Forestry Commission

The Use of Treeshelters

1992 Survey

Gary Kerr

Technical Paper 11

FORESTRY COMMISSION TECHNICAL PAPER 11

The Use of Treeshelters
1992 Survey

Gary Kerr

Silviculturist
Forestry Commission
Research Division

FORESTRY COMMISSION, EDINBURGH

First published 1995

ISBN 0 85538 330 5
FDC 236.3:(410)

ACKNOWLEDGEMENTS

This report would not have been possible without the help and co-operation of a large number of people. Thanks are due to the surveyors: Ian Collier, Martin Allen, Dave Rogers, Nick Smith, Ralph Nickerson, John Budd, David Hendrie and Jason Sinden. Special thanks are also due to Diane Whitehead who carried out the statistical analysis with help from Tracy Houston. Useful comments on the text were received from Simon Hodge, Paul Tabbush, Julian Evans, David Burdekin and Jenny Claridge.

KEYWORDS: Establishment, Forestry, Treeshelter(s)

Enquiries relating to this publication
should be addressed to:

The Research Publications Officer
Forestry Commission, Research Division
Alice Holt Lodge
Wrecclesham, Farnham
Surrey GU10 4LH

Front cover Survey inspection of 8-year-old oak in treeshelter (41319)

CONTENTS

Summary

Treeshelters have been the most important innovation in broadleaved tree establishment in the past 16 years, and recommendations for their use are given in Forestry Commission Handbook 7 (Potter, 1991). The correct use of treeshelters is important to ensure rapid early establishment of young trees; however during this 16-year period there has been no detailed examination of the way treeshelters are being used. In the summer of 1992, 193 sites were surveyed with the objective of comparing actual usage of treeshelters with the recommendations. The results of this survey will help woodland owners and advisers make the best use of treeshelters. These are the key points.

- Treeshelters provide good conditions for establishing trees; 89% of treeshelters surveyed contained a live tree.
- Effective weed control is essential when using treeshelters, but on 68% of sites visited there was little evidence of past, or present, use of herbicides or mulches.
- On 87% of sites where large deer (red, sika and fallow) were present and 42% of sites where hares were detected, treeshelters gave inadequate protection from browsing because of incorrect selection of treeshelter height.
- There was a positive relationship between the age of treeshelters and their angle of lean. This is probably attributable to poor choice of stake and a lack of periodic inspection and maintenance.
- In areas of high visual amenity trees were planted in straight lines on 65% of sites visited. This looked unsightly, with a consequent negative impact on the landscape.

Treeshelters are now a common method of establishing small areas of trees in lowland Britain but the results of the survey have shown that there is considerable scope for improving the way they are used.

Introduction

The story of the invention of the treeshelter (or 'mini-greenhouse' as it was first called) in 1979 by Graham Tuley at the Forestry Commission's Alice Holt Research Station is well known (Tuley, 1985). In 1979, 180 treeshelters were made by hand for use in the first experiment. Only a decade later the annual production was estimated to be in excess of 10 million (Potter, 1991).

Despite their popularity, there can be problems associated with the use of treeshelters. Examples include the use of white treeshelters planted in geometric grids in areas of high visual amenity, and the presence of leaning treeshelters in areas where subsequent maintenance is poor or absent. This survey was designed to investigate the use of treeshelters, with the objective of measuring the differences between recommended and actual use of treeshelters in lowland Britain, to help promote better use.

Before presenting the survey methods and results, it is worth while looking briefly at treeshelter components and recommended usage and assembly; the main points are summarised in Figure 1.

