HEDGEROW MANAGEMENT:

A SURVEY OF LAND MANAGERS' AND CONTRACTORS' PRACTICES AND ATTITUDES

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EXECUTIVE SUMMARY

INTRODUCTION

1. After a period of widespread hedgerow removal in the UK between the 1940s and 1970s, as a result of agricultural intensification, this is now a much less serious issue. The main concern is now the poor condition of many hedgerows, as a result of agricultural impacts (e.g. damage from grazing livestock), intensive hedge management or neglect.
2. New research was undertaken to determine current hedgerow management practices and the reasons that underlie decisions by farmers and contractors.
3. The detailed objectives of this research included:
    - To investigate differences in attitudes and management according to geographical location, farm type or other factors.
    - To identify any recent changes in management practices, and assess the influence of agri-environment schemes (e.g. the Environmental Stewardship Scheme in England and Tir Gofal and Tir Cynnal in Wales), conservation advice and other factors on hedgerow management.
    - To identify any poor management practices leading to the unfavourable condition of hedgerows and the reasons for the continuation of these practices.
    - To compare results with those from a previous survey, completed in 1999/2000.
    - To provide recommendations for the improved take-up of good hedgerow management practices.

METHODS

1. This research, based on an earlier study in 1999/2000, was undertaken in three main stages: a postal survey of 3,000 farmers in England and Wales, a postal survey of 782 agricultural contractors in England and Wales, and follow-up visits to a sub-sample of 128 farms in four counties (Devon, Leicestershire, North Yorkshire and Powys).
2. The questionnaire sent to farmers included questions about their farm, farming practices, hedge types, hedgerow management, attitudes to hedgerow management guidelines, views on the benefits and disadvantages of hedgerows and opinions on incentives to encourage more 'environmentally sensitive' hedgerow management. Most questions were the same as, or very similar to, those in the earlier study – to allow direct comparisons.
3. The contractor questionnaire also closely resembled that used in the previous survey – again collecting largely quantitative data from agricultural contractors who undertook hedge trimming and other hedgerow management work.
4. The follow-up visits to 128 farms (32 in each of the four target counties), all of whom had previously responded to the postal survey, involved both a face-to-face interview with the farmer and a field survey of five representative hedgerows. The interview collected more in-depth information on hedgerow management, with a greater emphasis on qualitative data (farmer comments). The field survey differed significantly from the 1999/2000 research, with the methodology for the hedgerow assessments being closely based on the standardised methodology for condition assessment, as set out in Defra's Hedgerow Survey Handbook.

RESULTS

Postal Survey of Farmers

1. Responses were received from 510 farmers (17%).
2. The mean farm size was 134 ha (median 72 ha), with farms in agri-environment schemes (mean 170 ha, median 97 ha) being larger than those outside agri-environment schemes (mean 65 ha, median 43 ha).
3. Permanent or long-term grass was present on 89% of all farms. Combinable winter crops were grown on 41% of farms. The highest percentages of farms with combinable crops, both winter- and spring-sown, were in North Yorkshire.
4. 87% of all farms had livestock, with the highest proportions in Powys, where 94% of farms had sheep, 70% beef cattle and 6% dairy cows.
5. Farms in North Yorkshire had the largest mean field size (5.4 ha) and Powys farms the smallest (3.7 ha).
6. 67% of farms were all or partly in an agri-environment scheme.
7. Half of all farmers estimated that the average height of their hedges was in the range 1.5 to 2.4 m, and this was the most common height range in all counties. Another 19% estimated their hedges to be 2.5-3.9 m tall.
8. 42% of farmers estimated that the average width of their hedges was 1.5-2.4 m and 35% estimated that their hedges were 1.0-1.4 wide.
9. Farms in agri-environment schemes had slightly shorter hedges (mean 2.6 m) than those not in a scheme (mean 3.0 m). This was largely due to a higher proportion of hedges on non-AE farms estimated to be in the 4-10 m height band. There was no significant difference in hedge widths between the two groups.
10. Mixed species and hawthorn (*Crataegus monogyna*) hedges were the most common hedge types.
11. Overall, farmers estimated that 55% of their hedges had less than 5% gaps and only 13% had more than 10% gaps.
12. Hedge bottoms on most farms (64%) were dominated by *"coarse grasses and grassland weeds such as nettles or thistles"*.

Hedgerow management

13. Hedges were mostly trimmed annually (45%) or two-yearly (29%). Smaller percentages were trimmed every three (11%) or four (3%) years. About 10% were untrimmed.
14. Hedges in Powys were trimmed more frequently than those in other areas.
15. Intervals between cuts were longer on arable farms (2.2 years) than on livestock farms (1.7 years). Cutting intervals on mixed farms were intermediate (2.0 years).
16. Farms in agri-environment schemes trimmed hedges less frequently than those that were not. On average, excluding untrimmed hedges, farms with agri-environment scheme agreements trimmed hedges every 2.1 years while those with no agreement trimmed every 1.5 years.
17. 26% of farmers had altered the timing of their hedge trimming as a consequence of an agri-environment scheme. The proportion was highest in Powys (36%). Hedges adjacent to grass fields appear to have been more affected than other types, with 77% of those farmers who had changed the timing of hedge trimming now cutting these

hedges later (57% were trimming their arable hedges later and 47% were trimming their trackside hedge later).

18. 44% of farmers had changed the frequency of hedge trimming because of an agri-environment scheme agreement, mostly to two-yearly (74%) or three-yearly (23%) cuts.
19. Most farmers (57%) trimmed hedges around arable fields in the September/October period. Hedges beside grassland or farm tracks were more likely to be trimmed later, throughout the September to February period.
20. In comparison with other regions, a larger proportion of farmers in Devon trimmed hedges around their arable fields in September/October.
21. Hedges around grass fields tended to be trimmed earlier in Powys and Devon, but those in North Yorkshire were trimmed relatively late. Similar patterns were observed for the trimming of hedges beside farm tracks and public roads.
22. The predominant soil type on a farm had no significant effect on time of trimming hedges beside arable fields, grass fields or farm tracks.
23. Farm type affected time of hedge trimming around arable or grass fields. Hedges beside arable fields on mainly livestock farms were generally trimmed later than those on mainly arable farms, but hedges around grass fields on arable farms appeared to be trimmed later than those on livestock farms.
24. 66% of hedges were rectangular/box-shaped (75% in Powys) and 34% A-shaped (48% in Leicestershire).
25. A flail was the most commonly used equipment for hedge cutting (92%), with small numbers using a finger-bar trimmer (2%), saw (2%) or other equipment (3%).
26. The farmer or farm manager decided the timing of hedge trimming on 78% of farms and contractors decided on 22% of farms.
27. Contractors trimmed hedges on 69% of farms, with most of the others being trimmed either by the farmer/manager (23%) or farm staff (8%).
28. Where contractors were used for hedge trimming, 54% usually did the work within one week of the farmer's preferred date.
29. 66% of farmers had field margins that were 2 m or more in width. The average width was 2.4 m.
30. 27% of farmers sometimes or always sprayed weeds in hedge-bottoms. 42% always fenced hedgerows to exclude livestock and 40% sometimes fenced their hedgerows. 82% of all farmers said that they always prevented sprays and fertilisers from contacting hedgerows.
31. 45% of farmers were receiving financial assistance with hedge management, ranging from 25% in Powys to 54% in North Yorkshire. Most English farms that had an agri-environment scheme agreement were receiving payments for hedgerow management, mainly through the Entry Level Stewardship (ELS) or Countryside Stewardship schemes. For example, 60% of those with an ELS agreement were receiving payments for hedgerow management options. In Powys, a large majority (86%) of farmers with Tir Gofal agreements were receiving hedgerow management payments.
32. In the previous five years, 73% of farmers had fenced hedgerows to exclude livestock, 54% had planted to fill gaps, and 50% had undertaken some hedge laying. Although this work, and other hedgerow management operations, had been done mainly without any financial assistance, the availability of grants would greatly increase the prospect of similar work being repeated.

33. There were significant differences between regions in farmers' perceptions about the ideal frequency and timing of hedge trimming to benefit wildlife. Although a clear majority of farmers regarded cutting every two years or less and trimming in autumn or winter as best for wildlife, those in Powys were more likely to consider annual trimming and cutting earlier (late summer or early autumn) as beneficial.

34. Approximately two-thirds (68%) of all farmers had not used any hedgerow management advice.

35. The most important factors determining how hedges are managed were (in order) *'providing stock-proof boundaries', 'providing shelter for livestock', 'keeping the farm tidy'*, *'maintaining or improving wildlife habitat'* and *'maintaining or improving the appearance of the local landscape'*. Least important were *'controlling pests', 'advice of conservation advisers and environmental groups'*, and *'advice from agricultural consultant"*.

36. Each of six potential problems that might be encountered if hedges are trimmed at two-yearly or longer intervals - difficulty in dealing with trimmings, inability of machinery to cope, increased 'wear and tear' to machinery, longer time required to trim hedges, deterioration of hedge structure (e.g. thinning at bottom) and fast growing species (e.g. ash) - were rated as a major problem by between 29% and 42% of farmers and as a major or moderate problem by more than 60%.

37. 62% of farmers stated that access limited by soil conditions was a major problem if hedges were trimmed in late winter, and only 9% regarded this as no problem. 27% considered access limited by growing crops as a major problem, but for 39% this was not a problem. Only 9% said that labour availability was a major problem in late winter trimming.

38. Difficulty in dealing with trimmings, if hedges are not trimmed annually, was seen as a major problem by 29% of all farmers. However, the percentage was significantly higher for those without an agri-environment scheme agreement (41%) than for farmers with an agreement (24%). Similarly, a higher proportion of farmers outside agri-environment schemes saw an inability of machinery to cope, deterioration of hedge structure and fast growing species as 'major problems' if hedges are cut less frequently.

39. 70% strongly agreed that *"Good hedgerows are a valuable asset on a farm"* and none disagreed. Only 10% agreed or strongly agreed with the statement that *"Hedgerows are an obstacle to efficient farming"*, but 73% disagreed or strongly disagreed. 39% strongly agreed that *"Farmers know best how to manage their hedges"*.

Postal Survey of Contractors

1. Responses were received from 223 contractors (29%), although only 84 (11%) of contractors undertook relevant hedgerow management work.

2. All contractors charged by the hour for hedge trimming, at an average price of £22.53/hour.

3. Hedges around arable fields were most commonly trimmed in September/October, hedges around grassland mainly in November/December and hedges beside public roads or farm tracks mainly between September and December.

4. Most contractors (58%) indicated that their clients did not specify a preferred trimming date.

5. Contractors estimated that 42% of hedges were cut to a height of between 1.5 and 2.4 m.

6. All hedges were trimmed to either a rectangular or 'box' shape (56%) or an 'A-shape' (44%).
7. The vast majority (94%) trimmed hedges with a flail.
8. Most contractors (61%) said that the important hedgerow management decisions were mostly or always made by their clients, although 29% said that these decisions were usually made jointly. In the postal survey of farmers, 22% indicated that their contractor usually decided on the timing of hedge trimming.
9. An estimated 53% of hedges were cut annually, 39% every two years, 7% every three years, and 1% every 4-6 years. 1% was left untrimmed.
10. Most contractors reported changes to their hedge management for clients, with many hedges now being trimmed less frequently and later than previously.
11. More than 20% of contractors thought that it was legal to remove a whole hedgerow without permission.
12. There were mixed views on the ideal frequency and timing of hedge trimming to benefit wildlife. 33% considered annual trimming of hedges to be best, but the same proportion thought that the ideal was three-yearly trimming. 39% thought that January/February hedge trimming was best for wildlife.
13. Although advisory publications were widely used, few had received any formal training in hedgerow management. Most contractors did not feel that they needed better information to improve their hedgerow management.
14. The most important factors influencing hedgerow management were *'maintaining a stock-proof field boundary'*, *'maintaining/improving habitats for wildlife'*, *'keeping the farm tidy'* and *'shelter'*.
15. Dealing with trimmings, the inability of machinery to cope, increased wear and tear on machinery, slower work rates, deterioration of hedge structure, and fast-growing species in hedges were all seen as significant problems when hedges are trimmed at 2-yearly or longer intervals.
16. The main problems preventing late winter hedge trimming were identified as '*limited access due to soil conditions*' and growing crops.
17. 75% agreed or strongly agreed that *"Farmers know best how to manage their hedges"*. However, 78% disagreed or strongly disagreed with the statement that "*Hedgerows are an obstacle to efficient farming*".

Follow-up Survey

Farmer interviews

1. More than half of the farms had made a major change to livestock numbers in the previous 10 years. Changes to sheep numbers had been generally downward, and some farmers commented that reducing sheep numbers had a positive effect on hedgerows. Several farmers had double-fenced hedgerows to exclude livestock, often with support from an agri-environment scheme, and had noted a consequent benefit to those hedgerows. Another management practice that had apparently benefitted hedgerows was the establishment of grass margins around arable fields.
2. A majority (64%) of farmers had made at least one major change to their hedgerow management in the previous 10 years. Changes were generally positive, with 38% allowing their hedges to grow taller, 36% trimming their hedges less frequently, 26% trimming hedges later, 26% planting hedgerow trees, 25% planting new hedgerows and 17% introducing hedge laying or coppicing. There was a clear trend away from late

summer trimming toward autumn/winter cuts. In Powys this was partly explained by new cross-compliance rules (Single Farm Payment Scheme) which prohibit hedge trimming before 1st September in Wales – although agri-environment schemes were also an important factor. In Devon, North Yorkshire and Leicestershire, the ELS scheme was frequently the main reason for a change to later or less frequent hedge trimming.

3. Most farmers who had changed their hedgerow management thought that this had brought benefits for the hedgerows and wildlife.

4. The most important factors determining how farmers managed their hedgerows were *'the need for stock-proof barriers'* and *'landscape benefits'*; followed by *'labour availability'*, *'grants', 'timing to fit in with other work'* and *'tradition on this farm'*. The least important were influences of *'farm foreman/workers'* or *'other farmers', and 'soil erosion'*.

5. The role of hedgerow contractors was considered to be very important in determining how hedgerows were managed on 27% of farms. Others take the contractor's views into account, but many made it clear that hedgerow management decisions were theirs, and that their contractor *"does as he is told"*.

6. Many farmers reported problems with thorns after hedge trimming, particularly in the feet of livestock, but also as a cause of punctures for cars and bicycles. This was often perceived to be more of a problem if hedges are trimmed later, when the thorns are 'harder', or if hedges are not trimmed annually.

7. Many of those farmers who were not currently following 'good practice guidelines' had objections to winter trimming and/or to cutting less frequently than annually.

8. Trimming hedges in January or February was considered by many to be a problem, because of wet soil conditions – which could result in wheel ruts, damage to grassland or arable crops, and would frequently be practically difficult or unsafe. These problems were greatest on farms in areas of high rainfall (e.g. Powys and Devon), farms with steeply sloping fields and on heavy soils. Another problem was the increased risks from 'harder' thorns (previously mentioned). Some farmers also said that labour availability (farm staff or contractor) could be a problem in January and February.

9. A large majority (87%) of those farmers not already trimming hedges in mid-late winter said that trimming in this period would present 'serious difficulties'. This view was particularly prevalent in Powys (97%) and Devon (93%).

10. Objections to trimming hedges every two or three years were often 'aesthetic' (e.g. it leaves a "*messy" or "untidy" hedge*) or based on the view that infrequent trimming was damaging to hedgerows (e.g. it *"shatters the hedge"*). Other potential problems mentioned were increased wear and tear on equipment, slower work rates, objections from contractors, encroachment of hedges into arable field margins and more 'open' hedges that provide less protection from predators for nesting birds.

11. Some farmers did not believe that current 'good practice guidelines' represented sound advice for hedgerow management. These included some who were implementing agri-environment scheme options despite their personal objections.

12. A clear majority (63%) of farmers thought that annual trimming was good for hedges, but 20% thought that it was bad for hedges.

13. Only 27% of farmers, however, thought that annual hedge trimming was good for wildlife, but 44% thought that it was bad for wildlife.

14. Farm tidiness was regarded as a 'very important' factor influencing the frequency of hedge trimming on 36% of farms and as a 'quite important' factor on another 41%. This was most important to Powys farmers, where 50% regarded tidiness as a very important factor.

15. Over 60% of farmers with roadside hedges managed these differently to their other hedges, usually trimming them more frequently and/or earlier, or cutting them shorter.

16. 27% had received some sort of complaint about their hedgerow management from other farmers, members of the public or an official body – most commonly from members of the public (20%), particularly about puncture risks after hedge trimming, or damage to vehicle paintwork.

17. When asked how more farmers could be encouraged to follow 'good practice guidelines' the most frequent answers related to continuing or increasing the availability of grant aid for hedgerow management e.g. through agri-environment scheme options or specific grant aid for work such as hedge-laying or fencing. Others felt that many farmers would not be persuaded, because of strongly held objections to current 'good practice' recommendations.

18. Hedgerow protection legislation (e.g. Hedgerow Regs., 1997), cross-compliance (e.g. through the Single Farm Payment Scheme), "enhanced" management through agri-environment scheme options, management grants and free advice were all strongly supported by a majority of the farmers interviewed – with the strongest support for grants. Farmers in Powys showed the strongest support for grants, but were least likely to support protection through cross-compliance rules (as those most affected by these rules at present). Farmers in Devon were the least likely to favour management grants or free advice, but gave the strongest support for legislation. Farmers in North Yorkshire were the most likely to favour free advice.

19. Many farmers considered that they did not need any help to improve their hedgerow management. Others suggested that they needed more available time and money, with several asking for grants for hedge planting or management.

20. Two thirds had previously received grants for hedgerow management. About 50% had planted new hedges in the last 10 years.

21. 80% considered their hedgerows to be very important to farm wildlife.

22. The mean annual cost of hedge trimming was estimated at £772 per farm (median £500). The mean hourly cost was £20.43 (median £20.00). The median cost of hedge trimming, per hectare of farmland, was calculated at £8.33.

23. Farmers had mixed views about the probable cost implications of trimming hedgerows less frequently than annually. Probably the largest group thought that there would be no overall impact, but there were significant numbers holding the views that costs would either increase or decrease.

24. Most thought that winter trimming would have no effect on costs, but several argued that costs would increase. Many argued that winter trimming was impossible on their farm anyway.

25. Only 22% of farmers owned equipment for hedge trimming.

26. A large majority (84%) considered the flail to have practical advantages over other machinery options. Where farmers had views on other machinery options, the need to clear up trimmings after rotary saws and finger-bar trimmers was widely regarded as a practical and cost disadvantage. Several did, however, comment on the value of a rotary saw in cutting overgrown hedges and on the good 'quality' of the work done by a finger-bar trimmer.

Field survey of hedgerows

27. The 640 hedgerows surveyed had a mean length of 204 m. 87% were 'shrubby hedgerows'. 62% were 'trimmed and dense', 16% untrimmed, 10% 'intensively managed' and 9% 'tall and leggy' along all or much of their length.
28. The mean number of connections to other hedgerows was 3.2.
29. Only 2.3% of hedgerows, or 9% where assessment was relevant (e.g. those adjacent to arable fields), failed either or both of the BAP favourable condition criteria for adjacent undisturbed ground (minimum of 2.0 m) and perennial vegetation (minimum of 1.0 m).
30. A larger proportion of hedgerows (24.3%) failed the BAP favourable condition criterion for nutrient enrichment indicator species, having 20% or more cover of nettles, cleavers and docks in a 2 m wide band alongside the hedgerow.
31. Only 0.3% of hedgerows failed the BAP favourable condition criterion for recently introduced species (>10% cover in the hedge or ground flora).
32. The mean hedge height was 2.6 m. Hedges in Powys tended to be shorter (mean 2.2 m) than those in Devon or Leicestershire (mean 2.9 m).
33. Only 1.1% of hedges failed the BAP favourable condition criterion for height (minimum 1.0 m). Another 1.1% had widths below the minimum 1.0 m. However, 21% failed the BAP favourable condition requirement for hedges to have a minimum cross-sectional area (height x width) of 3.0 m^2.
34. 13.5% of hedgerows had gaps that totaled more than 10% of the total hedgerow length. 19% had at least one gap of greater than 5 m width. All of these hedgerows would have failed the BAP favourable condition criteria for integrity/continuity
35. All hedges where the average height of the base of the canopy was 0.5 m or above would also fail the BAP favourable condition criteria for integrity/continuity. However, the percentage of hedgerows failing on this latter criterion is unknown, because the standard assessment method used does not provide an accurate figure. All that is known for certain is that between 15 and 47% of hedgerows would have failed.
36. Most of the isolated hedgerow trees, in shrubby hedgerows, were either ash (44%) or oak (24%). Ash trees were particularly dominant in Leicestershire, where almost 70% of all recorded hedgerow trees were of this species.
37. Devon had the highest density of trees in shrubby hedgerows (16.1 trees/km) and North Yorkshire the lowest density (3.2 trees/km), although Yorkshire had a higher proportion of hedgerows that were classified as 'lines of trees'.
38. The most frequently recorded tree size classes (measured as diameter at 1.3 m height) were 11-20 and 21-30 cm, but most classes up to 100 cm diameter were well represented.
39. Excluding recently introduced species and climbers, the mean number of woody species per 30 m of hedge was 4.85 (median 5 species). 69% of hedges had between 3 and 6 species (inclusive) per 30 m.
40. Hedges in Devon were more species rich, with an average of 5.8 native woody species per 30 m hedge length, followed by North Yorkshire (5.3 species), Powys (4.3 species) and Leicestershire (4.1 species).
41. The most frequently recorded woody species were hawthorn, recorded in 89% of all hedgerows (30 m sections only), blackthorn (66%), roses (66%), hazel (50%), elder (36%), ash (32%), holly (20%), pedunculate oak (20%) and field maple (18%). Hawthorn was the most frequently recorded species in Leicestershire and North Yorkshire. In Devon and Powys, three species were each recorded in 70-85% of all

surveyed hedgerows: hawthorn, blackthorn and hazel. Bramble was recorded in 68% of hedgerows, and was particularly frequent in Devon and Leicestershire hedgerows.

42. The most frequently allocated hedgerow management score was 5 ("healthy, dense hedgerow with frequent stems and more than 2m in height"), with 33% of all hedges in this category. Another 28% of hedges were given a management score of 3 ("over-trimmed, frequent stems – stems still healthy, but require more height – hard knuckle may be starting to forms at trim line"). 11% of hedges had a management score of 6 ("hedgerow more than 3m high and trimmed on rotation" or "non-intervention hedge, intentionally left untrimmed for several years"). All other management scores (1-10 scale) were infrequently recorded.

43. The mean hedge management score across all four counties was 4.64, with the lowest mean score in Powys (3.76) and the highest in Leicestershire (5.12).

COMPARISONS WITH 1999/2000 SURVEY

Postal Survey of Farmers

1. Hedgerow management had clearly changed since the previous survey in 1999/2000 (Britt *et al.*, 2000), most obviously in the frequency of hedge trimming - 44% of farmers having changed this during the past 10 years, as a result of an agri-environment scheme agreement. 74% of these had changed to two-yearly trimming and 23% to three-yearly cuts.
2. In 1999, 79% of farms trimmed most of their hedges annually, but in 2009/10 this figure had fallen to 45%. However, the first survey included only English farms, but the more recent data includes farms in Powys, who are more likely to trim annually. The figure for England only (in 2009/10) was just 34% and for Wales only 76%.
3. The time of trimming hedges had also changed since 1999, particularly for hedges around arable fields. In 1999, approximately one third of all farms trimmed arable hedges in July/August, probably mostly in late August, immediately after harvest. In 2009/10 this had fallen to 12%. Although September/October remained the main period for trimming arable hedges, there was an increase in January/February trimming, from around 8% in 1999 to 19% in 2009/10.
4. Around grass fields, where there was already a fairly even distribution of trimming times across the September/October and November/December periods in 1999, there was also a reduction in July/August trimming and an increase in January/February trimming by 2009/10.
5. The number of farmers using contractors for hedge trimming increased slightly, from 63% to 69%.
6. Although flails were still used on the large majority of farms, the percentage using this equipment fell slightly from 97% to 92%.
7. The most important hedgerow management decisions were made by farmers in both surveys, although the percentage fell slightly from 83% to 78%.
8. In 1999, 78% of farmers had estimated that their typical field margins in arable fields were only 0.5 to 1.5 m wide; but by 2009/10 the estimated average width was 2.4 m.
9. In 1999, just over 50% of farmers always prevented sprays and fertilisers from drifting into hedgerows; but by 2009/10 this figure had increased to 82%. The proportion that sometimes or always sprayed weeds in hedge bottoms fell from 40% to 27%.
10. The proportions of farmers that had undertaken any hedge planting, gapping up, hedge laying or coppicing within the previous five years were higher (for each type of work) in

2009/10 than in 1999. For example, in 1999 42% reported having undertaken some hedge laying and 30% had planted some hew hedges; but in the 1999/2000 survey these figures had risen to 50% and 43% respectively. The likelihood of farmers repeating this type of work was similar in both surveys – around 25% being 'very likely' to do so under current conditions and 50% very likely to repeat similar work if more grant aid was to be made available.

11. 'Providing stock-proof boundaries' was the most important factor influencing hedgerow management in both surveys.

Postal Survey of Contractors

1. Direct comparisons between the two contractor surveys should be treated with caution, because of relatively small sample sizes and the inclusion of Welsh contractors in the more recent study. Observed differences are, however, generally compatible with results from the farmer surveys.
2. In 1999, 94% of contractors were trimming most hedges annually; but in 2009/10 53% of hedges were trimmed annually and 47% less frequently.
3. The proportion of contractors that regarded annual trimming as best for wildlife fell from 53% in 1999 to 33% in 2009/10; but the proportion that regarded January/February as the best time to trim hedges, to maximize their value to wildlife, also fell, from 53% to 39%.
4. The main factors determining the way that contractors manage their clients' hedges were much the same in both surveys, but perhaps with slightly less importance given to farm tidiness and maintaining/improving the local landscape in 2009/10.

Follow-up Visits and Field Surveys

1. Again comparisons between the two farm surveys should be treated with caution, because of differences in the sampling methodology and the inclusion of Welsh farms in the 2009/10 research.
2. The proportion of farmers that had made changes to hedgerow management in the previous 10 years increased from 57% to 64%. In both surveys, reported changes were mainly positive i.e. bringing management closer to 'good practice guidelines.
3. Although fewer farmers were trimming hedges annually in 2009/10, there was an increase in the proportion that consider annual trimming to be good for hedges, from 46% to 63%. The proportion that regards annual trimming as bad for wildlife decreased, from 68% to 44%.
4. The average cost of hedge trimming increased from £706 to £772 per farm and from £12.40 to £20.43 per hour.
5. In both surveys, the most species-rich hedges were in Devon, with an average of 5.8 native woody species per 30 m in 2010 and 6.5 species in 1999.
6. Mean hedge heights and widths were larger in 2010 than in 1999. The percentage of gaps in hedges was lower in the 2010 survey.

DISCUSSION

1. The results of this research provide some encouragement for those in government and environmental organisations that promote 'good practice guidelines' for hedgerow management.

2. Agri-environment schemes have increased the proportion of hedges left untrimmed for at least two years. There has also been a move away from July/August trimming, and an increase in winter trimming – in line with current advice on 'good practice'.
3. Many farmers, however, remain unconvinced that 'good practice' guidelines are practical in their situation and many argue that annual trimming and late summer/ early autumn cuts are better for the hedge and/or for wildlife.
4. Some farmers who have changed their hedgerow management practices as a result of an agri-environment scheme are unhappy with what they are now being required to do – suggesting that without continued funding these might be likely to revert to annual trimming in late summer or early autumn.
5. Farmers in Powys cut their hedges more frequently than farmers in Devon, Leicestershire or North Yorkshire. Farmers in Powys and Devon, where wetter and frequently steeper fields make winter trimming more difficult (and sometimes dangerous), tended to trim their hedges earlier.
6. The risks of thorns getting into the feet of livestock or causing punctures, both perceived to be greater if hedges are cut when the wood has hardened, were also important causes of objections to winter trimming and less frequent cutting.
7. Differences in Single Farm Payment Scheme cross-compliance rules are responsible for some differences in hedge management between England and Wales. In England, hedge trimming is generally not permitted before 1st August, but in Wales the earliest date for trimming is now 1st September – forcing many Powys farmers to delay the start of trimming by 2-3 weeks.
8. The mix of hedgerow management has improved since 1999/2000, when almost 80% of farmers trimmed hedges annually and few hedges were cut in winter. Although 45% still trim most hedges annually and the favoured months for hedge cutting are September and October, significant proportions are now trimmed every two or three years, or left uncut, and November-December and January-February trimming is widespread.
9. As in 1999, the main hedgerow management decisions are made by farmers, but there are concerns that certain aspects of 'good practice' (e.g. winter trimming or cutting less frequently than annually) might not be feasible due to the unavailability of contractors or even contractors' refusal to adopt new practices.
10. The small proportion of contractors who have received any sort of training in hedgerow management is a concern. Most contractors did not feel that they needed better information to improve their hedgerow management. Also of concern is the finding that more than 20% of contractors thought that it was legal to remove a whole hedgerow without permission.
11. The main reasons for hedgerows being in 'unfavourable' condition appear to be a high percentage cover of nutrient enrichment indicator species in the hedge bottom, insufficient cross-sectional area (i.e. overall hedge volume is too small), too many gaps, or a lack of foliage in the lower part of the hedge (i.e. base of the canopy is too high).

CONCLUSIONS AND RECOMMENDATIONS

1. This research provides evidence that the desirable objective of diversity in hedgerow management is already being achieved in some counties e.g. Leicestershire and North Yorkshire.
2. Many farmers in wetter counties, and on hill farms, will probably not be able to implement all parts of the 'good practice' guidelines, for valid practical reasons.

3. Caution is needed to ensure that advances made in hedgerow management in the last 10 years are not lost as a result of changing priorities for agri-environment schemes or government spending cuts.
4. Continued financial support for hedge trimming on longer rotations, preferably three or more years, is important – particularly as many farmers remain convinced that annual trimming is best for the hedge and/or for wildlife.
5. New research, or improved dissemination of existing research results, is needed to convince more farmers and landowners of the rationale for current good practice guidelines. This should include information on the impacts of annual trimming on berry production (and winter food for birds), the relative costs of different trimming frequencies, practical management strategies for arable field margins (that benefit hedgerows), breeding success rates for songbirds in hedgerows managed under different trimming regimes.
6. The issue of training for hedgerow management contractors should be addressed.
7. Having achieved success in improving hedgerow management, the aim must now be to explore how management diversity can be further improved.
8. Rotational laying or coppicing should be more strongly promoted and financially supported. Lower cost methods of laying should be further researched, but coppicing could also provide a more economically feasible alternative.
9. Emphasis should be given to measures that address the main causes of unfavourable hedgerow condition. For example, farmers should be encouraged to…
    - increase the height and width of their hedges (so that most achieve the desired minimum 3.0 m^2 cross-sectional area)
    - buffer hedgerows against fertiliser drift, to gradually reduce nutrient levels in hedge-bottoms
    - plant up any gaps in hedgerows
    - double-fence hedgerows to protect them from grazing livestock, particularly sheep, allowing re-growth of foliage from the lower parts of hedgerow shrubs.

1. INTRODUCTION

Hedgerows are a characteristic feature of many agricultural landscapes in the UK, particularly those of lowland and semi-upland areas. Their function was originally agricultural, delineating field boundaries or dividing other parcels of land; or providing stock-proof barriers, preventing the free movement of livestock, and giving valuable shelter and shade to stock. Although hedgerows are also common in several other parts of the world (e.g. Brittany and Normandy in northern France), they are widely regarded as a key feature of the 'typical' British landscape, of rolling green hills and wooded valleys.

Some of the original agricultural value of hedgerows may have been lost long ago, but they still provide shade and shelter for grazing livestock, particularly in more exposed areas and where stock are overwintered outdoors. Although their importance to farmers may have diminished, their value as landscape features and wildlife habitats remains strong (Barr *et al. 2005*).

A period of agricultural intensification from the late 1940s through to the 1970s, prompted by the food shortages of World War 2, brought widespread removal of hedgerows, as farmers increased field sizes to accommodate new, larger-scale farm equipment. Hedgerow removal, drainage of wet grassland and other 'agricultural improvement' measures were actively encouraged by government. It was not until the late 1970s and 1980s that there was general recognition by politicians and the general public of the environmental damage that had been done during this drive for increased agricultural productivity. Although policies gradually changed during the next two decades, much damage had been done, including the loss of large lengths of hedgerows. No matter how much new hedgerow planting is undertaken now, the ancient hedgerows grubbed out during the 40's, 50's and 60's can never be properly replaced.

Changes in agricultural policy, both in the UK and Europe, and in public attitudes, resulted in reduced rates of hedgerow removal. In the 1980s and 1990s, hedgerow loss declined to such a level that it was no longer the main hedgerow conservation issue, and researchers instead began to focus on the problem of declining hedgerow quality (Barr *et al.*, 1991 & 1993; Haines-Young *et al*., 2000). The Hedgerows Regulations 1997 (Anon., 1997), prevented any hedgerow from being removed without consent and finally gave legal protection to 'important' hedgerows across England and Wales.

The poor quality of many hedgerows is, however, still evident. The causes are various, including the substitution of traditional management, which included hand cutting and rotational laying of hedges (Bannister & Watt, 1994), with annual flailing. Hedgerows have also been adversely affected by agricultural intensification in livestock areas, where greatly increased stocking densities for sheep and cattle have resulted in overgrazing of hedge bottoms and direct damage to hedge plants. In intensive arable areas, such as those of East Anglia, those hedges that still remain are often flailed hard each year, until all that remains are insignificant, thin and gappy lines of scrub – which provide little landscape or biodiversity value. A significant proportion of hedgerows have also suffered from neglect. Removal of any regular management has resulted in many of these losing the characteristics of hedgerows, and consequently developing into 'relict hedges', 'remnant hedges' or lines of trees (Barr *et al.*, 1991 & 1993).

The 2007 Countryside Survey found that the total length of woody linear features in Great Britain (including relict hedges and lines of trees, as well as 'managed hedgerows') decreased by 1.7% between 1998 and 2007 (Carey et al., 2008a & 2008b). This followed an increase in total length between 1990 and 1998 and a decrease between 1984 and 1990. There was, however, a greater decrease (6.2%) in the length of managed hedgerows, with a corresponding increase in lines of trees and relict hedges, providing further evidence of the effects of lack of management.

The total length of 'managed hedges' in Great Britain was estimated in 2007 to be 477,000 km (Carey *et al.*, 2008a). Data from earlier Countryside Surveys indicated that the total had fallen by 23% since 1984, when the estimated total length was 624,000 km. A large proportion of this change, however, was attributable to lack of management, which had resulted in hedgerows being reclassified as lines of trees or relict hedges (Carey *et al.*, 2008b).

The issues of hedgerow management, farmers' attitudes to hedgerows, and the rationale for current practices was addressed by various research projects in the late 1990s and early 2000s, including a survey of farmers and hedgerow management contractors across England (Britt *et al.*, 2000).

This research revealed that 90% of farms used a flail to trim hedgerows, and that 79% trimmed their hedges annually. Annual trimming does not allow the development of berries on species such as hawthorn (*Crataegus monogyna*), which flower on two-year-old wood, and agri-environment schemes such as the Environmental Stewardship Scheme (in England) now actively promote less frequent trimming. These schemes, and advice from various organisations, have also tried to increase the proportion of hedges trimmed in late winter, ensuring that fruits remain on hedgerows for birds and other animals to feed on when other food is in short supply (Croxton & Sparks, 2004).

Poor hedgerow management was also addressed by the inclusion, in 1995, of ancient and species-rich hedgerows as a priority habitat in the UK Biodiversity Action Plan. A Habitat Action Plan (HAP) was produced, which addressed the key hedgerow protection and conservation issues. Subsequently the HAP was extended to cover all hedgerows with at least 80% native shrubs. One initiative led by the Hedgerows Habitat HAP Steering Group was the development of a methodology for the assessment of hedgerow condition and a set of criteria for determination of favourable condition (Defra, 2007).

Countryside Survey 2007 results suggested that 48% of hedges in Great Britain were in favourable structural condition, according to the relevant HAP condition assessment criteria for hedge size and continuity. When additional criteria for favourable condition were also applied, namely those for the minimum width of adjacent undisturbed ground and perennial herbaceous vegetation, the percentage in 'favourable condition' fell to 31%. Application of further criteria, such as that for a maximum percentage cover of specified nutrient enrichment indicators (cleavers, docks and nettles) in the ground flora, would have been likely to further reduce this figure.

New research was undertaken to determine current hedgerow management practices and the reasons that underlie decisions by farmers and contractors.

The detailed objectives of this research, which largely repeated the earlier research undertaken by Britt *et al.* (2000), included:

- To investigate differences in attitudes and management according to geographical location, farm type or other factors.
- To identify any recent changes in management practices, and assess the influence of agri-environment schemes (e.g. the Environmental Stewardship Scheme in England and Tir Gofal and Tir Cynnal in Wales), conservation advice and other factors on hedgerow management.
- To identify any poor management practices leading to the unfavourable condition of hedgerows and the reasons for the continuation of these practices.
- To compare results with those from a previous survey, completed in 1999/2000.
- To provide recommendations for the improved take-up of good hedgerow management practices.

2. METHODS

The project was completed in three distinct stages:

1. Postal survey of farmers.
2. Postal survey of agricultural contractors.
3. Follow-up farm visits

The sub-sample of farms for the follow-up visits was selected from responses to the postal survey of farmers. At these farms, face-to-face interviews were conducted with farmers, to gather more in-depth information on hedgerow management before, finally, a small sample of representative hedges on each farm was surveyed.

2.1 POSTAL SURVEY OF FARMERS

A four page questionnaire (Appendix 1), with a reply-paid envelope and covering letter, was sent to 3,000 farmers - to collect quantitative data on hedgerow management and factors which influence management decisions. Names and addresses of farmers for the survey were randomly selected from databases held by the Department for Environment, Food and Rural Affairs (Defra) (for England) and the Welsh Assembly Government (WAG) (for Wales). To protect the anonymity of farmers surveyed, the selection of contact names and addresses was undertaken by Defra and WAG and questionnaire distribution was completed by a third party, the marketing organisation, Communisis. The research team had no access to the address list used for the postal survey.

One fifth of the questionnaires (600) was sent to farmers in each of three English counties - Devon, Leicestershire and North Yorkshire. A further 600 questionnaires were posted to farmers in Powys, Wales. The main reason for the choice of Devon, Leicestershire and North Yorkshire was that these counties provided the main focus of a previous hedgerow management survey (Britt *et al.*, 2000) and comparability between surveys was an important objective. Wales had not been included in the earlier research. The three English counties, which (with Powys) subsequently provided the focus for the later stages of the project (i.e. the on-farm interviews and contractors' survey), were originally selected for the following reasons:

- good geographical spread – with one county in each of three English regions (Yorkshire and Humberside, the East Midlands and South-West);
- arable, livestock and mixed farms were all well represented;
- each had a good total length of hedgerows;
- the most common UK hedgerow types - ITE hedge classes 4a (hawthorn dominant), 5a (mixed hazel predominant) and 6 (blackthorn predominant) (Cummins *et al.*, 1992) - were well represented in those counties;
- mixed hazel hedges, identified by Cummins *et al.* (1992) as one of two hedge classes which are most species-rich, were particularly common in Devon;

- hedgerows in each county had been the subject of other relevant studies e.g. work for the Devon Hedge Group by Cranfield University (Semple *et al.*, 1995), and ADAS hedgerow surveys in all three counties for the Department of the Environment, Transport and the Regions (Churchward *et al.*, 1996 & 1999).

The remaining 20% of survey forms (600) were sent to a random sample of farmers throughout the rest of England, outside of the three main target counties.

Data were collected on many aspects of relevance to hedgerow management, including farm size and type (see below* for definitions used), main hedgerow types, soil type, current hedgerow management (e.g. timing and frequency of trimming, use of coppicing or laying techniques) and use of contractors, the farmers' knowledge of and attitude to hedgerow management guidelines, views on the benefits and disadvantages of hedgerows and their opinions on what incentives might be needed to encourage them to manage their hedgerows in a more environmentally sensitive way.

* **Criteria for determination of farm type**

- ***Arable***: at least 75% of land (excluding woodland) in combinable arable crops, field vegetables or 'other arable'.
- ***Livestock***: at least 75% of land (excluding woodland) in permanent/long-term grass or short-term leys.
- ***Mixed***: more than 25% of land (excluding woodland) in arable (defined as above) and more than 25% in grassland (as above) and has livestock.
- ***Other***: does not fit into any of the above groups.

All farmers in the survey were also asked about the use of contractors in the management of their hedgerows and, if used, about the role/influence of their contractors in hedgerow management practices. Farmers were also asked if they acted as contractors themselves, managing hedgerows for other farmers.

A total of 510 completed questionnaires were returned (17.0%), lower than the response rate in the previous survey (24.5%) (Britt et al., 2000); although the larger sample size in this study did produce a small increase (4.3%) in the total number of responses received.

Data were entered onto Microsoft Excel spreadsheets.

2.2 POSTAL SURVEY OF CONTRACTORS

The project also considered the influence of agricultural contractors, who are responsible for much of the hedge trimming undertaken, on hedgerow management practice. A second postal survey was undertaken to find out to what extent the attitudes of contractors, and perhaps more importantly their availability to undertake the work, may have important impacts on factors such as the timing and frequency of trimming operations.

Questionnaires (see Appendix 2), with reply-paid envelopes and a covering letter, were sent out to 782 agricultural contractors, 200 in each of three regions – South-West England, the East Midlands and Wales, and 182 in Yorkshire. The sample was selected from business names and addresses listed online, mainly at Yell.com (www.yell.com) and the National Hedgelaying Society website (www.hedgelaying.org.uk/contract.htm)

Although 223 (29%) of the questionnaires were returned, a significant proportion of the agricultural contractors did not do any hedgerow management work (and there was no way of determining if they did or did not, in advance of mailing the questionnaires), 139 (18%) had not been completed. There were only 84 completed questionnaires (11%), from contractors doing relevant hedgerow work - 28 (33%) from the South-west, 12 (14%) from the East Midlands, 20 (24%) from Yorkshire, 11 (13%) from Wales and 14 (17%) from other areas in England.

As in the previous survey (Britt *et al.*, 2000), close compatibility between the farmers' and contractors' surveys was ensured - to allow direct comparisons between the attitudes of the two groups. The small number of responses from individual regions did not allow for analysis of possible regional differences in the views of contractors.

Both postal surveys were developed in close collaboration with Defra and WAG, and were approved by the Government's Survey Control Unit before distribution.

2.3 FOLLOW-UP SURVEY

Additional data were collected by visiting a sub-sample of 128 farmers who had responded to the postal survey and had indicated on their questionnaire a willingness to accept a follow-up visit. The purpose of these visits was to carry out in-depth interviews with farmers and to assess a small sample of representative hedgerows. The sample was structured according to geographic region, with 32 farms selected from each of the four target counties (Devon, Leicestershire, North Yorkshire and Powys).

One lead surveyor was assigned to each county, and given responsibility for the 32 selected farms in their county. All lead surveyors underwent a day's training in advance of the farm visits, to ensure familiarity with the methodologies for both the interviews and hedge surveys, and standardisation of approach. Two assistant surveyors helped complete farm surveys in Leicestershire and Powys, following initial training from the lead surveyor for those counties and under the supervision of the lead surveyor. All farm visits were made in the period from June to October 2010.

