only partially refers to physical appearance, size or straightness but it primarily refers to the essence of the tree, its genetic make-up and the level of confidence a forester can have in its source and traceability.

When I actually thought about this topic I found that every grower or forester within Green Belt has issues with plant quality. I should know as I tend to get their frustrations on this topic regularly. I will therefore concentrate on the issues raised by our foresters on a regular basis in relation to plant quality and the overall standard of planting stock available generally. The issues our foresters have with plant quality arc not with the physical attributes of the plants provided by the nursery sector today but are more to do with broader issues that arc possibly more difficult to solve.

For the purpose of this paper I have concentrated on figures and issues within Green Belt alone rather than the entire afforestation sector, However, our company has approximately 40% market share, so our concerns can realistically he taken as being representative of the overall afforestation market.

Green Belt has planted almost 20 million trees in the last two years, representing 17,000 acres of new plantation. The responsibility is on us to plant the best provenances available, and to establish quality plantations that fulfill the principles of sustainable forest management (SFM), the needs of the plantation owner, and the needs of future markets is immense and is paramount to everything else we do. It is only when you quantify the areas and the tree numbers, and add these to the fact that these trees are going to be here for 35 to 120 years minimum, that you realise the implications of what we arc doing, The importance of plant quality can therefore never be understated.

Our issues with plant quality are:

- Confidence;
- The conifer issue;
- The broadleaf issue.

I will not be concentrating on other issues such as whether plants achieve specific size categories or have certain physical attributes as outlined by others, as these specifications are predominately met anyway.

CONFIDENCE

I would have to say that the biggest issue people I have spoken to have in relation to plant quality is confidence or more specifically the lack thereof. This lack of confidence is not with the nursery manager or with the physical qualities of the plant leaving the nursery. This lack of confidence goes back to the provenance/seed Source stage.

Whilst reviewing the literature one quote regularly appeared. It reads:

> *'The use of sound seed from stands of high inherent quality is widely recognized as the best means of ensuring last growing and healthy plantations capable of yielding good quality wood. Seed that is guaranteed to have been collected in*

seed orchards or in selected seed stands or seed production areas may he slightly more expensive than wild seed but additional costs add little to newly established plantations'.

We would like to believe that this is what happens but we base a lack of confidence with the system on the general poor performance of a proportion of broadleaf crops whilst using plants grown from accepted continental provenances and home-collected seed. If a national survey of our broadleaf plantations were to take place and these plantations were quality rated from 1 to 10, I believe the results might not be as good as we would expect.

Foresters wonder if vast proportions of seed are collected not from within selected stands of high genetic quality but rather from thinnings or individual trees that are selected by the quantity of seed they produce rather than quality. I am sure I will be told that this thinking pattern is incorrect but, as I have said before, this fear exists on the ground. The relevance of this issue, particularly to the nursery sector and to the forestry sector in general, is that foresters make the species selection on the ground, and if they are uncomfortable with certain species because they mistakenly believe things are not what they should be, then you will get dramatic reductions in their use. For example, the change in pattern of sycamore and alder planted by Green Belt in the 1999/00 planting season compared to 2004/05. In the 1999/00 planting season equal numbers of sycamore and alder were planted. However, in the 2003/04 planting season there was four times more alder planted than sycamore, while in the 2004/05 planting season there was another 76% drop in the number of sycamore planted, while there was a corresponding increase in the number of alder planted. There is now 17 times more alder planted than sycamore, which is a dramatic change over a very short period and this change had nothing to do with the physical appearance of the sycamore plant. The reason for this is simple, a loss of confidence in sycamore's ability to perform in the field which is based on an assumption that incorrect provenances are being used. However, there arc no scientific data to back up this assumption. This has lead to a significant reduction in the utilization of sycamore plants with foresters substituting sycamore in a lot of eases with alder, ash or Sitka spruce.

THE CONIFER ISSUE

The second issue our growers have with plant quality is with our conifers. There are two main issues.

Plant quality

We have undoubtedly become the masters of growing Sitka spruce to 30-60 cm in vast quantities with a nice blue green healthy colour. We now need improvements in the production of other species like Scots pine and Douglas fir. Issues like shoot/root ratio, `J-rooting' and optimum size still need to be addressed in these species. Survival in the field can still be very variable and foresters find this an unacceptable risk.