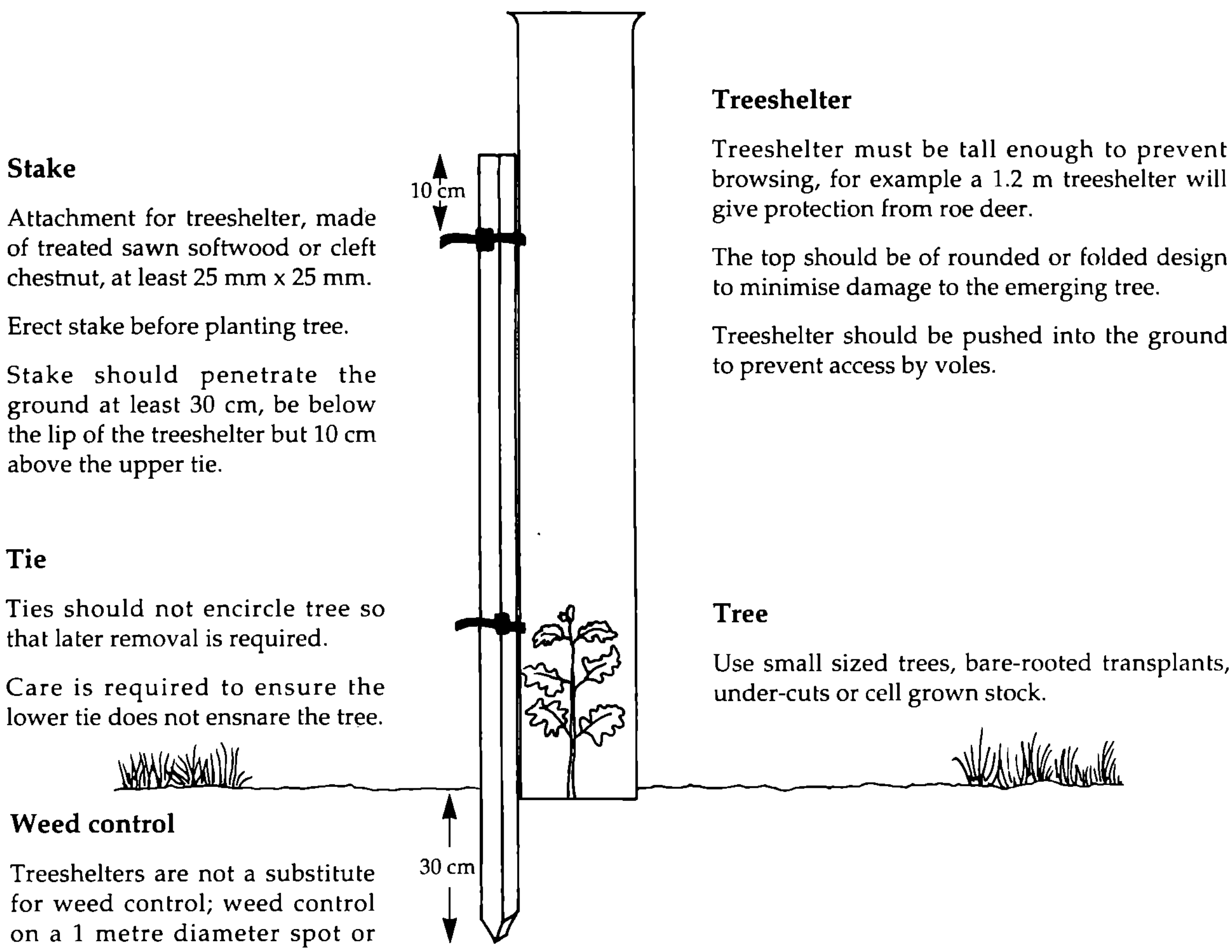


Figure 1 Recommended use of a 1.2 m treeshelter (adapted from an original by D. Hendrie)

Method of survey

The survey was carried out by eight surveyors during the summer of 1992. The surveyors were responsible for data collection and had all attended a training course to standardise methods of data collection and evaluation criteria.

Extent and distribution of survey sites

The population of sites surveyed was defined as those using treeshelters on land managed or grant aided by the Forestry Commission in four Forest Enterprise Districts: Midlands, Somerset and South Devon, Thetford and West Downs (Hampshire). In consultation with a statistician it was decided that 200 sites would adequately represent the range of site conditions experienced in lowland Britain.

Site selection

Within each Forest Enterprise District the surveyors planned to visit 50 sites, 15 managed by the Forestry Commission and 35 privately owned. This balance was appropriate to the levels of planting in England in the two sectors in the year ending 31 March 1991 (Forestry Commission, 1991, 1992). Using a combination of database technology and local knowledge a *master list* of all planting schemes using treeshelters was drawn up. For woodland estates each subcompartment was treated separately. From this master list, schemes were chosen at random until the target number was reached.

Data recorded

At each site two sets of data were recorded:

- information about the site;
- information about treeshelter design and usage.

Site information

1. Name, location and ownership of the land.
2. Area of site, planting year and species planted. Where the proportion of species planted was difficult to assess due to the number of species present or the planting pattern used the site was classified as mixed broadleaves or mixed conifers.

Treeshelter information

1. Treeshelter design, height, colour; other methods of tree protection used on the same site.
2. The use of treeshelters in the landscape. This was noted in three ways:

   (a) Treeshelter colour: at each of the sites visited the colour of the treeshelters was recorded and the surveyor made a judgement on whether this matched the surrounding vegetation.

   (b) Landscape prominence: for each site visited the level of visual amenity was assessed. If the site was in a prominent position in the landscape or near to an area of recreational use it was scored as 'high'.