At each farm, a face-to-face interview was conducted, using the questionnaire included as Appendix 3 to this report.

After interviewing the farmer, the surveyor went out onto the farm and (with some guidance from the farmer) selected five 'representative' hedgerows for a survey of some of their physical and biological characteristics - using a pre-determined and tightly defined methodology, and an appropriate pro-forma (Appendix 4). The hedgerow survey methodology was similar to that used in the 2000 survey (Britt *et al.*, 2000), but was largely based on the standard methodology for local hedgerow surveys (Defra, 2007) and the associated hedgerow condition assessment method. The methodology allows the condition of all surveyed hedgerows to be classified as 'favourable' or 'unfavourable'.

Hedgerow assessments included height and width, hedge shape, 'gappiness', height of lowest side-shoot, number of woody species/30 m length, proximity of cultivation, ground flora type (using simple categories only) and % cover, tree numbers, etc. An additional assessment, not included in the 2000 survey, was the ranking of each hedgerow on a management scale, developed for the Hedgerow Habitat Action Plan (HAP) Steering Group by the National Hedgelaying Society. Descriptions of each category on this 10 point scale are given in Appendix 3, and are also listed in the Results section of this report.

These interviews provided further detailed data, to supplement those from the earlier postal surveys. These data were subjected to statistical analysis; however, the main aims of this stage of the work were to collect largely qualitative information - to supplement, verify and aid interpretation of the quantitative data gathered by the larger scale postal survey (i.e. to get a better insight into the reasoning behind the answers given by farmers in the questionnaire) - and to 'quality check' the accuracy of some of their answers on hedge type and management.

Questionnaires and field survey forms were all returned to a central point for checking, data entry and analysis. Data were entered onto Excel spreadsheets (Microsoft Excel 2007). After data entry had been completed, every form was re-checked by the Study Director and any queries or uncertainties resolved, where possible - often after consultation with the relevant surveyor. Where correct entries could not be reliably determined, data were entered as missing values.

All three stages of the project were closely inter-linked to facilitate comparison and cross-reference between surveys.

2.4 DATA ANALYSIS

Data were summarised, in Microsoft Office Excel 2007, for all farms/contractors, by county and (as applicable) within other groupings (e.g. farm type, soil type or agri-environment agreement v no agri-environment agreement in the farmers' postal survey). Mean values are presented in the Results section, usually as percentages. Maximum, minimum and median values are also sometimes given, where appropriate.

Selected data were statistically analysed using analysis of variance (ANOVA); Kruskal Wallis tests, or contingency tables and Chi-square tests - where these methods were appropriate. However, the relatively small and unevenly distributed sample of respondents to the contractors' questionnaire (e.g. only 11 out of 84 respondents were from Wales) meant that statistical analysis of any regional differences in contractor survey data was not appropriate.

3. RESULTS

3.1 POSTAL SURVEY OF FARMERS

A total of 510 responses was received; 111 farmers in Devon, 88 in Leicestershire, 99 in North Yorkshire, 98 in Powys and 114 from other counties.

The mean farm size (*Question 2*) was 134.3 ha, although this figure was skewed by a small number of very large farms, with five reportedly having areas of 1,000 ha or more and the largest being 9,500 ha.

The median farm size, across all counties, was 72.0 ha. Median farm size was 65 ha in Leicestershire, 67 ha in Devon, 73 ha in North Yorkshire, 83 ha in Powys and 95 ha in other counties. However, median farm size did not differ significantly between counties (Kruskal Wallis test H=7.63, d.f. = 4, P = 0.106).

The mean size of farms that were in agri-environment schemes (170 ha, n = 332) was significantly greater than that for farms without an agri-environment scheme (65 ha, n = 163) (P = 0.016). Again, however, these figures were greatly affected by five farms with areas of 1,000 ha or more – all of which were in the group which had agri-environment scheme agreements. Farms in agri-environment schemes had a median size of 97.0 ha (minimum 1.2 ha, maximum 9,500 ha) and those outside agri-environment schemes had a median size of 43.0 ha (minimum 4 ha, maximum 424 ha).

The average number of fields per farm was 23.8.

3.1.1 Farms – cropping, stocking, field size and soil type (Section 1: Questions 1-6)

Cropping

The main 'crop' types *(Question 3)* were permanent or long-term grass (89% of all farms), combinable winter crops (41%), short-term grass (29%) and spring-sown combinable crops (27%). 13% had other arable crops, 7% grew field vegetables and 4% soft or top fruit. 37% of farms had an area of woodland. Compared to BD2103, there was a reduction of arable farming in the sample.

Winter-sown combinable crops were most frequently grown on North Yorkshire (58%) and Leicestershire farms (52%). Spring sown combinable crops were grown by higher percentages of farmers in North Yorkshire (37%) and Devon (33%). The highest percentage of farms with permanent grass or long leys was found in Powys (92%), but 87-89% of farms in all other areas also had this 'crop'. Short-term leys were most frequent on Devon farms (45%). Woodland occurred most frequently on farms in Powys (54%) and Devon (48%). Devon had the highest proportion of farms with organic crops (20%), which was 11% overall.

Stocking

Of all respondents, 446 (87%) had livestock *(Question 4)*. Of these farmers, 66% had sheep, 60% had beef cattle and 14% dairy cows. Smaller numbers had pigs (6%) or poultry (7%). The highest frequencies of sheep, beef and dairy enterprises were found in Powys - where 94%, 70% and 6% of farmers had the three major stock types respectively. Dairy cows were less common than beef and sheep in all areas.

Field size

Farms in Powys and Devon had the smallest fields. Field sizes differed significantly between regions (Kruskal Wallis H = 36.96, d.f. = 4, P<0.001). Mean field sizes, calculated from farm area and number of fields *(Question 2)*, were:

Devon	4.0 ha
Leics.	5.1 ha
North Yorks.	5.4 ha
Powys	3.7 ha
Other	5.9 ha

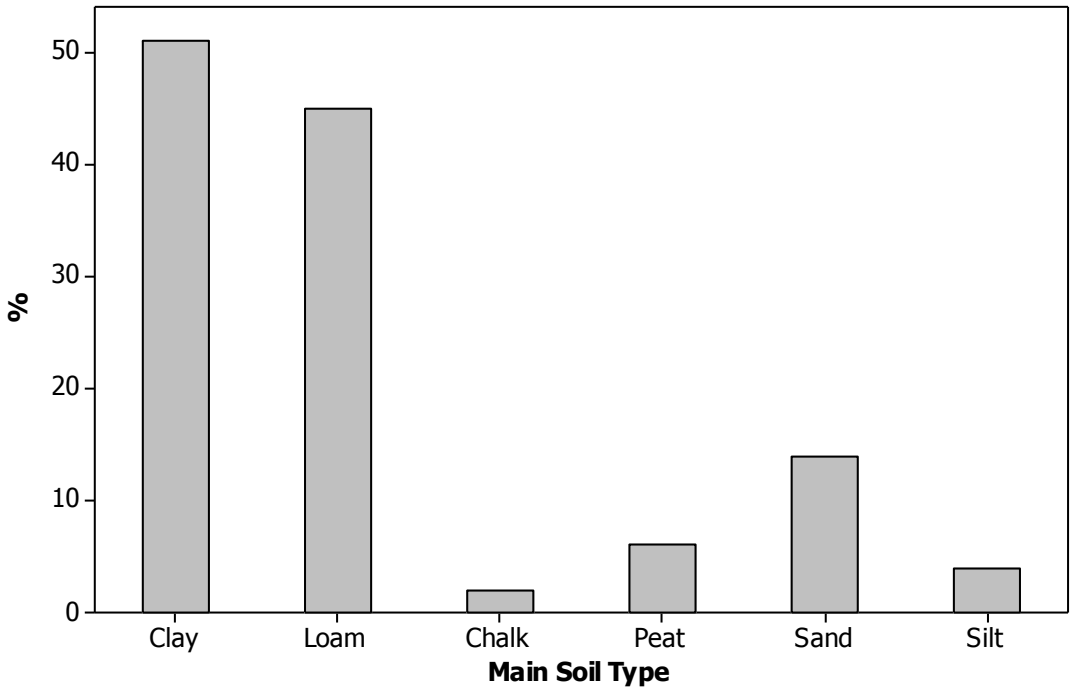
The medians of 'average' field sizes *(Question 5)* for each region were:

Devon	3.33 ha
Leics.	4.37 ha
North Yorks.	4.57 ha
Powys	3.36 ha
Other	4.37 ha

Soil type

Clays and loams were the main soil types (Figure 1) *(Question 6)*. Clay was the most common soil in Leicestershire (69% of farms), North Yorkshire (47%), Powys (47%) and other (55%) farms. Loams were the dominant soils in Devon (on 60% of farms), but also ranged from 31% to 45% in other counties. Sands were most frequent on farms in North Yorkshire (18%).

Figure 1. Percentage of farms with clay, loam, chalk, sand, peat or silt as a "main soil type."



Note: several respondents listed more than one main soil type.

3.1.2 Hedgerows – description (Section 2: Questions 7-13)

Field boundary types

More than half (56%) of all farmers estimated that 75-100% of their field boundaries were hedgerows [n = 501] *(Question 7)*. Only 11% estimated that 0-24% of their boundaries were hedgerows. A further 11% said 25-49%, and 21% answered 50-74%. Relatively large percentages of Devon (85%) and Leicestershire farmers (81%) reported hedgerow boundaries in the upper category.

Hedge heights

When asked to give the approximate percentages of all hedges in each of six height classes *(Question 8)*, the mean percentages overall (n = 486) were:

less than 1.0 m	3%
1.0-1.4 m	16%
1.5-2.4 m	50%
2.5-3.9 m	19%
4.0-10 m	10%
over 10 m	2%

In all counties the most common height category was 1.5-2.4 m, although the proportion of hedges in this category was lowest in Devon at 32%, as this county also had a large proportion (29%) in the 2.5-3.9 m category - although this result is likely to have been affected by the large number of hedge-banks in Devon, with many farmers including the heights of banks in their estimates of hedge heights.

Calculation of average hedge heights for groups with and without an agri-environment scheme agreement showed that farms in an agri-environment scheme (n = 319) had shorter hedges (2.6 m) than farms that were not in a scheme (n = 155) (3.0 m). This difference was statistically significant (P = 0.017). Looking in more detail at the responses from these two farmer groups, the estimated percentages of their hedges within the 1.0-1.4, 1.5-2.4, 2.5-3.9 and >10 m height bands were very similar for those with or without agri-environment agreements. The main differences were that hedges in the 4.0-10.0 height range were more common on farms without AE agreements and hedges less than 1 m tall were more frequent on farms with AE agreements.

An estimated 14% of all hedges on farms without AE agreements were 4-10 m tall, compared with 9% on farms with AE agreements. There were 11 farms that estimated 100% of their hedges to be 4-10m tall, and nine of these were on farms that did not have an AE agreement (5.8% of all non-AE farmers who answered this question).

Hedges less than 1 m tall were relatively uncommon – approximately 3% of all hedges on farms with AE agreements and 1% of hedges on farms without AE agreements. Five farms estimated 100% of their hedges to be in this height range, four of which were farms that had an AE agreement (1.3% of all AE farmers who answered this question).

It should also be noted that calculations of average hedge heights used the middle of each height range as the height for all hedges in that group. For example, all hedges estimated to be in the 4.0-10.0 range would have been assigned a nominal height of 7.0 m although most could actually have been only 4-6 m tall. The net effect will probably have been to over-estimate average heights.

Hedge widths

When asked to give the approximate percentages of all hedges in each of five width classes *(Question 9)*, the mean percentages overall (n = 485) were:

less than 1.0 m	8%
1.0-1.4 m	35%
1.5-2.4 m	42%
2.5-3.9 m	12%
over 4 m	2%

In Devon (51%) and Leicestershire (47%) the most common width category was 1.5-2.4 m; in all other counties it was the 1.0-1.4 m category.

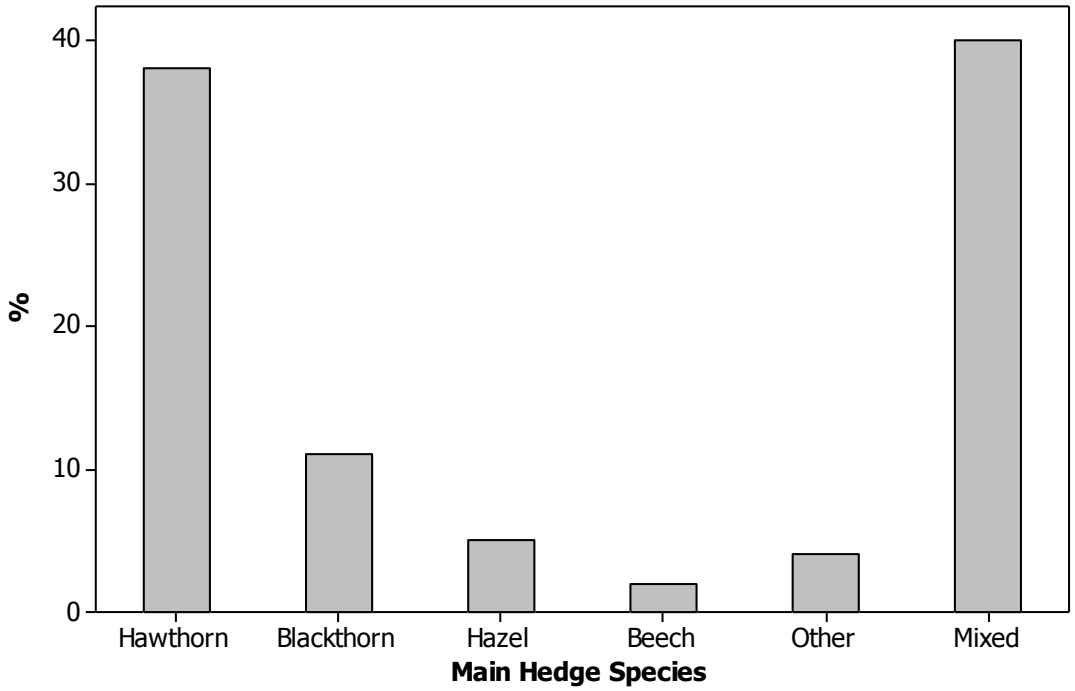
There was no significant difference between the average hedge width on farms in agri-environment schemes (1.9 m) and that on farms outside these schemes (1.8 m) (P = 0.53).

Woody species

Farmers' estimates of the woody species composition of their hedgerows *(Question 10)* indicated that mixed hedges were the most common with hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) also important (Figure 2) [n = 497].

Except for traveller's-joy (*Clematis vitalba*) and privet (*Ligustrum vulgare*), most of the 15 additional woody species and climbers listed in *Question 12* were commonly found (>24%) in the hedges of farmers. The most common was bramble (*Rubus fruticosus* agg.) which occurred frequently in >80% of farms in each of the four regions. Three other species occurred frequently on >50% of farms in all four regions - ash (*Fraxinus excelsior*), roses (*Rosa* spp.) and elder (*Sambucus nigra*).

Figure 2. Estimated percentages of listed woody species in farm hedgerows.



A few species showed marked regional differences. For example, honeysuckle (*Lonicera periclymenum*) was said to commonly occur on 78% of farms in Devon, but only on 33% of Leicestershire farms. Similarly, gorse (*Ulex* spp.), oak (*Quercus* spp.), sycamore (*Acer pseudoplatanus*) and holly (*Ilex aquifolium*) occurred more frequently in Devon than elsewhere.

Overall the proportion of farmers reporting gaps (*Question 11*) was as follows:

<5%	55%
5-10%	33%
>10%	13%

Gaps appeared to be more of an issue in Powys where the proportions in the three categories were 45%, 31% and 24%.

Overall, 64% of respondents thought that most of their hedge bottoms were "*dominated by coarse grasses and grassland weeds such as nettles or thistles*" *(Question 13)*, 34% thought that most were "*dominated by grasses and wildflowers*" and 6% thought that most were "*dominated by arable weeds such as cleavers or sterile brome*" [n = 484]. Nettles and thistles occurred as hedge bottom flora most commonly in Leicestershire (77%) and Powys had the highest proportion (47%) of wildflower/grass hedge bottoms.

3.1.3 Hedgerow management (Section 3: Questions 14-24)

Hedge trimming - frequency

Hedges were mostly trimmed annually (45%) or 2-yearly (29%) (Figure 3) *(Question 14)*. A further 11% of hedges were trimmed every three years, 3% every 4-6 years and 1% every 7-12 years. About 10% of hedges were untrimmed. 4% of farmers stated that they did not trim any of their hedges.

Taking the mid point of these categories, the average time between cutting per farm can be calculated. ANOVA of these values confirms ($F = 8.55$, d.f. = 4,470, $P < 0.001$) that hedgerow cutting in Powys (1.3 years) was more frequent than in the other regions (1.8–2.1 years). See also Figure 3.

Farm type significantly affected the frequency of hedge trimming ($P < 0.01$) (Table 1) with arable farms having a longer cutting cycle than livestock farms. There was no significant effect of soil type on frequency of hedge cutting ($P > 0.05$) (Table 1).

Another factor that affected the intervals between hedge cuts was whether or not a farm was in an agri-environment scheme. Excluding untrimmed hedges, farms with agri-environment scheme agreements (n = 332) trimmed hedges, on average, every 2.1 years. This compares with an average trimming interval of just 1.5 years on farms with no agri-environment agreement (n = 163). This difference was highly significant ($P < 0.001$).

Figure 3. Frequency of hedge trimming. Percentages of answers in each category, broken down by region (D = Devon, L = Leicestershire, Y = North Yorkshire, P = Powys, O = Other).

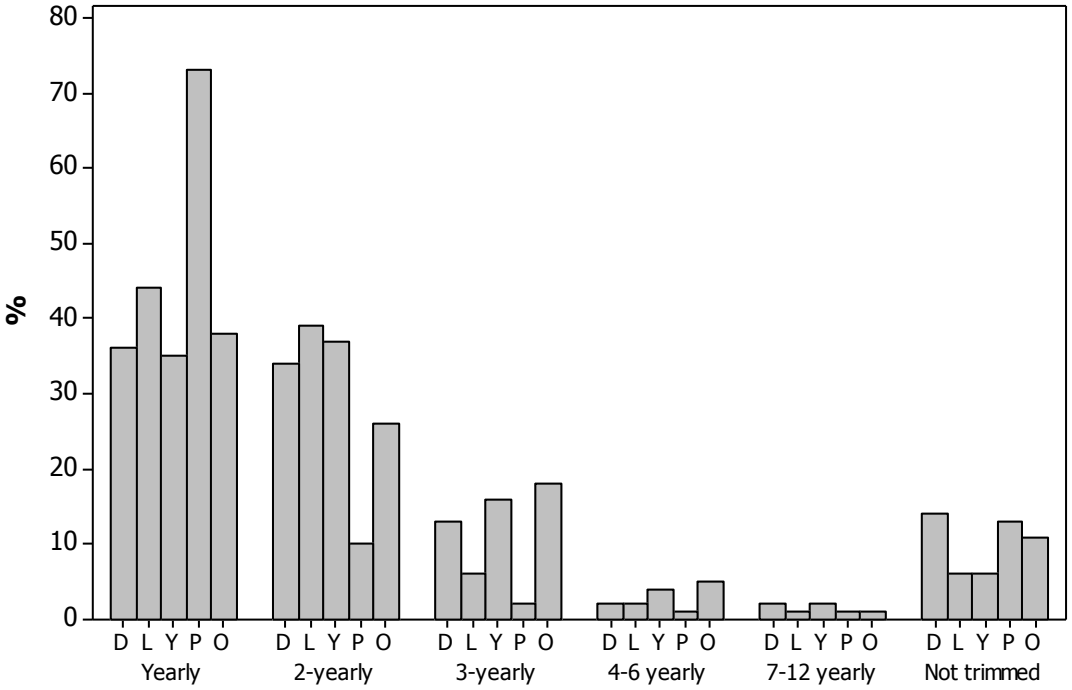


Table 1. Frequency of hedge trimming. Results from ANOVA of mean cutting interval between i) farm types and ii) soil types

Farm type	Mean cutting interval (years)	Soil type	Mean cutting interval (years)
Arable	2.2	Clay	2.0
Livestock	1.7	Loam	1.9
Mixed	2.0	Other	1.7
F	5.44		1.02
d.f.	2,391		2,377
P	0.005		0.360

Changes in the frequency of hedge cutting

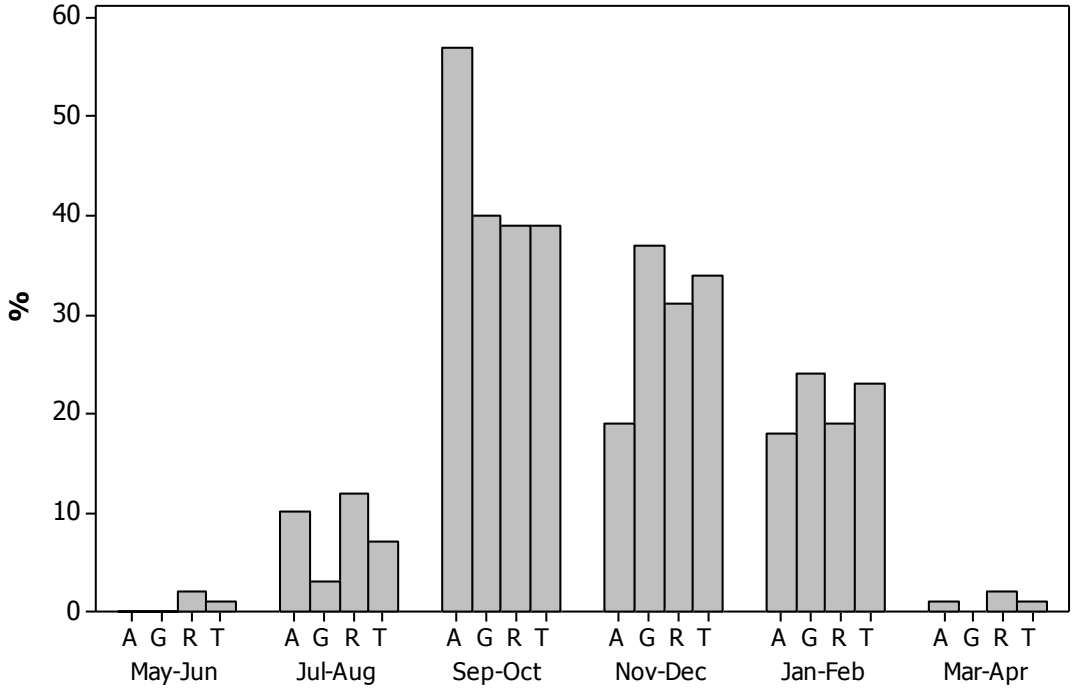
Of 474 responding farmers 44% agreed that the frequency of hedge cutting had changed as the result of an agri-environment scheme (*Question 15*). Of these 74% reported a change to 2-yearly cutting and 23% to 3-yearly cutting.

Hedge trimming - timing

The majority of farmers (57%) said that they usually trimmed hedges adjacent to arable fields in the September/October period (Fig. 4) *(Question 16)*. Only 10% trimmed these hedges in preceding months (all in July/August, none in May/June). 19% usually trimmed arable hedges in November/December, 18% in January/February and just 1% in March/April (Fig. 4).

Hedges adjacent to grassland and farm tracks were mostly trimmed slightly later, in the September to February period (Fig. 4). For hedges adjacent to grassland, 3% of farms trimmed their hedges in July/August, 40% in September/October, 37% in November/December, 24% in January/February and 1% in March/April. For hedges adjacent to farm tracks, 1% of farms trimmed their hedges in May/June, 7% in July/August, 39% in September/October, 34% in November/December, 23% in January/February and 1% in March/April.

Figure 4. Time of trimming hedges adjacent to arable fields (A), grass fields (G), public roads (R) or farm tracks (T). Percentages of answers in each category - all regions combined.



Note: Total percentages shown in Figs. 4-7 amount to more than 100%, as some farmers indicated that they trimmed hedges adjacent to arable fields, grass fields and farm tracks in more than one two-month period.

Farmers were more likely to trim hedges adjacent to grassland or farm tracks in the late autumn or winter than they were to cut hedges adjacent to arable fields in this period. Very few farmers regularly trimmed hedges between March and June.

Most hedges adjacent to public roads were trimmed in the September to December period, with 39% of farms trimming these hedges mainly in September/October and 31% in November/ December (Fig. 4). 2% trimmed hedges beside roads in May/June, 12% in July/August, 19% in January/February and 1% in March/April.

Figure 5 shows when hedges adjacent to arable fields were trimmed in each of the four regions surveyed. No farmers trimmed hedges around arable fields in May/June and only two farmers (1%) (both in 'other' counties) trimmed in March/April.

Figure 5. Time of trimming hedges adjacent to arable fields. Percentages of answers in each category, broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).

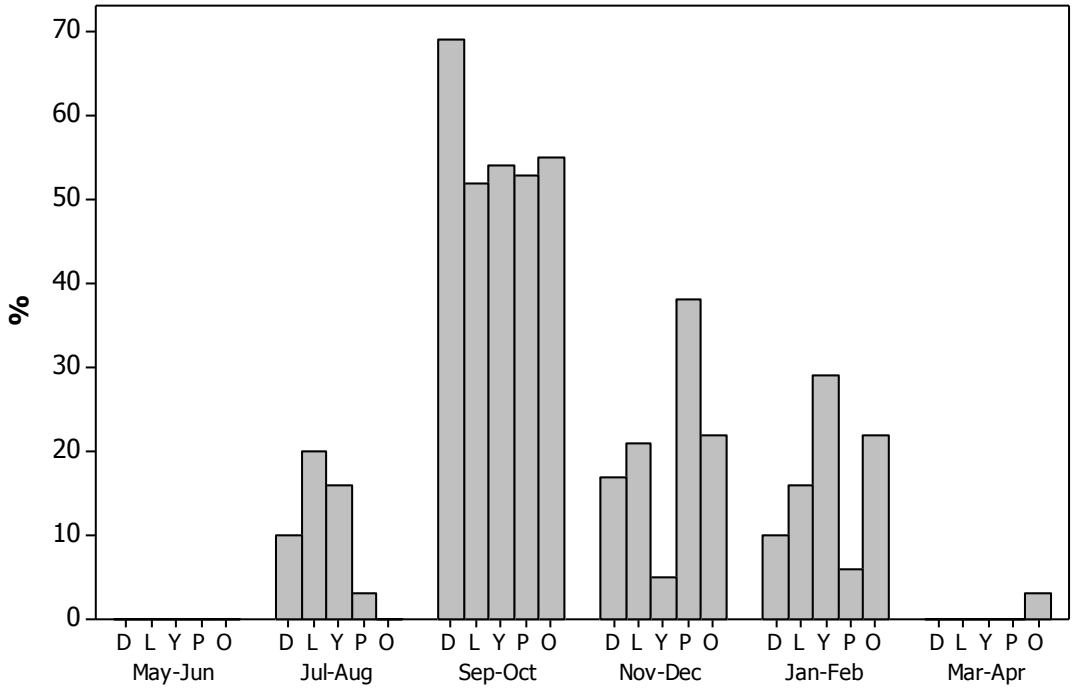


Table 2. Time of trimming hedges adjacent to arable fields. Number of answers in each category, broken down by region.

	Time of trimming			
Region	**Jul/Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Devon	6	40	10	6
Leics.	12	32	13	10
N Yorks.	10	34	3	18
Powys	1	17	12	2
Other	0	35	14	16
Chi-square	40.13			
P value	<0.001	***		
d.f.	12			

Note: Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

Although patterns are broadly similar (Fig. 5), there were significant regional differences in the timing of trimming hedges around arable fields ($P < 0.001$) (Table 2). In comparison with other regions, a larger proportion of farmers in Devon trimmed hedges around their arable fields in September/October. Farmers in North Yorkshire appeared to prefer cutting in January/February than in November/December.

There was no significant difference between the time of trimming around arable fields for farmers with or without agri-environment agreements ($P = 0.70$; Chi-square test with May/Jun/July/Aug, Sep/Oct and Jan/Feb/Mar/Apr months combined).

Figure 6. Time of trimming hedges adjacent to grass fields. Percentages of answers in each category, broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).

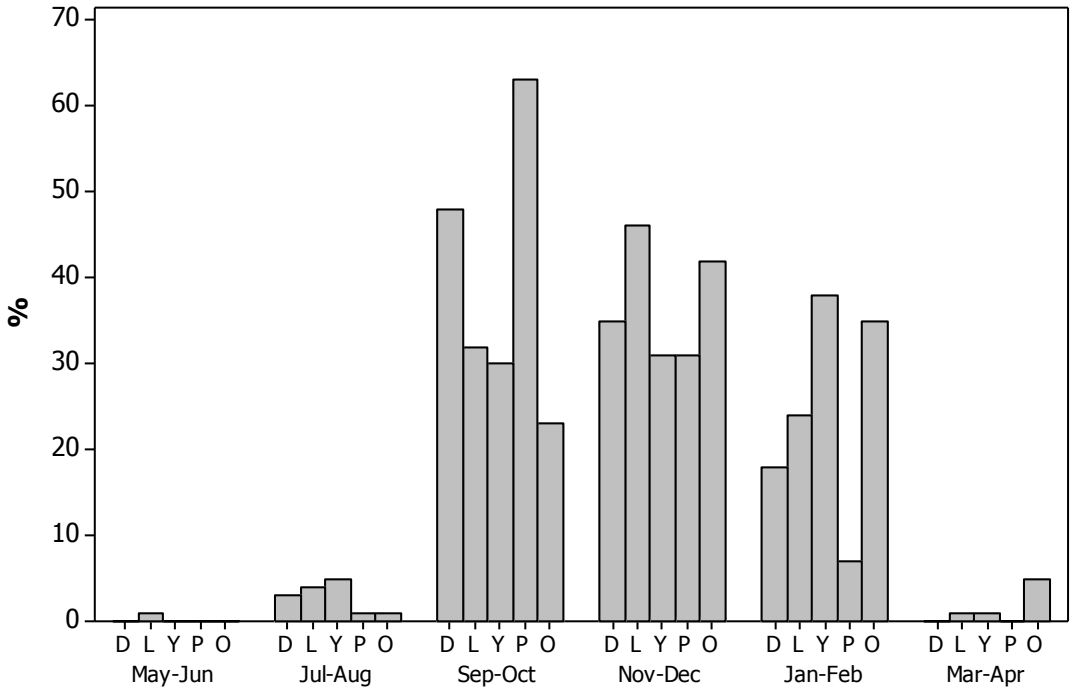


Table 3. Time of trimming hedges adjacent to grass fields. Number of answers in each category, broken down by region.

	Time of trimming		
Region	**Mar-Oct**	**Nov/Dec**	**Jan-Apr**
Devon	49	33	17
Leics.	29	36	20
N Yorks.	28	25	32
Powys	56	27	6
Other	21	36	34
Chi-square	51.03		
P value	< 0.001	***	
d.f.	8		

Note: Mar/Apr, May/Jun and Sep/Oct groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

There were also significant differences between regions in the times that hedges around grass fields were trimmed ($P < 0.001$) (Fig. 6; Table 3). Powys and Devon hedges tended to be trimmed earlier, and North Yorkshire hedges later.

Figure 7. Time of trimming hedges adjacent to farm tracks. Number of answers in each category, broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).

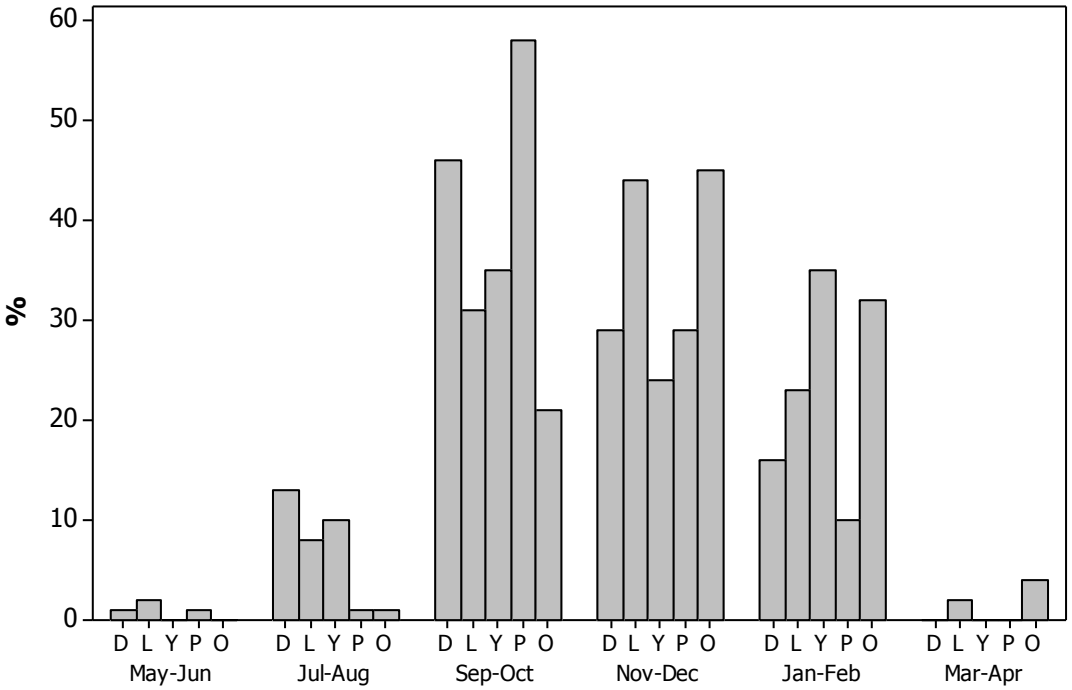
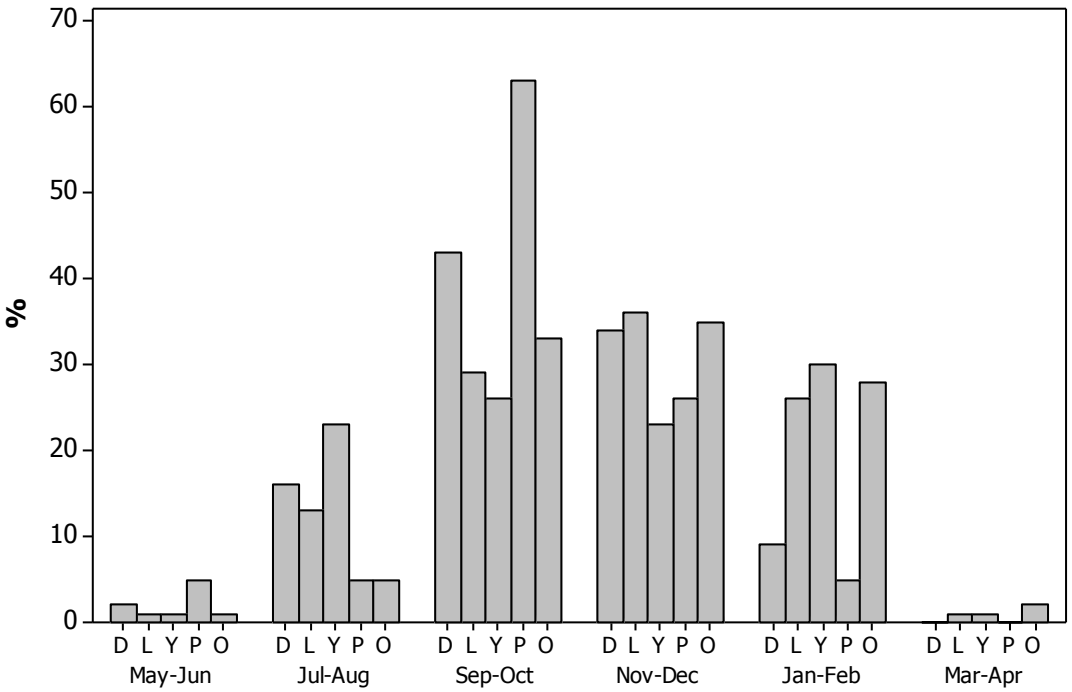


Figure 8. Time of trimming hedges adjacent to public roads. Number of answers in each category, broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).



Very small numbers trimmed hedges around grass fields outside the September-February period.

There were highly significant differences between regions in the times that hedges adjacent to farm tracks were trimmed ($P < 0.001$) (Table 4). In comparison with the other regions, a greater proportion of track-side hedges in Devon and Powys were trimmed earlier and North Yorkshire hedges later (Fig. 7). Relatively few track-side hedges in Powys were cut before September.

There were highly significant differences between regions in the times that hedges adjacent to public roads were trimmed ($P < 0.001$) (Table 5). In comparison with the other regions, a greater proportion of track-side hedges in Devon and Powys were trimmed earlier (Fig. 8). Relatively few track-side hedges in Powys and the "Other" region were cut before September.

Table 4. Time of trimming hedges adjacent to farm tracks. Number of answers in each category, broken down by region.

	Time of trimming			
Region	**May-Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Devon	13	41	26	14
Leics.	6	19	27	15
N Yorks.	7	25	17	25
Powys	2	40	20	7
Other	1	15	32	26
Chi-square	50.51			
P value	< 0.001	***		
d.f.	12			

Note: May/Jun and Jul/Aug groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

Table 5. Time of trimming hedges adjacent to public roads. Number of answers in each category, broken down by region.

	Time of trimming			
Region	**May-Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Devon	13	41	26	14
Leics.	6	19	27	15
N Yorks.	7	25	17	25
Powys	2	40	20	7
Other	1	15	32	26
Chi-square	57.49			
P value	< 0.001	***		
d.f.	12			

Note: May/Jun and Jul/Aug groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

Figure 9. Time of trimming hedges adjacent to arable fields. Percentages of answers in each category, broken down by soil type (C = Clay, L = Loam, O = Other).

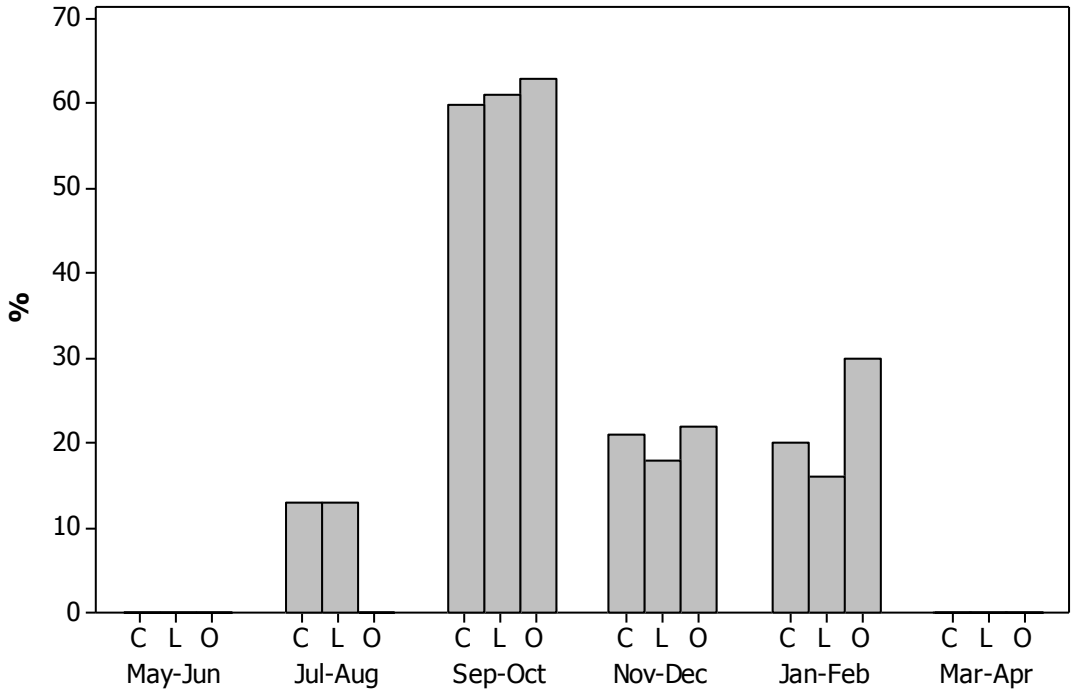
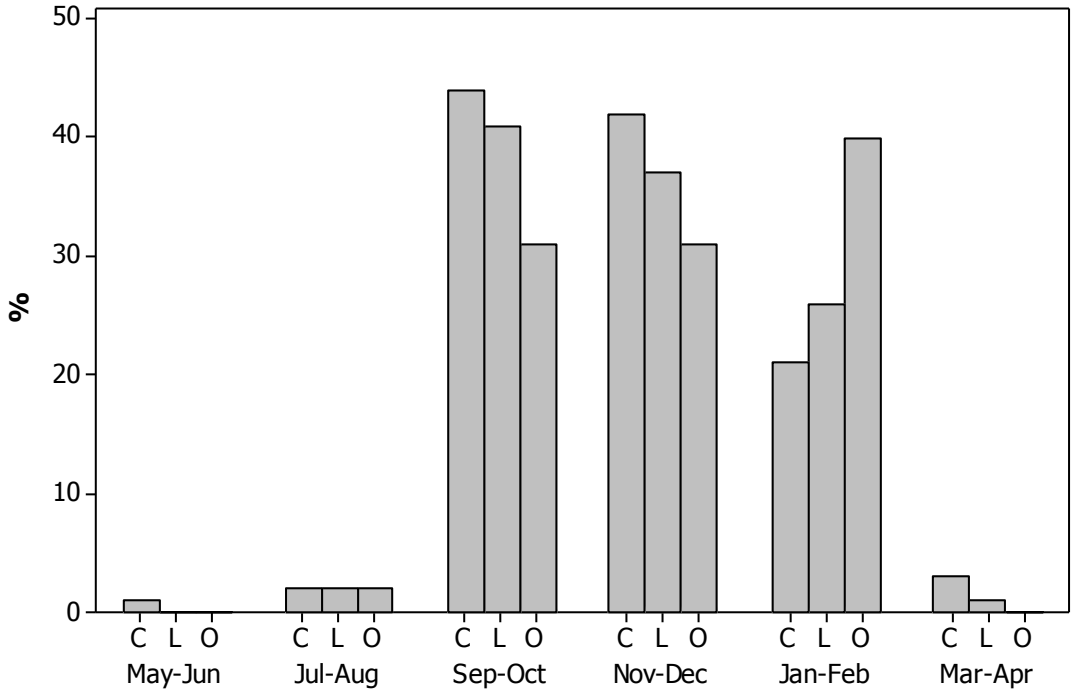


Table 6. Time of trimming hedges adjacent to arable fields. Number of answers in each category, broken down by main soil type.

	Time of trimming			
Soil type	**Jul/Aug**	**Sep/Oct**	**Nov/Dec**	**Jan/Feb**
Clay	11	52	18	17
Loams	12	56	17	15
Other	0	17	6	8
Chi-square	5.39			
P value	0.495	ns		
d.f.	6			

Notes: Only data from respondents giving a single answer to the question "*what is your main soil type*" are included (79% of all respondents). No trimming was reported outside the periods shown.

Figure 10. Time of trimming hedges adjacent to grass fields. Percentages of answers in each category, broken down by main soil type.



Note: Data for other minor categories (peat, silt and chalk soils) not shown.

Soil type did not have a significant effect on time of hedge trimming around arable fields (P = 0.495) (Fig. 9; Table 6).