It is an accepted fact that we, as a company and as an industry, should be planting more Douglas fir because of its superior wood quality. The main reason for avoiding it as a species is, of course. due to its susceptibility to deer, but production issues such as size and survival rates still worry foresters who tend to avoid these species on the ground. This in turn may lead to alternative species selections on sites that may not be suitable for Sitka spruce or broadleaves, yet they may be planted on these sites.

Foresters need to be confident in species like Douglas fir but I believe they would still not plant Douglas fir even if deer fencing was grant aided due to fears about plant quality. Green Belt planted 6,000 Douglas fir last year out of a total planting programme of 8.75 million plants.

Table 1. Comparison between number of sycamore and alder planted by Green Belt 1999/20 planting season and number planted in 2004/05

Years	199912000	**2003/2004**	**2004/2005**
Sycamore	600K	300K	70K
Alder	600K	1.2 million	1.19 million

A minuscule total by any standard and the numbers were rather similar for the previous planting season. The same quality issues can be applied to Scots pine, our native conifer. If Scots pine was not planted in mixtures with oak its uptake would indeed be poor. There are also provenance issues with Scots pine that need to be addressed. My view is that we should. as foresters, be planting more Scots pine.

Research in the field and putting research findings into practice

The example 1 use here is Queen Charlotte Island (QCI) vs Washington provenances of Sitka spruce and the practices in Coillte as opposed to the private forestry sector. The private sector prefers QCI sources while the practice in Coillte is to plant predominantly Washington sources. General recommendations are that, for the majority of sites, Sitka spruce of Washington or Oregon origin should be planted in preference to that of QC1.

This is because these sources provide a far better financial return to the grower through increased timber production over a shorter rotation. Research findings have shown increased diameter growth at breast height and increased standing volume of up to 25-37% in Washington stands over QCI after 22 growing seasons.

However, the perception amongst some foresters is different on the ground. Foresters tend to roll from season to season with primarily QCI as their core Sitka spruce source believing Washington to be more susceptible to frost and that it has reduced timber quality because it grows faster.

The literature states that in reality density varies very little in our provenance range, and due to reduced knot frequency (because of greater inter-whorl spacing added to quicker canopy closure) we find that Washington provenances actually produce better quality timber.

If we can reduce rotations and increase timber quality why the dependency on QCI in the private sector? There arc two reasons:

(i) People arc generally slow to change and they fear increased failure rates due to frost.
(ii) The lack of a clear forum for communication between the different sectors involved in forestry, i.e. Forest Service, Coillte and the private sector, where one could openly discuss the best way forward for the sector as a whole, make advantageous decisions and discuss and share research data and experiences in a co-ordinated fashion. QCI sources can grow well in Ireland, as we all know, but why settle for QCI if Washington or Oregon sources arc more productive?

THE BROADLEAF ISSUE

As already stated it is predominately the broadleaf issue that causes the most concern amongst foresters on the ground and is the area where confidence levels in plant quality and seed collection are at their lowest. This fear is based primarily on the performance of our broadleaf crops on the ground. The best way to review the broadleaf issue is to look at each species individually.

Alder *(Alnus glutinosa)*

The use of alder has grown in popularity amongst establishment foresters in recent years. Green Belt planted approximately 1.2 million alder in the 2003/04 season and again in the 2004/05 season. The company currently has no issues with alder, except the availability of desirable sizes. I believe its popularity is based simply on:

- Its ease of good establishment and growth;
- The type of site available for forestry combined with the desire to achieve minimum broadleaf percentages;
- Its wide natural range across Ireland;
- It is a native species and is considered to be less susceptible to deer damage.

Even though issues exist with Phytophthora and the image of its timber. I believe it will form a core species within future afforestation programmes, particularly if premia payments in the future are reduced from 20 years to 15 years, which will reduce planting of long rotation broadleaves. In relation to markets I believe that if the supply is there – critical mass, the markets for the timber will develop.