   (c) Planting pattern: the presence of straight lines was noted.
3. Maintenance. Three factors were assessed:

   (a) The presence of effective weed control, i.e. evidence of herbicides or mulch (older sites were judged based on existing vegetation).

   (b) Angle of lean of treeshelters.

   (c) Treeshelter degrade.

Factors (b) and (c) are described in points 6 and 9.

Figure 2 Treeshelter survey : map showing the locations of the 193 sites

4. The tallest browsing mammal species present in the area. The protection afforded by the height of the treeshelter was recorded as either adequate or inadequate, depending on the browsing level of the largest mammal species present. Information on the presence of mammals in the area was obtained from discussions with local rangers and foresters.

5. Staking of treeshelters. The survey recorded four aspects of staking treeshelters:

   (a) The type of stake.

   (b) The size of stake in relation to the recommendations given by Potter (1991).

   (c) Whether the method of tying the treeshelter to the stake required removal.

   (d) The position of the top of the stake in relation to the lip of the treeshelter (as part of systematic sampling described below).

Additionally, a 1 in 50 systematic sampling technique was used to record the following information (at least five shelters were assessed at each site).

6. Treeshelter angle of lean: assessed using a scoring system described in the Appendix.

7. The presence of a live tree.

8. Treeshelter degrade: assessed using a scoring system described in the Appendix.

Results and Discussion

This survey provides the first detailed examination of the way treeshelters are being used in lowland Britain since their invention 16 years ago. The population sampled was representative of the conditions in which treeshelters have been used, but trunk road and small amenity plantings not attracting Forestry Commission grant aid were excluded.

Location, size and age of planting schemes

In total, 193 sites were visited in four Forest Enterprise Districts, 43 in the Midlands, 49 in Somerset and South Devon, 51 in Thetford (Norfolk) and 50 in West Downs (Hampshire) (Figure 2). Half of the sites were less than 1 hectare (ha) in area and 81% were less than 2 ha (Figure 3), reflecting the fact that treeshelters are generally a cheaper option than fencing on small areas. Plantings of this scale are generally common; in a survey of 579 sites funded by Forestry Commission grant aid, Miller *et al.* (1988) found that the average size of a planting area was 1.4 ha. The fact that treeshelters are more economic than fencing on small areas and that there are a large number of small planting schemes have no doubt been important factors explaining the increase in the use of treeshelters in Britain.

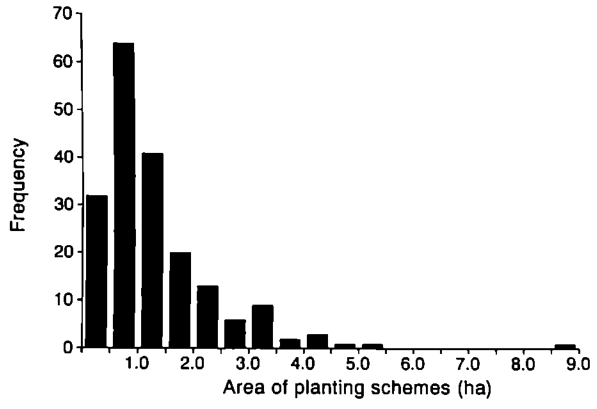


Figure 3 Frequency distribution of surveyed areas

The distribution of schemes sampled shows a significant increase in the number of planting schemes between 1985 and 1990 and then a reduction in 1991 and 1992 (Figure 4); the majority of schemes sampled were planted after 1987. This is broadly representative of the area of broadleaves planted in England during this period. In 1983/84 there were 1363 ha of broadleaves planted, rising to 3715 ha in 1989/90 (Forestry Commission, 1984, 1990). This increase was a result of the introduction of greater incentives for planting broadleaves, the most significant of which were the Broadleaved Woodland Grant Scheme in 1985 and the Farm Woodland Scheme in 1988.

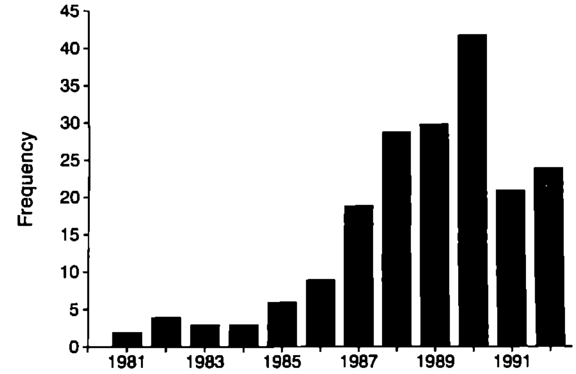


Figure 4 Frequency distribution of planting date of areas surveyed

Tree species

Treeshelters were originally designed to protect newly planted broadleaved trees (Tuley, 1985) and the survey results show that this was their predominant use. The most common species in treeshelters were oak (*Quercus* spp.), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*) and cherry (*Prunus avium*) (Table 1). It has sometimes been reported that beech does not grow well in treeshelters, but recent research (Kerr and Evans, 1993a) has shown this to be due to the presence of the beech woolly aphid (*Phyllaphis fagi*). However, this had not deterred the use of beech as a component on 17% of sites.