The predominant soil type on the farm did not significantly affect the time of trimming for grassland hedges (Table 7, Fig. 7) or farm track hedges (Table 9). However, significant differences ($P < 0.05$) were apparent for hedges adjacent to public roads (Table 8) where a greater proportion of hedges on loam soils were trimmed earlier.

Table 7. Time of trimming hedges adjacent to grass fields. Number of answers in each category, broken down by main soil type.

	Time of trimming		
Soil type	**Mar-Oct**	**Nov/Dec**	**Jan-Apr**
Clay	70	63	36
Loams	59	50	36
Other	14	13	17
Chi-square	5.69		
P value	0.224	ns	
d.f.	4		

Note: Data for May/Jun, Jul/Aug and Sep/Oct groups and for Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis. Only data from respondents giving a single answer to the question "*what is your main soil type*" are included (79% of all respondents).

Table 8. Time of trimming hedges adjacent to public roads. Number of answers in each category, broken down by main soil type.

	Time of trimming			
Soil type	**May-Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Clay	15	49	47	23
Loams	30	50	45	26
Other	2	19	6	12
Chi-square	15.69			
P value	0.016	*		
d.f.	6			

Notes: Data for 'May/Jun and Jul/Aug groups and for Jan/Feb and Mar-Apr groups were combined to facilitate Chi-square analysis. Only data from respondents giving a single answer to the question "*what is your main soil type*" are included (79% of all respondents).

Table 9. Time of trimming hedges adjacent to farm tracks. Number of answers in each category, broken down by main soil type.

	Time of trimming			
Soil type	**May-Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Clay	11	49	50	27
Loams	12	51	38	33
Other	1	13	11	9
Chi-square	3.72			
P value	0.714	ns		
d.f.	6			

Notes: Data for 'May/Jun and Jul/Aug groups and for Jan/Feb and Mar-Apr groups were combined to facilitate Chi-square analysis. Only data from respondents giving a single answer to the question "*what is your main soil type*" are included (79% of all respondents).

The type of farm had a significant effect on the time of trimming hedges around arable fields ($P < 0.05$) (Table 10) and grass fields ($P < 0.01$) (Table 11), but not public roads (Table 12) or farm tracks (Table 13). The main period of hedge trimming of arable hedges on predominantly livestock farms was later than on arable farms, but hedges around grass fields on arable farms appeared to be trimmed later than on livestock farms.

Table 10. Time of trimming hedges adjacent to arable fields. Number of answers in each category, broken down by farm type.

	Time of trimming			
Farm type	**Jul/Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Arable	8	40	10	15
Livestock	5	61	26	16
Mixed	12	44	6	8
Chi-square	15.88			
P value	0.014	*		
d.f.	6			

Note: None in May/Jun. Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

Table 11. Time of trimming hedges adjacent to grass fields. Number of answers in each category, broken down by farm type.

	Time of trimming		
Farm type	**May-Oct**	**Nov/Dec**	**Jan-Apr**
Arable	18	20	21
Livestock	119	78	47
Mixed	21	35	17
Chi-square	17.28		
P value	0.002	**	
d.f.	4		

Note: May/Jun, Jul/Aug and Sep/Oct groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

Table 12. Time of trimming hedges adjacent to public roads. Number of answers in each category, broken down by farm type.

	Time of trimming			
Farm type	**May-Aug**	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Arable	14	19	18	12
Livestock	26	93	66	38
Mixed	13	19	22	13
Chi-square	8.64			
P value	0.195	ns		
d.f.	6			

Note: May/Jun and Jul/Aug groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

Table 13. Time of trimming hedges adjacent to farm tracks. Number of answers in each category, broken down by farm type.

Farm type	Time of trimming			
	May-Aug	**Sep/Oct**	**Nov/Dec**	**Jan-Apr**
Arable	5	20	23	18
Livestock	14	83	59	36
Mixed	7	21	20	14
Chi-square	5.55			
P value	0.475	ns		
d.f.	6			

Note: May/Jun and Jul/Aug groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

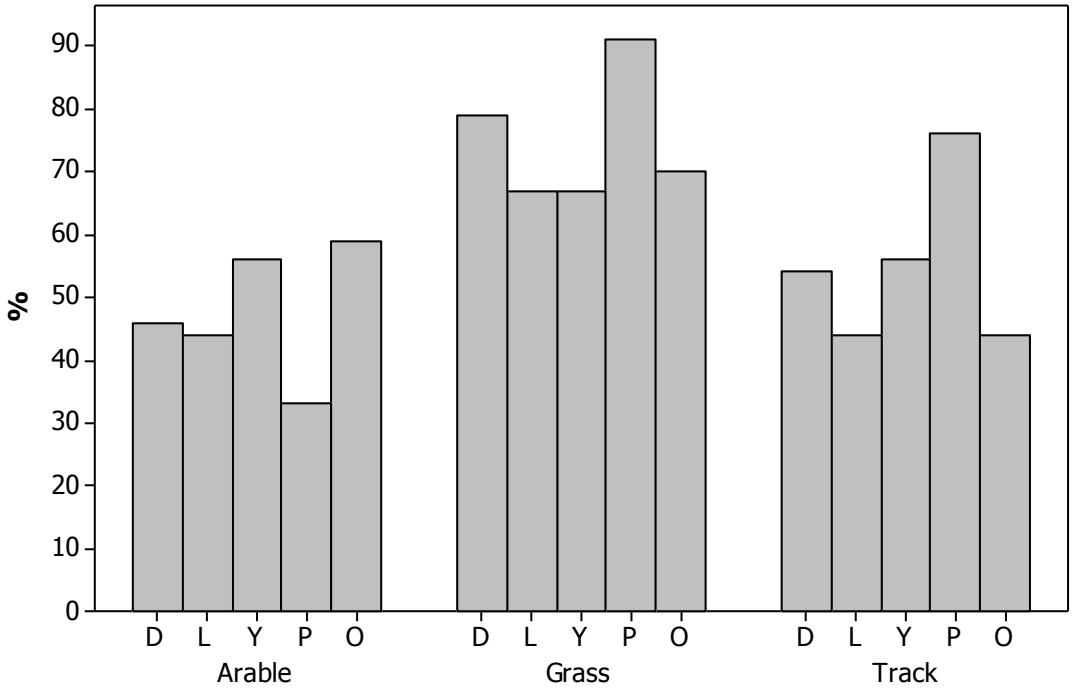
Timing changes

Of 466 responses to this question (*Question 17*), 26% agreed that the timing of their hedge trimming had changed as a consequence of agri-environment schemes. The proportion was highest in Powys (36%).

Considering only those farmers who had changed the timing of their hedge trimming, 47% were now trimming hedges around arable fields later, 77% were trimming hedges around grassland fields later and 57% were trimming hedges beside farm tracks later. The question did not ask them to specify how much later they were trimming these hedges.

Fig 11 shows which types of hedges were being cut later as a proportion of those farmers in each county who agreed that cutting was later. In each county, hedges adjacent to grass fields appear to have been more affected than other types. This is possibly because farmers find it easier to trim later around grass fields, where access is more likely to be possible in autumn or winter and where damage to growing crops is not an important consideration.

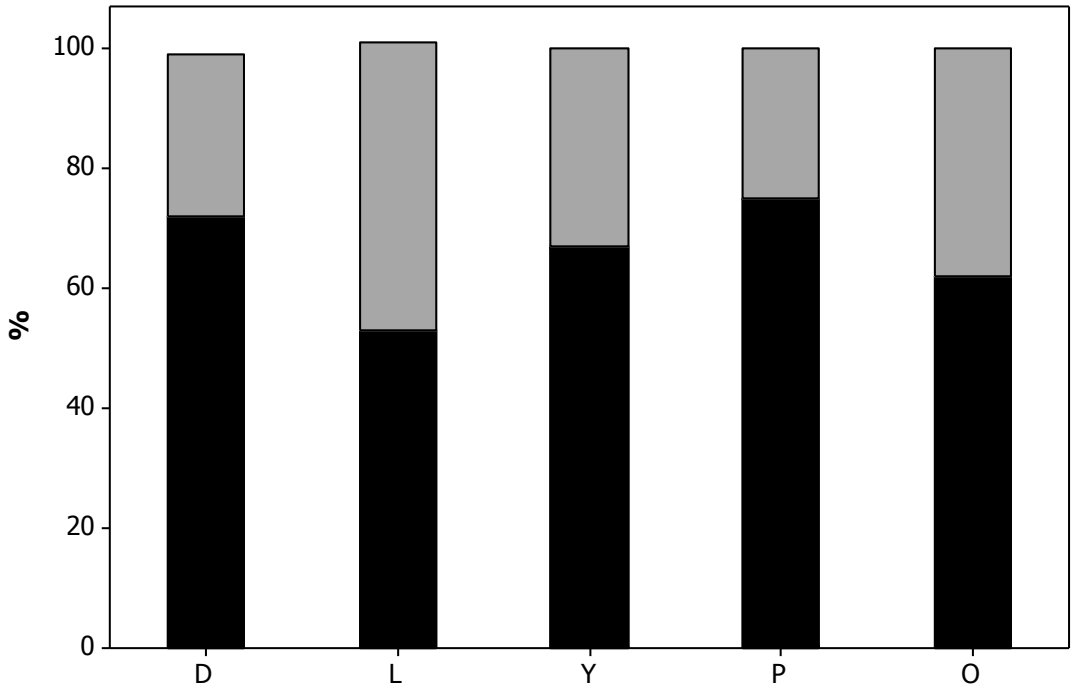
Figure 11. Where farmers agreed that hedges were being trimmed later as a consequence of agri-environment schemes, this graph shows the type of hedges that were being cut later, broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).



Hedge shape

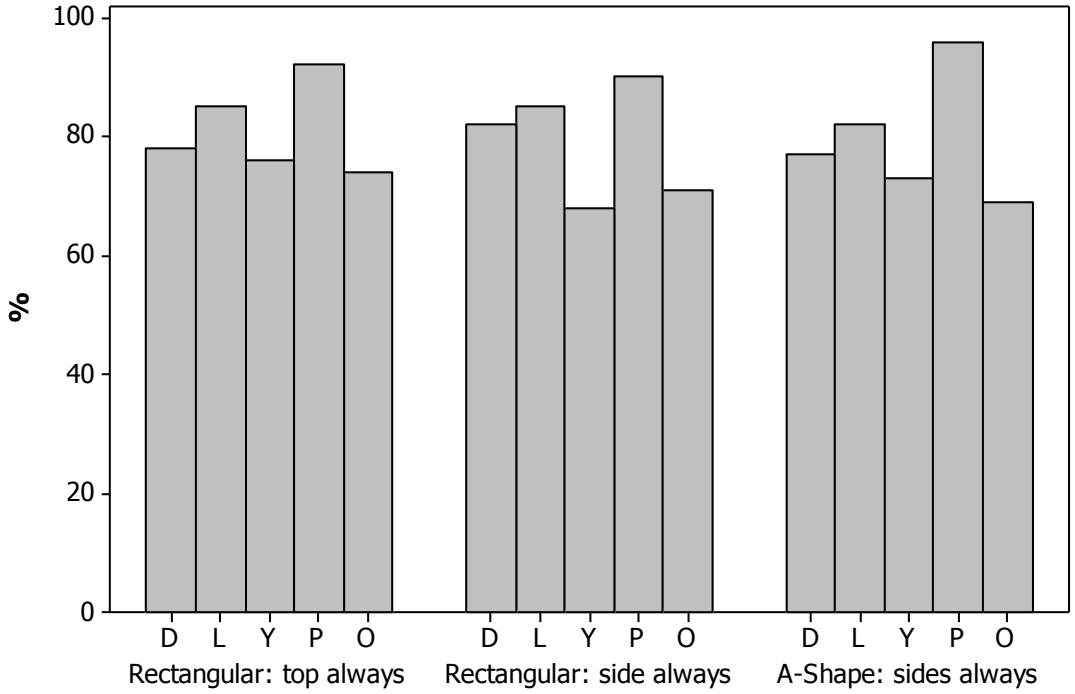
Data on hedge shape revealed that 66% of hedges were cut as rectangular/box-shaped hedges and 34% as A-shaped hedges *(Question 18)*. Rectangular hedges were most popular in Powys (75%) and A-shaped hedges in Leicestershire (48%) (Figure 12).

Figure 12. The percentage of hedges cut as rectangular/box-shaped hedges (black bars) or as A-shaped hedges (grey bars), broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).



Overall, 81% of rectangular hedge tops were always cut, 18% alternately and only 4% never cut (percentages sum to more than 100% because of multiple responses). The sides of both rectangular and A-shaped hedges were always cut on 79% of farms. In Powys cutting each time was most popular, while that figure was lower in North Yorkshire and other regions (Fig 13).

Figure 13. The percentages of hedge tops and sides that were cut each time the hedges were cut. Results are averages separately for rectangular and A-shaped hedges, broken down by region. (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).



Hedge trimming equipment

A flail was the most commonly used equipment for hedge cutting (92%), with small numbers using a finger-bar trimmer (2%), saw (2%) or other equipment (3%). 4% replied "don't know" and percentages add to more than 100% because of multiple entries *(Question 19)*.

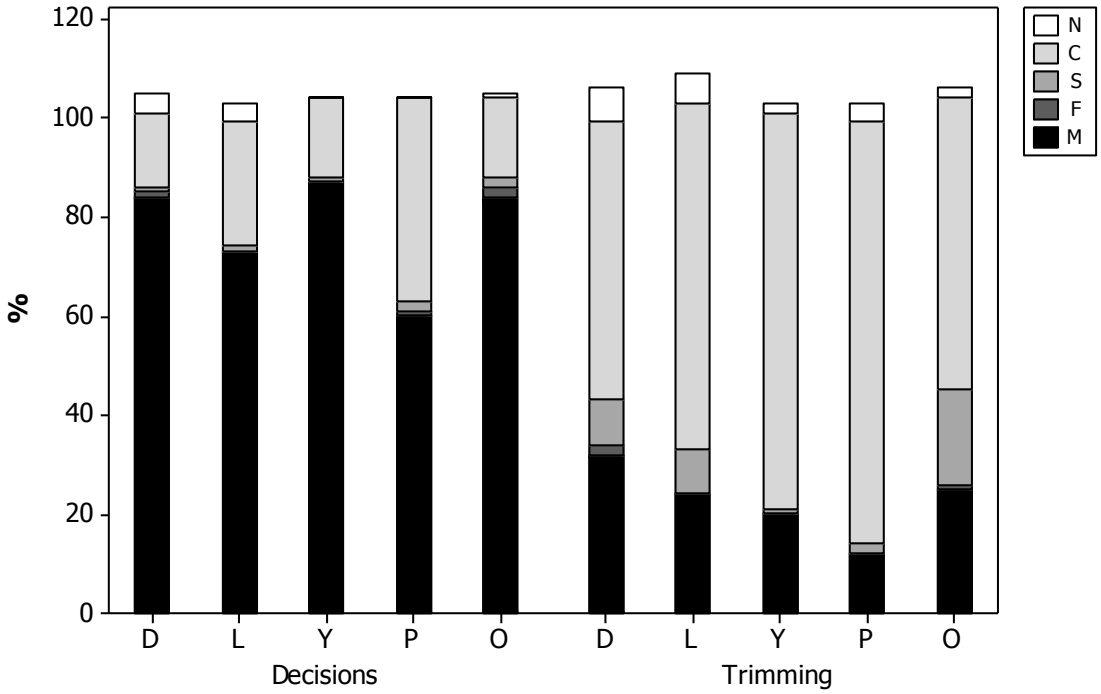
Decisions on hedge trimming

The farmer or his/her farm manager made decisions on the timing of hedge trimming in 78% of cases *(Question 20)* with some regional differences apparent (Fig 14). Contractors were said to be responsible for these decisions on 22% of farms; with farm foremen, farm staff or neighbouring farmers each deciding on 1-2% of farms *[total >100%, as some multiple answers were given].*

Agricultural contractors trimmed hedges on 69% of farms, with most of the others being trimmed either by the farmer/manager (23%) or farm staff (8%). (Fig 14)

Where contractors were used for hedge trimming, 54% were said to usually carry out the work within one week of the farmer's preferred target date *(Question 21)*. 13% were usually four weeks late and 4% were eight weeks late.

Figure 14. The percentage of farms where decisions on timing were made, and actual cutting done, by the farmer/manager (M), farm foreman (F), farm staff (S), contractor (C), or neighbouring farmers (N). (D = Devon, L = Leicestershire. Y = North Yorkshire, P = Powys, O = Other).



Management of hedge-bottoms

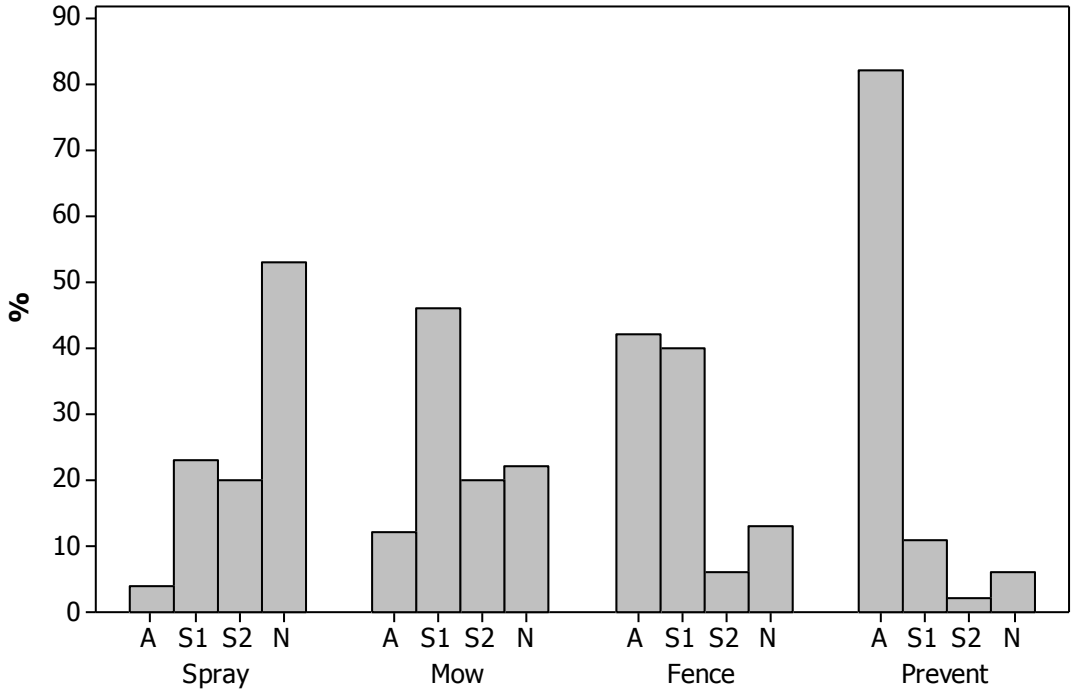
When asked to give the *"typical width left uncultivated around arable fields, between the crop and the base of the hedge (from the bottom of the side of the hedge, not the mid-line)" (Question* 22), two-thirds (66%) of farmers reported uncultivated arable field margins of 2 m or greater. The average width was 2.4 m and ranged from 0.1 to 7 m.

The estimated average width of uncultivated strips beside hedges was 2.5 m on farms with agri-environment agreements and 2.1 m on farms without agreements, but ANOVA showed this difference to be not quite significant (P = 0.086).

27% of farmers sometimes or always sprayed weeds in hedge-bottoms and 58% sometimes or always mowed hedge-bottom vegetation (Figure 15) *(Question 23)*. 42% indicated that they always fenced hedgerows to exclude livestock and 40% sometimes fenced their hedgerows. 82% of all farmers said that they always prevented sprays and fertilisers from contacting hedgerows. Only 8% of respondents stated that they seldom or never did this.

Whether or not a farm was in an agri-environment had no significant effect on numbers of farms that fenced hedgerows to exclude livestock (P = 0.46; Chi-square test).

Figure 15. Management of hedgerows. Farmers who spray to control weeds in hedgerow bottoms (spray), mow vegetation at the base of hedges (mow), fence off hedges to exclude livestock (fence) or prevent sprays and fertilisers contacting hedgerows (prevent). Percentages of responses in each of four categories – always (A), sometimes (S1), seldom (S2) and never (N).



Note: percentages may add up to more than 100% because of multiple responses.

Changed management because of agri-environment schemes or cross compliance

Just over 40% of all farms (n = 493), and 52% of those with agri-environment scheme agreements (n = 327), had changed their hedgerow management in the previous five years because of the requirements of an agri-environment scheme or cross-compliance rules (or both) (*Question 24*). Only 18% of farmers with no agri-environment scheme agreement (n = 158) had changed their hedgerow management in this period for either, or both, of these reasons. Across all farms, 33% had changed their management as a result of agri-environment scheme rules and 25% as a result of cross-compliance rules, with some overlap between the two reasons (16% indicating that both reasons were relevant).

Agri-environment scheme rules appeared to have a similar level of influence across all regions, but the influence of cross-compliance rules was greatest in North Yorkshire and least in Devon.

Of all farmers who had changed their hedgerow management, either as a result of an agri-environment scheme or cross-compliance rules (or both), and the question did not allow differentiation, 39% had stopped spraying weeds, 18% had stopped cutting vegetation, 40% had fenced the hedge and 44% had established buffer strips. 10% had made other changes.

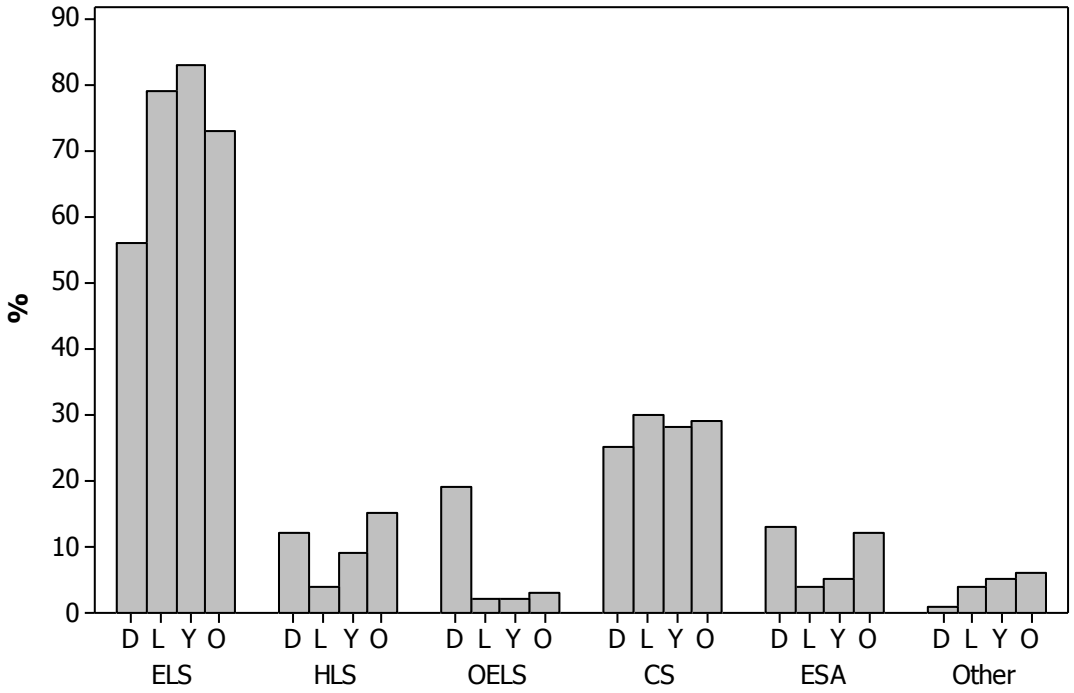
3.1.4 Conservation (Section 4: Questions 25-29)

Agri-environment schemes

Of responding farmers, 67% answered that all or part of their farm was managed by an agri-environment scheme (*Question 25*). Regional figures ranged from 62% (Powys and Leicestershire) to 73% (Devon). The figure for England was 68%.

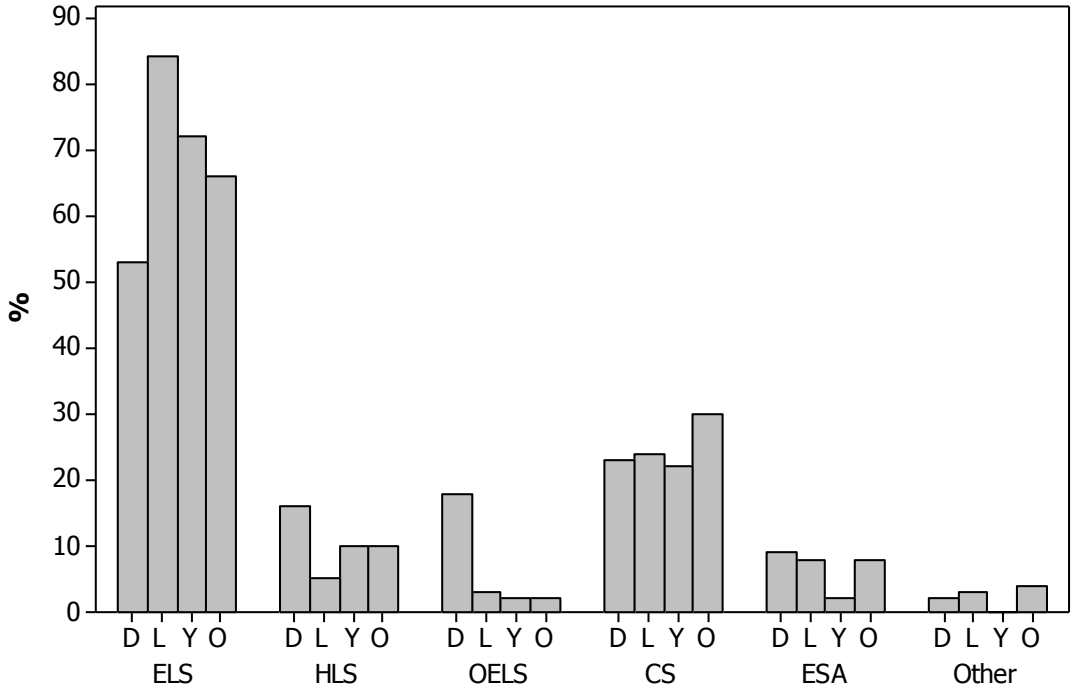
In England, the Entry Level Stewardship (ELS) and Countryside Stewardship (CS) Schemes were the most popular. 59% of all farmers with agri-environment scheme agreements were in ELS and 23% in CS. In Wales (Powys), Tir Cynnal (42% of all agri-environment agreements) and Tir Gofal (49%) were the predominant schemes (Fig 16).

Figure 16. Farms with agri-environment agreements: the percentage of farms in different schemes. Powys results (2% HLS, 8% ESA, 42% Tir Cynnal, 49% Tir Gofal and 7% other) not shown. (D = Devon, L = Leicestershire. Y = North Yorkshire, O = Other).



Across all regions, 45% of farmers were receiving financial assistance with hedgerow management, ranging from 25% in Powys to 53% in Devon and 54% in North Yorkshire. The figure for England overall was 50%. Most English farms that had an agri-environment scheme agreement were receiving payments for hedgerow management, mainly through ELS or CS (Figure 17). For example, 60% of farms in ELS were receiving payments under hedgerow management options – with figures for individual counties ranging from 53% in Devon to 84% in North Yorkshire. In Powys, a large majority (86%) of farmers with Tir Gofal agreements were receiving hedgerow management payments.

Figure 17. Farms receiving financial assistance towards hedge management: the percentage of farms in different schemes. Powys results (9% ESA, 86% Tir Gofal and 5% other) not shown. (D = Devon, L = Leicestershire. Y = North Yorkshire, O = Other).



Conservation management operations

In the previous five years the following proportions of responding farmers had undertaken the following activities (*Question 26*):

Gap filling	54%
Hedgebank restoration	33%
Fencing to exclude livestock	73%
Conservation operations excluding hedges	41%
Hedge coppicing	35%
Hedge laying	50%
New hedge planting	43%
Tree planting in hedges	43%

Gap filling appeared less popular in Devon (44%) than in other regions (54-59%). Hedgebank restoration was more popular in Devon (69%), and under 26% elsewhere, probably reflecting the geographical distribution of hedgebanks.

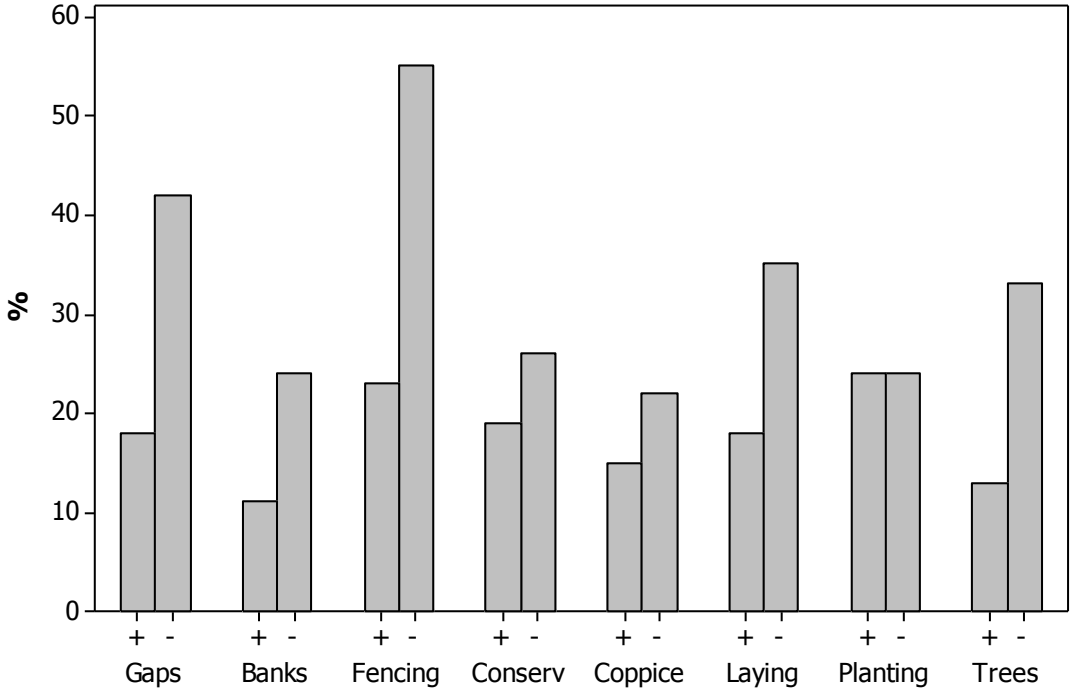
Fencing to exclude livestock had been undertaken on from 58% (North Yorkshire) to 88% (Devon) of farms. Hedge coppicing had been undertaken on 53% of farms in Powys, but only 17% in Leicestershire; while hedge laying had been done on 66% of Devon farms to only 29% in North Yorkshire. Hedge planting had been undertaken on 54% of Powys farms but only 27%

in Devon. Tree establishment was also less frequent in Devon (28%), with remaining regions at 44-50%.

Conservation work, excluding work on hedges, varied from 31% (Powys) to 47% (Other). The types of jobs that were included in these totals were not specified (the information was not asked for in the questionnaire).

The proportions of farmers undertaking these operations with and without grant aid are shown in Figure 18.

Figure 18. Gapping-up, hedgebank restoration, fencing, conservation excluding hedges, coppicing, laying, new hedge planting and tree planting undertaken by farmers, with (+) or without (-) grant aid, within the previous five years. Percentages of all farmers.



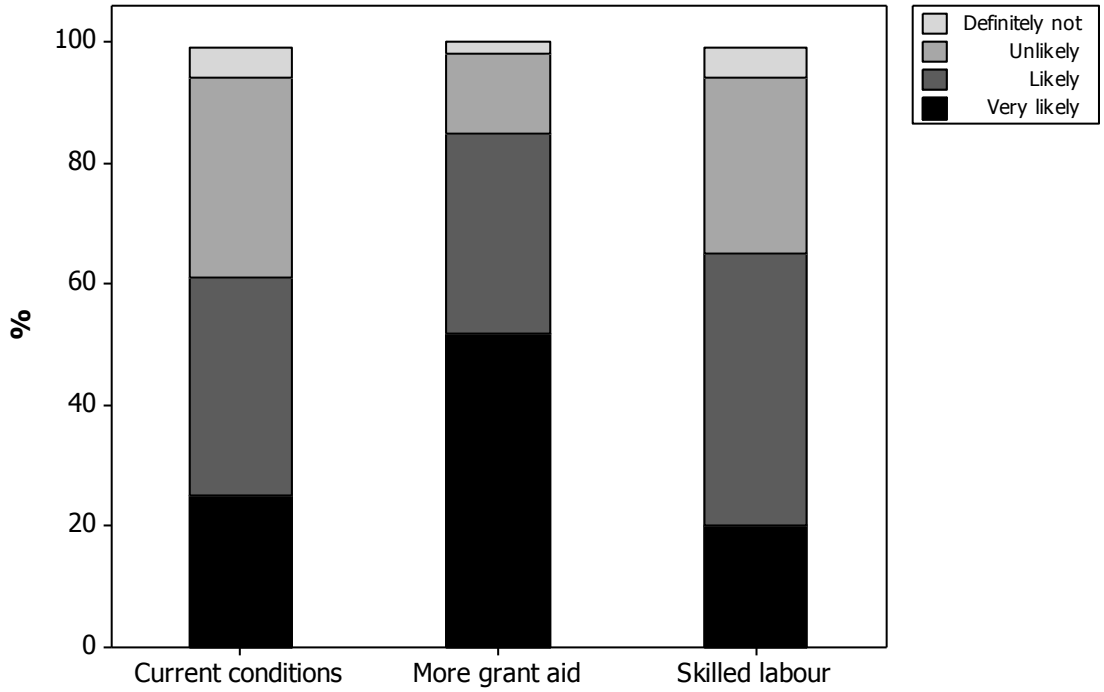
Key:

Gaps - Gap filling in hedges
Banks - Hedgebank restoration
Fencing – Fencing hedges to exclude livestock
Conserv - Conservation operations excluding hedges
Coppice - Hedge coppicing
Laying - Hedge laying
Planting - New hedge planting
Trees - Tree planting in hedges

All of the listed conservation and hedgerow management operations, except hedge planting were more likely to have been undertaken without grant aid than with grant aid (Figure 18). This was particularly so for gap filling in hedges, hedgebank restoration, fencing to exclude livestock, hedge laying and tree planting. This finding may appear surprising, in view of the fact

that 67% of farms were an agri-environment scheme, but most of these were in the English or Welsh 'entry level' schemes (Entry Level Stewardship and Tir Cynnal) which do not include, for example, specific options for hedge planting or restoration. In contrast, the 'higher level' schemes, such as HLS and Tir Gofal do include options for payments for all or most of the listed jobs.

Figure 19. Likelihood of farmers carrying out further hedge conservation operations in future a) under current conditions and arrangements, b) if more grant-aid was available or c) if skilled labour was more readily available. Percentages of respondents giving each of four possible answers.



A quarter (25%) of all farmers indicated that they would be *"very likely"* to undertake similar hedgerow conservation operations again under current conditions, with a further 36% saying that they would be *"likely"* to (Fig. 19) *(Question 27)*. If skilled labour was more readily available, there would be a small increase in the total percentage of farmers who would be *"likely"* or *"very likely"* to repeat work of this sort (65%). However, if more grant aid was available 52% said that they would be *"very likely"* to carry out similar hedgerow operations in the future and 33% would be *"likely"* to.

Management of hedgerows for wildlife

While 45% of hedges were being trimmed annually, only 28% of all respondents thought that this was the ideal frequency of trimming to maximise benefits to wildlife *(Question 28)*. About a third (34%) said that two-yearly trimming was the 'ideal' for wildlife, and 22% said three-yearly.

There were significant differences between the views of farmers in different regions regarding the ideal frequency of trimming hedges (P = 0.003) (Table 14). Farmers in Powys considered more frequent to be ideal, while farmers from "Other" regions thought longer cycles were better.

Table 14. Ideal frequency of trimming hedges for wildlife. Number of answers in each category, broken down by region.

	Time of trimming				
Region	**Yearly**	**2 yearly**	**3 yearly**	**4-6 years**	**Not trimmed**
Devon	29	33	26	6	12
Leics.	23	32	17	5	6
N Yorks.	21	36	18	7	9
Powys	40	30	10	1	7
Other	19	31	33	13	8
Chi-square	36.44				
P value	0.003	**			
d.f.	16				

There were significant differences between the views of farmers in different regions regarding the 'ideal' months to trim hedges, to maximise benefits to wildlife (P <0.001) (Table 15) *(Question 29)*. Powys farmers considered earlier trimming better, and those from "other" regions later trimming. Overall, farmers answered *"Sep/Oct"* (31%), *"Nov/Dec"* (26%) or *"Jan/Feb"* (36%) with 4% in July/August and 3% in March/April.

Table 15. 'Ideal' time of trimming hedges, to maximise benefit to wildlife. Number of answers in each category, broken down by region.

	'Ideal' time of trimming		
Region	**May-Oct**	**Nov/Dec**	**Jan-Apr**
Devon	42	29	36
Leics.	25	22	39
N Yorks.	29	14	46
Powys	46	31	18
Other	24	29	50
Chi-square	33.40		
P value	<0.001	***	
d.f.	8		

Note: May/Jun, Jul/Aug and Sep/Oct groups and Jan/Feb and Mar/Apr groups were combined to facilitate Chi-square analysis.

In the postal survey, farmers were not asked for the reasons for their answers to these two questions on the ideal time of trimming for hedges to maximise benefits to hedges or wildlife. This was, however, further explored in the follow-up survey.

3.1.5 Sources of advice and training (Section 5: Questions 30-31)

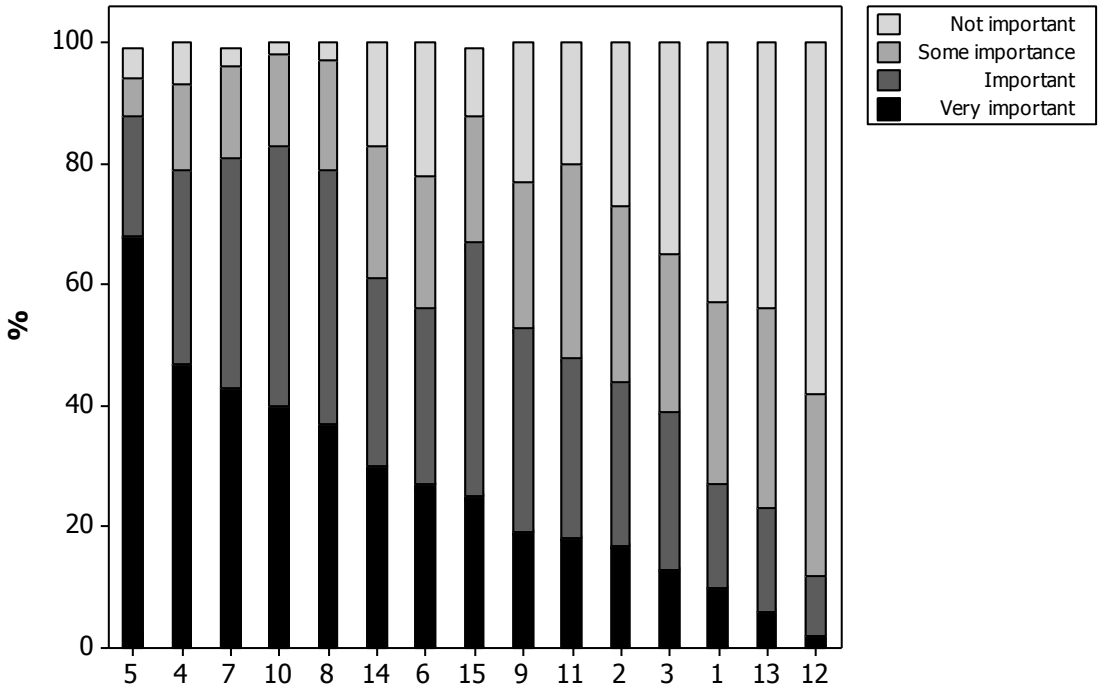
Approximately two-thirds (68%) of all respondents said that they had not used any hedgerow management advice *(Question 30)*. Farmers who had received publications on hedgerow management had got these mainly from FWAG (51 farmers) and Natural England/Defra, (46). 48 farmers had received hedgerow management advice in visits from FWAG, 27 from Natural England/Defra and 34 from agronomists/land agents. With the exception of FWAG (10 farmers), training from other organisations had single figure respondents. Likewise, with the exception of the FWAG (10 farmers) and Natural England/Defra websites, use of other websites were in single figures. Thirty-nine farmers were members of FWAG and 11 of Game and Wildlife Conservation Trust.

Generally, most farmers had implemented the advice received from various organisations (or said that they intended to do so) - at least in part. Most (88%) of those who had received advice from FWAG indicated that they had implemented some or all of that advice (29% *"fully"* and 59% *"in part"*).

Farmers who had not fully implemented advice on hedgerow management gave the following reasons *(Question 31)*: "*too expensive"* (21%), *"impractical"* (27%), *"advice contradicted good agricultural practice"* (14%), "*advice was not environmentally sound"* (13%), "*the appearance of the farm would have been adversely affected"* (15%), *and "skilled labour required was not available"* (10%). The (responding) sample size was not sufficient for a regional analysis.

3.1.6 Hedgerow management – influences (Section 6: Questions 32-37)

Figure 20. Agricultural factors influencing hedgerow management. Percentages of respondents that rated each factor as *"very important", "important",* of *"some importance"* or *"not important"*. The relative importance given to 15 questions are summarised in order of the decreasing "very important" category.