Ash *(Fraxinus excelsior)*

Foresters have refined their site selection for this species and are tending to get the mix of

plant quality, site and establishment techniques right. It is therefore ironic that ash has substantially contributed to the main worry growers have with plant quality, i.e. confidence of origin. The introduction of brown bud ash *(Fraxinus augustifolia)* into this country from the continent has been an expensive misadventure. Its removal and replacement has cost the Forest Service a minimum of € 600,000 to date, with an aggressive and expensive total eradication programme now considered essential. The grief factor experienced by foresters has been immense but the cost of allowing it to hybridise with native stock of common ash *(Fraxinus excelsior)* would be immeasurable. It is easy to understand why foresters would have concerns when we review the brown bud ash story.

Who was the scoundrel? Did one exist or was this an unfortunate chain of events?

One element concerns me in relation to collecting ash seed and that is that seed production of ash in closed stands is generally poor due to small crown development. Therefore seed collections are almost exclusively made front hedgerow trees and this practice is likely to continue until recently established seed orchards are brought into seed production. I wonder if this factor affects the quality of our plantations, because it definitely affects the confidence of our foresters.

Oak *(Quercus petraea* and Q. *robur)*

Unfortunately oak is still the species that raises the most concerns amongst our foresters. It is difficult to come up with reasons why a native tree can sometimes perform so poorly. Why is it so susceptible to mildew and why does it have such poor form with heavy stag heads appearing in many plantations? When experienced foresters and good sites in combination fail to produce good oak plantations it is only natural that one questions provenance and seed supply. Can we establish nice oak plantations? The answer is yes, but arc we producing enough of them?

should qualify my criticisms of oak by saying that I believe that we are judging our oak plantations far too early and stands seem to be improving with age.

Sycamore *(Acer pseudoplatanus)*

Our foresters have serious problems with sycamore for the following reason. In general there is no faith in the provenances used, even if seed is home collected.

Considering the fact that sycamore is a non-native species of continental origin it is possible that the present naturalized seed source may not he the most suitable for this country and as no provenance trials have been established in Ireland, there is no information on the performance of sycamore sources from its natural range tested under Irish growing conditions.

Beech *(Fagus sylvatica)*

Beech is a species that we are actually happy with from a provenance and plant quality view point. Foresters, I believe, are very conservative on site selection for beech and therefore it only tends to be planted on most suitable sites. Establishment difficulties are a completely different issue and have more to do with experience than plant quality.

Cherry *(Prunus avium)*

Our past experiences with cherry would have tarnished our foresters view on this species and also add fuel to their concerns on provenance. Cherry was heavily promoted in the mid 1990s based on its timber value, relatively short rotation and the fact that it was native and not very susceptible to damage by squirrels. However, the results were very poor and it had major problems with bacterial canker. However, I believe we should learn from our mistakes and not cast cherry to one side. Cherry should he given a second chance with different planting patterns. However, much work is still required in relation to suitable provenances, suitability of sites which should improve forester confidence in this species.

CONCLUSION

To bring things to a conclusion we must, as the title of this paper states, ask ourselves what does the grower want?

I believe the emerging trend in tree species usage over a period of time based on actual

experiences on the ground answers this question.

Let us look at the broadleaf usage within Green Belt over the last two seasons in Table 2.

What conclusions can we draw from these figures?

1. There is a definite move towards the use of native broadleaves.
2. There is a definite move towards the use of pioneer species.
3. There is a lack of confidence in the provenances of our exotic broadleaves.

So is it correct to conclude that a grower needs a good quality native tree from a home collected seed source. Personally I believe the answer to this is a resounding 'Yes'.

We must therefore address this issue by:

- Concentrating our forest policy in relation to broadleaves on the establishment of natives.
- We must source more quality native seed across all species.
- We must encourage the work of our national forest seed centre.
- We must view the establishment of native pioneers as positive and as an opportunity to facilitate the establishment of climax native broadleaves like ash and oak.
- We need to establish a strong forum to discuss at regular intervals our species of choice, the reason we choose them and consequently make sound policy decisions for the future.
- And finally, we must never forget that the onus is on all of us, as practising foresters, to work towards getting it right from the start.

Table 2. Broadleaf species planted by Green Belt – season 2003/04 and 2004/05.

Species	Season 2003/04	Season 2004/05
Alder	1.2m	1.19m
Ash	500k	670k
Oak	475k	503k
Syc	300k	70k
Beech	150k	50k
Birch	90k	200k