Table 1 Proportion of 193 sites with identifiable species components of greater than 10%

Species	Proportion of 193 sites (%)
Quercus spp.	83
Fraxinus excelsior	40
Mixed broadleaves	36
Prunus avium	25
Fagus sylvatica	17
Acer pseudoplatanus	12
Castanea sativa	8
Alnus spp.	8
Pinus sylvestris	6
Pinus nigra var.*maritima*	5
Tilia spp.	5
Betula pendula	4
Sorbus aucuparia	3
Larix spp.	2
Picea abies	2
Nothofagus procera	3
Nothofagus obliqua	3
Other broadleaves	5
Other conifers	3
Mixed conifers	1

There is no fundamental difference in the use of treeshelters with conifers, except with western red cedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*) which do not grow well in treeshelters (Potter, 1987). However, the scarcity of conifers in the survey probably reflects the scale of plantings investigated. Conifers are generally used in larger scale plantings where the use of treeshelters is not economic.

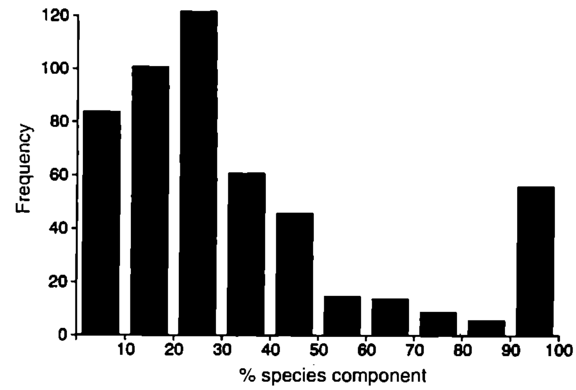


Figure 5 Frequency distribution of species components

The frequency distribution of individual species components in each scheme assessed shows that a majority were between 10% and 40% of the total number of trees planted (Figure 5). Only 11% of sites visited were planted with a single species, and of these, 80% were pure oak (data not shown). The large number of mixed broadleaved planting schemes reflects the current importance of environmental objectives in the Government's forestry policy (Anon, 1991).

Tree survival

Of the 4622 treeshelters assessed 89% contained a live tree. This is above the limit of 80%, below which beating-up is recommended (Kerr and Evans, 1993b). The level of survival is comparable with figures reported by Miller *et al.* (1988) in a survey of 579 sites funded by Forestry Commission grant aid. They found survival rates of between 82% and 95% for 6 types of plantings; however, not all sites had used treeshelters. It is often believed that the warm, sheltered, humid environment of treeshelters promotes tree survival. However, there is only limited information on this in the literature; most studies concentrate on the beneficial effects of treeshelters on the growth rate of young trees (Burger *et al.*, 1992; Frearson and Weiss, 1987; Ponder, 1991; Tuley, 1985).

Potter (1988, 1991) only cites the first treeshelter experiment in which every oak tree planted in a treeshelter survived, while 25% of those without treeshelters died in the first 2 years. In contrast, Kerr and Evans (1993a) reported that in three experiments with sheltered and unsheltered beech, they found no significant differences in survival rates after 3 years.

Treeshelter design

In this survey, polypropylene was found to be the most widely used treeshelter material, and tubular extrusions of polypropylene were more common than designs made from folded flat material. Thin plastic sheet on black plastic mesh was the third most widely used material (Table 2).

Table 2 Materials/design used in treeshelters

Design	**Sites**
Polypropylene: extrusion	112
Polypropylene: flat material	75
Plastic on black plastic mesh	55
PVC pipe	4
Others	6

Note Some sites used more than one design.

Other methods of individual tree protection

On 15% of sites visited treeshelters were used for a proportion of trees planted and other methods of individual tree protection were used for the remaining trees. Spiral guards, with and without a supporting cane, and large dimension polypropylene shelters (usually associated with planting shrubs) were the two most common alternative methods of protection (Table 3). On 53% of sites where other methods of protection were used alongside treeshelters their height would not give adequate protection against the species of deer present in the area.