Key:

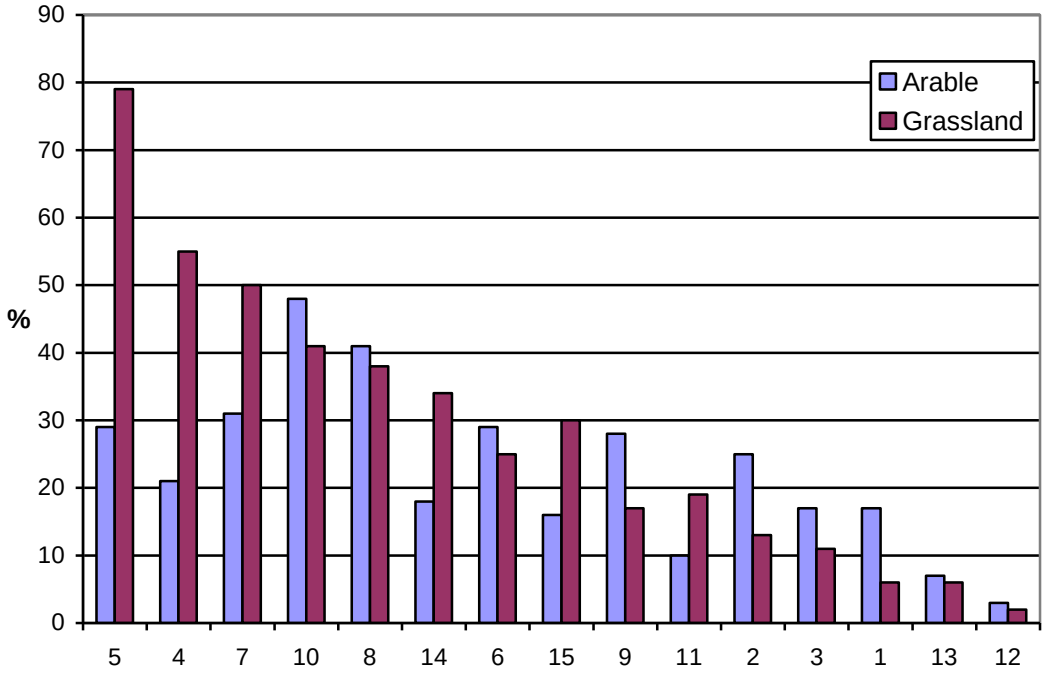
The numbers in Figure 20 refer to the following factors:

5 proving a stock-proof boundary
4 providing shelter for livestock
7 keeping the farm tidy
10 maintaining/improving habitats for wildlife
8 maintaining/improving the appearance of the local landscape
14 cost of laying/coppicing
6 requirements of a highways authority or parish council
15 cost of trimming.
9 maintaining/improving habitats for gamebirds
11 availability of labour
2 controlling weeds
3 reducing shading of crops
1 controlling pests
13 advice from conservation advisor or environmental groups
12 advice from agricultural consultant

The most important factor determining how farmers managed their hedges was *'providing stock-proof boundaries'* - with 68% of farmers rating this as a very important factor (Fig. 20) *(Question 32)*. Next in importance were (in order) *'providing shelter for livestock', 'keeping the farm tidy'*, *'maintaining or improving wildlife habitat'* and *'maintaining or improving the appearance of the local landscape'*. Least important were *'controlling pests', 'advice of conservation advisers and environmental groups'*, and *'advice from agricultural consultant'* (Fig. 20). The cost of trimming and maintenance was also a significant factor in hedgerow management decisions, with 25% rating costs as very important and 42% saying they were important. Very few farmers thought that farm tidiness (3%), the local landscape (2%) and wildlife habitats (2%) were of no importance in this context.

Comparisons between responses from arable and grassland farmers are shown in Figure 21.

Figure 21. Factors influencing hedgerow management. Comparison of results for arable and grassland farmers. Percentages of farmers in each group that rated each factor as 'very important'.

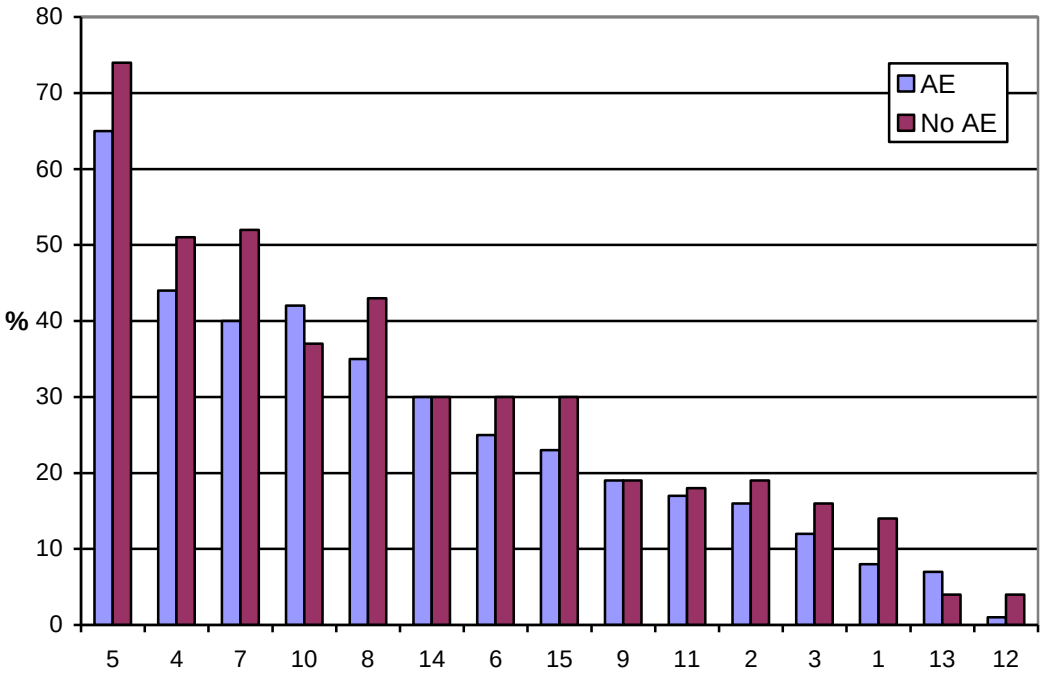


Key: As for Figure 20.

Comparisons between responses given by farmers with and without agri-environment (AE) scheme agreements are shown in Figure 22. Responses are generally similar, although farmers without AE agreements tended to be more likely than those with agreements to regard 'agricultural' factors as very important e.g. providing a stock-proof boundary (factor 5), providing shelter for livestock (4), reducing shading of crops (3), controlling weeds (2) and controlling pests (1). Those without AE agreements were also more likely to regard farm tidiness (7) and maintaining/improving the appearance of the local landscape (8) as very important – although, too many, these two factors did appear to be strongly linked. The cost of hedge trimming (15) and advice from agricultural consultants (12) also appeared to have greater importance to

farmers without AE agreements, although the latter was ‘not important’ to a clear majority of farmers in both groups.

Figure 22. Factors influencing hedgerow management. Comparison of results for farmers with agri-environment schemes (AE) and without an AE agreement (No AE). Percentages of farmers in each group that rated each factor as ‘very important’.

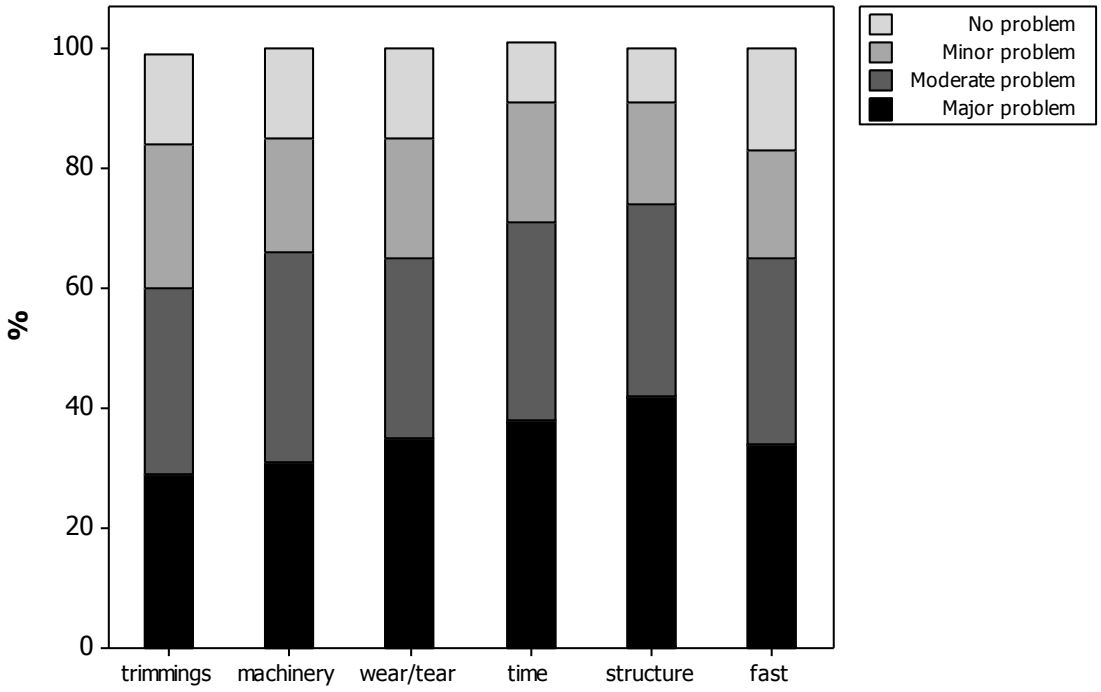


Key: As for Figure 20.

Problems preventing adoption of good practice

Farmers were asked how much of a problem each of six different factors were (or were likely to be) if hedges were trimmed at two-yearly or longer intervals - difficulty in dealing with trimmings, inability of machinery to cope, increased ‘wear and tear’ to machinery, longer time required to trim hedges, deterioration of hedge structure (e.g. thinning at bottom) and fast growing species (e.g. ash) (*Question 33*). Each of these issues was rated as a ‘major problem’ by between 29% and 42% of farmers (Fig. 23).

Figure 23. Perceived problems from trimming at 2-yearly or longer intervals. Percentages of respondents that rated each factor as a *"major problem", "moderate problem", "minor problem"* or *"no problem"*. Questions related to difficulty in dealing with trimmings, inability of machinery to cope, increased wear and tear to machinery, longer time to trim hedges, deterioration of hedge structure, and fast growing species.



Fast-growing species were viewed as a major or moderate problem by 65% of respondents. Analysis of these data in conjunction with answers from *Question 12* indicated that fast-growing species were frequently seen as a problem where ash was common in hedges, but not where elder (*Sambucus nigra*) was common (Table 16).

Table 16. Degree of problem that fast-growing species (e.g. ash) present to the trimming of hedges at two-yearly or longer intervals *versus* common/frequent occurrence of ash or elder (*Sambucus nigra*).

	Ash		Elder	
	Common	**Not common**	**Common**	**Not common**
Major problem	134	15	101	48
Moderate problem	114	21	90	45
Minor problem	61	19	54	26
No problem	45	27	37	35
Chi-square	26.14		6.71	
P value	<0.001	***	0.082	ns
d.f.	3		3	

Data on commonly occurring hedge species *(Question 12)* were also analysed in conjunction with data on the approximate percentage of gaps in hedgerows *(Question 11)*. A contingency table analysis was undertaken for each of the 15 woody species in the questionnaire, but only for field maple, dogwood, wild rose and bramble were these significant (Table 17). Dogwood and field maple were reported as common on farms that reported a lower percentage of gaps. In contrast, wild rose and bramble were more frequent on farms reporting a greater proportion of gaps in hedges.

Table 17. Occurrence of four woody species in hedges which differed in frequency on farms by hedge gappiness. Numbers of respondents in each category.

	Dogwood commonly found?		**Field maple commonly found?**		**Wild rose commonly found?**		**Bramble commonly found?**	
Estimated % gaps	Yes	No	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
0-5%	75	169	83	161	172	72	224	20
5.1-10%	33	111	49	95	90	54	129	15
> 10%	7	50	10	47	29	28	45	12
Chi-square	9.16		6.21		8.64		8.09	
P value	0.010		0.045		0.013		0.018	
d.f.	2		2		2		2	

A majority of all farmers stated that access limited by soil conditions (62%) was a major problem if hedges were trimmed in late winter (*Question 34*). Conversely, only 9% of farmers regarded this factor as no problem. In total, 27% of respondents considered that access limited by growing crops was a major problem but 39% considered this not to be a problem. Only 9% of farmers reported labour availability as a major problem in late winter trimming.

Analysis of responses to *Question 33* broken down by farms with or without agri-environment agreements (*Question 25*), showed that being in an agri-environment scheme had a significant effect on the extent to which some of these issues were regarded as problems when hedges are cut less frequently than annually. Table 18 below shows numbers of responses in each category for both the 'with' and 'without' agri-environment scheme groups. Probability levels were calculated using Chi-square tests. Values <0.05 indicate significant differences in the proportions of 'major problem', 'moderate problem', 'minor problem' and 'no problem' responses between the two groups.

Table 18. Perceptions of problems if trimming hedges every two years or less. Numbers (and percentages) of farmers that thought difficulty in dealing with trimmings, an inability of machinery to cope, wear and tear on machinery, a longer time to trim hedges, deterioration in hedge structure and fast growing species (e.g. ash) would be a 'major', 'moderate', 'minor' or 'no' problem. Data for those in an agri-environment scheme, outside any scheme and all farmers. P value calculated from Chi-square test for AE scheme versus no AE scheme.

	AE Scheme	Major problem	Moderate problem	Minor problem	No problem	P value
Difficulty dealing with trimmings	AES	73 (24)	110 (36)	81 (27)	41 (13)	
	No AES	58 (41)	29 (21)	28 (20)	25 (18)	
	All	131 (29)	139 (31)	109 (24)	66 (15)	<0.001
Fast growing species	AES	93 (31)	98 (33)	64 (22)	40 (14)	
	No AES	55 (41)	35 (26)	15 (11)	29 (22)	
	All	148 (34)	133 (31)	79 (18)	69 (16)	0.004
Longer time to trim hedges	AES	113 (37)	111 (37)	53 (18)	25 (8)	
	No AES	54 (40)	32 (24)	32 (24)	17 (13)	
	All	167 (38)	143 (33)	85 (19)	42 (10)	0.034
Inability of machinery to cope	AES	86 (29)	115 (39)	56 (19)	41 (14)	
	No AES	51 (38)	34 (25)	26 (19)	25 (18)	
	All	137 (32)	149 (34)	82 (19)	66 (15)	0.036
Deterioration of hedge structure	AES	118 (38)	108 (35)	57 (19)	25 (8)	
	No AES	70 (50)	34 (24)	20 (14)	15 (11)	
	All	188 (42)	142 (32)	77 (17)	40 (9)	0.038
Machinery wear and tear	AES	103 (34)	102 (34)	60 (20)	38 (13)	
	No AES	49 (37)	30 (23)	26 (20)	26 (20)	
	All	152 (35)	132 (30)	86 (20)	64 (15)	0.069

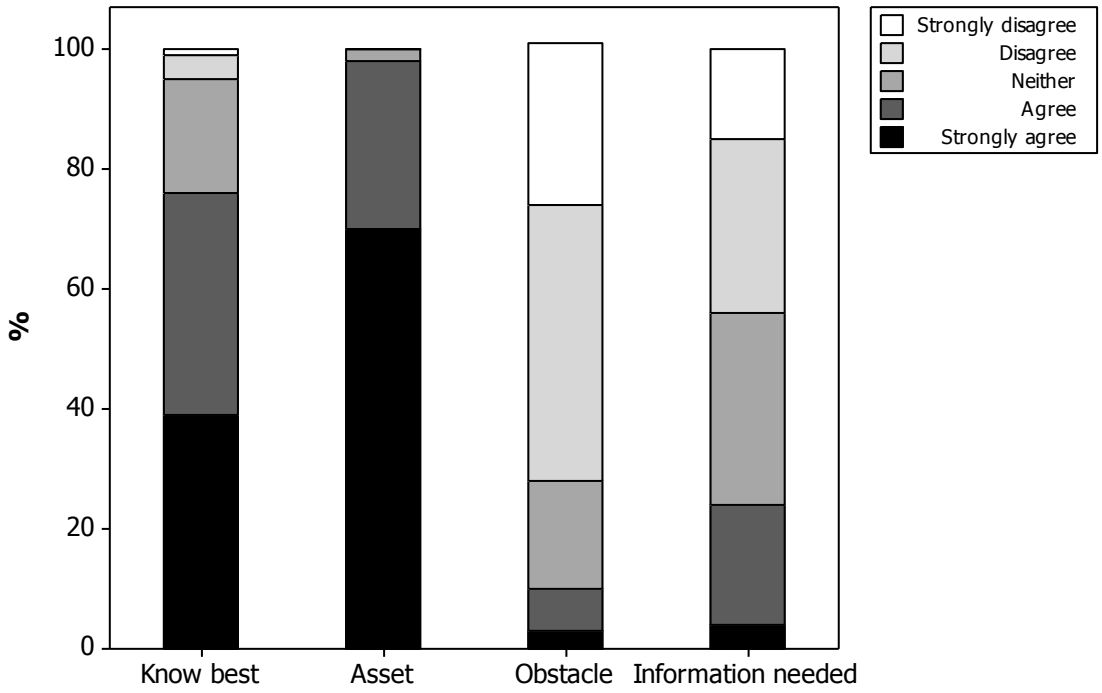
Note: Figures shown in brackets are percentages of all responses.

Difficulty in dealing with trimmings was regarded as a major problem by 29% of all farmers. However, the percentage was significantly higher for farmers without an agri-environment scheme agreement (41%) than for farmers with an agreement (24%) (P <0.001). A similar trend is seen for other perceived problems with less frequent hedge trimming, with a higher proportion of farmers outside agri-environment schemes seeing an inability of machinery to cope, deterioration of hedge structure and fast growing species as 'major problems'. Conversely, however, a higher proportion of farmers outside agri-environment schemes also recognised each of the six potential problems as 'no problem'.

General attitudes to hedgerows and their management

Most farmers (70%) strongly agreed with the statement that *"Good hedgerows are a valuable asset on a farm"* and none disagreed or strongly disagreed (Fig. 24) *(Question 35)*. One in ten farmers (10%) agreed or strongly agreed with the statement that *"Hedgerows are an obstacle to efficient farming"*, but 73% disagreed or strongly disagreed. 39% strongly agreed that *"Farmers know best how to manage their hedges"* and only 4% strongly agreed that they needed better information to improve their hedge management (Fig. 24).

Figure 24. Attitudes to hedgerows and hedge management. Levels of agreement or disagreement with four statements: *"Farmers know best how to manage their hedges"*, *"Good hedgerows are a valuable asset on a farm"*, *"Hedgerows are an obstacle to efficient farming"*, *"and I need better information to improve my hedgerow management"*.



Only 10% of farmers carried out hedge cutting for other farmers (n = 496) *(Question 36)* and 45% (n = 490) were willing to take part in a follow up survey.

3.2 POSTAL SURVEY OF CONTRACTORS

3.2.1 Contractors' work (Section 1: Questions 1-8)

Hedgerow management work

The number of respondents to the postal survey of agricultural contractors was 84, of which 14% were from the East Midlands, 33% from the South-west, 24% from Yorkshire, 13% from Wales and 16% from other areas *(Question 1)*. Overall, 83% undertook trimming, 25% coppicing, 39% laying, 22% tree planting, 29% hedge planting, 17% gapping and 4% grubbing.

Due to the low number of respondents from any single region, an analysis of data by region was not undertaken.

Overall an estimated average of 27% of the respondents' total time on farm contract work was said to be spent on hedgerow management operations *(Question 4)*. In a typical year, the average number of farms on which each contractor undertook hedgerow management operations was 18 *(Question 5)*.

All contractors charged for trimming by the hour. For coppicing, 56% charged by the hour, 25% by the metre and 19% at a fixed price. For laying these figures were 33%, 57% and 10% respectively and for hedge planting they were 41%, 23% and 36% (*Question 6*).

The average price for trimming was reported to be £22.53/hour. For coppicing the average prices were reported as £125/day, £24.56/hour or £6.80/m. For laying, the average prices were reported as £125/day, £18.78/hour or £8.31/m. For hedge planting the equivalent prices were reported as £116.67/day, £12.00/hour or £10.56/m (*Question 7*).

Well over half (61%) of all contractors stated that they did "*try to time hedgerow management work to coincide with other contract work on a farm*" *(Question 8)*.

3.2.2 Hedge trimming (Section 2: Questions 9-19)

Length of hedgerows trimmed

We suspect that some distances were entered in metres not kilometres. If we eliminate two responses of 18,000 and 40,457 km, then the average estimated total length of hedgerows trimmed for clients every year was 407 km (253 miles) *(Question 9)*, but the lengths trimmed by individual contractors varied enormously - from a minimum of 0 km to a maximum of 6,000 km [median = 100 km], with very large totals presumably being tackled by agricultural contractor companies with several staff.

Frequency and timing of trimming

Hedges around arable fields were most commonly trimmed in September/October (76% of respondents indicating that they "usually trimmed" in these months), July/August (30%), November/December (28%) or January/February (19%) *(Question 10)*.

Hedges adjacent to grassland were mainly trimmed in November/December (66%), September/October (49%), January/February (27%), with July/August (4%) and March/April (3%).

Hedges adjacent to public roads were mainly trimmed in November/December (53%), September/October (46%), January/February (33%), July/August (27%) and March/April (7%).

Hedges adjacent to farm tracks were mainly trimmed in November/December (58%), September/October (43%), January/February (37%), July/August (15%) and March/April (4%).

NB percentages may add up to more than 100 because of multiple responses by contractors.

A majority of contractors (58%) said that dates were not specified by the client. Of the remainder, 68% reported that they were able to carry out hedge trimming "within one week" of their clients' preferred date *(Question 11)*.

Hedge heights after trimming

After trimming, hedges cut by the surveyed contractors were mostly (42%) in the '1.5-2.4 m' height range, with 32% left 'less than 1.4 m high' and 26% 'over 2.5 m' [n = 64] *(Question 12)*.

Hedge shape

56% of hedges were trimmed to a 'box' shape and 44% to an 'A' shape. The top of rectangular hedges was always cut by 79%, cut alternately by 19% and never cut by 2%. Both sides of rectangular hedges were cut by 72%, and alternate sides cut by 28%. For A-shaped hedges the sides were always cut by 77% and alternately by 23%. *(Question 13)*.

Equipment used for trimming

Most (94%) respondents used a flail for hedge trimming *(Question 14)*. A few (16%) used a circular or rotary saw. 4% used a finger-bar trimmer. NB percentages add up to more than 10% because of multiple responses.

Decision making

Survey results indicate that the clients always (32%) or mostly (29%) made the important hedgerow management decisions *(Question 15)*. Only 6% said that important decisions were made mostly by the contractor and 3% said that the contractor was always responsible. A further 29% indicated that decisions were usually made jointly.

Frequency of trimming

Annual cutting was reported for an estimated 53% of their clients' hedges. An estimated 39% were trimmed every two years, 7% every three years, and 1% every 4-6 years. 1% was left untrimmed *(Question 16)*.

83% of contractors thought that the frequency of trimming had changed (93% from 1 to 2-yearly, 26% from 1 to 3-yearly and 5% other) *(Question 17)* and 68% considered the timing of hedge trimming to have changed (51% later trimming of arable hedges, 80% later trimming of grassland hedges, 49% later trimming of trackside hedges and 17% other changes) *(Question 18)*.

22% of contractors thought it was legal to remove a whole hedge without permission, 4% thought it legal sometimes, 6% did not know and 68% replied "no" *(Question 19)*.

3.2.3 Management of hedge for wildlife (Section 3: Questions 20-21)

Management of hedges for wildlife

A third (33%) of contractors indicated that annual hedge trimming was required to maximise the value of hedges to wildlife *(Question 20)*. A quarter (25%) felt that two-yearly trimming was better for wildlife, and a third (33%) considered three-yearly trimming the best way of achieving this aim. The remaining 8% thought that not trimming was of most value to wildlife.

When asked "*at what time of year, ideally, should hedges be cut to maximise their value to wildlife?*" many ticked more than one of the two-monthly periods offered as possible answers *(Question 21)*. The most frequent answers were 'January/February' (39%), 'November/ December' (26%) and 'September/October' (25%). Relatively few opted for 'July/August' (7%), 'March/April' (1%) or 'May/June' (1%).

3.2.4 Sources of advice and training (Section 4: Questions 22-23)

Advice and training received

The main sources of advisory publications on hedgerow management were FWAG (37%), Natural England/Defra (28%), local Wildlife Trusts (19%), agronomists or land agents (16%), ADAS (14%), Lantra (14%) and 'other' (14%) *(Question 22)*. Publications from other organisations named on the questionnaire were used by less than 10%. Visits, training, website use and membership were sparsely reported for each organisation (<10%).

Of those contractors that had received advice/training, 56% said they had fully applied the advice received (or intended to do so), 26% had partly applied the advice (or would do) and 18% had not/did not intend to. Implementation of advice/training received appears to have been patchy, but few conclusions can be safely drawn on this point - because of the very small sample size. *Question 23*, which asked why contractors had not fully implemented the advice/training received, should only have been answered by 15 respondents, so conclusions are difficult. However, several considered that the advice received had been '*impractical*' or '*contradicted good agricultural practice*'. The lack of skilled labour was the only category not ticked at all.

3.2.5 Hedgerow management – influences (Section 5: Questions 24-28)

Factors determining hedgerow management

The most important factors determining the ways that hedges are managed *(Question 24)* were considered to be *'maintaining a stock-proof field boundary'* (87% rating this as 'important' or 'very important'), *'maintaining/improving habitats for wildlife'* (88%), *'keeping the farm tidy'* (80%) and *'shelter'* (80%). The least important factors were *'advice from agronomist/land agent'* (82% rating this as of 'some importance' or 'not important'), *'controlling pests'* (69%) and *'advice from conservation adviser/environmental groups'* (64%) (Table 19).

Table 19. Relative importance of named factors determining the way hedges are managed - percentage of answers in each category (all respondents).

	Very important	Important	Some importance	Not important
Providing a stock-proof boundary	70	17	7	7
Requirements of a highways authority or parish council	41	26	24	9
Providing shelter for livestock	40	40	15	5
Maintaining/improving habitats for wildlife	36	49	11	4
Keeping the farm tidy	33	47	17	3
Maintaining/improving landscape	32	42	20	7
Cost of hedge-laying/coppicing	31	29	25	15
Cost of trimming and maintenance	28	41	23	8
Maintaining/improving habitats for gamebirds	28	36	22	14
Reducing shading of crops	24	42	25	10
Controlling weeds	16	29	39	17
Availability of labour	10	29	33	29
Advice from conservation adviser/ environmental groups	7	28	32	32
Controlling pests	7	23	30	39
Advice from agricultural consultant	4	14	34	48

Problems preventing adoption of good practice

Dealing with trimmings was seen as a major or moderate problem by 70% of respondents when trimming at 2-yearly or longer intervals. Similarly the inability of machinery to cope (73%), increased wear and tear (87%), increased time (88%), deterioration of structure (88%), and fast growing species (87%) were also seen as major or moderate problems *(Question 25)*.

The main problems preventing late winter hedge trimming were seen as *'limited access due to soil conditions'* (seen as a major problem by 71% of respondents) or growing crops (45%) *(Question 26)*. Only 8% regarded growing crops as *'no problem'* and no contractors placed soil conditions in this category. Conversely, *'limited availability of labour'* (10%) was generally not regarded as a serious problem in this respect.

Availability of skilled labour was only seen as a major problem by 8% of respondents when considering problems to hedge management operations *(Question 27)*. 21% considered timing conflicts with crop management as a major problem, with contradiction with farmers' views (4%) and hedgerow trees (15%) less serious.

General attitudes to hedgerows and their management

A list of statements relating to hedgerows and their management were put to the surveyed contractors, who were then asked to rate each according to their level of agreement or disagreement *(Question 28)*. One quarter (29%) strongly agreed (and a further 46% agreed) with the statement that *"Farmers know best how to manage their hedges"*. Those statements that brought greatest disagreement from contractors were "*Hedgerows are an obstacle to efficient farming*" (50% disagreed, 28% strongly disagreed), and "*I need better information to improve my hedgerow management*" (34%/20%).

3.3 FOLLOW-UP SURVEY

3.3.1 Face-To-Face Interviews

Completion of postal survey

Although questionnaires had previously been returned from all of the 128 farms visited in the follow-up survey, three of the farmers interviewed (2.3%) could not recall having personally responded to the postal survey.

Section 1: *Your Farm* (Questions 3-5)

Farm size

The average farm size *(Question 3)* was 94 ha (Devon 89 ha, Leics. 97 ha, N Yorks. 85 ha, Powys 105 ha).

Cropping and livestock changes

Almost a quarter (23%) of farms had seen a major change in cropping in the previous 10 years *(Question 4)*, with the greatest change recorded in North Yorkshire (50% of farms).

The main changes were in areas of winter cereals, spring cereals, short-term grass, sugar beet and 'other crops'. Changes in areas of winter cereals and sugar beet were mainly downwards, but changes in spring cereals, short-term grass and other crops were mainly upwards. Ten farms (8%) had decreased their area of winter cereals, but only two (2%) had increased their area.

Changes in grassland areas are shown in Table 20 below.

Table 20. Numbers of farmers, indicating that their area of grassland (short-term or permanent/long-term) had shown a major increase or decrease in the past 10 years.

	Major increase	Major decrease
Devon	3	2
Leics.	2	1
N Yorks.	5	1
Powys.	1	0
All	11	4

Only two farms (1.6%) had increased their woodland area, but none had significantly less woodland than 10 years previously.

Over half (53%) of farmers had made major changes in their livestock numbers in the previous 10 years *(Question 5)*.

Numbers of sheep had shown more decreases (23% of all farms) than increases (9%). The most changes in sheep numbers were recorded in Powys, where 13 farms (41%) had reduced sheep numbers and only two farms (6%) had increased numbers, Numbers of beef cattle had increased on 19% of farms and decreased on 13%. The county most responsible for this difference was Leicestershire, where eight farms (25%) had increased beef cattle numbers and only one farm (3%) had reduced numbers. In the other three counties, similar numbers of farms had increased and decreased beef numbers. Dairy cow numbers had increased on 9% of farms and decreased on 7%.

Where numbers of grazing livestock had changed in the past 10 years, stocking densities of sheep and beef had mostly remained stable or decreased. For example, across all farms in the survey, sheep densities showed substantially more decreases than increases (4% up, 15% down) and the pattern for beef cattle was similar (3% up, 6% down).

Section 2: *Hedgerow management* (Questions 6-29)

Impacts of changes in farm management on hedgerows

Changes in farm cropping or livestock numbers/densities were thought to have had an impact on hedgerows and hedgerow wildlife by 20% of all farmers, but 48% believed that any major changes in their farming practices had not had any impact *(Question 6)*. Of those that answered this question (for many it was not relevant, because they had made no major changes to crop areas or livestock numbers), 29% thought that there had been a resultant impact on hedgerows or hedgerow wildlife and 71% thought that there had been no impact.

Recorded comments indicate that some farmers recognised a benefit for hedgerows when sheep numbers were reduced. For example, one Yorkshire farmer commented that *"since the end of my sheep enterprise, hedges (particularly the bottoms) have thrived."* Another farmer, in Powys, said that reducing the stocking density of his sheep had resulted in *"less damage to hedges and less frequent break outs"*. Another Powys farmer who had increased cattle

numbers, to replace part of his sheep flock, observed that this had benefited hedgerows, because *"sheep get into hedges more"*.

Other farmers commented on the positive impacts that 6 m grass margins around arable fields, or adjacent game or wild bird seed strips, had had on their hedgerows.

The impacts of double-fencing hedges and the exclusion of sheep and other grazing livestock on hedgerows were also recognised, with the benefits including thicker, more dense hedges. One farmer in Powys commented that, although overgrazed by sheep in the past, his hedges were now in better condition after they had been double-fenced with support from the Tir Cynnal agri-environment scheme. A farmer in Leicestershire remarked that *"sheep are damaging to hedges, but most are now double-fenced – this helps the hedges"*. A lot of farmers were successfully protecting their hedges from livestock with temporary electric fencing.

A farmer in Devon commented that a "change from winter cereals to grass will have enhanced wildlife", but gave no further explanation to justify this assumption. Another Devon farmer who had converted some of his arable land to grassland for sheep grazing pointed out that, in fields that were previously in cereal production, *"hedges need better fencing to protect them from sheep, which have caused some damage"*

Changes in hedgerow management

A clear majority of farmers (64%) indicated that there had been a major change in some aspect of their hedgerow management, during the previous 10 years *(Question 7)*. Some of the main changes are shown in Table 21 below. Generally, across all four counties, farmers indicated more positive changes in their hedgerow management than negative ones.

Table 21. Percentages of farms making various changes in hedgerow management, during the previous 10 years.

	All farms	Devon	Leics.	Powys	N Yorks.
Hedges cut shorter	5	9	3	3	3
Hedges allowed to grow taller	38	28	34	28	59
Hedges trimmed more frequently	7	13	3	6	6
Hedges trimmed less frequently	36	25	41	19	59
Introduced laying or coppicing	17	13	3	31	22
Stopped laying or coppicing	4	3	0	9	3
Introduced flailing	5	6	6	6	0
Stopped flailing	0	0	0	0	0
Net removal of hedgerows	1	0	0	3	0
Net planting of hedgerows	25	16	18	34	31
Net felling of hedgerow trees	1	0	3	0	0
Net planting of hedgerow trees	26	34	3	9	56

Results also suggest a trend away from late summer (July/August) hedge trimming towards autumn-winter trimming (Sep/Oct or Nov/Dec). Although the majority (72%) had not changed their main period of hedge trimming in the past 10 years, of the 36 farms (28%) that had changed 34 (94%) were now trimming later. Only one farm (in Devon) had brought forward the date of hedge trimming (a *"slight change to earlier trimming, to avoid poaching/rutting in pastures"*) and the other had not trimmed their hedges previously. However, another Devon farmer had reverted to annual trimming, following a period of less frequent cuts – *"We cut hedges two-yearly for five years under the ELS scheme, but have now reverted to annual trimming because growth was too fast – too 'sticky' mainly due to ash"*.

Allocating numerical scores to each of the two month periods in the questionnaire (1 = May/Jun, 2 = Jul/Aug, 3 = Sep/Oct, 4 = Nov/Dec, etc.), it was possible to calculate mean scores for the main periods of hedge trimming before and after any change. The results show that, for those farms that reported a change in trimming date, the average date was now approximately 1-2 months later. For all farms, the mean score increased from 2.5 to 3.8. The largest numbers of farmers who had changed their trimming date were in Powys (16) and North Yorkshire (12). In Powys, mean scores increased from 2.2 to 3.4 and in North Yorkshire from 2.8 to 4.1.

In the three English counties, the Entry Level Stewardship Scheme (ELS) was frequently the primary reason for a change to later or less frequent hedge trimming. Comments recorded included:

- *"Hedges are cut less frequently because of ELS"*
- *"The main changes have been trimming every two years on rotation (under ELS) and leaving some hedges to grow taller"*
- *"I wanted to enter ELS for the benefits of payments for hedges… and it works well" and*
- *"All changes were driven by Stewardship."*

Agri-environment schemes were also an important factor in decisions to trim later in Wales. For example, comments from Powys farmers included:

- *"Tir Cynnal and an interest in wildlife conservation have been the main drivers"*
- *"Main changes to hedge management were due to the Tir Gofal Scheme"*
- *"Now in Tir Cynnal – usually trim in October" and*
- *"Tir Gofal and ESA schemes have been the drivers for planting of new hedges and cutting later."*

The most important reason for a change to slightly later average hedge trimming times in Powys, however, appears to have been the new requirement under the Single Farm Payment Scheme in Wales that hedges must not be trimmed before 1st September (e.g. comments included *"Later start to hedge trimming due to SFP requirements", "Changed time of trimming from early August to early September because of SFP requirements"*).

Other reasons given included *"Timing of cutting is later in the year because I went from cutting hedges myself to using a contractor, who just comes late"*.

Some farmers have continued to trim hedges at the same time of year, but now trim less frequently. For example, one farmer in North Yorkshire commented *"Cutting time is the same as always, autumn for arable and winter for grass, but hedges are now cut in alternate years."*

Several farmers who had changed their hedge trimming dates were not happy with this, even if they had chosen to include hedgerow options under ELS or another agri-environment scheme. For example, one Leicestershire farmer complained *"Some of our hedges are cut every two years under ELS, but this is bad for small birds and other wildlife; the hedges are widening out and are not stock-proof anymore" and goes on to suggest that "they should have just made people grow bigger hedges."*

Impact of changes in hedgerow management on wildlife

Most farmers (69%) thought that the changes to their hedgerow management would have made an impact on their hedgerows and wildlife *(Question 8)*. In almost all cases the perceived impacts were positive ones. Some of the comments recorded on this subject are shown below:

- *"Previously overgrown and unmanaged, and thin at the bottom – but hedges have improved greatly over the past 10 years"* (Devon)
- "*Hedges are thicker and better for wildlife (blossoms and berries) – they also grow down banks and prevent erosion"* (Devon)
- *"Berries available for birds"* (Devon)
- *"The fields were not stock-proof, but another major factor has been to develop wildlife value"* (Devon)
- *"The changes made have hopefully been positive for wildlife"* (Devon)
- *"More wildlife than before"* (Leics.)
- *"Less frequent hedge trimming will help wildlife"* (Leics.)
- *"Cutting every other year, instead of annually, is definitely better for wildlife"* (Leics.)
- *"Yes, more flowering species in the hedges (e.g. honeysuckle and dog rose), which are not seen if hedges are cut annually"* (Leics.)
- *"Creates more shelter for wildlife"* (Powys)
- *"More diversity and more self regeneration of hedges"* (Powys)
- "*Hedges are in better condition, especially because of the double-fencing"* (Powys)
- *"The hedgerows are really full – they are double-fenced and probably better for wildlife"* (Powys)
- *"Hedge-laying has given better cover in the hedges – better for birds and insects"* (Powys)
- *"There are more hedges and connectivity has been increased"* (North Yorks)
- *"Yes – mostly for birds, but also an increase in butterflies and bumblebees"* (North Yorks)
- *"More winter food on hedges for the birds due to cutting less often"* (North Yorks).

Not every farmer agreed, however. As one Leicestershire farmer put it…

- *"Bad for wildlife [trimming less frequently under ELS] – the best hedges are ones grazed by cattle, as they are more compact."*

Some of the Yorkshire farmers in particular seemed ambiguous about the benefits of some of the changes that they had observed as a result of changes to their hedgerow management. For example, the following comments were recorded from farmers in that county:

- *"More badgers and rabbits – the rabbits causing measurably more damage (excavations and barking) than previously – but berried hedges have increased bird numbers"*
- *"Increase in bird numbers and variety, particularly barn owls – also an increase in rats (any connection?) and more squirrels"*
- *"Greater variety of birds – but more woodpigeons."*

Influences on hedgerow management

When asked about the main influences determining how they manage their hedgerows *(Question 9)*, farmers very frequently mentioned the need for stock-proof boundaries, shade and shelter for livestock, providing wildlife benefits, agri-environment scheme requirements and a desire for farm tidiness (or "neat" hedges). Other influences mentioned by several farmers included the need for easy access to arable fields, enhancing landscapes, contractor availability, cross-compliance rules and cost. A few examples of comments recorded are given below:

- *"To keep stock in – that's what they were planted for"*
- *"Encouragement for wildlife and keeping hedgerows stock-proof – the two things are compatible"*
- *"Stock-proofing – keep dense with annual trimming, but fenced as well"*
- *"Consideration of shade/shelter – hedges planted north-south to provide shelter from prevailing winds"*
- *"Need shelter for cattle – conservation, cost and my contractor are all secondary influences"*
- *"ELS points for two-yearly cutting and this is better for wildlife"*
- *"Hedges are only cut when they get too big – I am not fussed about tidy hedges and I like to grow them for wildlife"*
- *"Shelter for lambs is my main influence – and landscape value"*
- *"Conservation and the protection that larger hedges provide for the cattle – protection from wind and shade for the cows"*
- *"I am committed to environmental and visual improvements, within economic reality"*
- *"Hedges are the only real environmental habitat – we haven't got any watercourses or woods – and I am keen on enhancing wildlife habitats"*
- *"Around arable fields the main aims are to maintain adequate clearance and access – around livestock fields to provide shelter and encourage birds"*

- *"I have always managed my hedges in much the same way, but have seen the benefits of biannual trimming under ELS – I do not want to have hedges too tall, however, and they are difficult to cut after more than two years"*
- *"My attitude has been changed by Stewardship – ELS and now HLS – this is the key driver"*
- *"You have got to keep your farm tidy – if you keep hedges tidy, well brushed, then you have shelter for your stock"*
- *"As a tenant farmer, I have to keep the farm tidy – and also have to consider health and safety along the main roads"*
- *"Tidiness of the farm – I have pulled some hedges out of ELS because I felt that they were no longer being managed correctly"*
- *"I want to keep hedges under control, but in a way that doesn't affect the wildlife"*
- *"I like tight, neat hedges – and always need good access to maximise my cropped land"*
- *"Balancing arable farming with good hedgerow management"*
- *"Consideration of the sunlight requirements in my hay fields determines how frequently the hedges are cut"*
- *"Smaller hedges are easier for the contractor to manage".*

The two most important factors determining the way in which farmers managed their hedgerows were (in order) *'the need for stock-proof barriers'* and *'landscape benefits'*; followed by *'labour availability'*, *'grants', 'timing to fit in with other work'* and *'tradition on this farm'* (*Question 10*). Each of these were classed as *'very important'* by >30% of interviewees (Table 22). The two most important factors (stock-proof barriers and landscape benefits) were rated as very important for over 65% of all farmers, even though many farmers had no livestock, and unimportant by only about 15%.

Despite the importance given to maintaining hedgerows as stock-proof barriers, several farmers commented that fences were also needed e.g. *"We need to fence hedges to make them stock-proof", "We need to fence anyway"* and *"Also need to fence hedges"*. It should also be noted that for some farmers 'landscape benefits' equated with 'tidy' hedges. For example, comments recorded against 'landscape benefits' included *"tidy countryside"* and *"good to look tidier"*. Another commented however that it was *"nice to have big hedges"*.

The least important factors were (in order) the influences of *'farm foreman/workers'* and *'other farmers', and 'soil erosion'*. Each of these were classed as *'not at all important'* by >75% of interviewees (Table 22).

The *'need for stock-proof barriers'* came out very strongly as the main factor determining the method of hedgerow management, with 74% of farmers rating this as 'very important' and only 14% considering it to be 'unimportant' (Table 22). This was clearly the main factor in Powys ('very important' to 81%) and narrowly so in Devon (84%, just ahead of *'landscape benefits'*) (Fig. 23). *'Landscape benefits'* was the most important factor for farmers in Leicestershire and North Yorkshire, rated as slightly more important than stock-proof barriers (Fig. 25).

Table 22. Relative importance of various factors in determining the way in which farmers manage their hedgerows. Percentages of responses in each of three categories ('very important', 'less important' and 'not at all important'). All four counties combined.

	Very	Less	Not
Labour availability	41	13	45
Grants	41	16	42
Tradition - on this farm	34	24	41
Tradition - in this area	24	27	48
Landscape benefits	66	19	15
Outside influences -			
farm foreman/workers	5	5	90
hedgerow contractors	27	18	54
other farmers	5	17	77
family/friends	19	20	62
Farming considerations:			
soil erosion	9	13	78
need for stock-proof barriers	74	12	14
timing to fit in with other work	40	25	36
problems caused by trimmings	14	23	64

The comments from farmers indicate that labour availability can be a problem for those who look after their own hedge management (e.g. *"We do our own hedge trimming, but only have one worker available three days per week, so have limited time for hedge work – we would lay hedges if we had time"*) and, occasionally, for those who depend on contractors (e.g. *"It can be difficult finding a contractor at the right time"*). However, most farmers who commented on the availability of contractors for hedge trimming, mainly farmers in Powys, indicated that this was not an important factor (e.g. *"I use contractors who are available when needed"* and *"Not a problem, as the contractor is available when needed"*).