Table 3 The proportions of sites using other methods of individual tree protection besides treeshelters

Design	**Sites (%)**
Spiral guard	9
Spiral guard + cane	5
Large dimension shelters (generally used with shrubs)	5
Vole guards	1
Others	2

Use of treeshelters in the landscape

Shades of brown and green were the most common treeshelter colours recorded (Figure 6), and on 84% of sites visited the colour fitted the landscape well. Of the sites visited, 34% were in areas of high visual amenity and trees were planted in straight lines on 65% of these sites. Overall planting was in straight lines on 71% of the sites (Table 4).

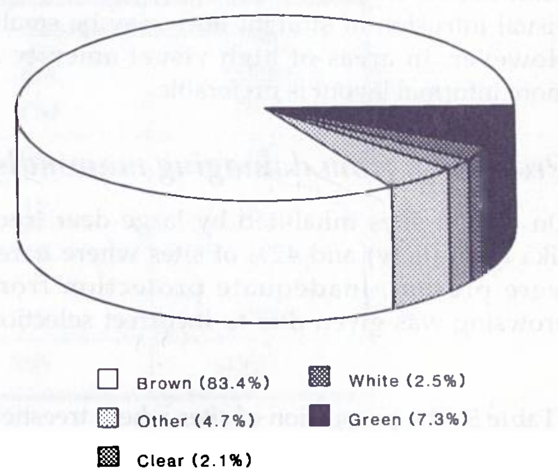


Figure 6 Treeshelter colour

The two main factors to consider when attempting to blend a planting scheme into the landscape are the colour of the treeshelters and their layout on site. Some of the early plantings were condemned because of the use of white treeshelters (the only colour available at that time) planted in a geometric grid pattern. These areas were obtrusive in the landscape and provoked much public debate. In response more sympathetic shades of brown and green were produced and the survey has shown that these now predominate.

Table 4 Proportion of sites planted in straight lines

Area of high visual amenity	Planted in straight lines		Total
	No (%)	Yes (%)	
No	17	49	66
Yes	12	22	34
Total	**29**	**71**	**100**

The case for planting trees in lines is that this makes it easier to relocate the trees for subsequent maintenance operations. Treeshelters allow trees to be located even in dense vegetation and therefore, unless mechanical access is required, planting in straight lines is not necessary. In areas where visual amenity is low, and on restocked areas where regrowth soon masks the initial planting pattern, the visual intrusion of straight lines may be small. However, in areas of high visual amenity a more informal layout is preferable.

Protection from damaging mammals

On 87% of sites inhabited by large deer (red, sika and fallow) and 42% of sites where hares were present, inadequate protection from browsing was given due to incorrect selection of treeshelter height (Table 5). Early designs of treeshelter were made to protect trees from roe deer whose maximum browse height has been measured as 1.1 m, and to provide adequate levels of protection the treeshelters were made 1.2 m in height. The principle of choosing the height of treeshelters to provide adequate protection is important. This survey has shown that in general, insufficient consideration is given to the importance of treeshelter height.

Maintenance

The maintenance of treeshelters has been the subject of debate for a number of years (Lang Brown, 1990; Kerr, 1992). Figures in Potter (1991) state that unit area inspection costs are three times higher for treeshelters than for fencing with no allowance included for maintenance as a result of inspection. It is probably fair to say that many users of treeshelters have underestimated both the need for and the cost of maintaining treeshelters. In a survey of sites receiving Forestry Commission grant aid Miller *et al*. (1988) reported that treeshelters were poorly maintained on more than half the sites visited.

In the present survey weed control was judged to be ineffective on 68% of sites visited. The use of effective weed control where treeshelters are used is very important to ensure rapid establishment of newly planted trees. The level of weed control found was clearly inadequate, and likely to result in slower establishment of young trees, thus keeping them in a vulnerable phase for longer. The reasons why weed control was considered 'ineffective' were not recorded but observations made by the

Table 5 The proportion of sites where treeshelter height was found to be effective/ineffective against browsing mammals

Tallest browsing mammal	Treeshelter height for effective protection (m)	Proportion of sites where protection is:	
		Effective (%)	Ineffective (%)
Rabbits	0.6	100	0
Hares	0.75	58	42
Roe deer	1.2	73	27
Large deer (red, sika, fallow)	1.8	13	87

surveyors ranged from 'total neglect' to 'the use of mechanical weed control', both of which have little effect on reducing weed competition for moisture and nutrients (Davies, 1987).

Data on the angle of lean and degrade of treeshelters were analysed using the Jonckheere-Terpstra test (Hollander and Wolfe, 1973) to determine changes in these factors over the 12 years for which data were available. The analysis demonstrated that as treeshelters became older the angle of lean increased significantly ($p<0.001$) (Table 6). This result underlines the need to use good quality stakes and straighten them during inspection and maintenance.

Table 6 The relationship between age of planting scheme and angle of lean of treeshelters

Treeshelter angle of lean (°)[a]	**Years since planting**	
	0-5 (%)	**6-11 (%)**
0-5	95	81
6-30	4	12
31-60	<1	2
61-90	1	3
Number of observations	545	4068

[a] See Appendix for information on assessment of treeshelter lean.

Table 7 The relationship between age of planting scheme and treeshelter degrade

Treeshelter degrade[a]	**Years since planting**	
	0-5 (%)	**6-11 (%)**
None	85	46
Minor	12	21
Intermediate	2	13
Advanced	1	20
Number of observations	545	4068

[a] See Appendix for information on assessment of treeshelter degrade.

A similar analysis of treeshelter degrade data has shown that as treeshelters become older the degree of degrade increased significantly ($p<0.001$) (Table 7). Ideally a treeshelter should be designed to break down when the tree has become stable, 5 to 10 years after planting, so that the tree is 'weaned off' the support of the shelter and stake. Recently there has been concern that treeshelters are not breaking down within the required period (Kerr, 1992), but the data show that treeshelters are actually breaking down. However, the quantity of data did not allow investigation of the rate of breakdown of different shelter designs.

Staking

A good staking material must be durable in the ground for the life of the shelter, must not be subject to warping, and should offer frictional resistance to any twisting movement of the shelter around the stake. The stake should also be reasonably easy to remove from the soil at the end of the life of the shelter.

Table 8 Treeshelter stake attributes

	Durability	No warping	Frictional resistance	Ease of removal from soil
Treated sawn softwood	✔	✔	✔	✔
Untreated sawn softwood	?	✔	✔	✔
Cleft chestnut[a]	✔	?	✔	✔
Cane	✔	✔	✖	✔
Metal	✔	✔	✖	✖
Plastic	✔	✔	✖	✔

[a] Heartwood.

Key

✔ stake material has this attribute

? stake material is variable in this respect

✖ stake material is poor in this respect

The best stakes are treated sawn softwood and cleft chestnut and these were found at 60% of sites visited. The reasons why other types of stake, which were found at 40% of sites, were considered sub-optimal are listed in Table 8.

At each site the dimensions of representative stakes were compared with the recommendations of Potter (1991) that sheltered sites with a deep soil require a 25 mm x 25 mm stake to support a 1.2 m treeshelter. On exposed sites or on thin or skeletal soils the advice is to increase this specification to 30 mm x 30 mm. The results of the survey have shown that on 54% of sites stake dimensions were below these criteria.

The method of tying a treeshelter to the stake should ideally not encircle the stem of the tree so that later removal is unnecessary. At 91% of sites visited the method of tying would not require subsequent removal.

A stake should ideally be driven into the soil far enough to give the treeshelter adequate support and its top should be 10 cm above the upper tie (on 1.2 m treeshelters) and below the lip of the shelter to prevent damage to the emerging tree. The top of the stake was below the lip of the shelter for only 77% of treeshelters surveyed.

Surveyors observed that for 0.6 m treeshelters on exposed sites two ties were superior to one. Basal damage to trees was observed when only one tie had been used as the treeshelters became dislodged from ground and movement of the shelter in the wind caused abrasion to the lower stem of the tree. During the survey, users of large treeshelters (1.5 m and 1.8 m) requested guidance on stake dimensions. This information is not available from manufacturers and does not exist in Forestry Commission publications. This aspect requires more work, but interim guidance would be to use 40 mm x 40 mm stakes in sheltered areas and 50 mm x 50 mm stakes on more exposed sites; both sizes of stake should penetrate the soil at least 40 cm, which may require holes to be preformed on some soils.

Conclusions

The results of the survey have been classified into two groups:

- Aspects of treeshelter usage that were found to be acceptable compared with recommendations, but with some room for improvement.

- Points where recommended usage is not being implemented and where considerable room for improvement exists.

Appropriate use of treeshelters

1. Treeshelters were mainly used on small areas, for which they are particularly well suited and economic. Effective and economic use of treeshelters on areas larger than 1-2 ha depends on the shape and size of the planting area and the number of trees planted, and therefore requires careful consideration.

2. On a large majority of sites the choice of treeshelter colour blended with the surrounding vegetation, reducing the negative visual impact on the landscape.

3. Some early methods of tying treeshelters to stakes involved ties that encircled the stem of the tree; many of these methods have now been superseded and the survey found them being used on only a small proportion of, mainly older, sites.

4. Generally, treeshelters are degrading but there is likely to be large variation in the rates of breakdown in different conditions and between designs. More objective information from manufacturers is needed.