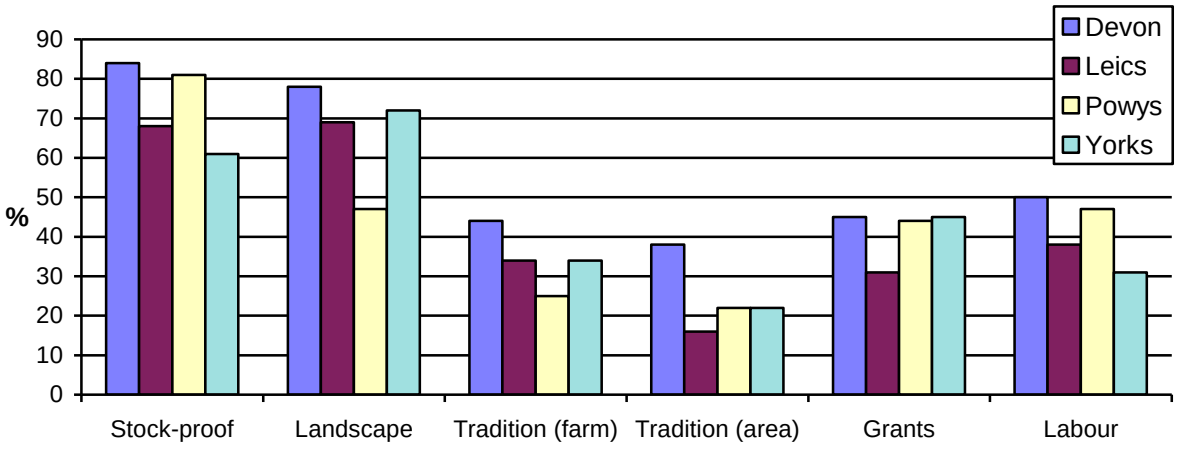
Tradition was considered to have some importance to a majority of farmers, although there were differences of opinion on the meaning or value of 'tradition'. For example comments included a simple *"we have always done it this way"* and *"I wouldn't want to be different"*, to specific examples of local traditions e.g. *"We do things in the Montgomeryshire style", "We are maintaining traditions of farming and hedge type in the Vale of Pickering"* and *"Tradition was always to cut prior to the Yorkshire Show in the second week of July"* Although some clearly want to follow local tradition, others see the 'normal' practices of their neighbours in an unfavourable light with comments such as *"Local tradition is not always ideal" and even "Murdering hedges is now traditional"*!

Grants or agri-environment scheme payments were a very important factor for 52 farmers (41%) (Table 22). Some of the comments noted included:

- *"Countryside Stewardship Scheme payments determine current management"* (Leics)
- *"Hedge management costs money – we previously received ESA payments, but no current grants"* (Powys)
- *"Less important, but I would welcome grants to plant-up hedges"* (North Yorks)
- *"Grants were important at the start"* (North Yorks)
- *"A big help, but not the main motivator"* (North Yorks).

Some farmers receiving agri-environment scheme payments were still continuing their previous hedgerow management, or were using payments to implement their preferred management methods. For example, *"I am now being paid for what I always did for no payment"*, *"ELS payments received, but we have always managed our hedges well", "Hedges have not been trimmed for the past two years – because of ELS and the way we like to see our hedges".* Others had more reluctantly changed their management e.g. *"ELS means cutting less frequently than I would otherwise do"*.

Figure 25. Relative importance of various factors in determining the way in which farmers manage their hedgerows. Percentages of responses in *'very important'* category. 'Breakdown by county.



As in the 1999 survey (Britt *et al.*, 2000), some farmers appeared to make a direct link between *'tidiness'* and *'landscape benefits'*.

The role of hedgerow contractors was considered to be very important in determining how hedgerows were managed on 27% of farms (Table 22). One farmer in Powys said that *"the contractor, who comes in Jan/Feb on a local rota, is the main influence"*. Another, in Leicestershire, stated simply that "*Most decisions are made by my contractor".* Some take the contractor's views into account, even though the farmer makes the final decision. For example, one farmer in Devon pointed out that *"Contractors don't like the look of a hedge cut after two years"* and another (in Powys) said that he always had a *"two-way discussion with the contractor, but it is mainly my decision"*. Several farmers made the point that their contractors

would be reluctant or might refuse to trim hedges less frequently than annually, because of the resultant wear and tear or potential damage to flails.

On many farms, however, the farmer made it clear that hedgerow management decisions were theirs, and that their contractor *"does what I want"* or *"does as he is told"*.

Some farmers were dependent upon the availability of their contractor to trim hedges at the desired time, and this might be largely outside the farmer's control e.g. "*Depends on his work schedule – must fit hedge trimming in with his other work"* (North Yorks).

Few were influenced by other farmers, but one commented that *"I pick up ideas from hedge management on other farms".* Another suggested that other farmers did not necessarily set a good example – *"I have had bad experience of very bad practice from some".*

A small number saw that hedgerows could help to reduce soil erosion. Comments noted included those from one Devon farmer who mentioned that hedges "prevent the erosion of banks caused by stock" and *"I have always grown hedges bigger to stop erosion".*

The need for stock-proof barriers was considered very important to some farmers. One Leicestershire farmer remarked that it is *"what hedges are there for".* More specifically, two others commented that hedgerows *"stop cattle and keep them apart"*, and that "*you need a good hedge for sheep and suckler cows"*. A larger number, however, made the point that hedgerows would not actually be stock-proof if they were not also fenced. Several farmers considered the shade and shelter that hedgerows provided for livestock to be important benefits.

Timing hedge trimming to fit in with other farm work is an important factor for many farmers. On arable farms, this was commonly the reason for trimming hedges between harvest and cultivations for the next crop. For example, one commented that although trimming was done by contractors, *"we need to fit hedge trimming in with harvest and cultivations*". More generally, other comments included *"we go back to hedge trimming between other jobs".* Farm diversification has brought other considerations into play for some farmers. For example, one Leicestershire farmer said that *"hedge work must fit in with farming and other activities, such as our car boot sales."* For others, integration with other farm operations was important, but not regarded as a problem e.g. *"Hedge work fits in well with other work on the farm."*

Problems caused by trimmings, in particular thorns in the feet of sheep and cattle, and punctures to vehicle tyres (bicycles and cars), brought comments from many of the interviewed farmers. These problems were often associated with infrequent trimming, or cutting in late autumn or winter – and were sometimes cited as the reason for a refusal to trim hedges in winter or for their reversion to annual trimming. Example comments are given below:

- *"We have had problems with lameness in the cattle, so we therefore cut annually and as early as possible - in September or October."*
- *"Occasional problems with the feet of lambs and cattle"*
- *"Problem of thorns in the feet of sheep and lambs"*
- *"Thorns in feet and in the wool"*
- *"This can be a problem if cutting two-yearly, but we have had no problems here"*

- *"Hedges are cut when there is no stock present"*
- *"Bigger hedges produce more trimmings"*
- *"We have a holiday home on the farm and punctures on bicycles is an issue, as the roads aren't swept"*
- *"Have to put up with occasional punctures"*
- *"Roads – less of a problem since reverting to annual cutting"*
- *"Occasional problems – lambs' feet and punctures"*
- *"No problems, as long as hedges are cut every year".*

Several farmers mentioned that the harder, 'woodier' thorns left on the ground after winter trimming were much more of a problem and that *"earlier cutting produces softer trimmings"*. Comments included *"there is more damage to feet if hedges are cut late"* and *"trimming late in the year causes problems, with thorns in lambs' feet".* Another farmer stated that thorns in the feet of livestock was *"a very real problem"* and argued *I would like to see it permissible to cut hedges in livestock fields frequently during summer, to avoid development of hard thorns"*.

One farmer recognised that *"it is a problem, but doesn't affect our hedge management"*. Another, however, had withdrawn hedgerows from an Environmental Stewardship Scheme hedgerow management option, because of his perception that less frequent trimming was the cause of punctured tyres… saying that *"we have removed some lengths of hedge from ELS (Option EB1) due to problems with punctures".*

Landscape benefits seem to be less important to farmers in Powys than in other counties (Figure 25 & Table 23).

Table 23. *How important are landscape benefits as a factor determining hedgerow management?* Number of responses in each category. Breakdown by county.

	Very important	Less important	Not at all important
Devon	25	5	2
Leics.	22	5	5
Powys	15	7	10
N Yorks	23	7	2

Reasons for not following 'good practice' guidelines

Farmers who did not already follow the 'good practice' guidelines for hedgerow management (i.e. trimming most hedges in January/February, not cutting both sides of every hedge annually and not flailing most hedges to a height of less than 1.5 m) were asked "*What, if any, would be your main objections to making the necessary changes to current practices*" *(Question 11)*. Recorded responses clearly indicate that the main objections were to late winter trimming and cutting hedges less frequently than annually.

Trimming hedges in January or February was considered by many to be a problem, because of wet soil conditions – which could result in wheel ruts, damage to grassland or arable crops, and would frequently be practically difficult or unsafe. These problems were greatest on farms in areas of high rainfall (e.g. Powys and Devon), farms with steeply sloping fields and on heavy soils. Comments included:

- *"Late winter trimming leads to pasture damage or skipping a season"*
- *"Wet conditions and sloping land make late trimming, after 1st December, difficult and dangerous";*
- *"Ground conditions may be a problem for winter trimming, on arable fields with heavy soil";*
- *"Problems of soil compaction and crop damage if cutting in January or February"*; *"January/February trimming is not possible because of wet soil conditions"*
- *"January/February cutting is impossible due to wet soils"*
- *"January/February trimming on heavy land would cause wheel ruts and compromise payments on 6m headlands (which you are not allowed to damage)"*
- *"January/February trimming is not possible, because the land is too steep and too wet"*
- *"Dry weather is important – later than December it can be too wet, causing damage".*
- *"Hedges are not accessible for trimming in January/February (at present they are trimmed in September/October)"*

Another reason for some to object to late winter hedge trimming was the concern (previously discussed) that the 'harder' thorns left on the ground after cutting at this time of year increased the risk of these thorns damaging the feet of livestock. One farmer in Powys was very concerned about the possible link between late hedge trimming and lameness in his cattle. In his opinion, thorns in the feet of cattle becomes a serious problem unless hedges are cut annually and no later than October, and he added that *"animal welfare is an important issue for the farm's main customer"* (a major supermarket) and pointed out that he was now required to assess lameness levels every month, under the Farm Assurance Scheme. Others simply commented that there would be *"more problems with the feet of livestock"* or *"problems with lambs' feet if hedges were cut later in the year"*.

Similar points about later trimming were made in relation to the risk of punctures e.g. *"roadside hedges are sometimes cut in June/July, giving a very neat job and soft cuttings that give no risk of punctures"*.

For others, late winter trimming simply fitted less comfortably into their annual timetable of farming operations. One farmer summarised the reason for early trimming by many arable farmers… *"Arable hedges are trimmed in September, to fit in between harvest and cultivation"*.

Another gave a livestock farmer's perspective… *"Stock are indoors in Jan/Feb and there is a high demand for labour at that time for lambing, feeding livestock, mucking out, calving, etc".*

Objections to trimming hedges every two or three years were generally related to aesthetic arguments (e.g. *"cutting less frequently than annually leaves a hedge looking very messy"*), and thoughts that hedges that were not cut annually were untidy, or the view that infrequent trimming was damaging to hedgerows. There was a commonly expressed view that *"trimming*

less frequently than annually shatters the hedge" or *"leaving a hedge untrimmed damages the hedge when it is trimmed and it looks ugly"*. Another suggested that *"trimming every three years with a flail leads to more shatter and damage to growing points"*.

Another potential problem which was raised by a number of farmers was the increased wear and tear on equipment, and greater risk of damage, if hedges were trimmed less frequently than annually e.g. *"Trimming infrequently means that contractors take longer and have difficulty in coping with growth"*.

Summarising his views on this aspect of 'good practice', one Leicestershire farmer said *"My objection to trimming less than annually is the mess that is made when the hedge is cut – it loses shape, takes longer to recover and takes longer to trim"*.

Several farmers simply did not believe that these 'good practice guidelines' represented good advice for hedgerow management and some would, therefore, not comply on principle. One put it simply, by stating *"I don't see the benefit of Jan-Feb cutting, the weather is better before Christmas"*. Some farmers managing hedgerows according to agri-environment scheme prescriptions were not happy with the management that they had committed themselves to. For example, one Powys farmer stated that his hedges were being *"cut every other year in Tir Cynnal, but I am not happy with this regime*" and another said *"Most of my hedges are managed under ELS, but I would rather cut annually because it creates a thicker base and a more dense hedge"*. Another farmer argued that *"I do not believe that infrequent trimming is good management compared to little and often"* and another said *"I have no time for the idea of cutting hedges every three years"*. One North Yorkshire farmer was particularly dismissive of the relevance of these guidelines to his situation… *"Not suited to cropping, soil, hedge type, style wanted or aesthetics – and contradicts advice from my hedge trimming contractor"*.

A few also believed that winter hedge trimming could actually be detrimental to wildlife, rather than beneficial. One explained that this has *"negative effects on wildlife, as late winter cutting removes overwintering invertebrates"*. Others also argued that trimming less frequently than annually could also be bad for wildlife, with several farmers suggesting that increased exposure of nesting birds to predators would be a problem. For example, one farmer commented *"I am not a fan of cutting every two years – it is bad for wildlife and small nesting birds, as the hedge bottom is more open, giving exposure to predators"*.

Frequency of hedge trimming - influences and impacts

When asked, without further prompting, what problems less frequent hedge trimming might present *(Question 12)*, several issues were highlighted – including those mentioned in the previous question (see above). Comments recorded included the following:

- *"Hedges encroaching onto fields, especially blackthorn"* (Devon)
- *"Very infrequent trimming of blackthorn hedges causes hedges to grow too wide"* (Leics.)
- *"Where ash and sycamore are present the hedge would become too difficult to control"* (Devon)
- *"Difficulty with willow and ash if hedges are cut on rotations longer than three years"* (Devon)

- *"Growth of hedges is too strong. If trimmed after two years, all you are left with is a row of sticks. Regular trimming encourages side shoots and a thicker hedge"* (Powys)
- *"Smashed and shredded ends that need further treatment (e.g. with a chain saw) and ditches full of piles of overgrown hedge"* (Devon)
- *"Hedges can be killed by leaving them too long between cuts"* (Powys)
- *"Encroachment, suckering, especially into wide arable margins"* (North Yorks.)
- *"Hedge material is too thick and the hedge splits"* (Powys)
- *"The hedge loses shape, takes longer to recover and takes longer to trim"* (Leics.)
- *"Difficulty in handling longer growth and the amount of the amount of 'flailings' to clear up"* (Devon)
- *"Greater cost, more debris – and contractors do not want to work on bigger, less frequently cut hedges"* (North Yorks.)
- *"My hedges are cut annually. The contractor is not happy to cut less frequently, because it is difficult and damaging for machinery"* (Powys)
- *"Contractors don't like it – it is slower, hard on machinery and knocks the hedge about- but it is probably better for wildlife"* (Leics.)
- *"Cutting every two years is OK, but if any less frequent then the size of the hedge material makes trimming difficult"* (Leics.)
- *"Manual clearing of trimmings is an extra task where hedges are trimmed every two years or less"* (North Yorks.)
- *"We trim every two years at present. This is OK, but less frequent trimming would be difficult, expensive and would probably need a saw rather than a flail. It would also be more damaging to the hedges"* (Leics.)
- *"Rabbits are more of a problem with large hedges"* (Leics.)
- *"Damage to vehicles and obstruction of footpaths"* (Leics.)
- *"Problems for road users on these very narrow roads"* (North Yorks.).

Although several farmers had previously commented on the possible increased exposure of nesting birds to predators in more open, infrequently trimmed hedgerows, one North Yorkshire farmer saw this from a different angle, arguing that less frequent trimming resulted in *"hedges becoming too thick for nesting birds"* The same farmer asked to see *"evidence of the benefits of less frequent cutting"*.

Another interesting perspective on this question was put forward by two farmers in North Yorkshire, that of public attitudes to bigger, less frequently trimmed hedgerows. One stated that this would be perceived by members of the public as *"poor cutting"*, while another made the statement that *"visitors to this area, which is a big tourist area, like low hedges so that they can see the farms".*

Several farmers contributed more positive remarks about less frequent trimming. For example…

- *"It doesn't bother me. If lopping or coppicing is needed I do it with a chainsaw, providing some firewood"* (Devon)
- *"I am already trimming three-yearly. Fast-growing species (e.g. ash) can be a problem, but not enough to make one change"* (Leics.)
- *"No real problems envisaged, and I plan to trim every two years from 2012 under Glas Tir"* Powys).

The number of farmers who thought that annual trimming was good for hedges (80 farmers, 63%) outnumbered those who thought that it was bad (25 farmers, 20%) by more than 3:1 *(Question 13a)* (Figure 26). Annual trimming was considered to be neither good nor bad for hedges by 18% of farmers (or they had no firm opinion). A clear majority of farmers in all four counties thought that annual trimming was good for the hedge (Figure 27). Only 9-28% thought that annual trimming was bad for hedges (Figure 27). The highest proportion of 'undecided' farmers was in North Yorkshire (30%).

Figure 26. Effects of annual hedge trimming on hedges. Percentages of farmers who felt that annual trimming was 'good', 'bad' or 'neither'. All farms.

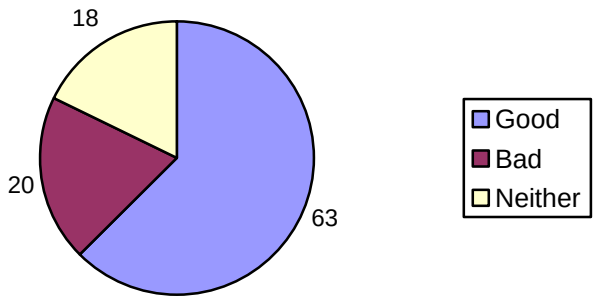
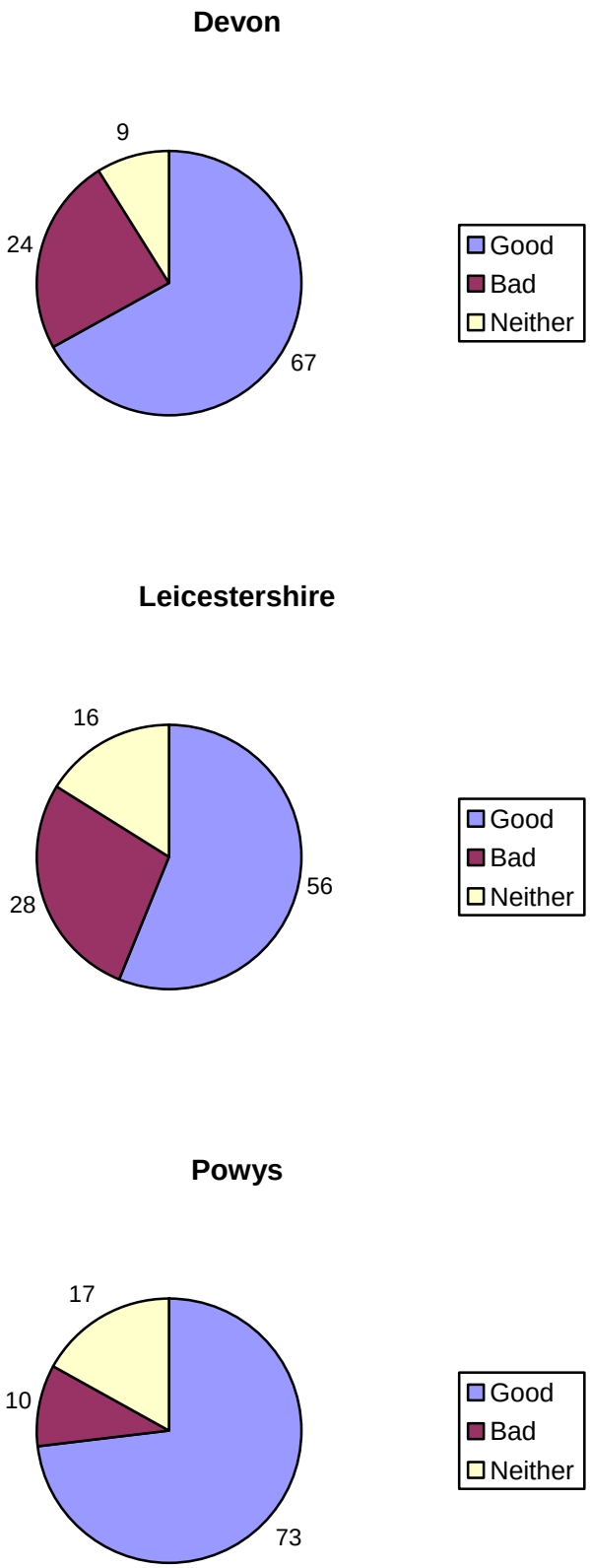
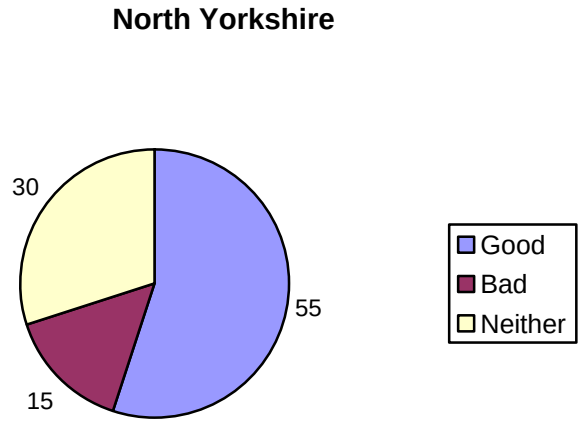


Figure 27. Effects of annual hedge trimming on hedges. Percentages of farmers who felt that annual trimming was 'good', 'bad' or 'neither'. Breakdown by county.





Recorded comments included the following:

- *"Trimming a 2-3 year-old hedge causes a lot of damage, which can't be good for the hedge"*
- *"Annual trimming is generally good for the hedge, although hazel can die off when trimmed annually"*
- *"Hedge recovers more rapidly if cut annually"*
- *"Thicker hedges when they are cut annually"*
- *"Impacts on the hedge depend on the individual hedge"*
- *"Smaller growth, less damage to the hedge when trimmed* [annually]*, but it is surprising how the hedge recovers"*
- *"Annual hedge trimming stunts growth"*
- *"Keeps hedges dense – a hedge goes 'wild' if it is not trimmed annually"*
- *"Annual trimming gives a denser hedge – trimming every two years, for bird food, is not good for the hedge – better to have more game cover and wild bird food mixes"*
- *"Annual hedge trimming can lead to thinner hedges at the base".*

In contrast, the percentage of farmers that regarded annual trimming as bad for hedgerow wildlife (44%) was greater than the percentage that considered it to be good (27%) (*Question 13b*) (Figure 28). A significant proportion (29%), however, answered "neither" to this question. There was some variation in responses between counties. The proportion that regarded annual trimming as good for hedgerow wildlife varied from 19% in Devon to 37% in North Yorkshire. The proportion replying that annual trimming was bad for wildlife ranged from 31% in Powys to 63% in Devon. Almost half (47%) of Powys farmers thought that it was neither good nor bad.

Figure 28. Effects of annual hedge trimming on hedgerow wildlife. Percentages of farmers who felt that annual trimming was 'good', 'bad' or 'neither'. All farms.

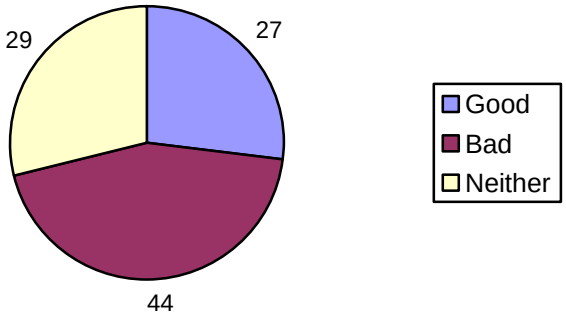
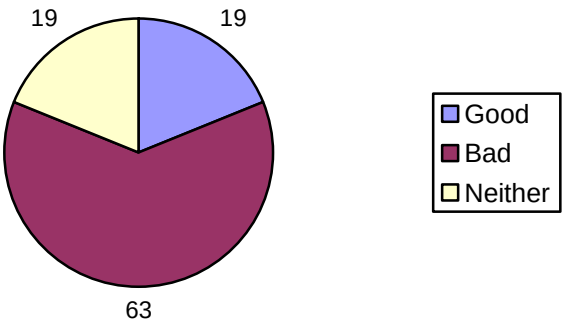
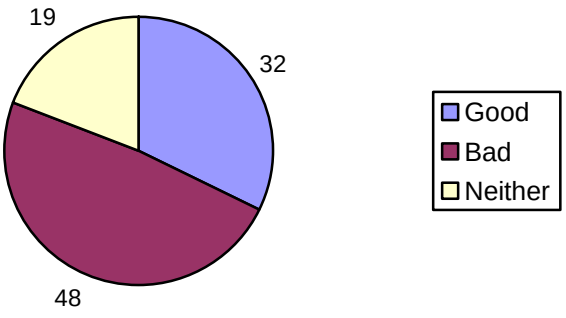


Figure 29. Effects of annual hedge trimming on hedgerow wildlife. Percentages of farmers who felt that annual trimming was 'good', 'bad' or 'neither'. Breakdown by county.

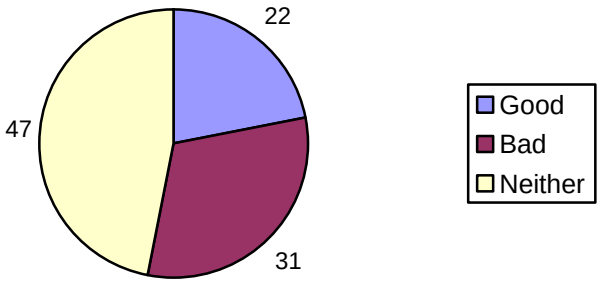
Devon



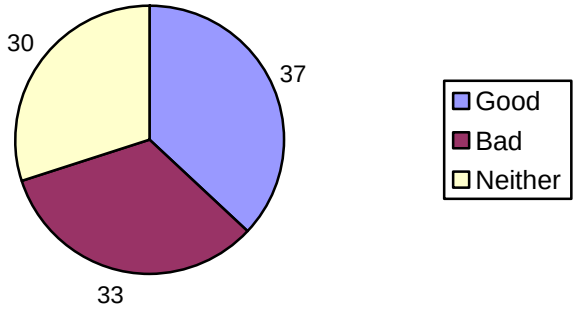
Leicestershire



Powys



North Yorkshire



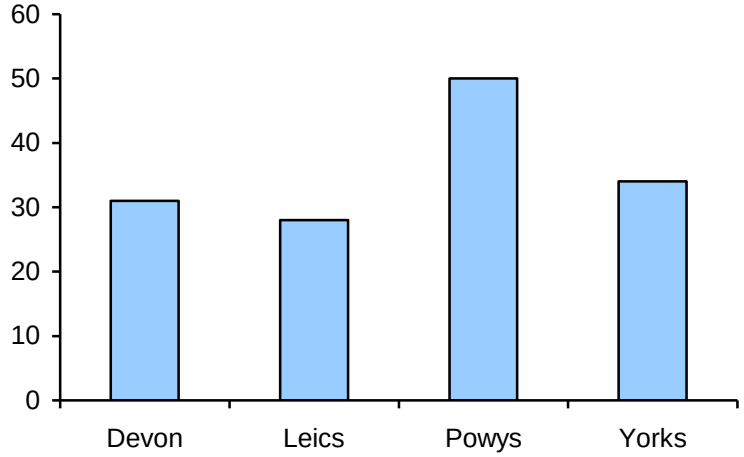
Recorded comments included the following:

- *"If cut every year a hedge is more dense, giving better cover for small birds – more open hedges are better for pigeons and magpies"*
- *"For things that live in the hedge, annual cutting is best, because the hedge is more dense – for birds that feed on the hedge, annual cutting might be bad because they lose food"*
- *"Effects on wildlife will depend on species and locality"*
- *"Cover is important and hedges grow a lot thicker if they are trimmed annually"*
- *"Highly dependent on situation – annual trimming reduces diversity, but will favour some wildlife species"*
- *"Letting some hedges grow up compensates for the effects of annual trimming of others"*
- *"There are still berries for birds to eat on annually trimmed hedges"*
- *"Annually trimmed hedges give more protection for small birds"*
- *"In the long term, annual trimming gives the best hedge and this must be best for wildlife"*

- *"Annual trimming is bad in the short-term, but if hedges are left then they become useless for wildlife".*

When asked *"to what extent is farm tidiness a factor influencing decisions on frequency of hedge trimming?" (Question 14),* 36% of all farmers answered that it was 'very important', 41% 'quite important' and 23% 'not important' (n = 128). This factor was most important to farmers in Powys – where 50% of farmers regarded farm tidiness as 'very important' (Fig. 30) and only 13% considered it as 'not important'.

Figure 30. Influence of farm tidiness on frequency of hedge trimming. Percentages of farmers for whom farm tidiness was 'very important'. Breakdown by county.



For 41% of farmers tidiness was more of a factor on some parts of the farm than on others *(Question 14a)*, with this figure ranging from 34% in Devon to 53% in Powys. Roadsides were often mentioned as areas where tidiness was more important, particularly by farmers in Powys and North Yorkshire. Several farmers liked to keep farm hedges tidy along driveways and in areas where visitors had regular access.

Timing of hedge trimming - influences and impacts

Of those farmers who were not already trimming hedges in mid-late winter [n = 92], a large majority (87%) said that doing it in this period *'would present serious difficulties'* (*Question 15)*. This view was particularly prevalent in Powys (97%) and Devon (93%). In North Yorkshire and Leicestershire, where higher proportions of farmers were already trimming hedges in late winter, 75% of farmers who were not doing so thought that this would be difficult.

Reasons given for not trimming hedges in late winter were largely related to wet soil conditions, and related issues of accessibility and safety, for example...

- *"Because of rutting damage"* (Devon)
- *"Access problem with machinery on wet slopes"* (Devon)
- *"Damage to land (rutting) due to wet and danger on sloping ground"* (Devon)
- *"Would cause rutting due to wet soil and would probably get bogged down"* (Devon)

- *"Ground conditions are not suitable in January/February – soils are too wet"* (Devon)
- *"I intend to cut in the winter, but very wet conditions have sometimes prevented trimming at all"* (Devon)
- *"Access and land conditions"* (Leics.)
- *"Heavy machinery on wet ground"* (Powys)
- "*Just not possible in winter in Wales!"* (Powys)
- *"Usually too wet after December"* (Powys)
- *"Almost impossible to access the land in the winter"* (Powys)
- *"The ground is too wet in winter and not safe on sloping ground"* (Powys)
- *"Health and safety and the land can be "mashed up"* (Powys)
- *"Wet, heavy land – can't travel with heavy equipment"* (North Yorks.)
- *"Ground conditions are paramount – it is likely to be too wet in January-March"* (North Yorks.)
- *"In winter the soil can soon reach full moisture capacity, and we are then unable to travel on the land"* (North Yorks.).

Other reasons given included the contractor being unavailable in late winter (e.g. *"the contractor is too busy after December", "problems with contractor availability"),* labour availability (e.g. *"the main problem is labour availability in winter – because of lambing, calving, stock feeding, etc."),* thorns in the feet of livestock (e.g. *"more material on the ground, more problems for the feet of livestock"*, *"lameness in cattle"*), and external pressures to cut roadside hedges earlier in the year (e.g. *"We don't trim that often, but the highways authority would chase us if hedges were left until January/February"*). Some arable farmers also maintained that hedges around arable fields needed to be trimmed before the new crop was established in autumn (e.g. *"arable land will <u>always</u> need hedges doing early" "a problem on the arable side, because of ease of travel"*).

Some 44% of farmers said that they trimmed all of the hedges on their farm in any one year (*Question 16*), even if hedges were not trimmed annually, with 56% practising some sort of rotational trimming. The percentages trimming all hedges in any one year for the four individual counties were North Yorkshire 33%, Leicestershire 43%, Powys 50% and Devon 50%.

Hedge size and shape

A clear majority (69%) of all farmers grew some hedges taller than others, most commonly for conservation/landscape purposes (25%) or because hedges were subsequently to be laid (32%) (*Question 17*). For each individual county, the percentages of farmers indicating that they grew some hedges taller than others were Devon 55%, Leicestershire 72%, Powys 77% and North Yorkshire 74%.

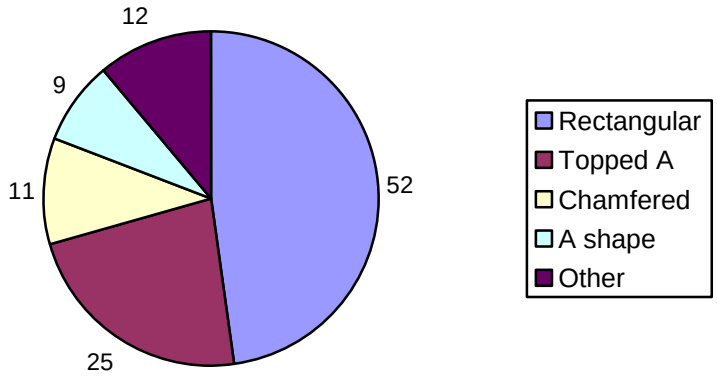
Various reasons were given for growing some hedges taller than others. These included:

- *"To provide variety of hedge appearance"*
- *"Habitat and shelter are the main drivers"*

- *"Tradition, variety and biodiversity"*
- *"Taller hedges for livestock shelter, but shading can be a problem, especially for hay-making (drying)"*
- *"Some bigger hedges acting as windbreaks against the prevailing winds, with only the sides of these hedges being cut regularly"*
- *"Two different ELS options – two-yearly or three-yearly"*
- *"Restoration of previously poor hedges"*
- *"Not trimmed if aiming to lay a hedge"*
- *"Shooting – for pheasants and partridges"*
- *"Roadside hedges are generally shorter"*
- *"Roadside hedges allowed to grow taller to stop rubbish getting into the field"*
- *"Big hedges around permanent pasture have always been tall – arable hedges are cut for ease of harvesting"*
- *"Privacy around houses"*
- *"Boundaries beside National Forest woodland plantations are grown taller"*
- *"If the fence breaks or rots, then the hedge is left to grow for six years, laid then double-fenced"*
- *"No particular pattern"*

When asked to what shape they cut most of their hedges *(Question 18)*, the most common responses were 'rectangular', 'square' or 'box-shaped' (52%), "topped A" (25%), 'chamfered' (11%) or "A-shaped" (9%) (Figure 31).

Figure 31. Hedge shape after trimming. Percentages of farmers trimming most of their hedges to rectangular/square/box, 'topped A', 'chamfered', A shape or other shape. All counties.



Note: Total >100% because some farmers gave two or more answers to this question.

Reasons given for their choice of hedge shape included the following:

Rectangular/square/box – *"appearance", "like it like that", "local tradition", "contractor's method", "convenience", "keeps hedges thick and looking neat", "neatness and ease", "contractor's choice", "how the contractor chooses to trim the hedges", "ease of cutting and traditional to the area", no particular reason"* and *"as the contractor does it".*

Topped A – "*better for wildlife, and also better growth along the sides and the hedge does not die out in the bottom", "to keep hedge thicker at the bottom"* and *"contractor's preference and local style".*

Chamfered – "*local style, contractor preference and farm tradition"* and *"contractor's preference".*

A shape – *"because the base density is better", "to allow height to develop for future hedge laying and for singing posts for birds"* and *"follow shape of the bank".*

Management of roadside hedges

Most farmers (94%) managed roadside hedges *(Question 19)*, with 62% managing them differently to their other hedges. Numerous farmers said that they trimmed their roadside hedges more frequently than most other hedges on their farm (e.g. *"Cut to ensure visibility and safety along a busy A road"*). For most, this meant trimming roadside hedges annually while others on the farm were cut less frequently, but some roadside (and private driveway) hedges were cut much earlier (in June or July) or trimmed twice per year (e.g. *"Summer cutting and annual flailing – for safety reasons"*). Roadside hedges were frequently of a different height to other hedges, most commonly shorter, but occasionally taller (e.g. *"Left slightly taller to prevent rubbish getting into the field from a lay-by"*).

Complaints about hedgerow management

Just over a quarter (27%) of farmers said that some aspect of their hedgerow management had brought an adverse reaction from other farmers, members of the public, an official body or an environmental group *(Question 20)*.

The most frequent complaints were from members of the public, who were responsible for complaints to 26 farmers (20%) or 76% of the farmers who had received complaints. The main public concerns appeared to be about the risk of punctures, after hedge trimming, or damage to the paintwork of vehicles. For example, recorded comments included the following:

- *"Complaints about thorns in the road and risks of punctures – contractors now blow trimmings off the road"*
- *"People complaining about punctures after flailing"*
- *"The public just ask for them to be cut, to stop cars being scratched"*
- *"Some local residents disapproved of cutting hedges every two years – they thought they were untidy, but the main issue was possible damage to vehicles"*
- *"Tall and overhanging hedges catch car wing mirrors and the tops of lorries"*
- *"No complaints, but trimming too late would lead to an increase in punctures and this would bring complaints"*
- *"Not generally, but avoiding thorns is always considered to prevent complaints"*

Sometimes local residents also voice their concerns about the visual or possible environmental impacts of hedgerow operations or the felling of hedgerow trees, for example:

- *"Comments from villagers when any hedge work or tree felling occurs"*
- *"No recent public complaints, but more than 30 years ago one villager complained about a large hedge being cut down"*
- *"Members of the public are sometimes alarmed by hedge-laying, which looks devastating initially!"*

The frequent practice of trimming roadside hedges in the summer months can be either encouraged (e.g. *"Some complaints from the public and from the highways authority that hedges are not cut soon enough or that they are too wide and obstructing cyclists"*) or discouraged by members of the public e.g. *"Occasional complaints from the public about summer cutting of roadside hedges and effects on nesting birds"*.

Other, less frequent remarks from the public have included comments (presumably negative?) from passers-by about "*ivy in hedges and trees"*.

Official bodies had complained to 12 farmers (9%) and five farmers (4%) had received an adverse reaction about their hedgerow management from another farmer. No adverse reactions were noted from environmental groups. Numbers of farmers who had received complaints, by county, ranged from 9 (28%) in Powys to 13 (41%) in North Yorkshire.

Official complaints were most frequently received from the local authority's highways department, as gentle 'reminders' or more formal demands to trim roadside hedges or to undertake work on hedgerow trees. Recorded comments included the following:

- *"The local council's Highways Department want us to trim our roadside hedges harder"*
- *"When roadside hedges were left uncut for two years, the local council complained"*
- *"Occasionally the local authority complains about non-trimming on a school bus route"*
- *"Occasional letters from the council regarding the need to trim a roadside hedge e.g. if it is covering a road sign"*
- *"Some local farmers have had complaints from the local authority when they cut later in the year – as the harder wood gives more problems with punctures"*
- *"The local authority and members of the public have very occasionally complained that a hedge needed trimming"*
- *"Highways authority asked us to remove hedgerow trees, that were too large and presented a hazard risk and insurance liability"*

At least one farmer had been asked by the Highways Agency "*to sweep up the cuttings on the road*", after hedge trimming.

A small number indicated that local parish councillors could have views on hedgerow management and might try to pressurise farmers to conform with their preferences. One stated that *"The parish council likes hedges to look tidy, and some of mine do not"*.

One farmer also indicated that growing larger hedgerows could result in a loss of Single Payment Scheme income, stating that… *"The RPA penalise me by reducing field size for my SPS claim"*

A small number mentioned that neighbouring farmers were occasionally disapproving of their hedgerow management choices, for example:

- *"Neighbouring farmers think our hedges are untidy…"*

Some farmers said that they had received no complaints, only positive remarks about their hedgerow management. For example, one Devon farmer commented:

- *"No, we have had many compliments about the standard of our hedge management…"*

Another farmer remarked:

- *"No – but locals comment nicely on hedge size in relation to land use".*

Encouraging farmers to follow good practice guidelines

Several of the farmers interviewed during the follow-up survey fundamentally disagreed with the 'good practice guidelines' as described by the interviewer i.e. trimming most hedges in late winter (January-February), not cutting both sides of every hedge annually and not flailing most hedges to a height of less than 1.5 metres. Comments included *"Good practice guidelines are totally flawed", "I do not support 'good practice' if it means cutting less frequently than annually"* and *"I disagree with the concept of 'good practice guidelines' for hedge management, which*

conflict with good practice in livestock welfare – there is a need for "useful" good practice guidelines".

Others felt that it would be an uphill struggle, because *"a lot of farmers do not agree with 'good practice guidelines' so will not follow them"* or simply because practices such as winter trimming were not feasible in that area...

Some farmers could not suggest any way of encouraging more farmers to adopt practices such as late winter trimming or less frequent trimming.

Suggestions that were made were most frequently related to the provision of additional financial incentives. For example, comments recorded included those that simply suggested increased or new payments…

- *"Make it worthwhile – reward them for it"*
- *"A specific subsidy for hedge management, with inspections"*
- *"Don't agree with the guidelines, but think that paying more would encourage more farmers to follow the guidelines"*
- *"More money"*
- *"Continue with schemes like ELS, and expand if possible"*
- *"Only one way to encourage farmers – to pay them money"*
- *"Give them more money! – although it shouldn't come down to money, as the hedges are there anyway and there should be enough money in farming to ensure that hedges are looked after"*
- *"In the end, farmers do whatever there is financial reward for, so payments through ELS/HLS would be helpful"*
- *"Grants"*
- *"Grants – money talks!"*
- *"Grants for hedge laying – I am disappointed with Glas Tir, because there is no incentive to lay hedges or build stone walls"*
- *"Offer them money"*
- *"Financial incentives"*
- *"Money is the only way to get them to do anything really"*
- *"Compensation if land is lost through agri-environment schemes (e.g. through widening hedges)"*
- *"Financial incentives to do a thorough and worthwhile job -it is expensive to do it well"*

…and others that asked more specifically for grants or payments to encourage specific management activities, for example:

- *"Conservation schemes – payments to encourage double-fencing and good hedge management"*
- *"Should be a grant for fencing to protect hedgerows"*

- *"Grants for fencing to protect hedgebanks; Grants for fencing to protect hedges – grants to let hedges grow up for 10 years"*
- *"Grant towards pletching (hedge laying)"*
- *"Grants for fences, to stop sheep damage"*
- *"Additional points within ELS to cut hedges in Jan/Feb – and a derogation process that allows weather dependent changes, with a phone call to Natural England as required"*
- *"Financial reward to leave wider margins to ease access to arable fields"*

Other suggestions included:

- *"(Guidelines) must be seen as practical for the farm and therefore a cost benefit analysis is needed"*
- *"Good legislation to prevent bad practice"*
- *"Shrubs that can survive on thinner soil and at higher altitude".*

A few farmers suggested that a multi-pronged approach was necessary…

- *"Grants – more information and sell the benefits for wildlife"*
- *"Financial benefit needed to "persuade", more consistent "vision" and better press coverage"*
- *"Indirectly, by educating contractors and maybe introduce a compliance scheme e.g. similar to BASIS – plus, provide free hedge plants and advice"*

One interesting additional comment, from a framer in Powys, recorded at this point in the interview was that *"agri-environment schemes should do more to encourage farmers to maintain previously grant-aided conservation work"*.

Five options for hedgerow protection or improved management (mostly already in place) were put to farmers and their views on each sought (*Question 21a*). These options were hedgerow protection legislation (e.g. Hedgerow Regulations 1997), cross-compliance (e.g. through the Single Payment Scheme), "enhanced" management through agri-environment schemes, hedgerow management grants and free hedgerow management advice.

Figure 32 shows the numbers of responses that were 'strongly in favour', 'neither for or against' or 'strongly against' for each of these options. Each was strongly supported by a majority of farmers. The strongest support was given to hedgerow management grants, for which 74% of farmers were strongly in favour and only 5% strongly against.

Figure 32. Percentages of farmers strongly in favour, neither for or against or strongly against various options for hedgerow protection/conservation (protection legislation, cross-compliance, hedgerow options in agri-environment schemes, management grants or free advice). All counties combined.

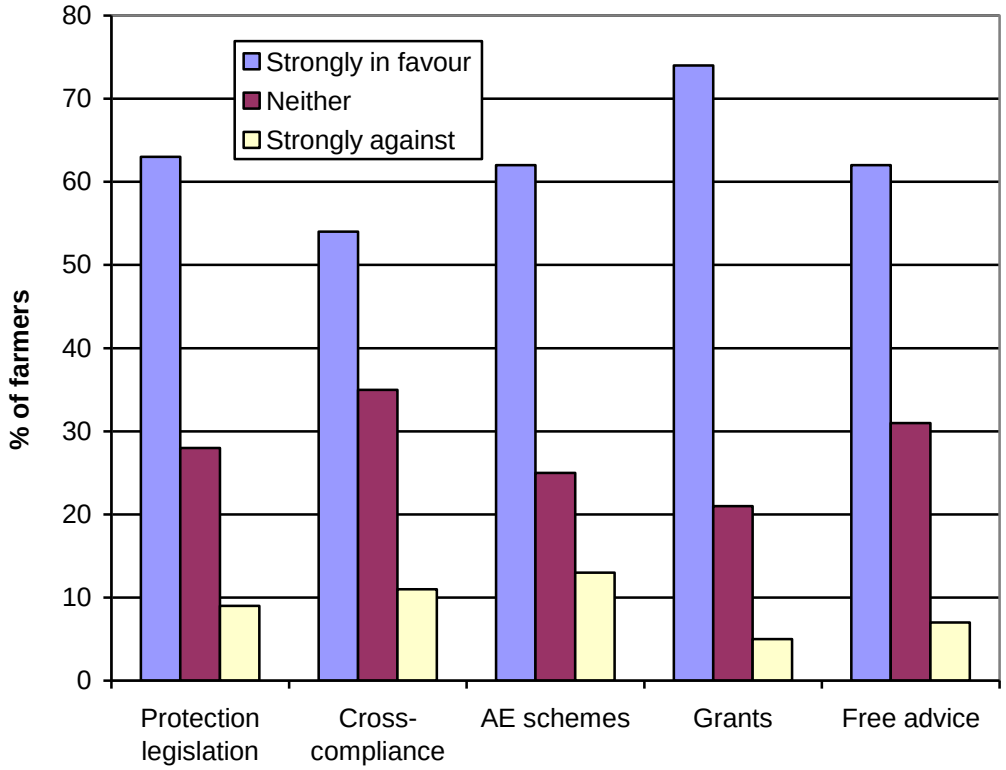
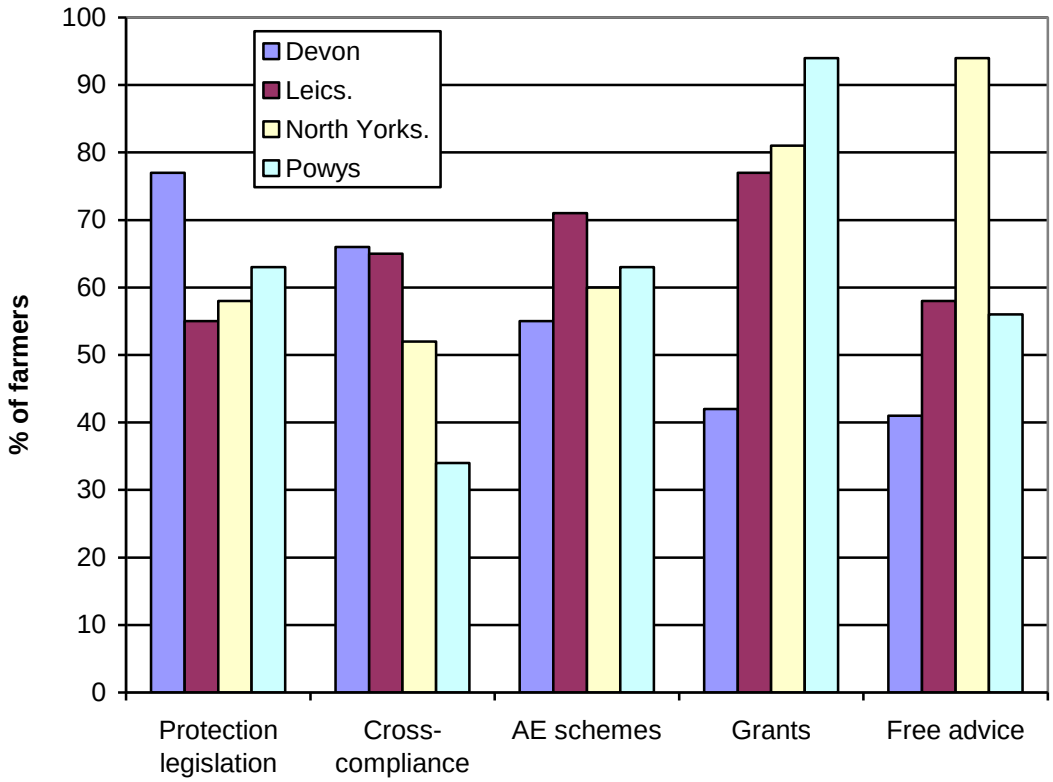


Figure 33. Percentages of farmers strongly in favour of various options for hedgerow protection/conservation (protection legislation, cross-compliance, hedgerow options in agri-environment schemes, management grants or free advice). Breakdown by county.



From Figure 33, it appears that farmers in Powys were less likely than those in the English counties to be in favour of using cross-compliance as a method of protecting hedgerows. Powys farmers were, however, the most likely to be strongly in favour of hedgerow management grants. Farmers in Devon were the least likely to be in favour of management grants or free advice, but gave the strongest support for hedgerow protection legislation. Farmers in North Yorkshire were most likely to be in favour of free advice.

More than half of all farmers in every county were strongly in favour of hedgerow protection legislation and use of agri-environment schemes for 'enhanced' hedgerow management.

When asked *"What do you need to help you improve the management of your hedgerows?"* (*Question 21b*) a sizeable proportion suggested that no further assistance was needed. For example, comments included:

- *"Nothing"*
- "*No help required*"
- "*Nothing else needs to be done*"
- "*Happy with management as it is*"
- "*More time would help, but I am managing them well now*"
- "*Hedges on my farm are getting better – I can't think of any more help that I need*"

- *"Don't know that I do need any help, hedges are pretty resilient"*
- *"No help required, I think that I already manage my hedges well"*
- *"Nothing more"*
- "*Not advice – if you are farming your land, you know best how to manage your hedges*"
- "*Nothing – I do not personally need free hedgerow management advice, but most farmers would benefit*".

Numerous others identified a shortage of time, labour or money as current problems restricting how they manage their hedgerows. For example…

- "*More staff – high labour cost and time are important factors*"
- "*Labour and assistance with costs*"
- "*Labour and time (and cost)*"
- "*More time, more money*"
- "*More time and money – nothing else*"
- "*Time, labour, cost*"
- "*Time and a cost benefit*"
- "*Financial incentives to continue*"
- "*Incentives – although hedge management is generally not considered a problem on this farm*"
- *"More cheap labour – 20 blokes with a bill hook and chain saw!"*

More specifically, grants for hedge planting or management were required by some…

- "*Grant aid to plant hedges would be useful, but we are constrained in current management because of animal welfare requirements*"
- "*Hedge laying grants would enable a more structural approach to providing a diversity of hedge type – currently 'monoculture hedges'*"
- "*Grants for hedge-laying*"
- "*Grant to fill gaps in hedges*"
- "*Grant towards fencing*"
- "*Grant aid to double-fence the rest of my hedges and to coppice hedges and plant up gaps*"
- "*Need to plant a few more trees, to replace the elm trees that were lost, but lack of time to do the work is a problem – free plants and/or planting grants would help*"
- "*More payments for hedge-laying and double-fencing*"

Good quality advice or training were also identified as needs by several farmers…

- *"Advisers with experience"*
- *"Expert advice"*

- *“Advice, if anything”*
- *“Training course or practical sessions in hedge planting”*
- *“Information/advice”*
- *“Training and awareness – I have been on recent farm walks that have been informative”*

Others expressed a view that a good farm income was the key to good hedgerow management, and other environmental measures on the farm.

Another farmer suggested that advice, financial support and outside labour would all be beneficial to him: “*Guidance, grants and help e.g. community service”.* Others needed “*better and newer equipment”* or had very specific machinery requirements e.g. *“machinery to cast up hedgebanks”*.

A small number of farmers were critical of existing agri-environment schemes. One requested *“a workable agri-environment scheme other than Glas Tir”* and another asked for “*bigger financial incentives”* going on to argue that *“ELS does not provide enough benefit to outweigh its disadvantages – it is not an attractive enough ‘product’”.*

Grants for hedgerow management

Two thirds (66%) of all farmers said that they had previously received grants for hedgerow management (*Question 22*). Numbers varied from 19 (59%) in Devon and North Yorkshire to 25 (78%) in Powys.

New hedge planting

Approximately half of all farmers had planted new hedges in the last 10 years (*Question 23*). Of those that had planted new hedges, 84% had planted only native species and 79% had planted only mixed species hedges.

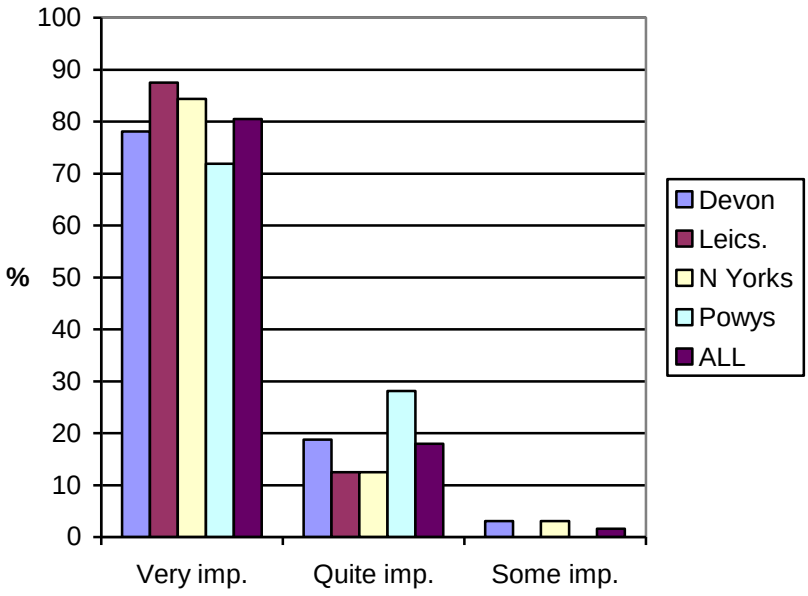
Advice on hedgerow management

Only a small number had received hedgerow management advice from an outside body but did not then implement that advice (*Question 24*). One considered that the advice received was bad – *“I was told to plant and lay sycamore”* – while others felt that they were unable to implement the advice for practical reasons (e.g. three-yearly trimming or hedge laying).

Importance of hedgerows to wildlife

A large majority (80.5%) of farmers considered hedgerows to be very important to wildlife on their farm (Figure 34) (*Question 25*). No farmers regarded their hedgerows as having no value to wildlife.

Figure 34. Percentage of farmers in each county regarding hedgerows as 'very important', 'quite important' or 'of some value' to wildlife on their farm.



Comments about the value of hedgerows to wildlife included:

- *"Probably main attractor of wildlife"*
- *"Crucial – there wouldn't be any wildlife without the hedges"*
- *"Provide variety in the landscape and shelter for wildlife"*
- *"Wildlife would not survive without hedges"*
- *"Nothing else to support wildlife"*
- *"Protection from sparrowhawks".*

Several farmers also indicated that enhancing wildlife benefits is an important factor determining how they manage their hedgerows. For example, comments included:

- *"Wildlife are one of the priorities in how they are managed"*
- *"I see my role as a 'steward of the countryside' to encourage wildlife"*
- *"Personally keen on good hedges for bird life"*

Others considered good management to be vital if hedgerows were to provide good wildlife habitats. For example:

- *"Maintenance of the hedgerow is important for healthy wildlife"*
- *Conscious of wildlife value;; Managing hedges with wildlife in mind;*

The issue of a perceived increase in raptors, and their possible impacts on song birds, was frequently raised by farmers. One commented that hedgerows "*could be very important (for wildlife), if not for the high numbers of predators*".

Plants and animals for which hedgerows are important

Farmers were asked if they could name any plants or animals for which hedgerows are an important habitat on their farm (*Question 26*). More than three quarters (78%) could, although a small proportion gave a list that indicated that they had a fairly detailed knowledge of their hedgerow wildlife. Most frequently mentioned was “birds”, “song birds”, ”small birds” or “farmland birds”. Individual species mentioned by several farmers included rabbits, pheasants, partridge, yellowhammers, primroses, hares, thrushes, blackbirds, badgers, deer, voles, foxes, sparrows, bluebells, violets, foxgloves, red campion and blackthorn.

A small number gave quite long lists of species using their hedgerows, indicating a good knowledge and an interesting flora and fauna. Four examples, all from Devon, include:

- *“Dormice, bullfinches, marsh tits, willow tits, dunnocks, grass-hopper warbler, tree pipits, and brown hare”*
- *“Linnets, nuthatches, goldcrest, primroses, violets, bluebells, campions, foxgloves, oxeye daisies, etc”*
- *“Greater horseshoe bat, yellowhammer, violets, primroses, blackthorn/hawthorn flowers and fruit, song thrush, long-tailed tits, robin and mistle thrush”*
- *“Hares, partridges, deer (for shade), rabbits, foxgloves, primroses, orchids, red campion, bluebells, honeysuckle, badgers, foxes, woodpecker, blackbirds, thrushes and tits;”*

Costs of hedge trimming

Farmers were asked approximately how much they paid for hedge trimming, and were invited to give their answer as a total cost per year, an average cost per 100 metres or an average cost per hour (*Question 27*).

85 farmers (66%) gave an estimated (mostly) or actual cost per year. 67 farmers (52%) gave an average cost in £s per hour. Only two farmers (<2%) quoted a cost per 100 metres.

Results are shown in Tables 24 and 25 below. Farmers in all counties were paying contractors around £20.00 per hour for hedge trimming.

Table 24. Costs of hedge trimming – as annual costs per farm or cost per hour. Mean, median, minimum and maximum values. All counties combined.

	£ per year/farm	**£ per hour**
Mean	771.87	20.43
Median	500.00	20.00
Min.	15.00	6.50
Max.	3,500.00	33.00
n	85	67

Note that values add to more than 128, because some farmers gave answers in both forms.

Table 25. Costs of hedge trimming – as annual costs per farm or cost per hour. Mean, median, minimum and maximum values. Breakdown by county.

	£ per year/farm		£ per hour	
	Mean	Median	Mean	Median
Devon	1135	700	20.17	20.00
Leics.	868	800	21.83	23.00
North Yorks.	556	280	20.69	20.00
Powys	424	350	19.87	20.00

The average annual cost per hectare was also calculated. Values ranged from £0.37 to £62.19.

The lowest estimated value was from a farmer in Powys who claimed that he only spent £15 per year to trim the hedges on his 40.5 ha farm. He was cutting his own hedges and this was his estimate of fuel costs alone. The highest value (£62.19 per ha) was given by a farmer in Leicestershire, who claimed to be spending £2,500 to trim hedges on his 40.2 ha farm. The same farmer estimated that he was spending £300 per 100m metre of hedge length or £23 per hour – suggesting that he only had 833 metres of hedgerows to manage and that the contractor spends an average of almost 8 minutes on every metre of hedge!

The mean cost was £10.90 per ha and, probably more meaningful (in light of the extreme examples given above), the median was £8.33 per ha.

Impacts of less frequent trimming or winter trimming on the cost of hedgerow management

Less frequent trimming

Opinion was divided on the probable financial impacts of reducing the frequency of hedge trimming. Significant numbers thought that this would reduce costs…

- *"Would save, if averaged over a number of years"*
- *"Reduces costs"*
- *"Slightly cheaper"*
- *"Costs would be lower, but cost for cutting about 50% higher each year"*

Interestingly, those farmers who commented that less frequent trimming should reduce overall costs included a few who have already switched to trimming hedges less frequently than annually…

- *"Already trim infrequently, so I am saving money"*
- *"I already trim infrequently – cheaper than more frequent trimming"*

At least as many (probably more), however, held the view that costs would increase…

- *"Trimming less frequently than at present (2-3 yearly) would be more expensive because of high manual labour cost and more wear and tear on machinery"*
- *"Adds to cost on average (over a period)"*
- *"Increased cost – increased wear on hedge trimmer. It* (infrequent trimming) *also knocks a hedge to pieces and kills the hedge"*
- *"Overall costs might be slightly higher – as it takes twice as long to cut it and there will be added contractor costs for machinery damage"*
- *"Increased costs – the hedge would become tougher and the contractor might not agree to doing it or might put his prices up"*
- *"The cost after two years would be more than double – and I would refuse to do it, because it damages the machine"*
- *"Overall costs would be higher, as trimming would require two or three passes with the flail, rather than just one"*
- *"A possible increase, as it takes longer and you would have more wear and tear on the machine"*
- *"It might be more expensive and some contractors may give up because of repair costs"*
- *"Time factor e.g. 1 hr on yearly cut hedge = 4 hrs on 3-year cut"*
- *"Increase slightly – an extra two or three passes needed and slower"*
- *"Increased cost of cutting – slow and more than one pass is needed"*
- *"More expensive – wear and tear, and clearance of debris".*

Others suggested that there could be an increase in costs, but qualified their answer. For example…

- *"Would cost more – because of damage to the trimmer – except where the hedge is hawthorn or blackthorn"*
- *"Increases costs, because the contractor needs to buy a heavier machine or do three runs for every hedge (this could double the cost) – but it also depends what is in the hedge"*.

Probably the largest group, however, were those that thought that less frequent trimming would have very little or no effect on costs. Comments included the following:

- *"Little overall effect, averaged over the trimming cycle"*
- *"No overall effect – less frequent, but takes correspondingly longer"*
- *"Not much difference averaged over a number of years"*
- *"About the same – only cutting every two years, but hedges are slower to cut"*
- *"Little impact – the longer you leave a hedge, the slower the job is for the contractor"*
- *"No overall impact when we changed to bi-annual cuts"*
- *"Cutting every two years costs about the same as annual trimming"*

- *"Probably not a lot of difference, as the contractor would have to go slower"*
- *"Takes longer to cut, but approximate break even"*.

Winter trimming

Very few farmers thought that costs would be lower if hedges were trimmed in January or February. Most thought that there would be no direct increase in costs, but many either dismissed the possibility of winter trimming on their farm (e.g. because soil conditions would make access too difficult)…

- *"Not practical on this farm – on other farms… probably little difference"*

…or argued that winter trimming would result in increased costs due to impacts on growing crops, the effects of soil damage or the need for wheel ruts to be repaired. Comments included:

- *"None – I currently trim 90% of my hedges in November/ December"*
- *"Increased costs, because of the cost of repair of rutting damage and recovery of bogged down machinery"*
- *"No impact on cost of trimming, but negative impacts on arable cropping"*
- *"We do this anyway – little difference in cost"*
- *"No difference, although I currently trim in winter"*
- *"No impact, but possible problems with thorns"*
- *"Slower work on wet ground and the hedge has hardened in winter, so it is harder to trim"*.

One farmer in Devon expressed the concern that "*damage to soil structure might incur penalties on Single Farm Payment"*.

Another farmer (Leicestershire) made an interesting comment about possible impacts on contractor charges:

- *"No different – although it would mean a shorter working day, so the contractor might charge more"*

Some additional comments related to the costs of hedgerow management were recorded. These included the following:

- *"Allowing hedges to grow very wide has a cost, from loss of grass"*
- *"I would like to fence along all grassland hedgerows but I can't afford to"*.

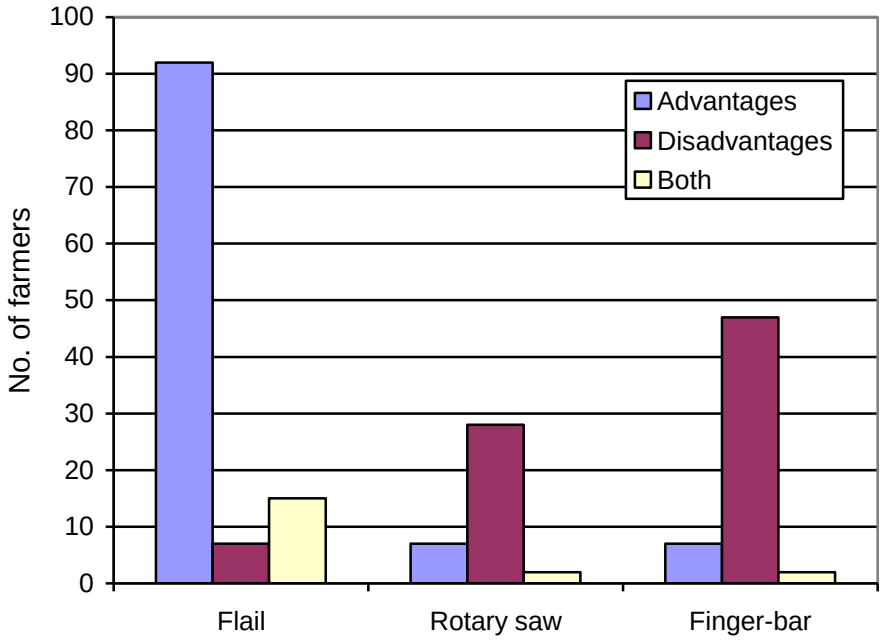
Hedge trimming machinery

Only 28 farmers (22%) indicated that they owned machinery suitable for hedge trimming (*Question 29*). Of these, 26 farmers (20%) owned a flail – 9 in Devon, 9 in Leicestershire, 3 in North Yorkshire and 5 in Powys. Very few farmers owned either a rotary saw/shaping saw (<2%) or a finger-bar trimmer (<1%).

A large majority (107 farmers, 84%) considered the flail to have practical advantages over other machinery options (Figure 35). However, 22 farmers (17%) regarded the flail has having

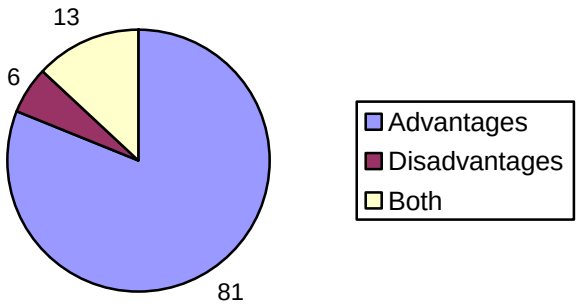
practical disadvantages. 15 farmers (12%), included in the two previous totals, considered this equipment to have both advantages and disadvantages. 14 farmers (11%) offered no opinion on the practical advantages or disadvantages of using a flail.

Figure 35. Numbers of farmers who considered the flail, rotary saw and finger-bar trimmer to have practical advantages, disadvantages or both.



Looking at these data another way, including only those farmers who stated an opinion, 81% saw the flail as having only practical advantages, 6% as having only disadvantages and 13% recognised advantages and disadvantages for this equipment (Figure 36).

Figure 36. Percentages of farmers regarding the flail to have practical advantages, disadvantages or both. Data only include those farmers that expressed an opinion (n = 114).



In contrast, relatively few farmers had views on the practical advantages or disadvantages of other machinery options, but the numbers that regarded rotary saws and finger-bar trimmers to have mainly disadvantages greatly exceeded the very small numbers that saw these machines to have advantages (Figure 35).

Fewer farmers had views on the costs of different equipment options, but these generally mirrored those on practicality i.e. that the flail generally had 'cost advantages' while the rotary saw and finger-bar trimmer had 'cost disadvantages'. 68 farmers (53%) thought the flail had cost advantages.

Several farmers did, however, recognise that a rotary saw was useful for cutting overgrown hedges or hedges that were cut on longer rotations and that a finger-bar trimmer gave a good, neat cut to a hedge. For both, however, their main limitations, in comparison with the flail were thought to be a slower working speed and the need for labour-intensive, and costly, clearing up of hedge trimmings. Several also thought that there might be a risk to safety when a rotary saw is used.

Recorded comments about machinery options for hedge trimming included the following:

1. Flail

- *"The flail is best, because there are no trimmings to clear up afterwards"*
- *"Flail does not leave trimmings (that cause problems)"*
- *"The flail is more convenient, only needing one man i.e. no 'clearers'"*
- *"Flail is much neater and pulps the wood"*
- *"No mess to sweep up with a flail, but the problem with the pulp produced is that it may be carried into drains by rain"*
- *"Flail produces ugliest result and is probably most damaging to plants"*
- *"Flail doesn't leave trimmings that need picking up like a finger-bar mower, as flails leave a mulch that fertilises the hedge"*
- *"Flails cause more damage than a finger-bar"*
- *"No cost of clearing up after a flail"*
- *"No need to tidy up after a flail"*
- *"Flail leaves hedges damaged (maybe?) and disease can get in"*
- *"The flail is good, but detritus eventually builds up"*
- *"Flail leaves a mulch and is increasing the fertility of the hedge"*
- *"No need to tidy up after a flail, but do have to after a saw or finger-bar cutter"*
- *"The flail has the advantage of speed"*
- *"Flail has a speed advantage, but also a practical disadvantage – it damages the hedge unless used annually"*
- *"The flail is good for annual cutting, but causes problems with thorns in the feet of livestock if not cut annually"*

- *“Flail reduces debris, but can cause punctures”*
- *“Flail mulches well, but damages hedges and the vortex throws material a long way”*
- *“Flails are tidy and need less cleaning up”*
- *“Flail makes a mess of big hedges, and is suitable for only 1-2 years’ growth”*
- *“The only advantage of a flail is that, unlike the finger-bar cutter, there is no cleaning up”.*

2. Finger-bar trimmer
    - *“Finger-bar does a better job, but have to clear up trimmings”*
    - *“Finger-bar cutter is outdated and impractical”*
    - *“Finger-bar does a fantastic job, but far too slow and prone to damage, and you have to pick up the parings”*
    - *“Finger-bar trimmer is slow and prone to breaking down and leaves a lot of material to be cleaned up”*
    - *“Using a finger-bar trimmer means having to pick up trimmings”*
    - *“Finger-bar would mean a need to trim annually”*
    - *“A finger-bar cutter is too slow and have to pick up waste”*
    - *“A finger-bar cutter is best for the hedge, but there is a high cost in cleaning up the trimmings”*
    - *“Finger-bar does a clean job, but leaves lots of mess to clear up”*
    - *“Finger-bar leaves too much to tidy up”*
    - *“Might be easier to cut over a fence with a finger-bar”*
    - *“Finger-bar cutter does an excellent job, and hedges are much better for it, but you need to clear up the trimmings afterwards and we couldn’t get anyone to do that”*
    - *“Does anyone still use a finger-bar cutter?”*
3. Rotary/ shaping saw
    - *“Rotary saws are not safe and don’t leave such a tidy job”*
    - *“Health and safety issues for the rotary saw, which is dangerous to use”*
    - *“Rotary saw might be useful under certain circumstances”*
    - *“Shaping saws are dangerous”*
    - *“Our contractor used a rotary saw for the last hedge cut, two years ago, but the removal of debris was time consuming”*
    - *“We use a rotary saw on about 5% of the hedges each year – on the largest hedges”*
    - *“Not impressed with the shaping saw, which is no better than the flail”*
    - *“A shaping saw is best for bigger hedges”*

- *"Rotary saws and finger-bar cutters require labour intensive collection of trimmings, but spare labour is not available on modern farms. It would not be a problem if farms were highly profitable."*
- *"For a rotary saw, there are the costs of picking up the cut material"*
- *"Saw is suitable for big hedges"*
- *"Rotary saw cuts the hedge well, but throws trimmings far"*
- *"Clearing up (after a rotary saw) is time consuming"*
- *"Rotary saw does a cleaner job and is kinder on larger material, but is dangerous"*
- *"Rotary saw is good for dealing with difficult/thick material <u>but</u> you then have to clean up, costing more and requiring subsequent fires to get rid of the trimmings"*
- *"A rotary saw makes a much better job (than the flail) but is not easily available".*

General comments

A final request for any other general comments (*Question 30*), gave farmers an opportunity to raise a range of issues.

Several farmers in Devon suggested that the importance of hedgebanks and specific issues related to their management needed greater attention…

- *"Hedgebanks are different to ordinary hedges (all hedges on this farm, like on most Devon farms, are hedgebanks)"*
- *"There is little recognition of the bank part of a hedgebank"*
- *"The bank component of the hedgebank is ignored in advice and guidelines"*
- *"There should be more recognition generally of the specific factors relating to hedgebanks e.g. the added wildlife value of the banks and recognition of regional variations (a short hedge on top of a tall bank has as much value as a tall plain hedge)".*

Another subject area that farmers in all counties had comments on was hedgerow protection and conservation measures – including SFP cross-compliance requirements, hedgerow management options in agri-environment schemes and current management guidelines. For example…

- *"There is not enough supervision to ensure that cross-compliance regulations and Environmental Stewardship options are being observed"* (Devon)
- *"I joined the ELS scheme four years ago mainly for money, but I have been impressed at the change in hedgerows – thicker, more blossoms, with increased usage by wildlife. My wife remarked that it has stimulated an appreciation of wildlife in both of us and she now even leaves daisies to grow on the lawn instead of mowing them! However, my parents and other farming relatives disapprove of the "untidy" hedges and tell me that it is not proper management!"* (Devon)
- *"Being in ELS or similar would have a big influence on how hedges are managed, but I would rather not have that added layer of bureaucracy"* (Devon)

- *"Farmers should be rewarded for maintaining, protecting and keeping in place the hedgerows"* (Devon)
- *"Defra rules are based upon flawed advice, including the Silsoe report to the Devon Hedge Group, which was opposed by the Group's NFU and RICS members, whose opposition was ignored"* (Devon)
- *"Legislation is too complicated – simplify it, to make it easier to understand"* (Leicestershire)
- *"More guidelines! Farmers should be trusted to manage their farm in the best way for their stock and land, but there should be some restrictions on arable land and monitoring to ensure that no damage is done"* (Leicestershire)
- *"I have still to see the benefit of ELS hedgerow management requirements"* (North Yorkshire)
- *"Guidelines are too targeted, with too much emphasis on birds and berries – leave nature to itself"* (North Yorkshire)
- *"I want to see good hedgerows. It should be mandatory to keep hedges in good order"* (North Yorkshire)
- *"Tir Gofal has been ended so abruptly, as farms go into Glas Tir. The farm can't do any more capital works because in Glas Tir there isn't an option for us to do this. We are strongly concerned that in the future our income will drop dramatically"* (Powys)
- *"We have worked for 20 years to improve the environment and encourage biodiversity on the farm. Under the Glas Tir Scheme there will be no financial support for those of us who have created a diverse environment to sustain all kinds of animal and plant life, alongside the farm business. Our farm income will fall substantially and we are worried we will not be able to maintain what we have achieved over 20 years, let alone make improvements. There will be no incentives or help to maintain environmentally desirable areas of the farm."* [Written statement from a farmer in Powys] (Powys)
- *In Tir Gofal – the main reason for changes to hedge management – we are noticing changes already"* (Powys)
- *Delay of start of hedge trimming* [no longer allowed before 1st September under SFP cross compliance rules in Wales] *means that most are now trimmed "in one mad rush"* (Powys)
- *"Hedge management is 'money driven' by central government"* (Powys)
- *"I am against the widening of hedges without adequate compensation for loss of Single Farm Payment value"* (Powys).

Others commented on the types of grant that they would like to see introduced or extended, to improve hedgerow management standards…

- *"Grants for fencing to protect hedges should be available"* (Devon)
- *"Grants for fencing to protect hedges and grants to let hedges grow up for 10 years"* (Devon)
- *"More grants should be available for fencing to protect hedgerows"* (Devon)

- *"Farmers would be keen to take up grant aid to protect hedges* (i.e. hedgebanks) *from livestock"* (Devon)
- *"If free hedge plants were available, I would plant more hedges"* (Leicestershire)
- *"Few incentives to plant up hedgerow trees, tagging, etc or to gap up hedges – but these activities have a cost to the business"* (North Yorkshire)
- *"Lack of grants for hedge laying – it would be good for wildlife to get laying again"* (Powys).

*Several made comments about the merits, or otherwise, of different hedgerow managem*ent and restoration methods…

- *"'Old' tradition used to be coppicing (and laying) for firewood on 10-15 year rotation"* (Devon)
- *"Hedge laying is not worthwhile. The best approach with a mature hedge is to chop it off and allow it to regenerate naturally, but it needs protection from livestock."* (Devon)
- *"Cutting less often than two years is not practical for farming, because hedges are then too big to trim and clearing up is costly"* (Leicestershire)
- *"Less frequent hedge cutting is generally a bad idea – plants get split and mashed – you get a poorer hedge"* (Powys)
- *"Every hedge is different – you lay when the hedge gets less dense"* (Powys)
- *"A better way to increase wildlife value and quality of hedges is to leave for 5-6 years then lay, rather than cutting every two years"* (Powys)
- *"You have to keep hedges looking neat, but how you then benefit wildlife is difficult. A possible solution is to leave one or two hedges and cut the rest (some sort of rotation), but choice for the farmer is important"* (Powys)
- *"All hedges need to be double-fenced to protect them from sheep"* (Powys)
- *"Generally my hedges are in better condition than 20 years ago, as they have been double-fenced and gapped up. I am against 'enhanced' management (i.e. cutting every 2-3 years), but in favour of leaving hedges for six years and then laying them (and then cutting every year)"* (Powys)
- *"I am strongly against two metre margins, as they increase weed populations and require more herbicide"* (North Yorkshire).

There were also a few comments on possible impacts of hedgerow management on land values or tenancy agreements:

- *"Good hedges also maintain the value of the land"* (Devon)
- *"Hedges considered to be in a 'poor state' feature in relation to dilapidations in negotiations between landlords and tenants – and any hedgebank not trimmed annually might be considered to be in a poor state"* (Devon).

Hedgerows are still regarded by some farmers to have an important agricultural function, for example…

- *"Hedges on the farm are important for shelter in spring during lambing"* (Powys)
- *"Hedges are very important for shelter of ewes and lambs during winter and shading in summer"* (Leicestershire).

…although a few identified possible problems, for example if a hedgerow had several trees:

- *"Hedgerow trees shade out crops and impair hay drying"* (Devon)

Some mentioned the negative effects that walkers or trespassers could sometimes have on hedgerows or farm wildlife:

- *"There was a noticeable increase in wildlife when walkers were kept off footpaths during the foot and mouth disease outbreak"* (Leicestershire)
- *"Young people have no consideration for hedges. We have had problems with hedge and fence damage caused by local townspeople breaking through a hedge to get access to a nearby village"* (Leicestershire).

There was also some concern that a lack of available staff for environmental work on the farm was affecting hedgerow management standards (e.g. *"Fewer people on the land these days and limited time availability, with the emphasis always on profitable/paid work"* - Leicestershire), and a feeling that more needed to be done to train people in traditional management skills (e.g. *"I would like to see assistance for young people to learn the art of hedge-laying"* - Powys).

Although, as seen earlier in the Results section, most farmers seem quite happy with the Hedgerows Regulations, there is some concern that enforcement may be inadequate:

- *"Not enough enforcement of the Hedgerow Regulations – there is a need for strengthening of some measures"* (Powys)
- *"I recently contacted the council to report hedge removal by a neighbouring farmer, but was told that this was OK on private property!"* (Leicestershire).

A few very specific technical issues were also raised, including a perception that available planting stock for hedges could be unsuitable for some areas (e.g. *"Shrub whips grown in good conditions won't grow in poorer conditions up here"* (Powys) and one request for official approval, or derogation, to use a herbicide for control of cleavers in hedgerows (*"We need some derogation or a new product to clear cleavers from hedges"* - North Yorkshire).

Finally, a small selection of comments from farmers showing some of the different attitudes on hedgerow management:

- *"I feel that I am going against the general rural culture (of neat and tidy hedges) which needs to change"* [a Devon farmer who trims every 3 years or less]
- *"We don't want a wilderness or 'scalped' hedges – but something in between"* (Leicestershire)
- *"I generally have no strong views, but like tidy hedges and annual cutting, to keep them tight and stock-proof"* (North Yorkshire)
- *"I like to see 'controlled neglect'"* (North Yorkshire)
- *"If you look after a hedge well then conservation looks after itself"* (Powys).

Although the above comments include at least one from each county, there is no particular significance in their geographical location.

3.3.2 Field Survey of Hedgerows

Five hedgerows were assessed on each of the 128 farms, a total of 640 hedgerows.

Hedgerow length

The total length of hedgerows surveyed was 130.5 km, a mean hedgerow length of 204 m. By county, the lengths of hedgerow were as follows:

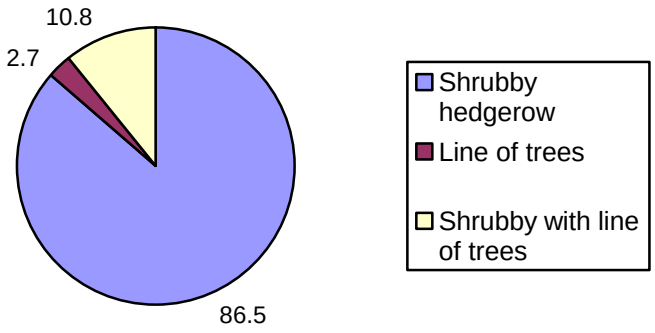
- Devon 31.5 km (mean 197 m)
- Leicestershire 32.4 km (mean 203 m)
- North Yorkshire 39.1 km (mean 244 m)
- Powys 27.5 km (mean 172 m)

Hedgerow length ranged from 45 to 750 m.

Hedgerow type

The vast majority (87%) of all hedgerows surveyed were classed as 'shrubby hedgerows, (Figure 37). Approximately 11% met the criteria for a 'shrubby hedgerow with a line of trees', with just under 3% being described as a 'line of trees' (Figure 35).

Figure 37. Hedgerow type. Percentage of hedgerows of each type – shrubby hedgerows, lines of trees and shrubby hedgerows with a line of trees. All four counties.



A much higher proportion of hedgerows in North Yorkshire (29%) were considered to be shrubby hedgerows with a line of trees than in the other three counties (3-8%). Only 0-4% of hedgerows in each county were lines of trees.

Hedgerow shape

Most hedgerows were described as 'trimmed and dense' (Figure 38). Just over 60% were trimmed and dense along all or a significant part of their length. This was the predominant hedgerow shape in all four counties.

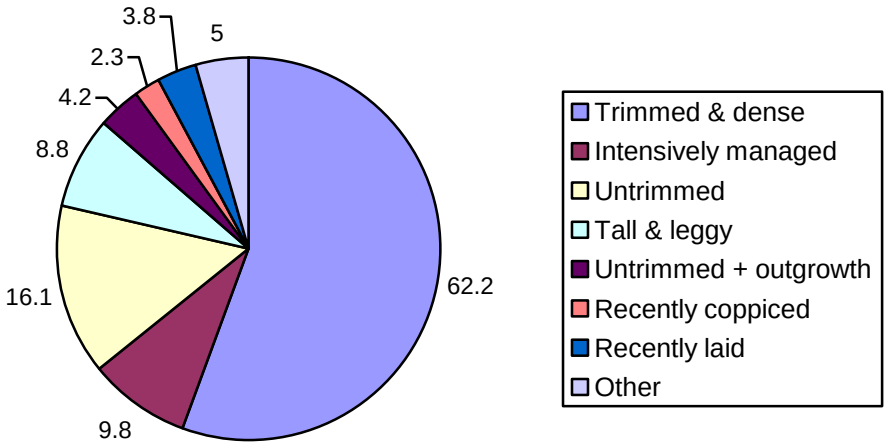
Trimmed and dense hedgerows were most frequent in Leicestershire (74%) and least frequent in Devon (50%). The figures for Powys and North Yorkshire for this hedgerow shape were 68% and 56% respectively.

Untrimmed hedgerows were the next most frequently recorded shape - 16% of all hedgerows (Figure 38). These were most commonly recorded in North Yorkshire (23%) and Leicestershire (20%). Fewer hedgerows in Devon (15%) and Powys (7%) were untrimmed along all, or a large part of, their length. A further 4% of all hedgerows were put in the 'untrimmed + outgrowth' category, almost all of which were in North Yorkshire (9% of hedges) or Devon (7%).

'Intensively managed' hedgerows were much more frequently recorded in Devon than in the other three counties. Figures for the four counties were Devon 26%, Powys 8%, North Yorkshire 4% and Leicestershire 2%. The overall figure for all counties was 10%.

'Tall and leggy' hedgerows were most common in North Yorkshire, where 16% were given this description. In Leicestershire, Devon and Powys only 2%, 7% and 10% of hedgerows were tall and leggy – giving an overall percentage of 9% of hedgerows in this category.

Figure 38. Hedgerow shape. Percentages of hedgerows of each shape – trimmed and dense, intensively managed, untrimmed, tall and leggy, untrimmed + outgrowth, recently coppiced, recently laid, and 'other'.



Note: Figures add to more than 100%, as individual hedgerows often had two distinct shapes along significant proportions of the total hedgerow length.

Recently coppiced or recently laid hedges were relatively infrequent (coppiced 2.3% and laid 3.7%); although in North Yorkshire almost 7% had recently been coppiced (compared with 0.6-1.2% in each of the other three counties). The lowest frequency of recently laid hedges was recorded in Devon (1.9%). The equivalent figures for North Yorkshire, Leicestershire and Powys were 4.4%, 3.8% and 5.0% respectively.

Hedge length

The estimated total length of all 640 surveyed hedgerows was 130.5 km. The mean hedgerow length was 204 m, almost identical to the mean length of hedgerows in the 1999 survey (202 m). Table 26 shows hedgerow length data for each of the four surveyed counties.

Table 26. Lengths of surveyed hedgerows - totals, means, minimum and maximum lengths. All hedgerows and breakdown by county.

County	Total hedgerow length (km)	Mean hedgerow length (m)	Minimum length (m)	Maximum length (m)
Devon	31.5	197.1	50	625
Leics.	32.4	202.6	45	615
North Yorks.	39.1	244.3	50	750
Powys	27.5	171.6	55	560
All	130.5	203.9	45	750

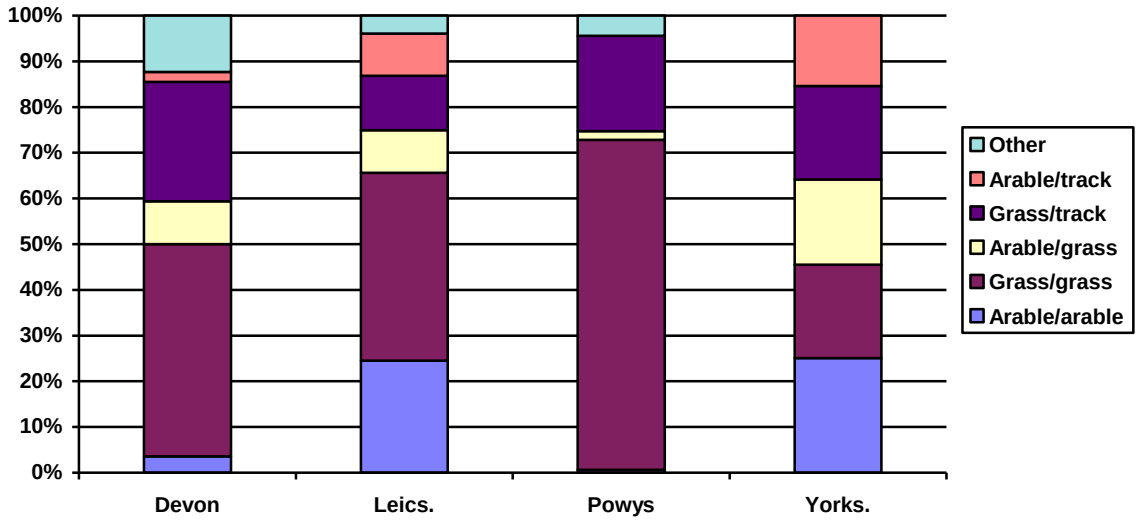
Connections to other hedgerows

The mean number of connections to other hedgerows was 3.19 (North Yorkshire 2.61, Leicestershire 3.52, Powys 3.22 and Devon 3.41).