5. Treeshelters were found to be associated with high levels of tree survival (89%), reducing the need for expensive beating-up.

Inappropriate use of treeshelters

1. The use of effective weed control in combination with treeshelters is very important to ensure rapid establishment of young trees. The level of weed control revealed by the survey was unacceptably low.

2. Many people involved in tree planting, foresters in particular, have a strong desire to plant trees in straight lines or in geometric grid patterns. This is often unnecessary with treeshelters and should be avoided, particularly in areas of high visual amenity.

3. Treeshelters were found to have a stake above the lip of the shelter in 23% of cases. This error can be very damaging to trees emerging from shelters, particularly on exposed sites.

4. On a large number of sites the choice of treeshelter height, and also other methods of protection, had not been made with reference to the tallest browsing mammal in the area. Trees with inadequate protection may, with very low deer densities, survive and grow to fulfil the objectives of the planting scheme, but full protection is the only sensible recommendation in view of the current expansion of deer populations.

5. As plantings get older the angle of lean of treeshelters increases: this is probably attributable both to the choice of staking material and to a lack of periodic inspection and maintenance.

Treeshelters are an effective aid to tree establishment, but this survey has shown that not all aspects of optimum usage are widely practised. Better communication of best practice by woodland advisers will help to improve this situation. This survey has highlighted areas where attention should be focused.

References

ANON. (1991). *Forestry policy for Great Britain.* Forestry Commission, Edinburgh.

BURGER, D.W., SVIHRA, P. and HARRIS, R. (1992). Treeshelter use in producing container grown trees. *HortScience* **27**, 30–32.

DAVIES, R.J. (1987). *Trees and weeds.* Forestry Commission Handbook 2. HMSO, London.

FORESTRY COMMISSION (1984). *Forestry facts and figures 1983–84.* Forestry Commission, Edinburgh.

FORESTRY COMMISSION (1990). *Forestry facts and figures 1989–90.* Forestry Commission, Edinburgh.

FORESTRY COMMISSION (1991). *Forestry facts and figures 1990–91.* Forestry Commission, Edinburgh.

FORESTRY COMMISSION (1992). *Forestry Commission: annual report and accounts 1990–91.* Forestry Commission, Edinburgh.

FREARSON, K. and WEISS, N.D. (1987). Improved growth rates with treeshelters. *Quarterly Journal of Forestry* **81**, 184–187.

HOLLANDER, M. and WOLFE, D.A. (1973). *Nonparametric statistical methods.* Wiley, New York.

KERR, G. (1992). To remove or not?: treeshelter question. *Forestry and British Timber* **21**, 18–20.

KERR, G. and EVANS, H. (1993a). Beech in treeshelters. *Quarterly Journal of Forestry* **87**, 107–115.

KERR, G. and EVANS, J. (1993b). *Growing broadleaves for timber.* Forestry Commission Handbook 9. HMSO, London.

LANG BROWN, J. (1990). Success lies in cultural techniques. *Forestry and British Timber* **19**, 13–14.

MILLER, F.R., SAVILL, P.S. and KIRK, C.F. (1988). *The broadleaved woodland policy in privately owned woodlands.* Oxford Forestry Institute, Oxford.

PONDER, F. (1991). Growth of black walnut seedlings protected by treeshelters. *Annual Report of Northern Nut Growers Association* **82**, 170–174.

POTTER, M.J. (1987). Shelter questions and answers. *Forestry and British Timber* **16**, 28–29.

POTTER, M.J. (1988). Treeshelters improve survival and increase early growth rates. *Journal of Forestry* **86**, 39–41.

POTTER, M.J. (1991). *Treeshelters.* Forestry Commission Handbook 7. HMSO, London.

TULEY, G. (1985). The growth of young oak trees in shelters. *Forestry* **58**, 181–195.

Appendix: Assessment of treeshelter lean and degrade

Treeshelter lean

This was assessed on an eight point score.

Score	Angle of lean (°)
1	0
2	1-5
3	6-15
4	16-30
5	31-45
6	46-60
7	61-75
8	76-90

Treeshelter degrade

This was assessed on a four point score.

Score	Degrade
1	No shelter degrade
2	Degrade commenced but only minor (small splits at top)
3	Intermediate breakdown [a]
4	Advanced breakdown [a]

[a] Only used if, in the judgement of surveyor, the shelter will degrade 5 to 10 years from planting.

Recommended use of a treeshelter

Stake
Attachment for treeshelter, made of treated sawn softwood or cleft chestnut, at least 25 mm x 25 mm.