Adjacent land use

Land use combinations adjacent to each surveyed hedgerow reflected the different farm types in the four counties. For example, in Powys a high percentage (72%) of hedgerows had grassland (mostly improved) on both sides and where only one side was adjacent to grassland the other side was most likely to border a farm track or road (21% of Powys hedgerows) (Figure 39). Only one surveyed hedgerow (0.6%) in Powys had arable crops on both sides. In Devon and Leicestershire, over 40% of hedgerows had grassland on both sides; but in Devon only five hedgerows (3.6%) had arable fields on both sides whereas the corresponding figure for both Leicestershire and North Yorkshire was 25%. In North Yorkshire, 21% of hedgerows had grassland on both sides, although the arable fields were frequently separated from the hedgerow by a 6 metre grass margin.

Figure 39. Land use types immediately adjacent to surveyed hedgerows. Percentages of hedgerows with each land use combination. Breakdown by county.



Associated features

Almost half (45%) of all hedgerows had a bank on the side that was assessed (*Question 6*). However, banks were much more frequent in Devon (where they were adjacent to 88% of all hedgerows) and Powys (63%) than in North Yorkshire (27%) or Leicestershire (4%).

Estimated bank heights ranged from 0.25 to 3.0 m. The mean height of hedgebanks was 0.7 m (mean of all heights, that were each estimated only to the nearest 0.25 m) and was similar for all counties (Powys 0.6 m, Devon 0.7 m, North Yorkshire 0.8, and Leicestershire 0.8 m).

The average vegetation height beside hedgerows was 35 cm (North Yorkshire 41 cm, Leicestershire 41 cm, Powys 12 cm and Devon 46 cm).

Half (50%) of all hedgerows had a fence on the recorded side or within the hedge. Variations between counties largely reflected the relative importance of livestock farming, and the need for fencing, in the different areas: North Yorkshire 46%, Leicestershire 34%, Powys 65% and Devon 57%.

Almost one fifth (18.6%) of all hedgerows were adjacent to a ditch. Most commonly these were external dry ditches (9.4%) or external wet ditches (6.7%). Internal ditches, with a line of shrubs on both sides, were less frequently recorded – being found within 2.5% of all hedgerows (dry ditches 1.9% and wet ditches 0.6%).

Undisturbed ground

Where applicable for measurement (e.g. where the adjacent land use was not grassland, woodland, a road or another built feature) the mean width of undisturbed ground next to hedgerows, measured from the centre-line of the hedge, was 4.7 m (n = 159) and the mean width of perennial herbaceous vegetation 3.9 m (n = 157) (Table 27).

Table 27. Average width of undisturbed ground and average width of perennial herbaceous vegetation adjacent to hedgerows, excluding grassland, roads, etc.

	Average width of undisturbed ground (m)	Average width of perennial herbaceous vegetation (m)
Mean	4.72	3.89
Median	3.0	2.5
Min.	0.5	0.5
Max.	22	22
n	159	166

The median width of undisturbed ground by county was Devon 2 m (n = 15), Leicestershire 4 m (n = 59) and North Yorkshire 3 m (n = 85). The median width of perennial herbaceous vegetation by county was Devon 2 m (n = 14), Leicestershire 2.5 m (n = 61), North Yorkshire 3 m (n = 90).

The width of perennial vegetation adjacent to a hedgerow was only measured for one hedge in Powys, due to the relative scarcity of arable fields in that county.

147 hedgerows (92% of those assessed) had at least 2 m of undisturbed ground and 162 hedgerows (98% of those assessed) had at least 1 m of adjacent perennial vegetation.

Favourable condition – UNDISTURBED GROUND AND PERENNIAL HERBACEOUS VEGETATION COVER

Minimum of 2 m of undisturbed ground and 1 m of perennial vegetation alongside the hedge.

A total of 15 hedgerows (2.3% of all hedgerows or 9.0% of hedgerows where assessment was relevant) were not in favourable condition because they failed to meet one or both of these requirements.

Only 12 hedgerows (1.9% of all hedgerows or 7.5% of hedgerows where assessment was relevant – mainly those beside arable fields) had less than 2 m of undisturbed ground.

Only four hedgerows (0.6% of all hedgerows, or 2.4% of hedgerows where assessment was relevant) had less than 1 m of adjacent perennial vegetation.

One hedgerow failed on both of these criteria.

Nutrient enrichment ground flora indicator species

The estimated cover of three nutrient enrichment indicator species was recorded in a 2 m wide band alongside each hedgerow (Table 28). The percentage cover was estimated to the nearest 5%, meaning that presence at very low levels (<2.5%) was not formally recorded (although often noted on the recording form).

Nettles (*Urtica dioica*) were more frequently recorded than either cleavers (*Galium aparine*) or docks (*Rumex* spp.), being present (at a minimum level of 2.5% cover) alongside 58% of all hedgerows. Cleavers was recorded beside 21% of hedgerows and docks beside 14%. However, all three species were present in smaller quantities (<2.5%) alongside many other hedgerows.

Table 28. Estimated percentage cover of three nutrient enrichment indicator species in a 2 m wide band alongside hedgerows (estimated to nearest 5%).

	Nettles	**Cleavers**	**Docks**	**All**
Min.	0	0	0	0
Max.	90	80	50	125
Mean	10.2	2.8	1.3	14.2
Median	5	0	0	5
n	635	636	636	637

The highest estimated mean percentage covers for each of these three species were recorded in Devon (mean 17.0% cover) and North Yorkshire (13.0%). The figures for Leicestershire (4.5%) and Powys (6.2%) were relatively low in comparison.

Some 41.1% of hedgerows had >5% total cover of these three nutrient enrichment indicator species, 32.5% had >10% cover, 20.4% > 20%, 15.3% >30%, and 7.2% >50% cover.

Favourable condition – NUTRIENT ENRICHMENT INDICATOR SPECIES

Less than 20% cover of nettles, cleavers and docks (combined total)

The threshold for hedgerows in 'favourable condition' is 20% cover, in total, for these three nutrient enrichment indicator species.

In this survey, 155 hedgerows (24.3%) had 20% or more cover of these three species – failing this criterion for favourable condition.

Recently introduced, non-native species

Very few recently introduced, non-native species were recorded in the ground flora of hedgerows. The most frequently recorded was Indian balsam (*Impatiens glandulifera*), but this was only found in six hedgerows (0.9%) – four in North Yorkshire and two in Powys. The

percentage cover for Indian balsam was estimated at 10% in one Yorkshire hedgerow, but was less than 5% in the other five hedgerows.

The only other non-native ground flora species recorded were ground elder (*Aegopodium podagraria*) in a single Yorkshire hedgerow, dwarf elder (*Sambucus ebulus*) in one Powys hedgerow, and giant hogweed (*Heracleum mantegazzianum*) in another Powys hedgerow. Only giant hogweed (25% cover) had a percentage cover of 5% or more. Dwarf elder, although described by Rose (2006) as introduced, is said by Stace (1997) to be "possibly native".

Among the more recently introduced woody, non-native species recorded were:

North Yorkshire - snowberry (*Symphoricarpos albus*) and flowering currant (*Ribes sanguineum*)

Leicestershire – Swedish whitebeam, cherry plum (*Prunus cerasifera*), white poplar (*Populus alba*) and a hybrid poplar.

Powys – Cypress species (*Chamaecyparis*), Leyland cypress (x *Cupressocyparis leylandii*), laburnum (*Laburnum anagyroides*), Sitka spruce (*Picea sitchensis*) and ornamental hollies (*Ilex aquifolium* or *I. x altaclarensis* cvs.).

Devon – Rhododendron (*Rhododendron ponticum*) and Japanese rose (*Rosa rugosa*).

No non-native, woody species was recorded frequently, but the most commonly recorded were the cypresses (including Leyland cypress), which were found in four Powys hedges, with 5-20% cover in each hedge. Rhododendron was recorded in two Devon hedges (5% cover in each). All other recorded species were found only in one hedge, with estimated cover always <5% except for Japanese rose (5% in one Devon hedge) and the two ornamental holly cultivars (variegated) found in a Powys hedge (5% combined cover).

Only three hedges had more than 5% cover of recently introduced non-native species – all in Powys. Two of these had cypress species (10% and 20% cover) and the other a combination of Leyland cypress and two ornamental holly cultivars (5% Leyland cypress and 5% holly).

There were other, more frequently occurring, introduced species – but these were longer-established species such as horse chestnut (*Aesculus hippocastanum*) and sycamore (*Acer pseudoplatanus*). Sycamore, for example, was recorded within the 30 m survey sections of 69 hedgerows (10.8%), and was most frequent in North Yorkshire (31 hedges, 19.4%) and Devon (26 hedges, 16.3%).

Favourable condition – RECENTLY INTRODUCED SPECIES

Maximum 10% cover of recently introduced species in the hedge or ground flora

The threshold for hedgerows in 'favourable condition' is 10% cover of recently introduced non-native species – in the ground flora or in the shrub layer.

Only two hedgerows, both in Powys, failed these criteria for favourable condition – one because of giant hogweed in the ground flora and one because of a cypress species in the hedge.

Dimensions

The mean hedge height was 2.62 m (n = 637) (Table 29). Hedges in Devon and Leicestershire (both approximately 2.9 m mean height) were taller than those in Powys (mean height 2.20 m).

Table 29. Hedge heights. Mean, median, minimum, maximum and percentage of all hedges (including lines of trees) equal to or taller than 1.0 or 1.5 metres. All counties and breakdown by county.

	Mean	Median	Min.	Max.	% ≥1.0 m	% ≥1.5 m
North Yorks.	2.57	2.25	0.10	9.00	97.5	92.0
Leicestershire	2.85	2.50	1.25	12.00	100.0	99.0
Powys	2.20	1.75	0.25	7.50	98.1	74.0
Devon	2.87	1.75	0,75	20.00	99.4	79.0
All counties	2.62	2.00	0.10	20.00	98.9	86.0

These data were skewed somewhat by the inclusion of a small minority of 'line of trees' hedgerows. Exclusion of these 15 hedgerows produced the analysis summarised in Table 30 below. The mean hedge height is then 2.47, although the median height remains the same – 2.0 (n = 622).

Table 30. Hedge heights. Mean, median, minimum, maximum and percentage of all shrubby hedges (excluding lines of trees) equal to or taller than 1.0 or 1.5 metres. All counties and breakdown by county.

	Mean	Median	Min.	Max.	% ≥1.0 m	% ≥1.5 m
North Yorks.	2.51	2.25	0.25	9.00	98.1	92.2
Leicestershire	2.85	2.50	1.25	12.00	100.0	99.4
Powys	2.12	1.75	0.25	7.00	98.1	73.2
Devon	2.38	1.75	0.75	8.00	99.3	78.4
All counties	2.47	2.00	0.25	12.00	98.9	85.9

The mean width of all hedgerows was 2.98 m (Table 31).

Table 31. Hedge widths. Mean, median, minimum, maximum and percentage of all hedges (including lines of trees) equal to or taller than 1.0 or 1.5 metres. All counties and breakdown by county.

	Mean	Median	Min.	Max.	% ≥1.0 m	% ≥1.5 m
North Yorks.	2.59	2.25	0.25	8.0	96.8	86.1
Leicestershire	3.04	3.00	1.25	10.0	100.0	99.3
Powys	2.38	2.00	0.75	8.0	99.4	89.3
Devon	3.94	2.75	0.50	18.0	99.4	96.2
All counties	2.98	2.50	0.25	18.0	98.9	92.7

Favourable condition – HEDGE SIZE

Minimum height 1.0 m, minimum width 1.0 m and minimum cross-sectional area 3 m^2.

Only seven hedges (1.1%) had an average height of less than 1.0 m, the minimum height required for 'favourable condition' – four in Yorkshire, two in Powys and one in Devon.

Another seven hedges had widths below the minimum 1.0 m – five in Yorkshire, one in Powys and one in Devon.

More than three quarters (79%) of all hedges had a minimum cross-sectional area (height x width) of 3.0 m^2, as required for one of the criteria for hedgerows in 'favourable condition. 129 hedges (21%), including all 14 hedges with a height or width of <1.0 m, had a cross-sectional area of less than 3.0 m^2 and would therefore have failed an assessment of favourable condition on this criteria.

Hedgerow Integrity/ Continuity

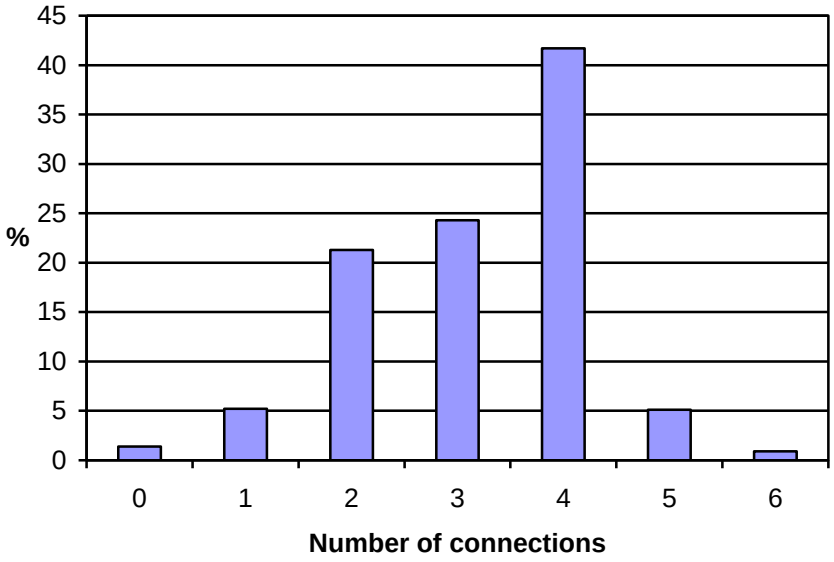
Continuous hedgerows, with few gaps, in strong hedgerow networks are very important for landscapes and biodiversity. Frequent gaps, large gaps, a lack of cover around the base of the hedge and poor connectivity with other hedgerows are all negative factors.

The mean number of connections to other hedgerows was 3.19 and the median 3.

Two thirds (66%) of all hedgerows were connected to three or four other hedges (Figure 40). Nine hedgerows were not connected to another hedge. Eight of these were in North Yorkshire.

The proportion of hedgerows with three or more connections to other hedges was 72%, but differed between counties. The best connectivity was recorded in Devon (87%) and Leicestershire (81%). Hedgerow networks in North Yorkshire were apparently more fragmented, with only 47% of hedgerows being connected to three or more other hedges. The figure for Powys was 74%.

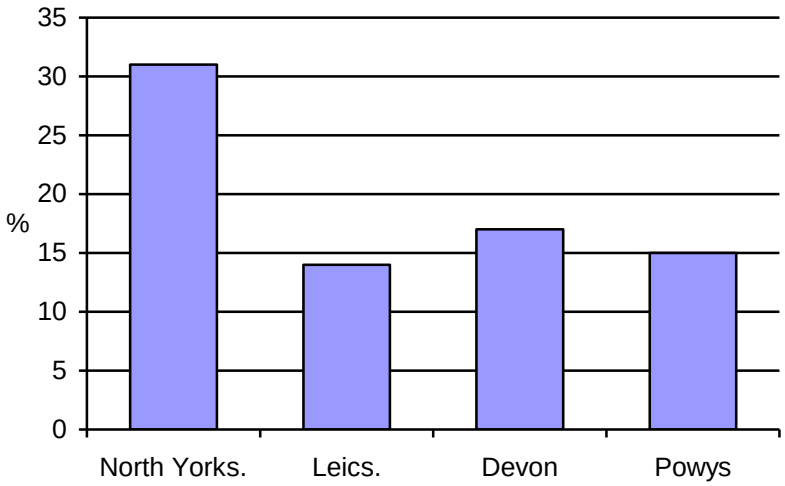
Figure 40. Connections to other hedgerows. Percentages of all hedgerows with 0, 1, 2, 3, 4, 5, or 6 connections to other hedges at their ends. All counties combined.



The mean percentage of gaps in hedges was 3.25%, but the median was 0% - as 67% of all hedges had no gaps. Only 14% had gaps along >5% of their length and only 1.6% had >10% gaps. The threshold for 'favourable condition' is <10%, and 13.5% of hedges exceeded this level of 'gappiness'.

Almost one fifth (18.6%) of all hedges had one or more gaps greater than 5 m wide, a distance regarded as critical for certain species e.g. common dormouse (*Muscardinus avellanarius*). The proportion of hedgerows with gaps of >5 m was greater in North Yorkshire (31%), than in Leicestershire (14%), Powys (15%) or Devon (17%) (Figure 41).

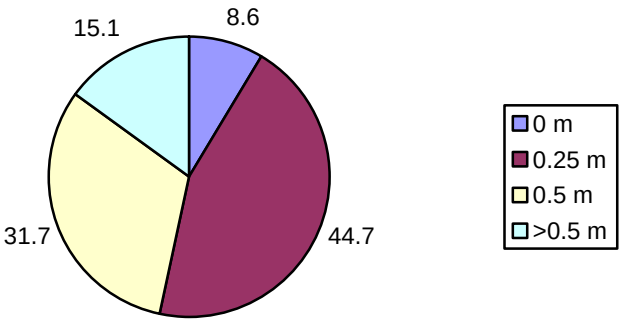
Figure 41. Percentages of hedgerows in each county with one or more gaps >5 m wide.



Considering shrubby hedgerows only, the mean of the average height of the base of the canopy (lowest leafy shrub growth) was 0.4 m, but the median was 0.25 m. Figure 42 shows the proportions of shrubby hedgerows where the average height of the canopy base was estimated to be <0.5 m, 0.5 m or >0.5 m.

The exact percentage that would have failed this criterion for favourable condition is not known, but would be higher than for most other criteria – being somewhere between 15 and 47%. The standard hedgerow condition methodology, as used in this research, requires the average height to be estimated to the nearest 25 cm, but the relevant criterion for favourable condition requires the average height of the base of the canopy to be less than 0.5 m. All heights recorded as 0.5 m could, therefore, have actually had an average basal canopy height of anywhere between 27.5 and 62.5 cm – and may or may not have been above the 50 cm threshold.

Figure 42. Average height of base of hedge canopy. Percentages of hedgerows where the average height, estimated to the nearest 25 cm was either 0, 0.25, 0.5 or >0.5 m. Shrubby hedgerows only; all counties combined.



Favourable condition – INTEGRITY/CONTINUITY

Less than 10% gaps; no gaps >5 m wide; average height of base of hedge canopy <0.5 m (for shrubby hedges only).

13.5% of hedges had more than 10% gaps.

19% of hedges had one or more gaps more than 5 m wide.

15-47% of hedgerows had an average height of the canopy base that was ≥0.5 m.

Hedgerow trees

The most frequently recorded hedgerow trees were ash and oak species (*Quercus robur* and *Q. petraea*). These two species accounted for almost 70% of all 'isolated' trees in shrubby hedgerows (excluding lines of trees and shrubby hedges with lines of trees), with ash (44%) being more common than oak (24%). Oak and ash were also the dominant hedgerow trees in all four counties, although their relative importance varied (Figures 43 & 44).

Figure 43. Total numbers of isolated ash and oak trees in shrubby hedgerows – by county and all counties combined.

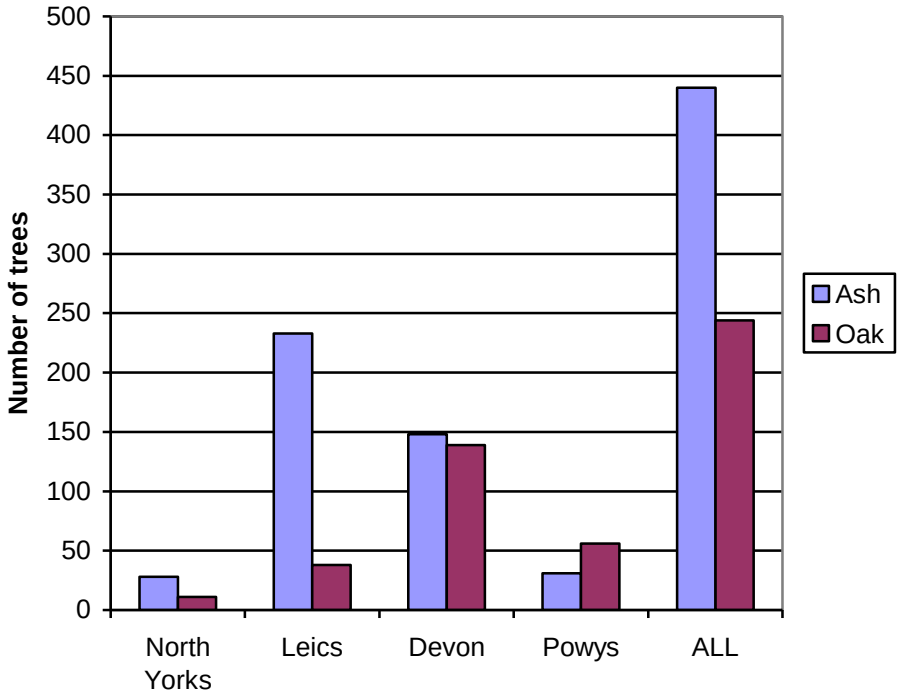
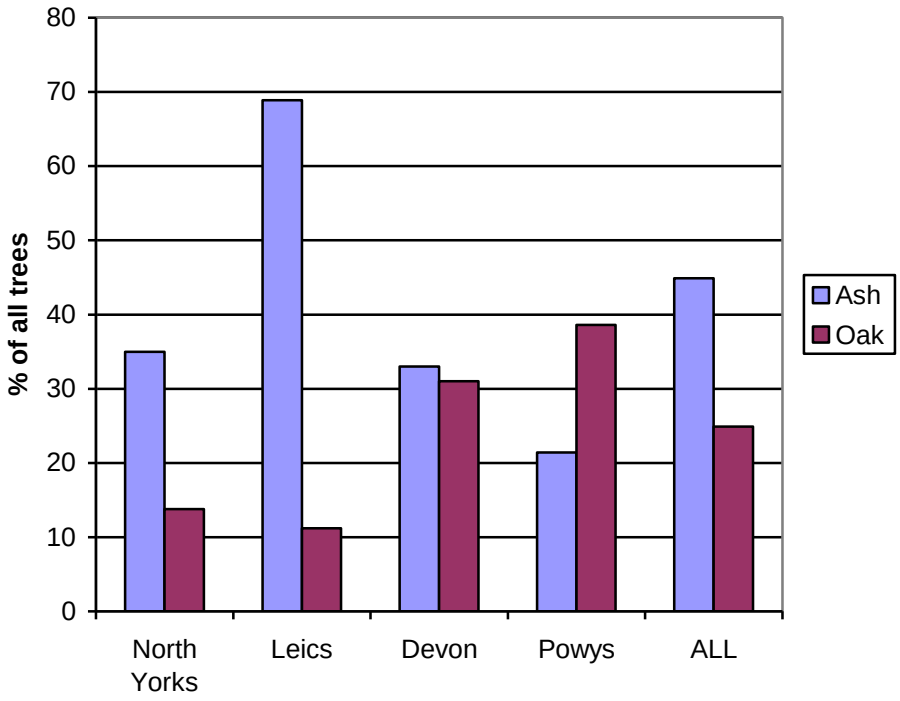


Figure 44. Ash and oak trees in shrubby hedgerows as percentages of all trees recorded – by county and all counties combined.



Willows (*Salix* spp.), mainly goat willows (*S. caprea*), and field maple (*Acer campestre*) were the next most frequently recorded trees, both making up 3.8% of the total. Other species that were recorded quite frequently included hawthorn (3.6%), sycamore (3.5%), beech (3.1%), silver birch (2.6%), holly (2.5%) and elms (2.1%). All of the beech trees recorded were in Devon hedges, where they represented 6.9% of the total number of trees in shrubby hedgerows.

Other species recorded frequently (>5% of all trees) in individual counties were sycamore in Powys (11.7%) and North Yorkshire (7.5%), silver birch in Powys (7.6%) and hawthorn in Devon (6.0%).

Willows were recorded more frequently in Leicestershire (2.7%) and North Yorkshire (2.5%). Crab apple trees were apparently more common in North Yorkshire than in any of the other counties (all <1%). The same was true for hazel and whitebeam. Holly trees were recorded more frequently in North Yorkshire (5.0% of all trees), Powys (4.1%) and Devon (3.1%) than in Leicestershire (0.3%).

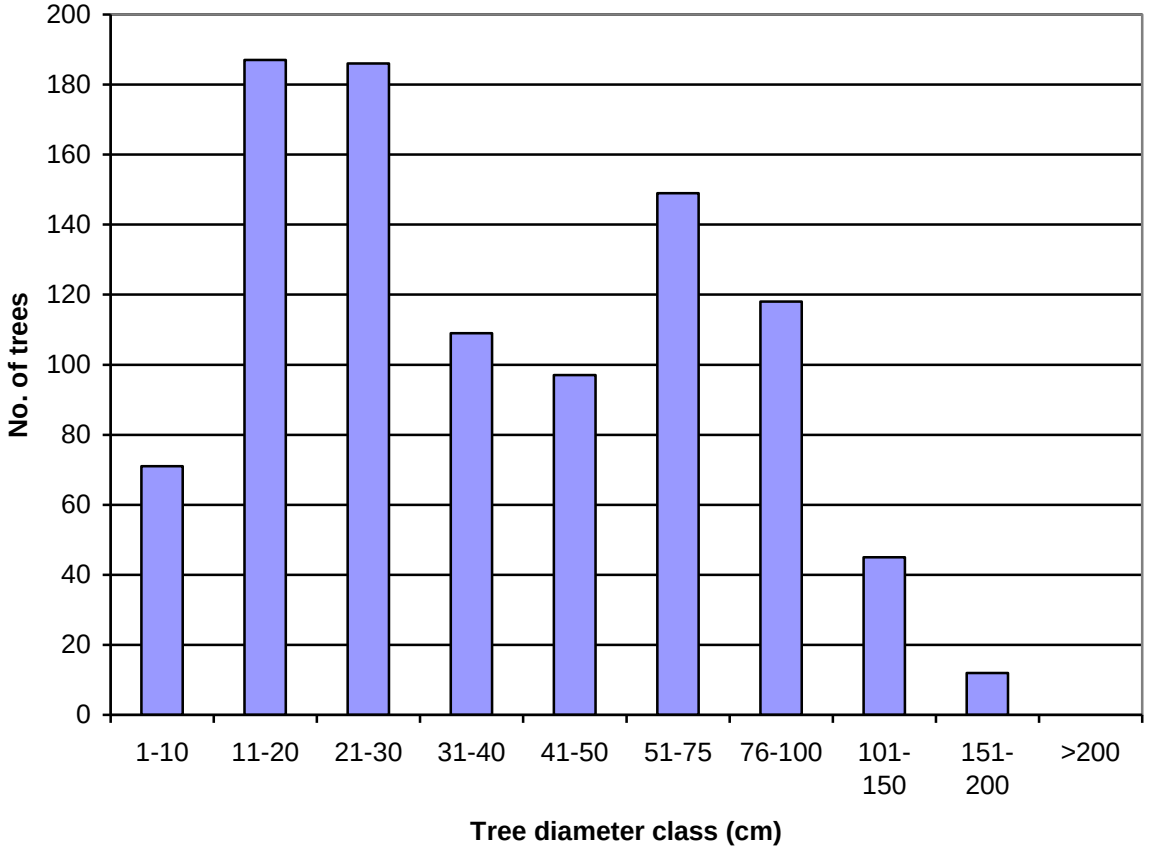
The mean density of isolated hedgerow trees in shrubby hedgerows varied greatly between counties:

- North Yorkshire 3.2 trees/ km
- Leicestershire 10.7 trees/ km
- Devon 16.1 trees/ km
- Powys 5.5 trees/ km

Estimated stem diameters of individual trees in shrubby hedgerows, across all four counties, ranged from 2 cm to 275 cm. The median diameter was 35 cm.

The most frequently recorded size classes were 11-20 and 21-30 cm, but most classes up to 100 cm diameter were well represented (Figure 45).

Figure 45. Estimated stem diameters of trees in shrubby hedgerows. Numbers of trees in different size classes. All counties combined.



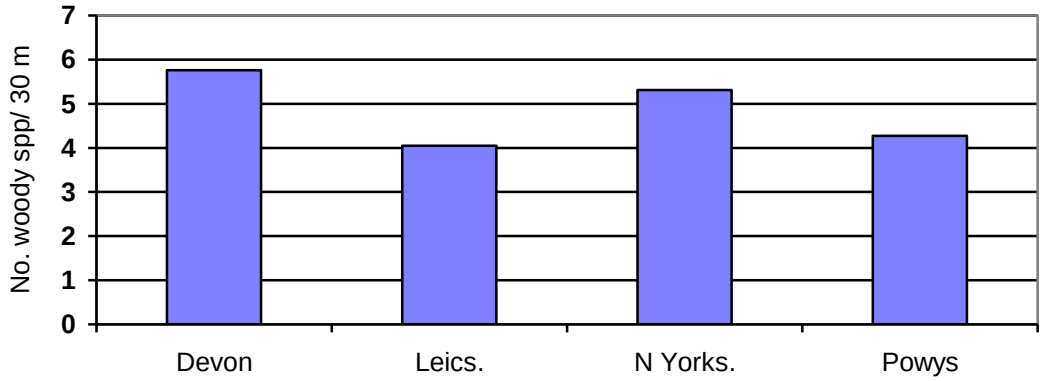
Note larger band sizes in chart above for classes above 50 cm diameter (25 or 50 cm bands, rather than 10 cm).

Woody species diversity

The mean number of woody species per 30 m of hedge length, excluding recent introductions and climbers, was 4.85 (median 5 species). The number of species per 30 m ranged from a minimum of 1 (in 21 hedges, in Leicestershire, North Yorkshire and Powys) to 12 (in 4 hedges, all in North Yorkshire). 69% of all surveyed hedges had between 3 and 6 species (inclusive); and 86% had between 2 and 7 species (inclusive).

Hedges in Devon were more 'species rich', having an average of 5.76 woody species per 30 m of hedge, followed by North Yorkshire (5.31 species). Powys (4.27 spp/ 30 m) and Leicestershire (4.05 species) had the least species-rich hedges (Fig. 46).

Figure 46. Woody species diversity in surveyed hedges. Mean number of woody species per 30 m hedge length. Breakdown by county.



The most frequently recorded woody species, in the 30 m sections only, were hawthorn (*Crataegus monogyna*), recorded in 89% of all surveyed hedgerows; blackthorn (*Prunus spinosa*), 66%; roses (*Rosa* spp.), 66%; hazel (*Corylus avellana*), 50%; elder (*Sambucus nigra*), 36%; ash, 32%; holly (*Ilex aquifolium*), 20%; pedunculate oak (*Quercus robur*), 20%; and field maple (*Acer platanoides*), 18%.

Hawthorn was the most frequently recorded species in Leicestershire and North Yorkshire (Figure 45). In Devon and Powys, three species were each recorded in 70-85% of all surveyed hedgerows: hawthorn, blackthorn and hazel (Figure 47).

Apart from these three dominant woody species (hawthorn, blackthorn and hazel), several other species appeared to show clear differences in frequency between counties. For example, holly was more frequent in Devon (particularly) and North Yorkshire, elder in Leicestershire and North Yorkshire, English elm (*Ulmus procera*) in Devon and Leicestershire, beech (*Fagus sylvatica*) in Devon, and sycamore (*Acer pseudoplatanus*) in Devon and North Yorkshire. Other species most strongly associated with Devon included gorse (*Ulex* spp.), pedunculate oak (*Quercus robur*), spindle (*Euonymus europaeus*) and goat willow (*Salix caprea*). Species particularly associated with North Yorkshire hedges included buckthorn (*Rhamnus cathartica*), guelder-rose (*Viburnum opulus*) and wild plum (*Prunus domestica*). Ivy was also much more frequently recorded in Devon hedgerows than elsewhere.

Bramble (*Rubus fruticosus* agg.) was recorded in 68% of all hedgerows, ivy (*Hedera helix*)) in 37% and honeysuckle (*Lonicera periclymenum*) in 13%. Bramble was particularly frequent in Devon and Leicestershire, where this species occurred in 83-84% of all hedgerows. Frequencies were lower in Powys (56%) and North Yorkshire (49%). Ivy was much more frequently recorded in Devon hedgerows (72%), than in the other three counties (North Yorkshire 14%, Leicestershire 28%, Powys 34%). Similarly, honeysuckle was also much more frequent in Devon hedgerows (34%), than in North Yorkshire (11%), Leicestershire (1%) or Powys (8%). Again these figures relate only to the recorded 30 m sections of hedgerow.

Figure 47. Frequency of occurrence of hawthorn, blackthorn, hazel, elder and ash in 30m sections of surveyed hedgerows. Breakdown by county.

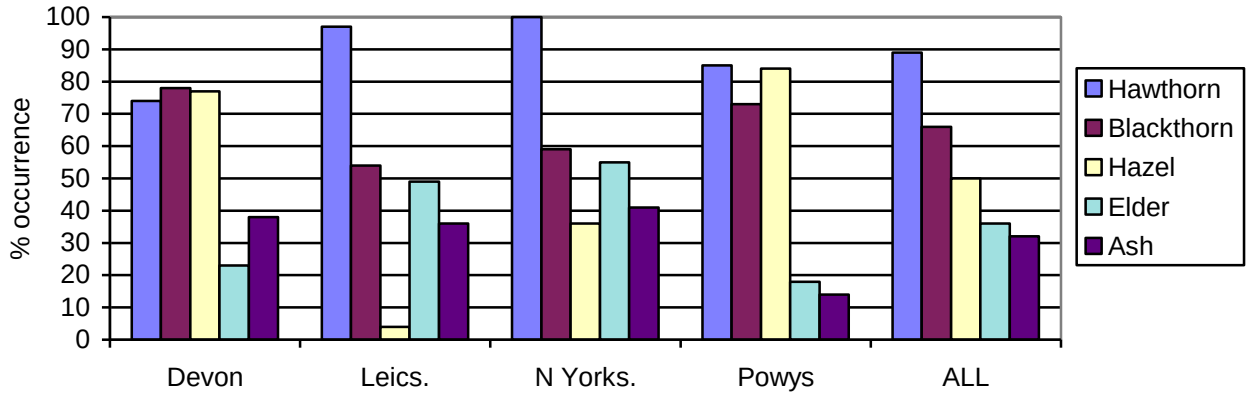


Figure 48. Estimated percentage cover of hawthorn, blackthorn and hazel in 30 m sections of surveyed hedges. Data includes all hedges. Breakdown by county.

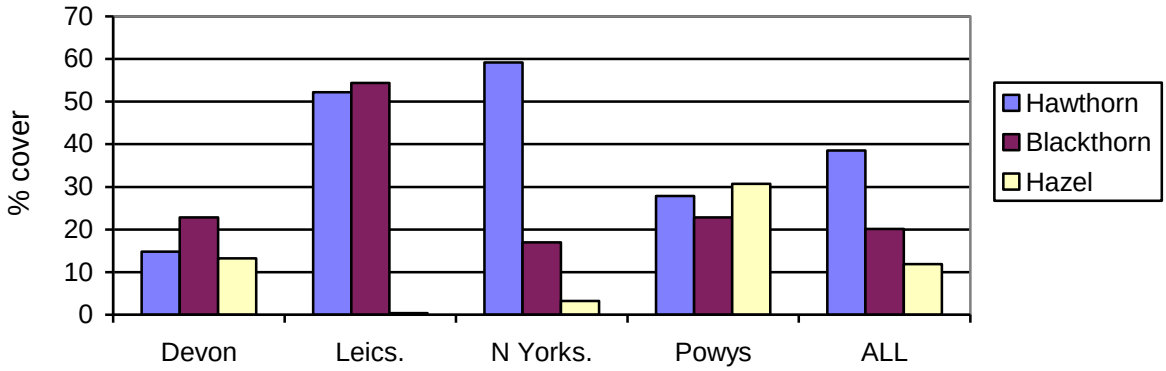


Figure 49. Estimated percentage cover of hawthorn, blackthorn and hazel in 30 m sections of surveyed hedges. Data includes only hedges where each species was recorded. Breakdown by county.

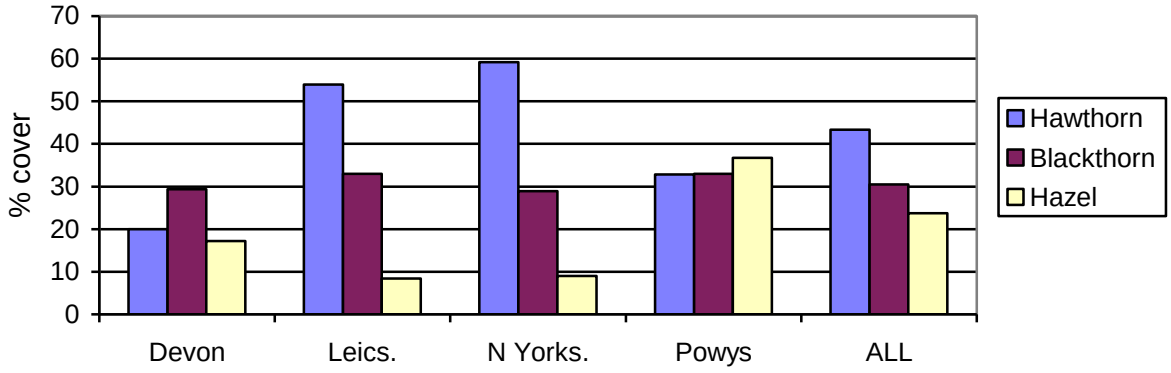
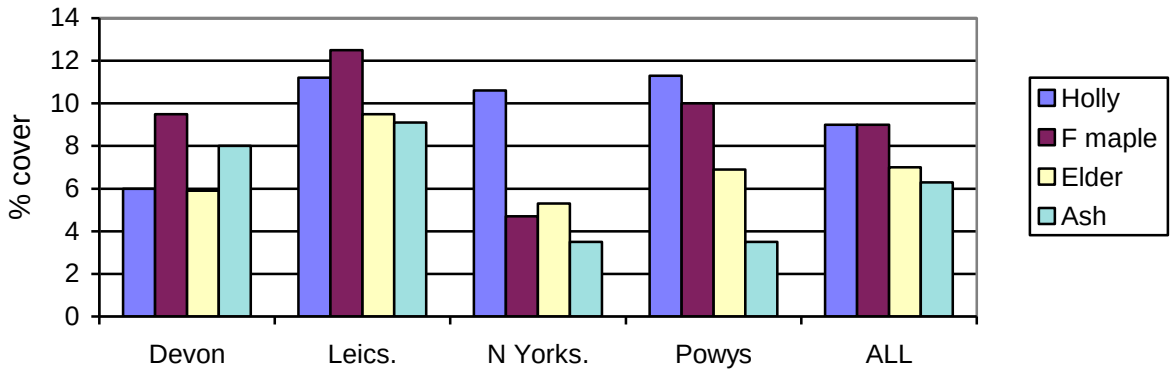


Figure 50. Estimated percentage cover of holly, field maple, elder and ash in 30 m sections of surveyed hedges. Data includes only hedges where each species was recorded. Breakdown by county.



The three most frequently recorded species (hawthorn, blackthorn and hazel) were also those with the highest percentages of cover in the surveyed 30 m hedge sections (Figure 48). In hedge sections where these species occurred, mean estimated cover was 43.3% for hawthorn, 30.5% for blackthorn and 23.7% for hazel (Figure 49).

Hawthorn was the dominant species in North Yorkshire, hawthorn and blackthorn were both important in Leicestershire hedges. Hedges in Devon and Powys had a more even mix of three dominant species – hawthorn, blackthorn and hazel.

No other frequently occurring woody species, present in more than 100 hedges, had a mean estimated percentage cover of >10% in hedges where the species was present, although figures for individual counties could be >10% (Figure 50). Figures for the species concerned were holly 9.0%, field maple 9.0%, elder 7.0%, ash 6.3%, rose species 5.6%, pedunculate oak 3.7% and dog rose 3.3%. Holly had the lowest percentage cover in Devon (6.0%) and field maple was least abundant in North Yorkshire (4.7% cover). The highest percentage cover for both ash (9.1%) and elder (9.5%) was recorded in Leicestershire. Cover of oak was lowest in North Yorkshire (0.9%).

Hedgerow management scale

Figure 51 shows the mean hedgerow management score for surveyed hedges in each county, and for all hedges across the four counties (n = 627). The lowest mean score was recorded in Powys (3.76) and the highest in Leicestershire (5.12). The overall mean was 4.64.

The most frequently allocated management score was 5 (“healthy, dense hedgerow with frequent stems and more than 2m in height”) (n = 209, 33% of all hedges), then 3 (“over-trimmed, frequent stems – stems still healthy, but require more height – hard knuckle may be starting to form at trim line”) (n = 173, 27.6%) and 6 (“hedgerow more than 3m high and trimmed on rotation” or “non-intervention hedge, intentionally left untrimmed for several years” (n = 68, 10.8%). Figure 52 shows the proportion of hedgerows in each score group.

Figure 51. Hedgerow management scale. Mean management score (1-10 scale) for surveyed hedgerows in Devon, Leicestershire, Powys, North Yorkshire and all four counties combined.

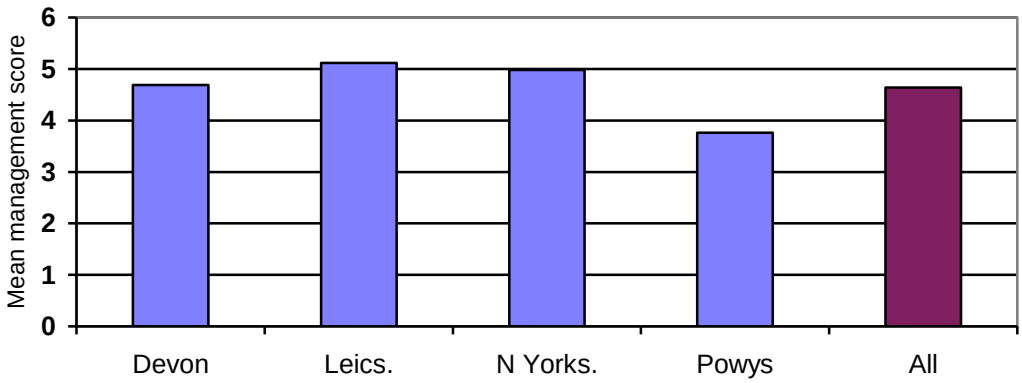
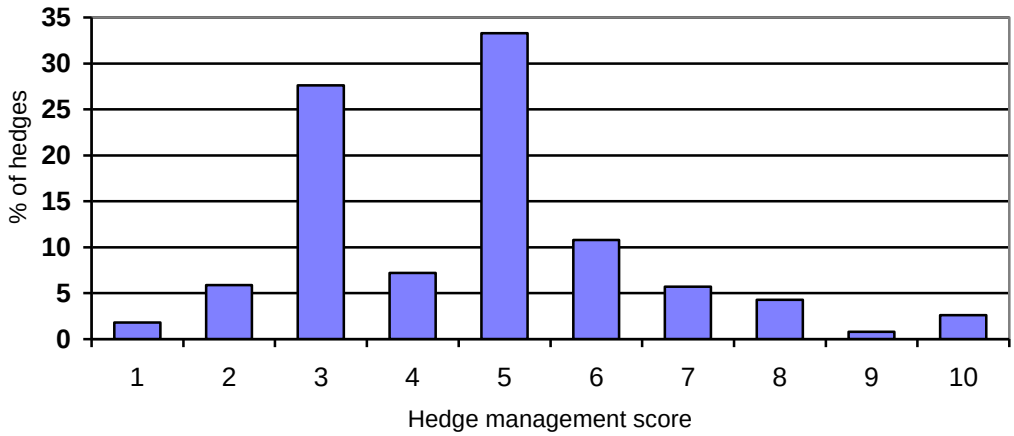


Figure 52. Hedgerow management scale. Percentage of all surveyed hedgerows in each score group. All four counties combined.



Tables 32 and 33 compare some key hedgerow characteristics (hedge type, shape, height, width, % gaps, gaps >5m, mean base height of the canopy, and total woody species) for hedgerows in each management scale group.

Table 32. Hedge types and shapes within each hedge management score category. Percentages of all hedgerows classified as type a) shrubby hedgerow, b) line of trees, or c) shrubby with line of trees; and percentages classified as having shape a) trimmed and dense, b) intensively managed, c) untrimmed, d) tall and leggy, e) untrimmed + outgrowth, f) recently coppiced, g) recently laid and h) other.

Management score	Hedge type			Hedge shape							
	a	b	c	a	b	c	d	e	f	g	h
1	72.7	0.0	27.3	45	36	18	27	9	0	0	0
2	94.6	0.0	5.4	27	59	0	19	5	3	0	5
3	97.7	0.0	2.3	83	20	1	3	0	0	1	3
4	95.6	2.2	4.4	18	2	20	7	0	22	40	4
5	85.6	0.5	13.4	89	0	9	1	2	0	1	2
6	85.3	1.5	10.3	32	1	54	13	4	3	1	1
7	86.1	0.0	11.1	25	0	58	6	14	3	3	17
8	63.0	18.5	22.2	7	0	3	56	26	0	0	7
9	20.0	0.0	80.0	0	0	0	100	60	0	0	0
10	0.0	56.3	43.8	19	0	19	19	13	0	0	50

Note: Figures may add to more than 100%, as individual hedgerows often had two distinct types or shapes along significant proportions of the total hedgerow length.

Table 33. Mean hedge heights and widths, percentages of hedges with gaps >5 m wide, mean heights of the base of the hedge canopy, and mean number of woody species per surveyed 30 m hedge section within each hedge management score category.

Management score	Mean Height (m)	Mean Width (m)	Gaps >5m wide (%)	Mean ht. of canopy base (m)	Mean no. woody spp/ 30 m
1	1.84	2.08	27.3	0.56	5.1
2	1.59	1.91	43.2	0.52	4.4
3	1.56	2.05	13.3	0.40	5.1
4	1.87	1.99	8.9	0.30	5.1
5	2.29	2.63	13.4	0.34	4.8
6	3.39	3.81	20.6	0.43	4.6
7	5.11	4.69	8.3	0.44	4.5
8	6.09	5.78	25.9	0.75	4.7
9	4.25	6.88	20.0	1.10	5.4
10	8.02	10.13	25.0	1.20	4.2

From Table 32 it can be seen that a clear majority of hedgerows in all hedge management classes except 9 ("over-mature hedgerow with tops dying back, collapse possible – perhaps becoming dominated by tree species such as oak, ash or sycamore") and 10 ("hedge developed into line of trees") were classed as shrubby hedgerows (hedge type a). More than 85% of all hedgerows that were given management scores of 2, 3, 4, 5, 6 or 7 were shrubby hedgerows. For hedgerows with the two most frequently allocated management scores, 3 and 5, over 80% were classified as "trimmed and dense" (shape a).

Generally speaking, the higher the management score the greater the size of the hedge (height and width) – although hedges in classes 1-4 all had similar mean heights and widths (Table 33).

Hedges given a management score of 1, 2 (in particular), 6, 8, 9 or 10 were most likely to have one or more gaps >5m in width.

The mean height of the base of the canopy was slighter higher in over-trimmed hedges (management score 1 or 2) and, of course, much higher in mature (score 8) or over-mature (score 9) hedgerows or lines of trees (score 10).

Hedgerows in most management classes had 4.5 to 5.3 woody species per 30m. Lines of trees had the poorest species diversity (4.2 species/ 30m).

Care should be taken in interpretation of data for the infrequently recorded hedge management score classes, as these are based on results for a very small number of hedgerows.

3.4 COMPARISONS WITH 1999/2000 HEDGEROW SURVEY

3.4.1 Postal survey of farmers

Frequency of hedge trimming

Hedgerow management practices had clearly changed since the earlier ADAS survey in 1999/2000 (Britt *et al.*, 2000). The most obvious change was in the frequency of hedge trimming, with 44% of all farmers responding to the postal survey indicating that they had changed this aspect of their management during the past 10 years as a result of an agri-environment scheme agreement. Almost three quarters (74%) of these had changed to two-yearly trimming and 23% to three-yearly cuts.

Direct comparisons with the results from the 1999/2000 survey are only really valid for the English counties, as the previous survey did not include any farms in Wales.

In 1999 79% of farms (England only) were trimming most of their hedges annually. In 2009/10 the equivalent figure for English farms had fallen to 34% (Fig. 53). For Wales the percentage trimming most (>50%) of their hedges annually in 2009/10 was much higher than in England (76%). For England and Wales combined the figure was 45% (Fig. 53).

Figure 53. Percentages of farmers trimming hedges annually in 1999 (England only) and 2009/10 (E – England, W – Wales, All – England & Wales).

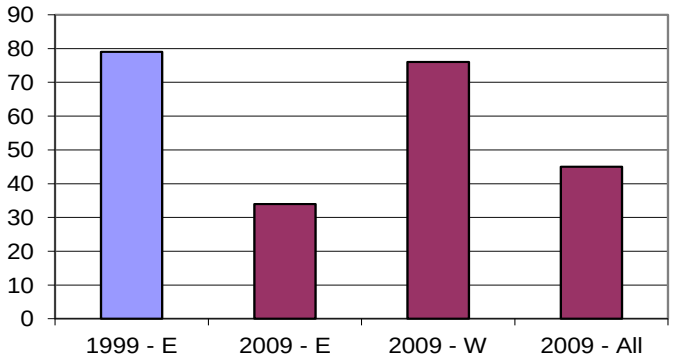
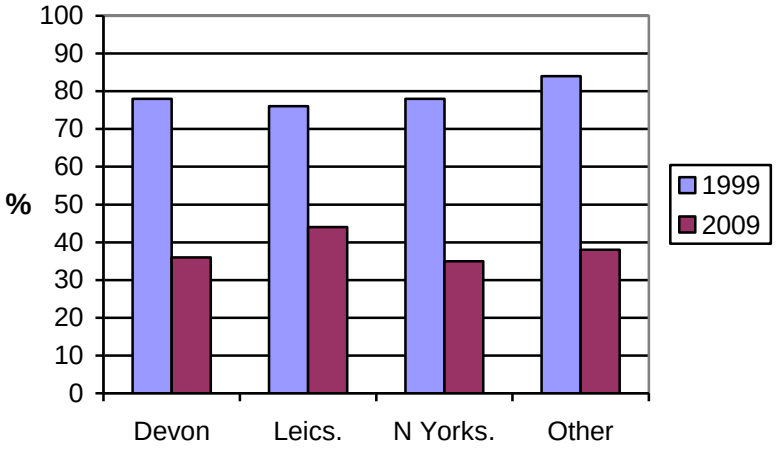


Figure 54 shows how the percentage of farmers in Devon, Leicestershire, North Yorkshire and other counties in England trimming annually fell by between 42% and 55% in this 10 year period. The reduction was greater than 50% for all groups except Leicestershire.

Figure 54. Frequency of hedge trimming. Comparison of 1999/2000 and 2009/10 results. England only. Percentages trimming most hedges annually.



Figures 55 and 56 showed how there was a corresponding increase in numbers of farms trimming their hedges every two or three years.

Figure 55. Frequency of hedge trimming. Comparison of 1999/2000 and 2009/10 results. England only. Percentages trimming most hedges every two years.

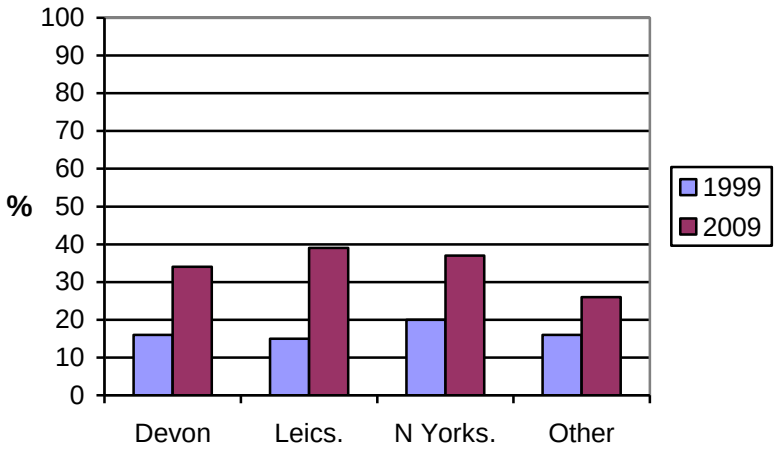
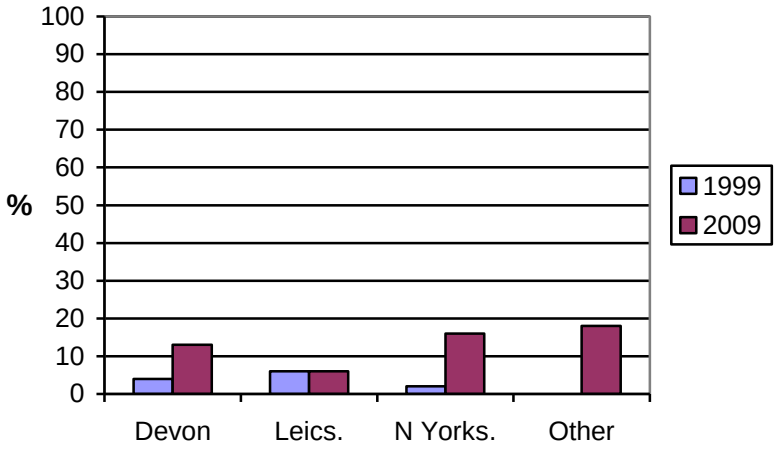


Figure 56. Frequency of hedge trimming. Comparison of 1999/2000 and 2009/10 results. England only. Percentages trimming most hedges every three years.



Only relatively small percentages of farmers cut hedges on rotations of 4-6 years (data not shown). In Devon the percentage remained at 2%, the same as in 1999. In Leicestershire, the percentage fell from 3% to 2%. In North Yorkshire and other counties there was an apparent increase from 0% in 1999 to 4% (North Yorks.) or 5% (others) in 2009/10.

Statistical analysis indicates that farmers in agri-environment schemes are more likely to trim less frequently than annually.

Despite this reduction in annual trimming, it seems that more farmers in 2009/10 believed that annual trimming was best for wildlife. The percentage that thought that annual trimming was best increased from 21% in 1999 to 28%, but the percentage that believed two-yearly trimming to be best for wildlife fell from 49% to 34%. However, the proportion that thought three-yearly trimming was best for wildlife increased slightly from 18% to 22%.

Time of trimming

The time of trimming hedges had also changed since 1999, most strikingly for hedges around arable fields (Figures 57 and 58). In 1999, approximately one third of all farms were trimming their arable hedges in July/August, probably mostly in late August, immediately after harvest. In 2009/10 this figure had fallen sharply to around 12%. Although September/October remained the main period for trimming arable hedges, there was an apparent increase in January/February trimming from around 8% in 1999 (Figure 57) to approximately 19% in 2009/10 (Figure 58).

Around grass fields, where there had already been a fairly even distribution of trimming times across the September/October and November/December periods in 1999 (Figure 59), there was also a reduction in July/August trimming and an increase in January/February trimming by 2009/10 (Figure 60). Hedges around grass fields are now trimmed in September/October, November/December or January/February in almost equal proportions – although there are differences between counties (Figure 60). For example, Devon farmers still favour September/October trimming, whereas Leicestershire farmers are more likely to trim their hedges in November/December.

Although it appears that farmers have taken on board advice to trim hedges later, statistical analysis does not, however, provide evidence of any clear difference in trimming time for groups of farmers with or without agri-environment scheme agreements.

In Wales, although not included in the previous survey, it was clear that the introduction of new Single Farm Payment Scheme cross-compliance rules, prohibiting hedge trimming before 1st September, had virtually stopped all hedge trimming before this date – except along some roadsides.

Farmers' views on the ideal time to trim hedges to benefit wildlife remained almost unchanged over the 10 year period between the two surveys, with approximately 30% suggesting that the ideal time was September/October and just over 60% suggesting late autumn or winter (November to February).

The main objection to late winter hedge trimming in 2009/10 was the same as that given by farmers in 1999, namely access limited by soil conditions – although the percentage giving this reason fell slightly from 68% to 62%. Only 27%, however, gave growing crops as a reason for not trimming in winter, half as many as in the previous survey (54%).

In the previous survey, soil type had a significant effect on time of trimming hedges adjacent to arable fields, with farms on light soils being more likely to trim in late autumn or winter. No significant differences were found in the new survey.

Figure 57. Time of trimming hedges around arable fields. 1999.

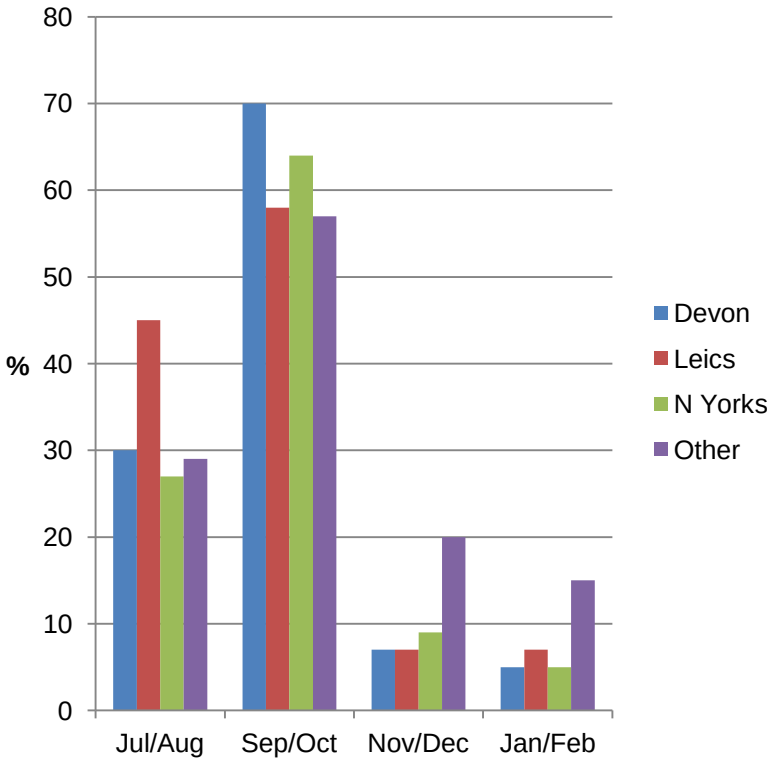


Figure 58. Time of trimming hedges around arable fields. 2009.

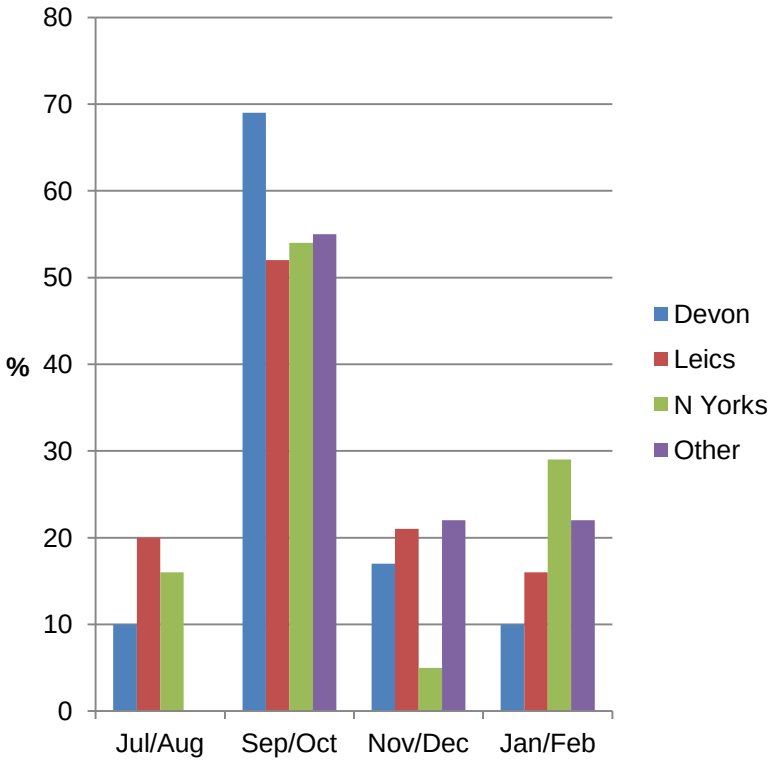


Figure 59. Time of trimming hedges around grass fields. 1999.

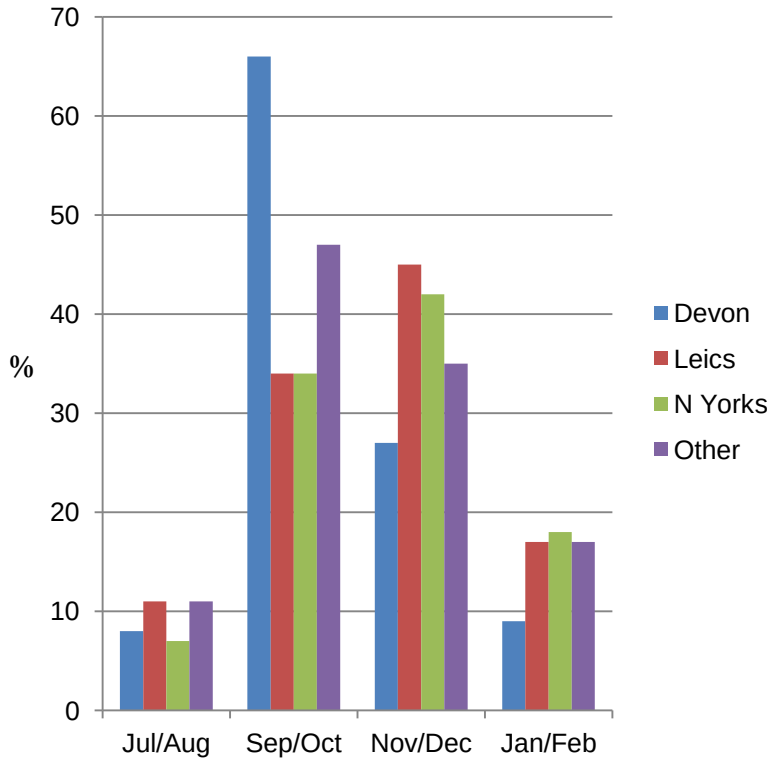
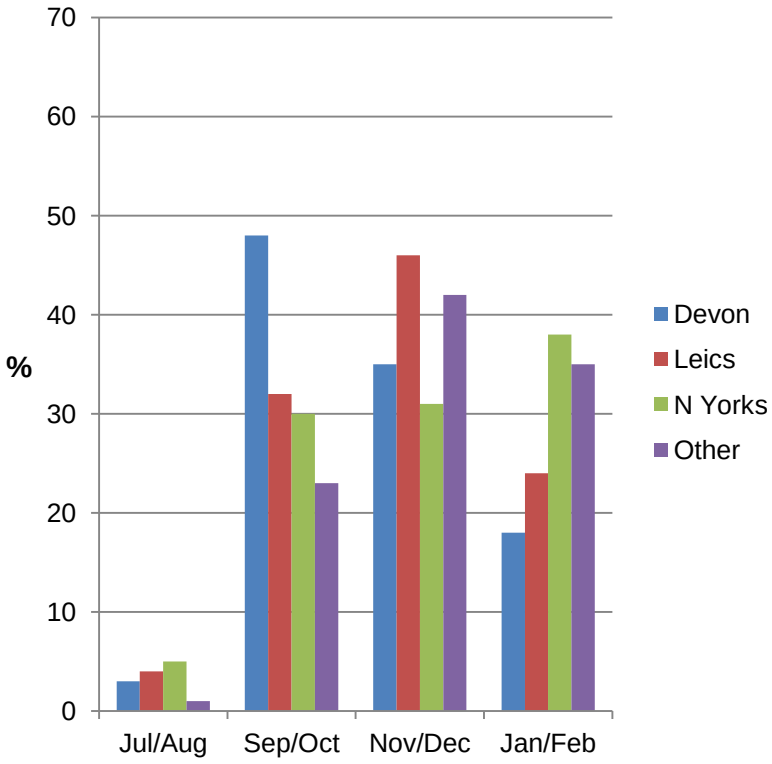


Figure 60. Time of trimming hedges around grass fields. 2009.



Use of contractors

There was a slight increase in the use of contractors, from 63% of farms in 1999 to 69% of farms in 2009/10.

Hedge trimming equipment

Flails were used by a large majority of farms, in both surveys – 97% in 1999 and 92% in 2009/10.

Decisions on hedge trimming

A large majority of farmers in both surveys said that they made the important hedge management decisions, although the percentage fell slightly from 83% to 78%.

Hedge bottom management

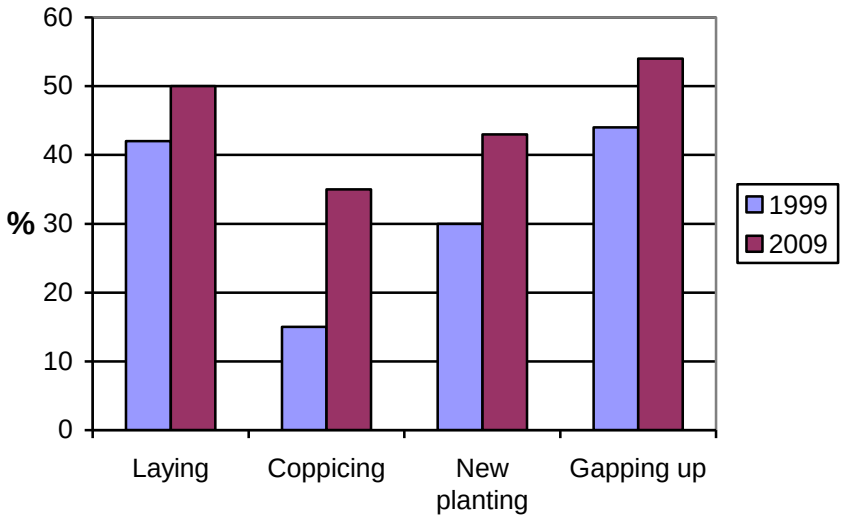
The average field margin width beside hedgerows in arable fields in 2009/10, as estimated by farmers in the postal survey, was 2.4 m. In 1999, 51% estimated that their typical field margins were only 0.5 to 1.0 m wide and a further 27% estimated them to be in the range 1.0 to 1.5 m.

In 1999, just over half of all farmers said that they always prevented sprays and fertilisers from drifting into hedgerows. In 2009/10, this figure had increased to 82%. The proportion that sometimes or always sprayed weeds in hedge bottoms fell from 40% to 27%.

Hedgerow conservation work in past five years

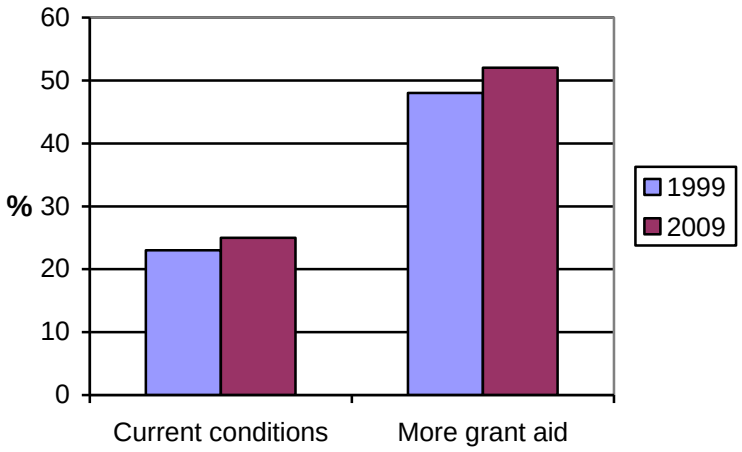
Comparing both surveys, more farmers in the 2009/10 survey reported that they had undertaken specified hedgerow conservation operations in the previous five years (Figure 61). As in the earlier survey, more of this hedgerow management work (or other conservation work) had been completed without grant-aid than with.

Figure 61. Percentages of farmers in the 1999 and 2009/10 surveys that had undertaken hedge laying, hedge coppicing, new hedge planting or gapping up in the previous five years.



The likelihood of farmers repeating this sort of work within the next five years was similar in both surveys (Figure 62). In both surveys the percentage that indicated that this would be *"very likely"* doubled if more grant aid was to be made available.

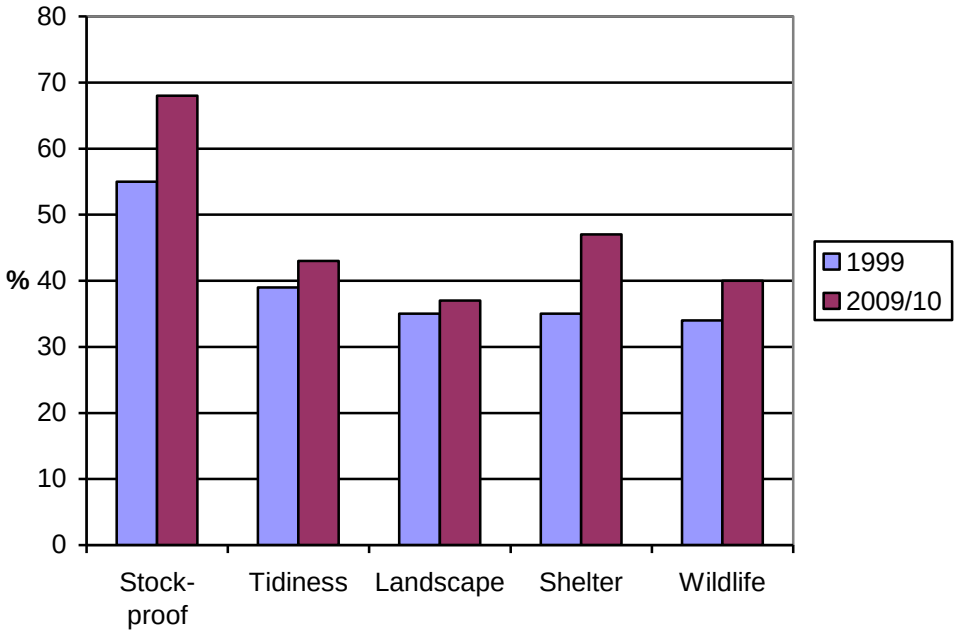
Figure 62. Percentages of farmers 'very likely' to repeat the sort of hedgerow conservation operations that they had undertaken in the past five years a) under current conditions or b) if more grant aid was available. Results for 1999 and 2009/10 surveys.



Influences on hedgerow management

The strongest influences on hedgerow management were the same in both surveys, with 'providing stock-proof boundaries' remaining the most important factor (Figure 63). With 12-13% increases in the proportion rating stock-proof boundaries and providing shelter for livestock as very important, this suggests that agricultural reasons for maintaining hedgerows remain important – although results for 2009/10 include Powys, where livestock farming is dominant; so this has probably resulted in much of the recorded increase.

Figure 63. Main influences on hedgerow management. Percentages of farmers in 1999 and 2009/10 surveys rating '*providing stock-proof boundaries*', '*keeping the farm tidy*', '*maintaining/ improving the local landscape*', '*providing shelter for livestock*', and '*maintaining/ improving habitats for wildlife*' as "*very important*".



3.4.2 Postal survey of contractors

Some caution is required when comparing contractor survey data from the two studies, because of relatively small sample sizes (66 in 1999 and 84 in 2009/10) and the fact that the original survey did not include any farms in Wales.

Hedgerow management work

Hedgerow management operations accounted for an estimated 27% of total contract work for the 84 contractors who were doing some hedgerow work. This was very similar to the figure in 1999 (29%).

In 1999, almost all contractors (98%) charged by the hour for hedge trimming. In 2009/10 they all charged by the hour. The average price had increased from £14.10/hour to £22.53/hour.

Hedge trimming

In 1999, most of their clients' 'arable' hedges were trimmed in July/August or September/ October. In 2009/10, 76% "usually" trimmed hedges for their farmer clients in September/October, 30% in July/August, 28% in November/December and 19% in January/February (totals >100% because of numerous multiple responses).

In the earlier survey, 94% of contractors were trimming most hedges annually. In 2009/10, contractors estimated that they were trimming 53% of their clients' hedges annually and 47% less frequently.

All contractors were using a flail in 1999, but in 2009/10 94% used a flail, 16% a rotary saw and 4% a finger-bar trimmer.

The shape to which hedges were being cut seems to have changed little. In 1999, around 60% were cut to a rectangular or 'box' shape and 40% trimmed to an 'A-shape'. In 2009/10 the corresponding figures were 56% and 44%.

Management of hedges for wildlife

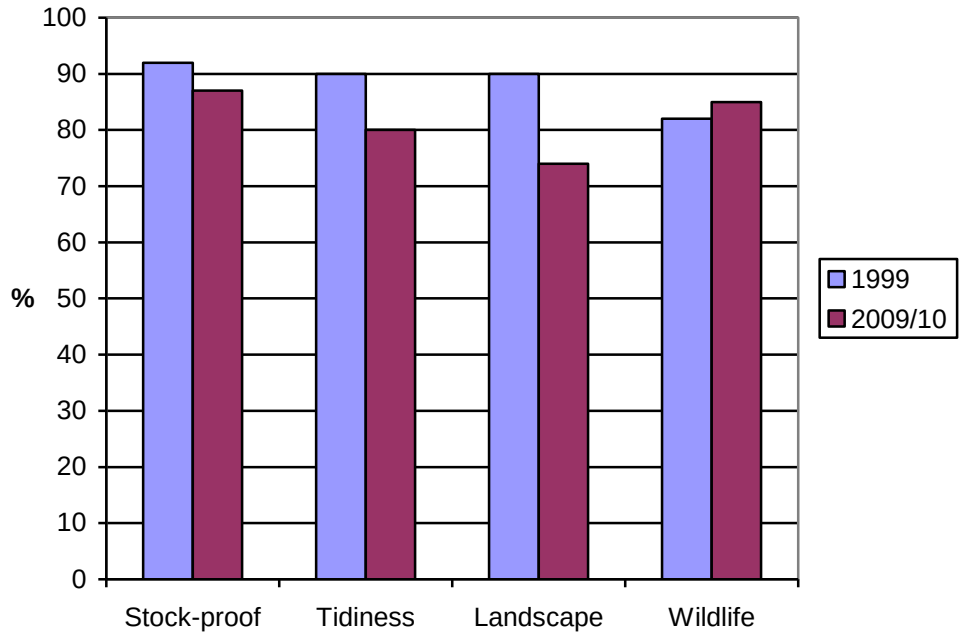
The proportion of contractors that regarded annual trimming as best for wildlife fell from 53% in 1999 to 33% in 2009/10.

January/February was thought to be the best time to trim hedges, to maximize their value to wildlife, by 39% of contractors in 2009/10 – lower than the corresponding figure from the 1999 report (53%).

Factors determining hedgerow management

Figure 64 below shows that the main factors determining the way that they manage their clients' hedges remained much the same as those reported in the 1999 contractors' survey, but perhaps with slightly less importance now assigned to farm tidiness and maintaining/ improving the local landscape.

Figure 64. Main influences on hedgerow management. Percentages of contractors in 1999 and 2009/10 surveys rating '*providing stock-proof boundaries*', '*keeping the farm tidy*', '*maintaining/ improving the local landscape*' and '*maintaining/ improving habitats for wildlife*' as *"important"* or "*very important*".



3.4.3 Follow-up visits and field surveys

Farmer interviews

Only tentative conclusions can be drawn from comparisons of data from the farm visits and field surveys in 1999 and 2010, because of the inclusion of an additional county (Powys) in the later survey and because of an important difference in the sampling strategy. In 1999, the farms selected for the follow-up visits were split into two equal groups, based on prior knowledge of their hedgerow management. Details can be found in Britt *et al.* (2000), but generally the 'good' management group had taller and less frequently trimmed hedges than the 'poor' group and they were more likely to trim hedges in winter. In 2010, is was not possible to equally divide the 32 farms for each county into 'good' and 'poor' management groups, using the same or other suitable criteria, due to insufficient farms having volunteered to take part in this stage of the research. Nonetheless, the following points are worthy of note.

As in 1999, most farmers in the 2010 survey had made changes to hedgerow management in the previous 10 years. In 1999 this applied to 57% of farmers, and in 2010 to 64%. Again most changes had been positive i.e. they had brought more hedgerow management closer to (or in line with) 'good practice guidelines. The main changes in the period 2000-2009 were a reduction in trimming frequency, allowing hedges to grow taller and planting more hedges or hedgerow trees. There was also a trend away from late summer trimming, with ELS stated as the main reason for this.

The most important factor influencing hedgerow management in Devon remained the need for stock-proof boundaries. Landscape benefits was still the most important factor for Leicestershire farmers. In 1999, no single factor was of particular importance for farmers in North Yorkshire, but in 2010 landscape benefits was the main consideration. Landscape benefits were also important to Leicestershire farmers. In Powys, stock-proof barriers were clearly most important.

Despite the reduction in numbers of farmers trimming hedges annually, there appears to have been an increase in the proportions of farmers who considered that annual trimming was good for hedges – from 46% to 63% – and a corresponding reduction in the numbers that regarded annual trimming as bad for wildlife (from 68% to 44%).

The average cost of hedge trimming increased from £706 to £772 per farm and from £12.40 to £20.43 per hour.

Field surveys

As in 1999, the most species-rich hedgerows were in Devon (5.8 species per 30 m, compared with 6.5 species per 30 m in the previous survey). For unknown reasons, there was a big increase in the average species richness of hedges in Leicestershire (from 3.3 to 4.1 spp/30 m) and North Yorkshire (from 3.4 to 5.3 spp/30 m).

Hedges in the 2010 survey were bigger than in the previous survey, with the mean height increasing from 1.9 to 2.5 m and the mean width from 2.1 to 3.0 m.

The average percentage gaps in hedgerows reduced from 7.0% in 1999 to 3.3% in 2010.

In 1999, the mean width of field margins around arable fields was just 0.8 m. In 2010, the mean width of undisturbed ground adjacent to hedgerows (measured from the centre line of the hedge) was 4.7 m, and the mean width of perennial herbaceous vegetation 3.9 m.

The most frequently recorded woody species in hedges varied by county in both surveys, with very similar results in 1999 and 2010. The most frequently recorded species in Leicestershire and North Yorkshire, in both surveys, was hawthorn. In Devon, again in both surveys, hawthorn, blackthorn and hazel were each recorded very frequently. Powys hedges, only surveyed in 2010, were dominated by the same three species found most frequently in Devon hedges.

Hedge management score assessments were only undertaken in the 2009/10 survey.

4. DISCUSSION

The results of this research provide some encouragement for those in government and environmental organisations that actively encourage farmers to follow 'good practice guidelines' for hedgerow management.

There is clear evidence that agri-environment schemes have directly resulted in an increase in the proportion of hedgerows that are left untrimmed for two or more years. There has also been a move away from trimming hedges in July/August, with a corresponding increase in winter trimming – in line with current advice on 'good practice' as promoted through agri-environment schemes and by various environmental bodies. However, large numbers of farmers remain unconvinced that these guidelines are practical in their situation and many argue strongly that annual trimming and late summer or early autumn cuts are better for the hedge and/or for wildlife i.e. that the 'good practice guidelines' constitute bad advice. It is also a concern that a number of farmers that have changed their hedgerow management practices as a result of an agri-environment scheme appear to be unhappy with what they are now being required to do. This would suggest that without continued government funding these farmers might be likely to revert to annual trimming in late summer or early autumn.

Hedges were cut more frequently by farmers in Powys than in the three English counties, and farmers in Powys and Devon tended to trim their hedges earlier. The wetter and frequently steeper land on farms in these two counties makes winter trimming very difficult and sometimes dangerous. A few farmers who trim in winter commented that they would sometimes fail to find a suitable opportunity to cut their hedges, resulting in an additional year without trimming. This could cause difficulties, particularly where fast-growing species such as ash are present, since trimming is then more difficult and might damage machinery.

Another frequent reason for objections to winter trimming, and less frequent cuts, was the risk of thorns in the feet of sheep or cattle. Several farmers commented that later trimming left harder thorns on the ground, which presented more of a threat to livestock. Similar comments (about harder thorns from later hedge cuts) were also mentioned in connection with increased puncture risks for farm vehicles, cars and bicycles.

Differences in cross-compliance rules, which must be followed by all farmers claiming the Single Farm Payment, are responsible for some of the differences between farms in England

and Wales. In England, hedge trimming (except along some roadsides, where safety is a priority) is not permitted before 1st August, but on Welsh farms the earliest date for trimming is now 1st September. Many farmers in Powys had been required to delay the start of trimming by two or three weeks to comply with this requirement. Some resentment of this change was noted, but the majority of Powys farmers interviewed in this research appeared to have accepted this change (although reluctantly in some cases).

Although 45% of farmers trimmed most of their hedges annually and the favoured months for hedge cutting were September and October, this survey has also shown that significant proportions of farm hedges were now trimmed every two or three years, or left uncut, and that November-December or January-February trimming was also widespread. Data from Britt *et al.* (2000) showed that almost 80% were trimming most of their hedges annually and that few hedges were being cut in January or February, so the mix of hedgerow management appears to have improved.

As in 1999, contractors had some influence on hedgerow management decisions, but the main decisions were taken by farmers. It is clear, however, that contractor availability is important and several farmers were concerned that certain aspects of 'good practice' (e.g. winter trimming or cutting less frequently than annually) might be impractical due to their contractor's unavailability or even a refusal to adopt new practices.

The small proportion of contractors who have received any sort of training in hedgerow management is a concern.

The field survey has highlighted the main causes of hedgerows being in 'unfavourable' condition i.e. hedgerows that fail to meet all of the Hedgerow BAP favourable condition criteria. These were…

- hedge-bottom with too high a percentage cover of nutrient enrichment indicators (at least 20% total cover of nettles, docks and cleavers in a 2 m wide band alongside the hedge);
- hedge with insufficient cross-sectional area (<3.0 m^2);
- hedgerow with too high a percentage of gaps (>10% of total hedgerow length);
- hedge with little or no foliage in its lower parts (average height of the base of the canopy at least 50 cm).

5. CONCLUSIONS AND RECOMMENDATIONS

Evidence that diversity of management, probably at the farm scale, is desirable for biodiversity objectives (e.g. Marshall *et al.,* 2001; Barr *et al.*, 2005) would suggest that a mix of management practices could be preferable to all farmers following a single 'good practice' prescription. The results of this research suggest that this aim is already being achieved in some areas, for example in Leicestershire and North Yorkshire; at least at the county-scale.

It probably needs to be accepted that many farmers in wetter counties (in Wales, Northern Ireland, and western parts of England and Scotland), and those on hill farms, will probably not be able to implement some of the 'good practice' guidelines that are being promoted, for perfectly valid practical reasons.

Some caution is needed to ensure that the advances made in hedgerow management in the last 10 years are not lost as a result of changing priorities for agri-environment schemes. At present there would appear to be some risk of this, as government and farmer organisations are actively promoting 'in-field' options for arable fields under ELS (e.g. wild bird seed and pollen and nectar mixtures), possibly at the expense of hedgerow and other field margin options, through initiatives such as the Campaign for the Farmed Environment. Government cuts may also restrict spending through HLS. Survey results also give some indications that many farmers in Powys are unhappy with proposals for new agri-environment scheme options in Wales. Continued financial support for hedge trimming on longer rotations (preferably three or more years) is important, particularly in view of the findings that many farmers remain unconvinced that cutting less frequently than annually is best for the hedge or for wildlife.

This is also an indication that the rationale for some key aspects of current good practice guidelines has not been effectively explained to farmers. More effective dissemination of key research messages to farmers, landowners and contractors is urgently required. This should include:

- Better information on the impacts of annual trimming on fruit/berry yields, and the species affected e.g. impacts on farmland birds in the winter's "hungry gap".
- Good, up-to date data on the relative costs of annual, two-, three- and four-yearly trimming.
- Simple management strategies for arable margins, that are easy to manage and have clear and demonstrable benefits for both the hedgerow and arable crop.
- Research data on breeding success rates for songbirds in hedges managed under different trimming rotations, directly addressing the widespread perception among farmers that only annually trimmed hedges are dense enough to provide adequate protection from predatory birds e.g. corvids and sparrowhawks.

Where there are research gaps, covering any of these key issues, they need to be addressed as a priority.

The issue of training for contractors also needs to be addressed, and it is suggested that the Habitat Action Plan Steering Group should consider the main training needs, and initiates discussions with agricultural colleges and other potential training providers.

Having achieved a good deal of success in improving hedgerow management, and particularly increasing the proportions of hedges trimmed on longer rotations, the aim must now be to explore how management diversity can be further improved. As has been highlighted previously in this report, there are good practical reasons for the refusal of many farmers to implement some aspects of 'good practice' – particularly winter trimming on hill farms in high rainfall areas such as Powys. Ideally, much wider introduction (or re-introduction) of rotational laying or coppicing should be promoted and financially supported. At present, the high cost of

laying limits the extent of this traditional hedge management practice. Lower cost methods of laying should be further researched, but coppicing could also provide a more economically feasible alternative.

The field survey has also identified what are likely to be the main causes of hedgerows failing to meet the Hedgerow BAP favourable condition criteria. Emphasis should be given to measures that address these causes of unfavourable condition. For example, through agri-environment schemes or other initiatives, farmers should be encouraged to…

- increase the height and width of their hedges (so that most achieve the desired minimum 3.0 m^2 cross-sectional area);
- buffer hedgerows against fertiliser drift, to gradually reduce nutrient levels in hedge-bottoms;
- plant up any gaps in hedgerows; and
- double-fence hedgerows to protect them from grazing livestock, particularly sheep, allowing re-growth of foliage from the lower parts of hedgerow shrubs. This would also encourage the growth of tree and shrub seedlings and suckers in hedgerow gaps.

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APPENDICES