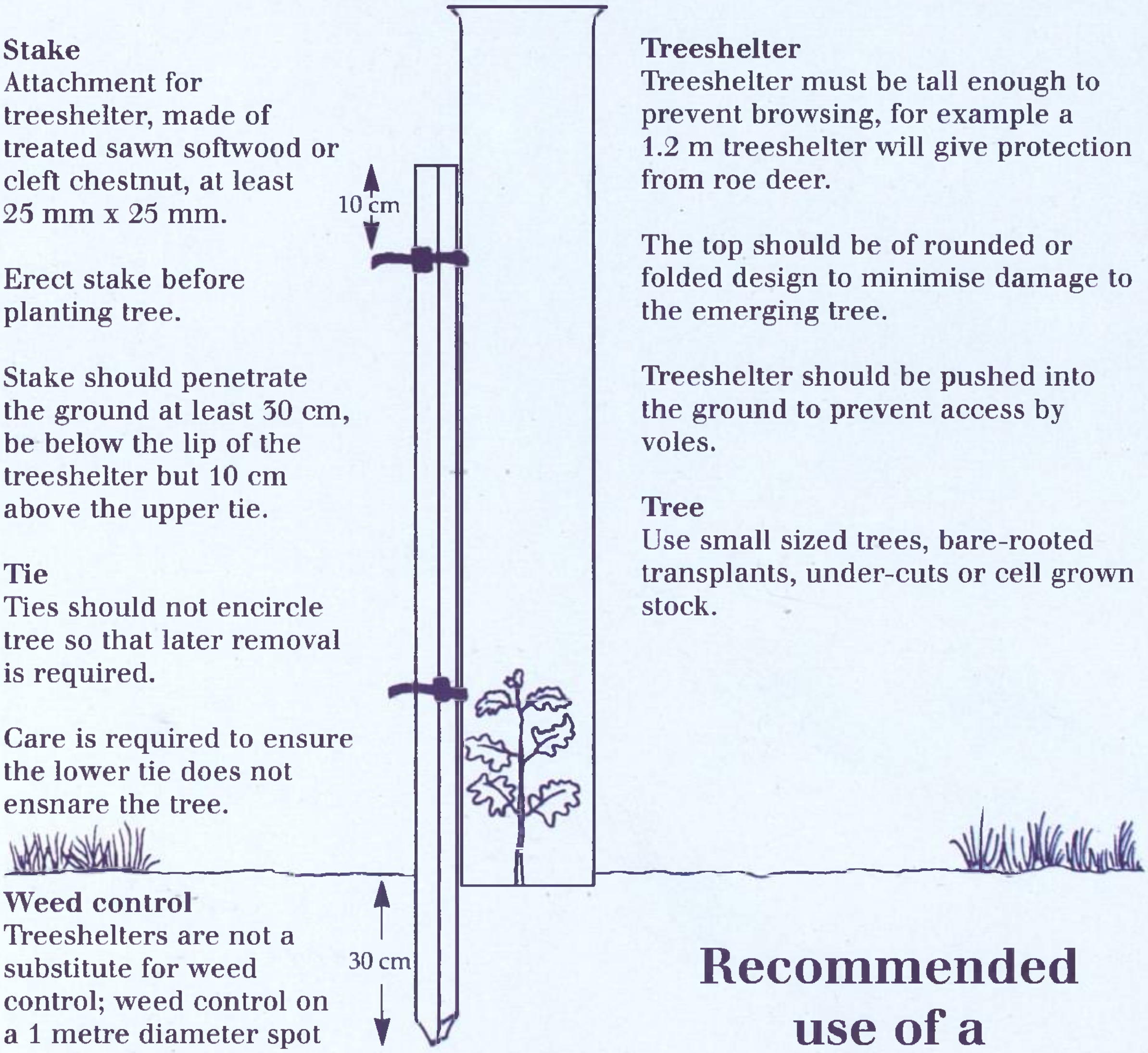
Erect stake before planting tree.

Stake should penetrate the ground at least 30 cm, be below the lip of the treeshelter but 10 cm above the upper tie.

Tie
Ties should not encircle tree so that later removal is required.

Care is required to ensure the lower tie does not ensnare the tree.

Weed control
Treeshelters are not a substitute for weed control; weed control on a 1 metre diameter spot or band around the treeshelter is essential.



Treeshelter
Treeshelter must be tall enough to prevent browsing, for example a 1.2 m treeshelter will give protection from roe deer.

The top should be of rounded or folded design to minimise damage to the emerging tree.

Treeshelter should be pushed into the ground to prevent access by voles.

Tree
Use small sized trees, bare-rooted transplants, under-cuts or cell grown stock.

£3